GENERAL CATALOGUE 2020

REV. 02

VORTICE GROUP

VORTICE INDUSTRIAL

VORTICE INDUSTRIAL

Air is life

More than twenty years of experience at the service of the air

LORAN becomes **VORTICE INDUSTRIAL**.
The change of company name to underline the commitment of the VORTICE Group in the industrial air treatment sector. The company, based in Isola della Scala, will present itself with the VORTICE INDUSTRIAL brand on the export markets and progressively also in Italy. The company was born in 1994 from an entrepreneurial idea of people with thirty years of experience in the field of air handling units. In 2011 it became part of Vortice Group, a historic Italian brand synonymous with excellence in the design and industrialization of products that move the air.

Today VORTICE INDUSTRIAL represents the beating heart of the Group in the development of machines for industrial air conditioning, with a strong technical and technological expertise able to solve with specific solutions the most demanding application needs.

Our head office is located in the industrial area of Isola della Scala, in the province of Verona.
Surface area 12.000 m^2 with a production unit of 6.000 m^2.

"In respect of the environment and people, we work to contribute to well-being and social progress through the development of highly specialized industrial air conditioning solutions, able to anticipate and meet the needs of our customers"

CUSTOMIZED CONFIGURATION PROJECT ASSISTANCE

VORTICE Industrial designs and manufactures customized products

Advanced tools of assisted configuration, modularity in the product concept, integrated production process: these are the key elements to give flexible and punctual answers to our customers.

Application professionals

The quality of the solutions proposed by VORTICE Industrial comes, first of all, from the assistance to the designer in the initial phase of the project, with a strong application know-how built over time and verified in the health and medical, food and chemical process sectors.

CUSTOMIZED PRODUCTS

Maximum level of customization also in stainless steel monobloc applications for the food and pharmaceutical sectors.

RESEARCH FOR SUSTAINABILITY

High efficiency

The applications are developed with a strong focus on reducing energy and water consumption and optimizing thermodynamic parameters.

Hygiene

Solutions and technologies that guarantee the maximum hygienic requirements, even for the most critical market segments such as hospital, chemical, pharmaceutical and food.

SOLUTIONS FOR SPECIALIST SEGMENTS

Customer focus

Application development tools that are easy to use, flexible and able to develop solutions to specific customer needs in terms of modularity, performance and sizing.

FLEXIBILITY OF THE PRODUCTION PROCESS

Responsiveness

High internal vertical integration (laser cutting, panel bender, aluminium cutting and drilling centres, panel forming plants with polyurethane insulation), competence and efficiency of the assembly staff. The tools to be a partner that meets the needs of the most demanding customers.

Reliability

Efficient internal supply chain processes, combined with IT tools that integrate application development with the factory, ensure rapid customer response and product delivery with a high level of reliability.

CERTIFICATES OF QUALITY

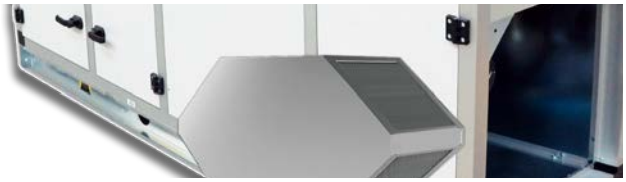
The quality of our products is documented by means of certificates that guarantee every stage of the company production process, from production to material management, from production control to document management. By operating in this way, the process can be managed in an organic manner, as well as having the guarantee that all production activities are certainly carried out in the manner provided in the project, or in the technical documents. The documentation process serves precisely to demonstrate that the activities are managed in a uniform manner and in accordance with quality standards.

LEGEND OF THE SYMBOLS

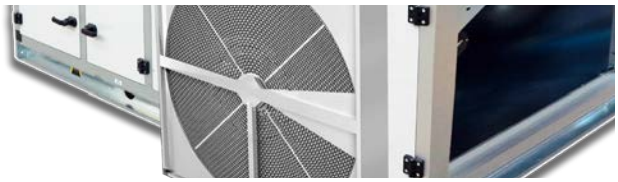
- Units comply with EcoDesign directives
- Units with EC Brushless fans
- Units with centrifugal EC Brushless fans
- Units with rotary heat wheel recovery
- Units with plate heat recovery
- Refrigerant circuit with R410A gas
- Refrigerant circuit with R32 gas
- Units equipped with ON/OFF Scroll compressor
- Units equipped with DC Inverter type compressor
- Units built with materials suitable for the food industry
- Units built with materials suitable for hospital and pharmaceutical sectors
- Units built to be easily washable internally
- Unit suitable for swimming pool dehumidification
- Units built with materials suitable for swimming pool sector
- Ceiling configuration
- Horizontal configuration
- Vertical configuration
- Ceiling or horizontal configuration

INDEX

Heat recovery units with plate heat exchanger



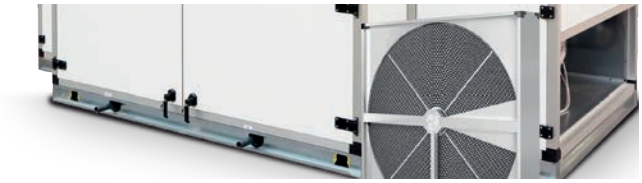
Heat recovery units with plate heat exchanger



Heat recovery units with rotary wheel

Integrated refrigerant circuit heat recovery units

Integrated refrigerant circuit heat recovery units



Integrated refrigerant circuit heat recovery units

Swimming pool dehumidifiers

Swimming pool heat pump air handling units

CTAE

AIR HANDLING UNITS

INTRODUCTION

Maximum configuration flexibility, high energy efficiency, easy and quick handling during transport and installation: these are the main characteristics required of a modern air handling unit.
The CTAE series offers all of this, accompanied by an efficient and innovative construction technology that allows it to be included in any building project or production process. The advanced design ensures maximum energy efficiency and reduced operating costs, the available sizes are virtually unlimited as well as the possibilities to combine different internal components. The flexible design of the CTAE air handling units allows all requirements to be met with a range of airflow rates from 500 m^3/h up to 190.000 m^3/h.

The CTAE series air handling units represent the tailor-made solution for every commercial and industrial application: meeting rooms, cinemas, hotels, restaurants, offices, pharmaceutical industry, chemical and mechanical industry, the quality of construction and components used are a guarantee of reliability and functionality.

EUROVENT CERTIFICATION

Our company participates in the *Eurovent Certified Performance* programme for Air Handling Units.

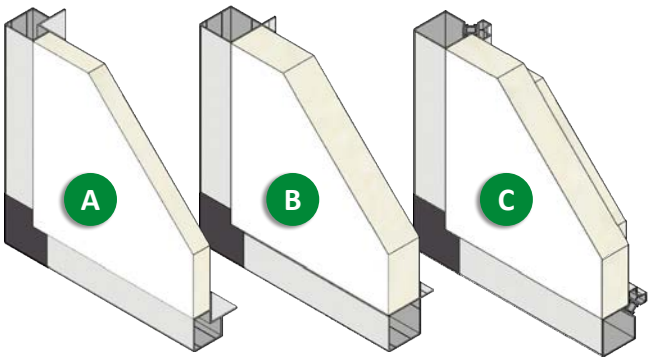
To verify the validity of the current certificate:
www.eurovent-certification.com

Result sp63	Eurovent Classification according to EN1886					
D1	Casing strength class	D1	D2	D3		
	Max. relative deflection mm x m-1	4.00	10.00	EXCEEDING10		
L1	Casing air leakage class at-400 Pa	L1	L2	L3		
	Max. leakage rate (f400) l x s-1 x m-2	0.15	0.44	1.32		
L1	Casing air leakage class	L1	L2	L3		
	Max. leakage rate (f700) l x s-1 x m-2	0.22	0.63	1.90		
ePM1 80% (F9)	Filter bypass leakage class	ePM1 80% (F9)	EPM1 70% (F8)	ePM1 55% (F7)	ePM10 70% (F6)	ISO Coarse
	Max. filter bypass leakage rate k in % of the volume flow rate	0.50	1	2	4	6
T2	Thermal transmittance	T1	T2	T3	T4	T5
	(U) W/m2 x K	U <= 0.5	0.5 < U <= 1	1 < U <= 1.4	1.4 < U <= 2	No requirements
TB2	Thermal bridging factor	TB1	TB2	TB3	TB4	TB5
	(kb) W x m-2 x K-1	0.75 < Kb <= 1	0.6 < Kb <= 0.75	0.45 < Kb <= 0.6	0.3 < Kb <= 0.45	No requirements

MAIN CHARACTERISTICS

STRUCTURE

The structure of our air handling units is made up of anodised aluminium profiles joined by means of aluminium corner joints and double-shell sheet metal panels with thermal-acoustic insulation in between.



FRAME

The frame is made up of a modular system with extruded profiles in UNI 9006/1 anodized aluminium alloy, coupled with angles in die-cast aluminium or, in the case of the thermal break profile, corners in nylon reinforced with fiberglass. There are 3 types of profiles available:

A: 40 mm aluminium profile, suitable for 23 mm thick panels;

B: 50 mm aluminium profile, suitable for 48 mm thick panels;

C: aluminium profile with 60 mm thermal break, suitable for 63 mm thick panels.

INTERNAL INSULATION

The applicable thermal and acoustic insulation is:

• Injected polyurethane, 40+/-5 kg/m^3 density, thermal conductivity 0.022 (W/mk). Fire reaction according to ISO 3582 DIN 4102:B3.

• Mineral wool, 90/100 kg/m^3 density, thermal conductivity 0,045 (W/mk). Fire reaction according to ISO 3582 and DIN 4102: B0.

PANELS

The sandwich panels can be made in different types with thicknesses of 23/48/63 mm. The materials used for the realization of the panels are:

• Prepainted hot-dip galvanized steel sheet, UNI EN 10169, EN 10327, Z100 coating. The protective system is made according to standard 13523.
Available thicknesses: mm 6-8-10-15/10.

• Galvanized steel sheet, type DXD51-Z200 (EN 10142).
Available thicknesses: mm 6-8-10-15/10.

• Aluminium sheet 5754 H 111 with magnesium
Available thicknesses: mm 8-12/10.

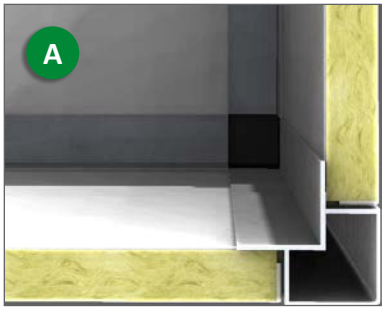
• Austenitic stainless steel sheet AISI 304 (EN10088/97), cold rolled, with 2B brilliant surface finish.
Available thicknesses: mm 6-8-10/10.

• Austenitic stainless steel sheet AISI 316 (EN10088/97), cold rolled, with 2B brilliant surface finish.
Available thicknesses: mm 6-8-10/10.

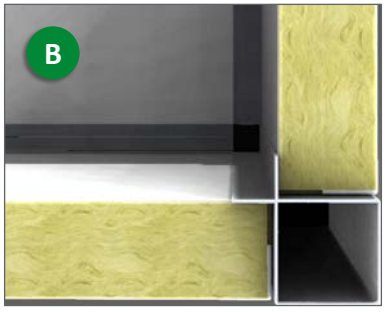
BASE FRAME

The base frame is made with high thickness bended beams in galvanised sheet metal or AISI 304 stainless steel. The base frames are fixed on the 4 sides of each section and the support to the ground is guaranteed in the transversal direction of the unit.

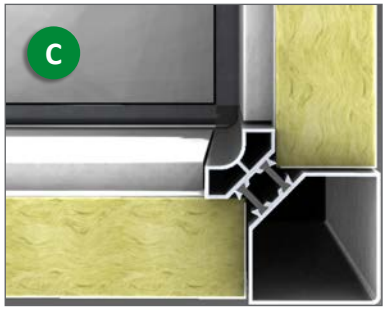
For small/medium-sized sections, if required, additional base beams are supplied, or threaded adjustable feet, suitable to level the unit in case of uneven support base.



40 mm profile
23 mm thickness profile



50 mm profile
48 mm thickness profile



60 mm thermal break profile
63 mm thickness profile

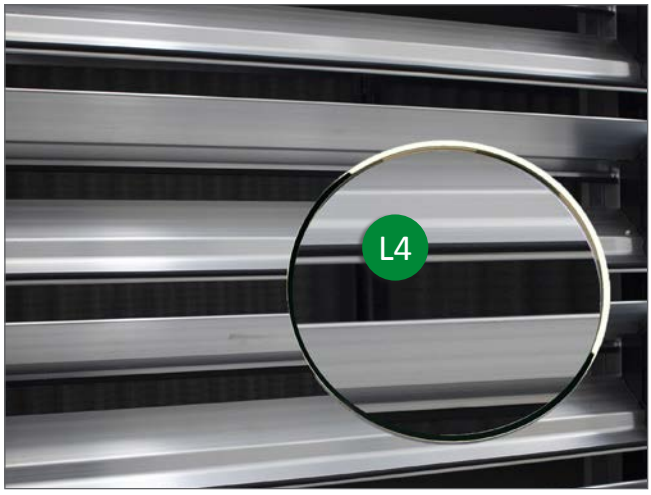
AIR DAMPERS

In the standard version they are made with frame and aerofoil fins in aluminium, spacing 100 mm.

On request, they can be made of AISI 304 stainless steel for hygienic applications according to VDI6022.

The special shape of the fin allows the seal according to DIN1946-EN1751. The dampers can also be equipped with specific gaskets that allow sealing classes **L2** and **L4**.

All dampers are equipped with a motorised pin for the application of manual or electric actuator. They can be installed both inside and outside the unit.



SEALING GASKET

ALUMINIUM DAMPERS

ELECTRIC ACTUATOR

FILTERS

Air filtration is to be considered a fundamental part of the composition of the air handling unit, as it performs an action of removal of contaminants present in the aeraulic flow.

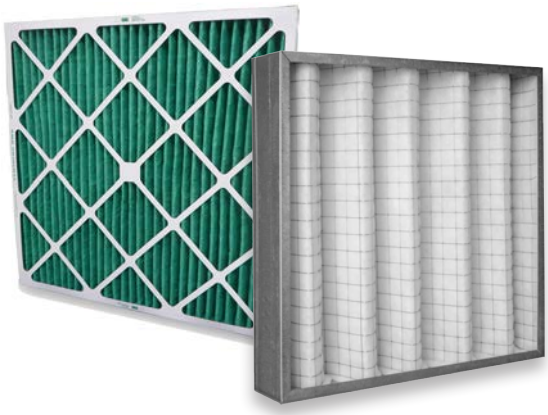
MEDIUM EFFICIENCY FILTERS

Medium efficiency or coarse filters are used as first or second stage filters.
Filtration class according to EN 779-2002:

ISO Coarse 40% (G2): Average weight efficiency ≥ 65%, filter cells with corrugated metal mesh (stainless steel galvanized).

ISO Coarse 45% (G3): Average weight efficiency ≥80%, roller mattress filter synthetic septum with progressive density.

ISO Coarse 45% (G4): Average weight efficiency ≥ 90%, corrugated filter cells with synthetic mat, galvanised steel frame, electrowelded galvanised steel wire protection mesh.



FILTERS

HIGH EFFICIENCY FILTERS

High efficiency filters or fine filters are used as a second stage or as a pre-filtration stage for HEPA /ULPA. Filtration class according to EN 779-2002:

F5

Average colorimetric efficiency ≥40%, corrugated filter cells with synthetic mat, galvanized steel frame, electrowelded galvanized steel wire protection mesh. Soft bag filters with large filtering surface in fibreglass. Galvanized steel frame.

F6 / ePM1 55% (F7) / ePM1 80% (F9)

Average colorimetric efficiency ≥ 60%/80%/90%, soft bag filters with large filtering surface in fibreglass.
Galvanized steel frame Length mm 380. On request, the filtering surface can be increased by increasing the length of the filter to 535 or 635 mm.
Filter with rigid bags in fibreglass, frame in ABS polypropylene.

VERY HIGH EFFICIENCY FILTERS

Very high efficiency filters are used as final stages to ensure high air purity. They are mainly installed in those environments where maximum asepticity is required, such as clean rooms, hospitals, pharmaceutical or electronic sectors. The type of installation of these filters is basic and they are housed in special galvanised or stainless steel counterframes, fitted with suitable gaskets that make the assembly free of by-passes.

Filtration class according to EN 1822:
H11 Efficiency ≥ 95%

H13 Efficiency ≥ 99.95%

H14 Efficiency ≥ 99.995%

Absolute filtration of polyhedron HEPA, frame made of galvanised steel, filter medium made of glass microfiber paper.

MOLECULAR FILTRATION

These filters are designed to eliminate pollution caused by gases (molecules) such as exhaust gases from cars, industrial emissions released by combustion processes or simply cigarette smoke.
They have variable retention capacity depending on the type of molecule treated. They can be combined with dust filtration. Types:

• Soft bag filter with coal performs a double action: filtration of dust with filtration efficiency ePM1 55% (F7) and gaseous contaminants.
It is installed in place of the existing bag filter and no additional filtration is required. It consists of fibreglass media + active carbon.

• Rigid bag filter with charcoal performs a double action: filtration of dust with filtration efficiency ePM1 55% (F7) and gaseous contaminants.
It is installed in place of the existing bag filter and no additional filtration is required.
It consists of fibreglass media + active carbon.

• Cartridge filters with active carbon, ideal for applications in the service and industrial sectors where deodorization is required. They are applied on galvanised sheet metal plates with bayonet interlocking device.

HEAT EXCHANGERS

The heat exchange coils are the main elements that guarantee the thermo-hygrometric transformations of the air. The heat exchange is indirect; there is a primary fluid such as hot or cold water, hot or cold gas which, when suitably conveyed into the coils, interacts with the secondary fluid, which in this case is the air. They are made up of a finned pack consisting of tubes made of different materials and continuous fins, equipped with a collar that increase the contact surface and makes the spacing of the same constant. The tubes are mechanically expanded, this operation allows the perfect contact between tube and fin and therefore a perfect heat exchange. The fins have a corrugated surface that makes it rigid and allows to create a turbulence of the air increasing the heat exchange coefficient. All the coils can be removed both on the connection side and the opposite side.

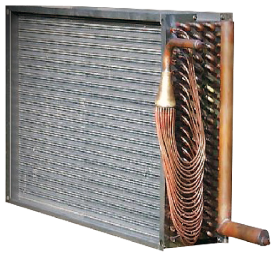
HEATING, COOLING, OVERHEATING WATER COILS

- Frame made of galvanised steel, stainless steel AISI 304 / 316, Aluminium
- Pipe made of copper, iron, stainless steel AISI 304 / 316
- Fins made of aluminium, prepainted aluminium, copper
- Fin spacing according to performance requirements (2.0 .... 10 mm)
- Headers and manifolds made of copper, galvanised iron, stainless steel AISI 304 / 316
- Special coating for greater corrosion protection
- SPECIAL VERSIONS AVAILABLE ON REQUEST

STEAM COILS

- Frame made of galvanised steel, stainless steel AISI 304 / 316, Aluminium
- Pipe made of copper, iron, stainless steel AISI 304 / 316
- Fins made of aluminium
- Fin spacing according to performance requirements (2.0 .... 10 mm)
- Coils complete with threaded or welded flanges
- Accessories such as flanges, gaskets, etc. available on request
- SPECIAL VERSIONS AVAILABLE ON REQUEST

DIRECT EXPANSION COILS



- Frame made of galvanised steel, stainless steel AISI 304 / 316, Aluminium
- Pipe made of copper, tinned copper
- Fins made of aluminium, prepainted aluminium, copper
- Fin spacing according to performance requirements (2.0 .... 6.0 mm)
- Cooling or heat pump operation
- Several types of refrigerant gases available
- SPECIAL VERSIONS AVAILABLE ON REQUEST

ELECTRIC COILS

- Frame made of galvanised steel or stainless steel AISI 304
- Pipe made of iron and finning made of galvanised iron
- Single or multistage armoured electric heaters
- Complete with mechanical thermoregulator
- Power supply 400V 3ph 50Hz
- Automatic reset thermostat
- Terminal block protection IP55

HUMIDIFICATION SECTIONS

Air humidification is crucial in normal air conditioning processes, as the hygrometric content of the air has often to be kept at a constant level to ensure the well-being of users and the management of production processes. The most used systems are:

HONEYCOMB HUMIDIFICATION

The adiabatic humidification consists of a suitably shaped honeycomb pack made of sheets of absorbent paper impregnated with resins that, in addition to giving the right consistency and self-support, protect it from decomposition processes and inhibit the formation of mold.

HONEYCOMB HUMIDIFICATION

HUMIDIFICATION WITH PRESSURIZED WATER

This type of humidification represents a new generation of humidifiers, with only 4 watts of electricity consumption per l/h of water.

It uses a special high pressure pump to pressurize the water which is then atomised through stainless steel nozzles producing a very fine and uniform mist.

In compliance with the main international guidelines and standards (ASHRAE 12-2000, VDI6022, VDI3803, L8).

HUMIDIFICATION WITH PRESSURIZED WATER

SPRAYED WATER HUMIDIFICATION WITH SINGLE OR DOUBLE NOZZLE RAMPS

Adiabatic humidification consisting of a series of low pressure spray nozzles fed by a header connected to the normal water supply or to various pumping systems.

This type of humidification can also be used as adiabatic cooling or as a washer.

NOZZLES HUMIDIFICATION

STEAM HUMIDIFICATION

Isothermal humidification consisting of one or more manifolds made of perforated stainless steel pipe, complete with additional concentric pipe for discharge of condensation.

STEAM HUMIDIFICATION

DROPLET ELIMINATORS

They are designed to ensure maximum retention of water drops that are created inside the unit, due to cooling treatments and humidification of the air.

The materials and types that can be selected are:
- extruded polypropylene;
- extruded aluminium;
- stainless steel press-formed sheet metal.

DROPLET ELIMINATOR

DRAIN PANS

The drain pans are made of press-formed and welded sheet metal with a high thickness of AISI 304/316 stainless steel or galvanized iron.

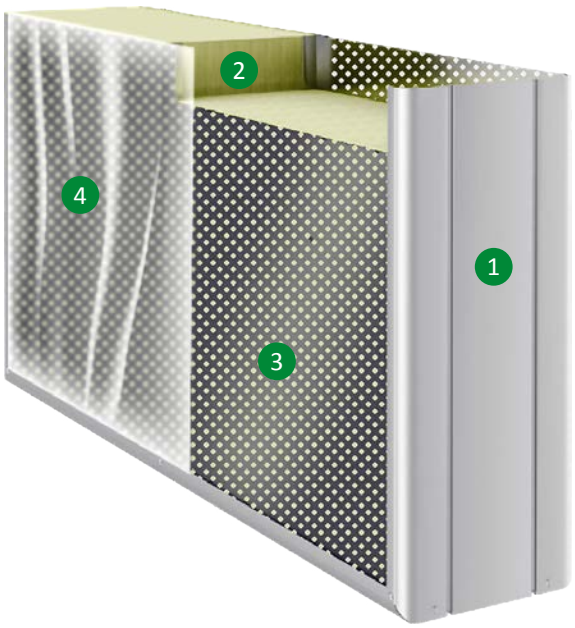
They can be "flat" type (without inclination) or "draining" type single sloped and rounded edges. They are equipped with a discharge hole on the front or on the bottom, with a sleeve to facilitate the hydraulic connection on site.

SLOPED DRAIN PAN

SOUND ATTENUATORS

They are made of mineral wool, thickness 100/200 mm, density 90 kg/m^3 and are protected by a fabric veil or, on request, by a plastic film that makes the unit airtight. The mineral wool is contained in a galvanised frame, equipped with a micro-expanded mesh containing galvanised steel.

SOUND ATTENUATORS



①	Steel frame / structure
②	Mineral wool
③	Steel mesh
④	Plastic film (on request)

HEAT RECOVERY UNITS

The heat recovery units are widely used for the partial recovery of the exhausted energy, favouring a considerable saving in the operating costs of the plant.

PLATE HEAT RECOVERY UNITS

Plate heat recovery units are heat exchangers that allow the transfer of heat between two airflows under the action of a temperature difference.
The use of these devices allows significant savings on operating costs in air conditioning systems, thus allowing the recovery of energy that otherwise would be lost in the form of heat.
They can be made of aluminium, aluminium with non-toxic coating based on corrosion-resistant polyurethane or stainless steel AISI 316L.

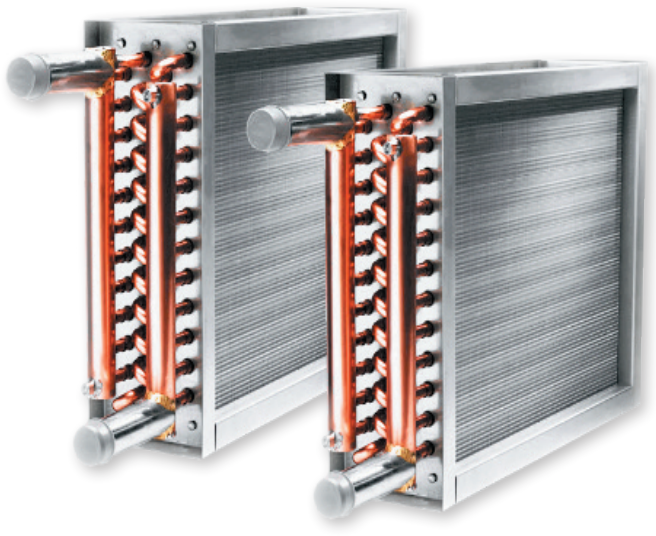
PLATE HEAT EXCHANGER

ROTARY HEAT WHEEL RECOVERY UNITS

The rotary heat recovery units consist of a cylindrical rotor containing thousands of channels and characterized by a very high surface development, a containment frame (complete with brush seals to minimize the leakage between the intake and exhaust airflows), and a drive system consisting of an electric motor equipped, as required, with a speed regulator.

They can be made of aluminum, aluminum with non-toxic paint coating.
Wheels can be supplied with hygroscopic surface treatment that allows the recovery of latent load.

ROTARY HEAT WHEEL EXCHANGER



RECOVERY COILS

RECOVERY COILS

They are manufactured as standard heat exchange coils, they are installed on the exhaust section and on the external air section, connected by a glycol water circulator, they create a heat exchange between the two flows.

They are mainly used in environments where airflows must not be contaminated in any way.

HEAT PIPE RECOVERY UNITS

The heat pipe recovery units consist of a heat exchanger, remarkably similar to a coil finned pack, generally with copper pipes and aluminium fins, divided into two adjacent sections. The pipes are loaded with a two-phase fluid (normally R134a), which changes state from liquid to steam and vice versa, allowing energy recovery with low pressure drops.

The divider, generally located in the centre of the exchanger, separates the flow of fresh air from the flow of exhaust air.

FAN SECTIONS

TYPE OF FANS

There are 2 types of fans that can be installed:

• Centrifugal fans (with forward or backward blades); of double inlet type, with forward or backward blades, depending on the required performance, statically and dynamically balanced according to ISO 1940 grade 6.3 standards. The fans are coupled by means of belts and pulleys to electric motors, fixed on special belt tensioning slides, three-phase asynchronous type with cage rotor, closed construction, external ventilation, IP55 protection degree, insulation class F, in compliance with IEC 60072-1 IEC 60034 standards and suitable for continuous duty (S1).

PLUG FAN WITH BASE FRAME

• Plug-fan fans with directly coupled motor, centrifugal impeller with backward blades in sheet steel, welded and painted, linked to the electric motor shaft, statically and dynamically balanced according to DIN ISO 1940. Performances in accuracy class 1 according to DIN 24166.

These fans can be coupled to EC brushless electric motors to ensure accurate air flow regulation, ensuring that all regulatory requirements (such as SFP) are met. The fan airflow can be kept at constant value or at constant pressure.

WALL PLUG FAN

FREQUENCY CONVERTERS

In air handling units, frequency converters are often used to control the speed of motors to improve energy savings. In particular, they are used to control airflow or differential pressure. Simple commissioning is facilitated by the selectable operating modes included in the unit. Frequency converters can be used flexibly. Versions with integrated mainswitch or flat versions for special installations are available.

FREQUENCY CONVERTERS

ACCESSORIES

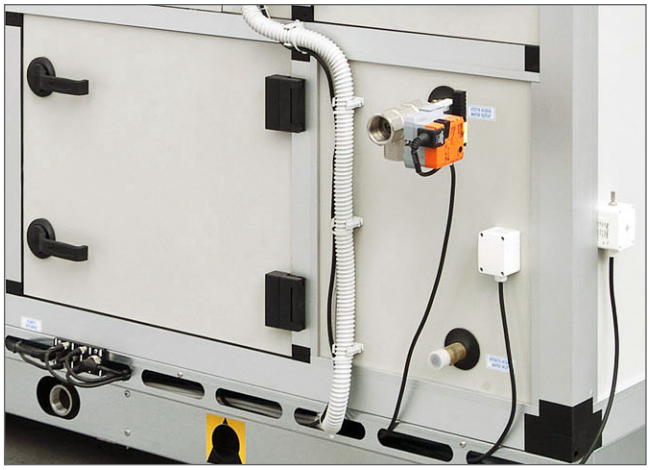
In each fan section are installed, as standard, the safety microswitches, safety net, grounding cable, flexible coupling. On request it is possible to have the fan sections with inspection porthole, low consumption lighting sources, rubber or metal vibration damping spring supports.

Other accessories available are RAL painting on request and ATEX explosion-proof versions.

ACCESSORIES

CONTROLS

The CTAE air-handling unit control has been designed to meet a wide variety of control requirements for air conditioning and air quality with the aim of providing a complete solution to the end user.
The control is supplied mounted on the unit and complete with internal wiring, ready for interfacing with the main models of transducers and actuators available on the market.
The LCD display housed on board the machine, or the remote one, allows the complete configuration of the parameters and the monitoring of the operating status of the plant. All the components are located in an internal technical compartment or on a metal frame installed on the machine.



CONTROL WIRING

ELECTRIC BOX WITH DISPLAY

The solutions adopted always favour easy access to the panel and to the electrical components in order to facilitate the electrical power connections of the unit.

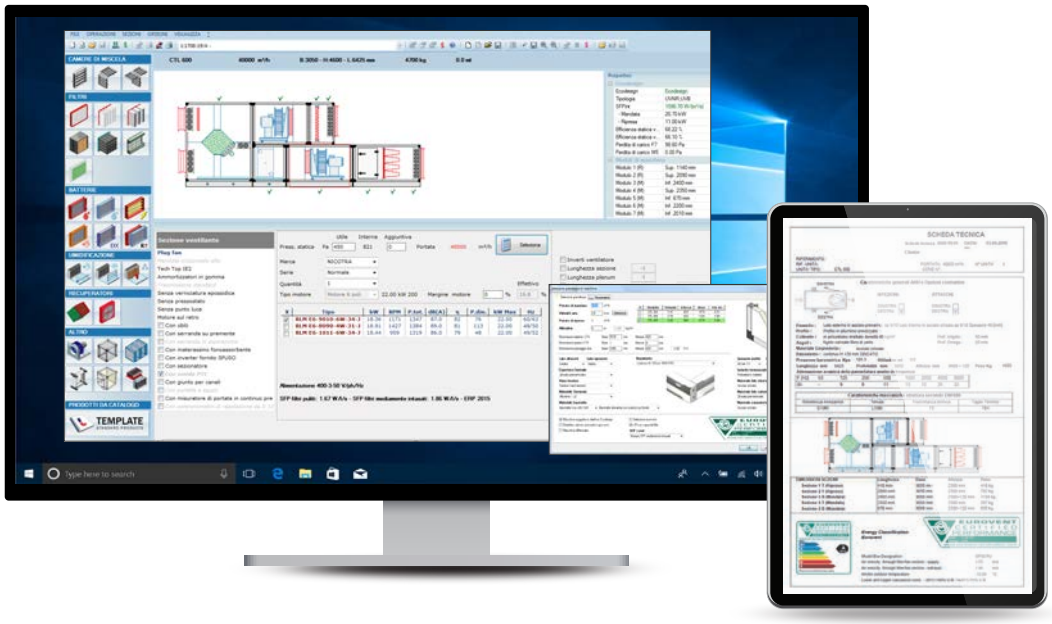
The main control functions provided are as follows:

- temperature control;
- humidity control;
- periodic or continuous control of the external air;
- control of external air dampers;
- control of heat recoveries device;
- fan airflow control as a function of differential pressure;
- control of enthalpy free-cooling;
- control of start up and transitional periods;
- antifreeze management;
- alarm management;
- control of periodic maintenance of the fans;
- alarm history record;
- alarm history recording on USB device;
- control of supervision system.

SELECTION SOFTWARE

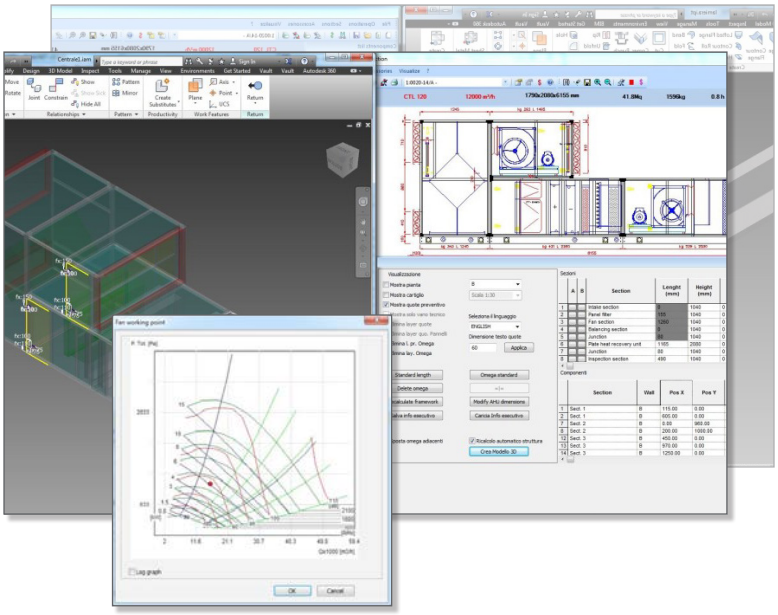
Our company offers the customers a simple and immediate selection software of Air Handling Units, able to provide all the technical data necessary for the performance sizing and dimensions of the units, helping the installer in the design of the complete system.

It is possible to download it from our official website, after registering for free in the reserved area.
Our specialized staff is also at your complete disposal for the activation of the software, clarifications regarding the use and the various configurations.



- Easy and intuitive to use
- Multilingual interface
- Design of air handling units with complex compositions
- Export CAD drawing
- List of components / materials
- Export of technical data sheet to multilingual PDF
- Integration of the ERP Directive 2018
- Suitable for EUROVENT certification

... and many other features.



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www.vorticeindustrial.com

ACCESSORIES

On request, a wide range of practical and functional accessories can be installed on all the control units, allowing you to customize the unit according to your needs:

- Wired IP65 LED light
- Porthole on inspection doors
- Handles of different types with or without key lock
- Fixed or adjustable hinges
- Safety net on inspection doors of the fan sections
- Wired main-switches
- Different cable glands
- Indoor/outdoor frequency converters supplied fitted and wired
- Safety micro-switches or emergency button
- Manual controls on dampers
- Actuators on dampers
- Differential pressure switches or manometers for filters, complete with pressure connections

INSPECTION PORTHOLE

ADJUSTABLE OR FIXED HINGE

MAIN SWITCH

LED LIGHT WIRED

HANDLE WITH KEY

- Sensor control module for differential volume / pressure complete with pressure connections
- Differential pressure transducers for fans
- Antifreeze probes for coils
- Additional soundproofing of fan sections with sound-absorbing material
- Lifting legs
- Adjustable or fixed threaded feet
- Anti-vibrating flexible connections for ducts in canvas
- Drains with siphons
- Spare filters
- Circular flanges and counterflanges for steam coils
- Aluminium louvres with fixed fins and net
- Flat or sloped protruding roof of any sheet metal
- Rain hoods with bird screen
- Technical compartments for coils valves or electrical panels housing

.... and more.

SENSOR CONTROL MODULE

DIFFERENTIAL PRESSURE SWITCH

CTAE H+

HYGIENIC AIR HANDLING UNITS FOR HOSPITAL AND PHARMACEUTICAL SECTOR

INTRODUCTION

HYGIENIC air handling unit suitable for applications in the hospital and pharmaceutical sector, or industrial applications where a high hygienic standard is required.

The **CTAE H+** unit can be subjected to ordinary cleaning cycles in full compliance with all the construction measures necessary to facilitate proper cleaning and accessibility to all internal surfaces.
Another main feature is the reduction of thermal bridges.

The units are accompanied by CE certification and certification according to **VDI 6022**.

- AHUs with horizontal (H) or vertical (V) configuration.
- AHUs can be configured with a monobloc structure or divided into several modules to facilitate transport and facilitate the customer in handling and positioning it on site.
- All internal components are in stainless steel AISI 304 or AISI 316, designed to have no protrusions, sharp edges or corners in which dirt can accumulate.
- The internal corners are connected with a radius that allows easy cleaning and disinfection, as required by Directives 2006/42/EC and EN 6022.

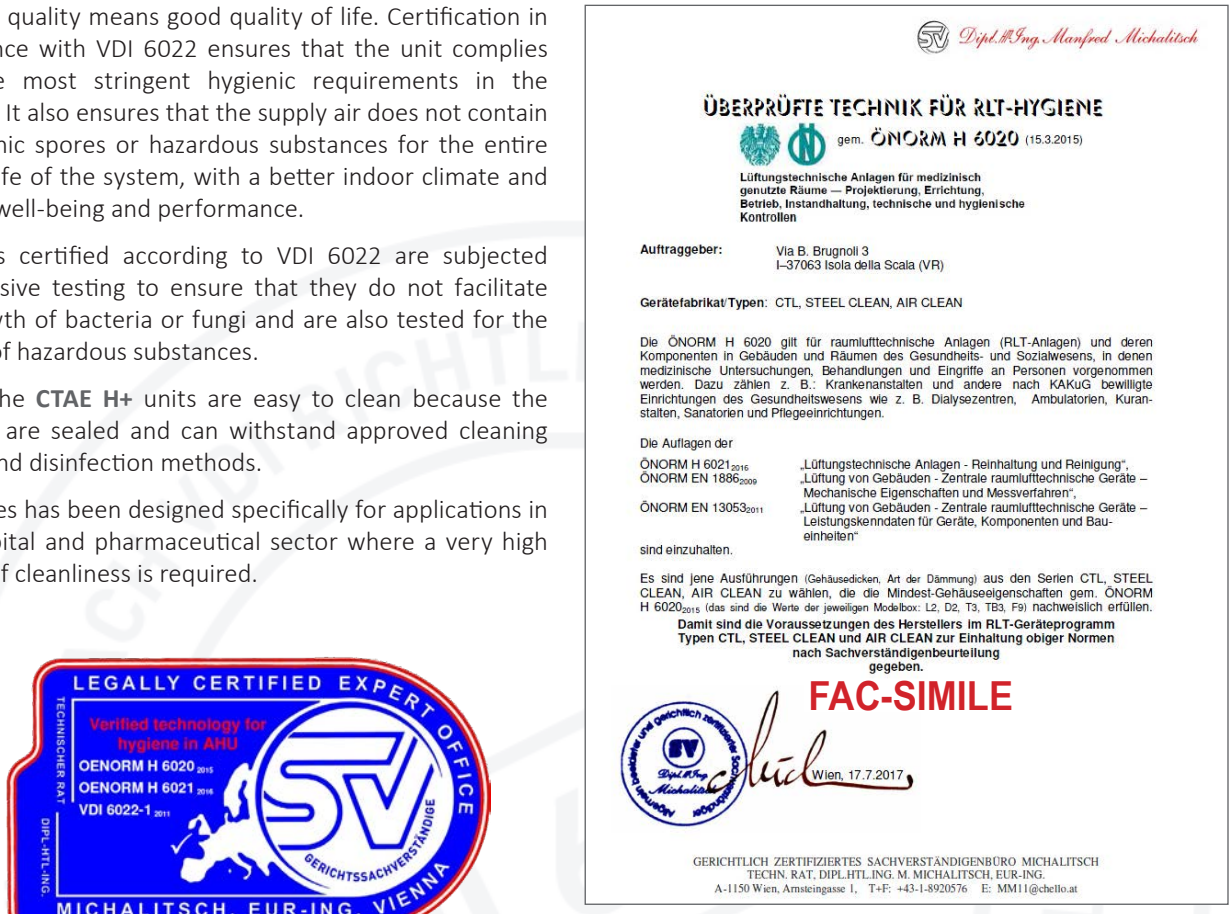
CERTIFICATIONS

Good air quality means good quality of life. Certification in accordance with VDI 6022 ensures that the unit complies with the most stringent hygienic requirements in the industry. It also ensures that the supply air does not contain pathogenic spores or hazardous substances for the entire service life of the system, with a better indoor climate and optimal well-being and performance.

Materials certified according to VDI 6022 are subjected to extensive testing to ensure that they do not facilitate the growth of bacteria or fungi and are also tested for the release of hazardous substances.

Finally, the **CTAE H+** units are easy to clean because the surfaces are sealed and can withstand approved cleaning agents and disinfection methods.

This series has been designed specifically for applications in the hospital and pharmaceutical sector where a very high degree of cleanliness is required.



Dipl.-Ing. Manfred Michalitsch

ÜBERPRÜFTE TECHNIK FÜR RLT-HYGIENE

gem. ÖNORM H 6020 (15.3.2015)

Lüftungstechnische Anlagen für medizinisch genutzte Räume — Projektierung, Errichtung, Betrieb, Instandhaltung, technische und hygienische Kontrollen

Auftraggeber: Via B. Brugnoli 3
I–37063 Isola della Scala (VR)

Gerätefabrikat/Typen: CTL, STEEL CLEAN, AIR CLEAN

Die ÖNORM H 6020 gilt für raumlufttechnische Anlagen (RLT-Anlagen) und deren Komponenten in Gebäuden und Räumen des Gesundheits- und Sozialwesens, in denen medizinische Untersuchungen, Behandlungen und Eingriffe an Personen vorgenommen werden. Dazu zählen z. B.: Krankenanstalten und andere nach KAKuG bewilligte Einrichtungen des Gesundheitswesens wie z. B. Dialysezentren, Ambulatorien, Kuranstalten, Sanatorien und Pflegeeinrichtungen.

Die Auflagen der

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Damit sind die Voraussetzungen des Herstellers im RLT-Geräteprogramm Typen CTL, STEEL CLEAN und AIR CLEAN zur Einhaltung obiger Normen nach Sachverständigenbeurteilung gegeben.

FAC-SIMILE

Wien, 17.7.2017

GERICHTLICH ZERTIFIZIERTES SACHVERSTÄNDIGENBÜRO MICHALITSCH
TECHN. RAT, DIPL.HTL.ING. M. MICHALITSCH, EUR-ING.
A-1150 Wien, Arnsteingasse 1, T+F: +43-1-8920576 E: MM11@chello.at

MAIN CHARACTERISTICS

STRUCTURE AND PANELS

• Frame made of anodized aluminium profiles with thermal break. Thickness: 60mm.

• Sandwich panels coupled by stainless steel screws to the anodised aluminium profiles.

• Sandwich panels, 63 mm thick, made with an internal shell in stainless steel AISI 304/316 with polyurethane foam in between, with a density of 40 kg/m^3 and external sheet metal of any sheet metal.

• Sloped drain pans in AISI 304 or AISI 316 on the treatment sections in order to avoid the stagnation of condensation or hygienic liquids.
Their special construction with rounded edges ensures perfect drainage of hygienic liquids and the absence of condensation stagnation.

REMOVABLE SOUND ATTENUATORS

SLOPED DRAIN PANS

• Base frame in AISI 304/316 stainless steel of variable thickness and height to allow the creation of siphons of adequate height to the pressures at stake, with the possibility of adding feet adjustable in height.

• Inspection doors to allow disassembly and removal of all components.

• Internal structural work in stainless steel AISI 304/316 designed and so built in order not to have protrusions, sharp edges or inaccessible corners in which dirt could accumulate.

• Internal corners connected with a radius that allows easy cleaning and disinfection, as required by Directive 2006/42/EC.

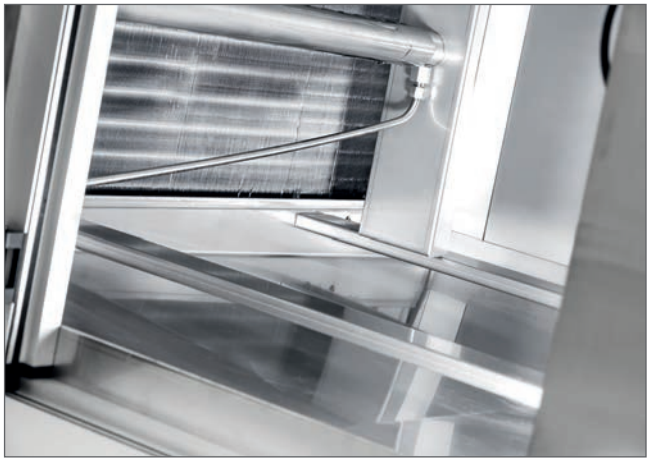
• Bottom sloped panels and drain valve in all sections without thermal treatment.

• Side removable sound attenuators for hygienic operations.

• Coils made of materials suitable for hygienic purposes (stainless steel) with a minimum spacing of 10 cm in order to insert indicators or adjustment instruments, positioned higher than the drain pan below to allow cleaning operations.

• Dampers with airtight gaskets in closed position (L4).

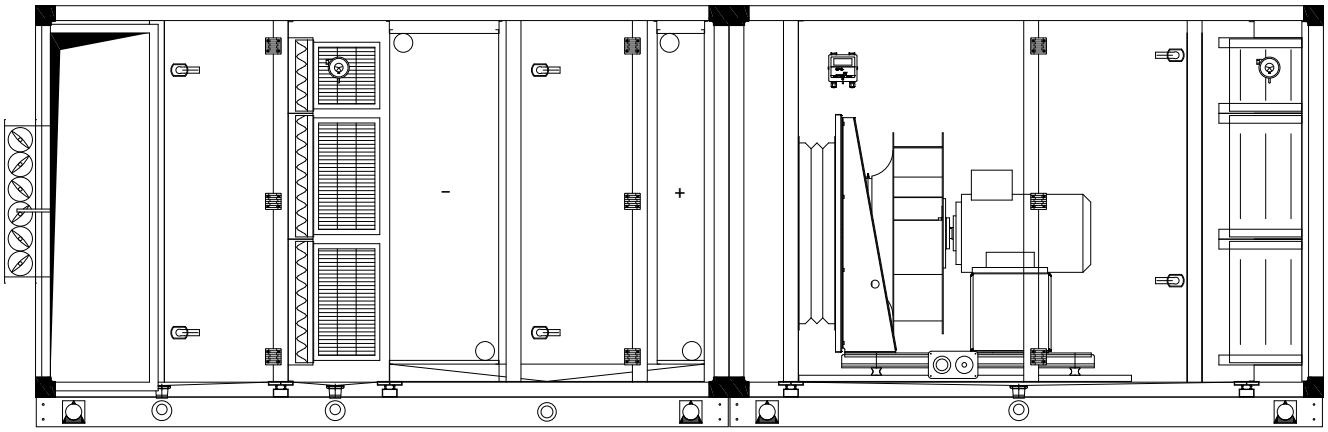
INSPECTION SECTIONS



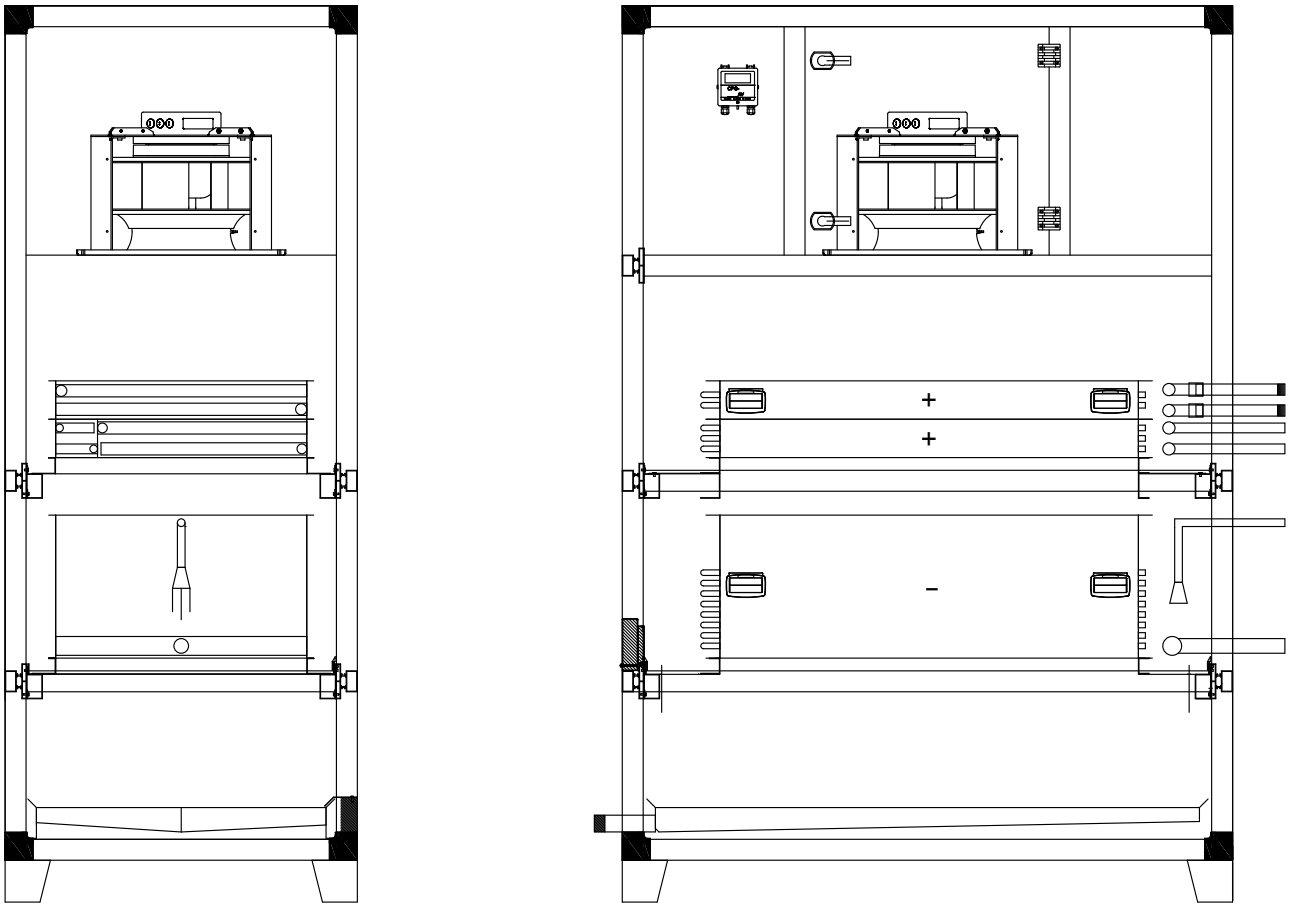
STAINLESS STEEL COMPONENTS

CONFIGURATION AND TYPOLOGY

AHUs can be configured with a monobloc structure or divided into several sections to facilitate transport and facilitate the customer in handling and positioning on site, with horizontal (H) or vertical (V) configuration.



HORIZONTAL CONFIGURATION (H)



VERTICAL CONFIGURATION (V)

STEELCLEAN

WASHABLE UNITS FOR FOOD INDUSTRY

INTRODUCTION

Compliance with hygiene standards is the highest priority in food processing. In these environments, bacterial contamination that may originate in the air handling units can spread in the air distribution systems, causing damage to the product, to the health of the consumer and entail very high costs that often exceed, IN A SHORT TIME, the pure investment for the air handling unit.

In these processes, the use of detergents and disinfectants is often problematic without considering that many food processes are often very sensitive to temperature changes and changes in the chemical composition of the air, so long and repeated cleaning of the units can hinder the processes themselves and cause serious economic damage.

Often, the temperature and humidity conditions required by these processes are also ideal for the proliferation of bacteriological cultures, almost always in remote points, cavities, edges and corners, where cleaning operations are not very effective. The **STEELCLEAN** series air handling units have been designed for all these applications, air treatment unit **COMPLETELY SANITIZABLE** and **STERILIZABLE** in every single part, assembled with materials resistant to sterilization temperatures close to 150 °C.

CERTIFICATIONS

Good air quality means good quality of life. Certification in accordance with VDI 6022 ensures that the unit complies with the most stringent hygiene requirements in the industry. It also ensures that the supply air does not contain pathogenic spores or hazardous substances for the entire service life of the system, with a better indoor climate and optimal well-being and performance.

Materials certified according to VDI 6022 are subjected to extensive testing to ensure that they do not facilitate the growth of bacteria or fungi and are also tested for the release of hazardous substances.

Finally, the **STEELCLEAN** units are easy to clean because the surfaces are sealed and can withstand approved cleaning agents and disinfection methods.

This series has been designed specifically for applications in the food industry and for production processes where a very high degree of cleanliness is required.

It also represents the state of the art among the specific units for the food sector, and is suitable for use with high temperature differences between the air inside and outside, excellent sound reduction and absence of thermal bridges.

Dipl.-Ing. Manfred Michalitsch

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I–37063 Isola della Scala (VR)

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FAC-SIMILE

Wien, 17.7.2017

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MAIN CHARACTERISTICS

STRUCTURE

The internal structure of the units is made of chambers with watertight modules in AISI 304 stainless steel of strong thickness (15/10mm) manually TIG-welded.

TIG-WELDING

ADVANTAGES

- smooth, crack-free interior surfaces that are easy to clean and disinfect;
- high degree of noise reduction;
- absence of thermal bridges (the internal chambers are completely insulated from the external structure);
- accessibility of all internal components to facilitate the sanitisation and extraction of components.

INTERNAL CHAMBERS

All internal chambers are made of AISI 304 stainless steel, designed and built completely rounded and without sharp edges or corners that cannot be reached, to avoid the accumulation of dirt and facilitate hygienic operations, so as to reach the maximum level of HYGIENE.

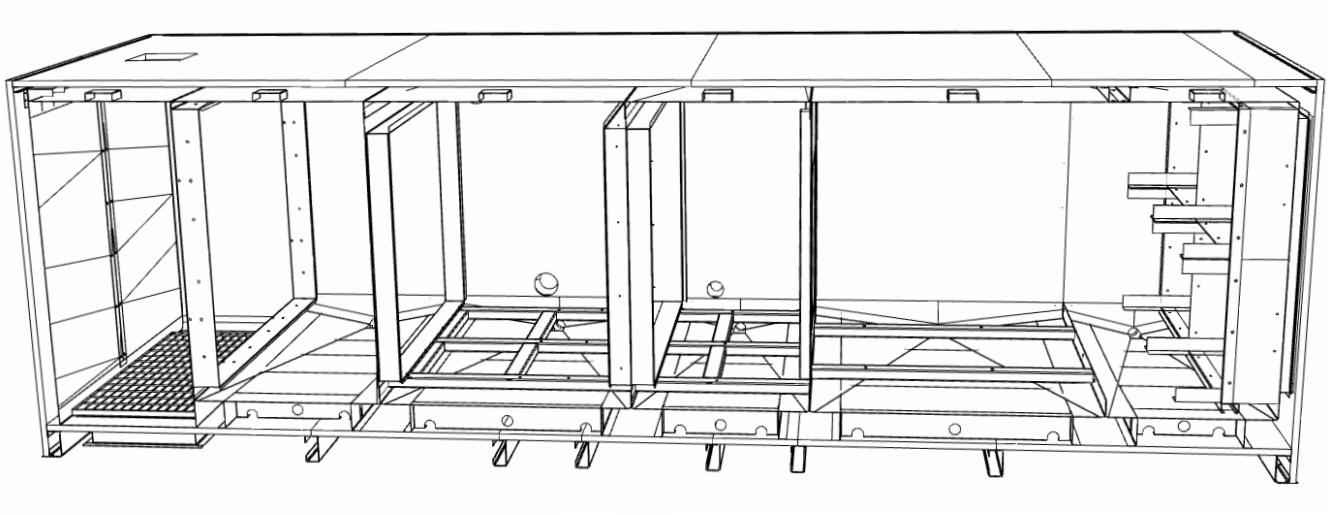
All internal corners are connected with a radius of curvature that allows easy cleaning and disinfection.

STRUCTURAL WORK WITHOUT SHARP CORNERS

The units are characterised by a very high thermal and acoustic insulation guaranteed by a self-supporting frame structure in sandwich panels **75 to 100 mm** thick, made of an inner shell in stainless steel AISI 304 with polyurethane foam in between with density 40 kg/m^3 and outer sheet of any sheet metal and thickness.

Possibility of choosing the EXTERNAL metal sheet among:
- pre-painted white galvanised steel (RAL 9010);
- AISI 304 or AISI 316 stainless steel;
- aluminium sheet with magnesium.

Possibility of choosing the INTERNAL structural work and welded chamber between:
- AISI 304 or AISI 316 stainless steel.



DETAIL OF THE INTERNAL CHAMBERS

MAIN CHARACTERISTICS

PANELS

The panels can be made in two different thicknesses: **75 mm** and **100 mm**.
Both versions are characterized by a sandwich panel with thermal insulation in injected isocyanate at high density (40 kg/m^3).

EXTERNAL FRAME PAINTED ON REQUEST

The external finishing frame of the panels is made of 06/10mm steel, and it is possible to have it painted in a personalised RAL colour, on request of the customer.

BASE FRAME

The **BASE FRAME** is made of 304 stainless steel with a high thickness (30/10 mm) and variable height to allow the creation of siphons of adequate height to the pressures at stake, with the possibility of adding fixed or threaded **FEET** and adjustable in height, suitable to level the unit in case of uneven support base.

BASE FRAME WITH ADJUSTABLE FEET

COMPONENTS

On all the sections, and in correspondence of each internal component, there are several drain pans for collecting condensate and liquids used in the hygienic processes.

The **DRAIN PANS** are made of AISI 304 or AISI 316 steel, and their particular construction with sloped and rounded edges, with steep slopes and adequate drains, ensures perfect drainage of hygienic liquids and the absence of stagnation of condensation.

The drain pans comply with directives 2006/42/EC and EN 6022.

SLOPED DRAIN PANS

The inspection **DOORS** are built with internal panel in stainless steel AISI 304 and external panel with finish on request of the customer. The doors are completely recessed in the unit structure and, when closed, they form a smooth internal surface without protrusions or sharp edges, in order to avoid the accumulation of dirt.

Installation on board of **ACCESSORIES** such as pressure switches and differential pressure gauges, flow meters, temperature probes and cable glands.

DIFFERENT TYPES OF HINGES

MAIN CHARACTERISTICS

The locking system of the doors uses completely external **HANDLES** and hinges in stainless steel, so as to allow an easy cleaning and disinfection.

CLOSING HANDLES

DAMPERS with perfectly airtight gaskets (L4).

AIRTIGHT DAMPERS

Possibility of adopting **FILTER SYSTEMS** of various efficiency classes (panel filters, soft and rigid bag filters, absolute filters) on AISI 304 stainless steel counterframes.

BAG FILTERS

COILS of any type (water-glycol, direct expansion, steam) and combination of materials (stainless steel, copper tubes, aluminum, copper, stainless steel fins, with cataphoresis treatment...) with frames in stainless steel AISI 304. Possibility of installing automatic washing systems inside the unit (e.g. coil sections) on both horizontal (H) and vertical (V) versions.

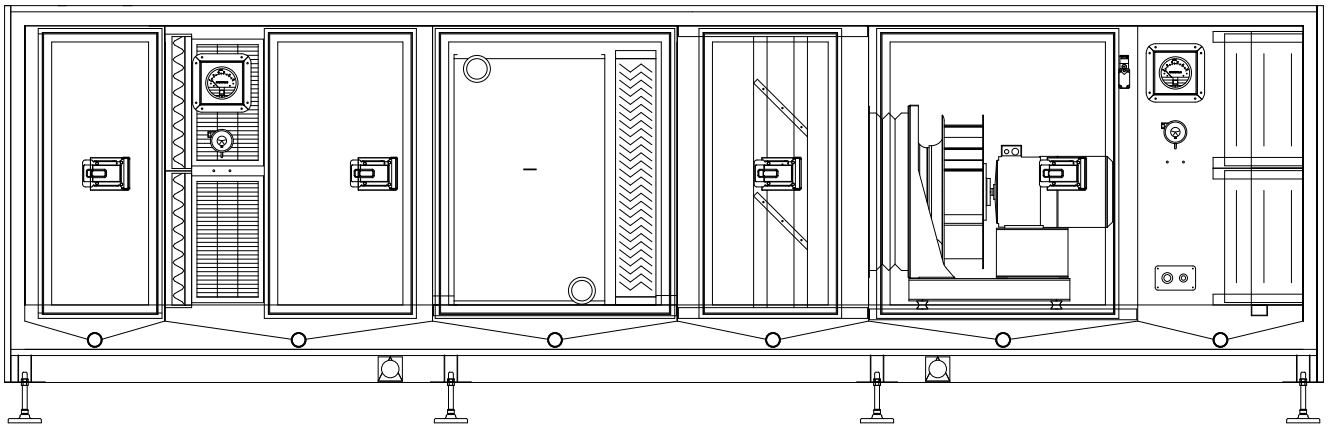
COILS WITH SPECIAL TREATMENT

PLUG FANS treated with epoxy coating.

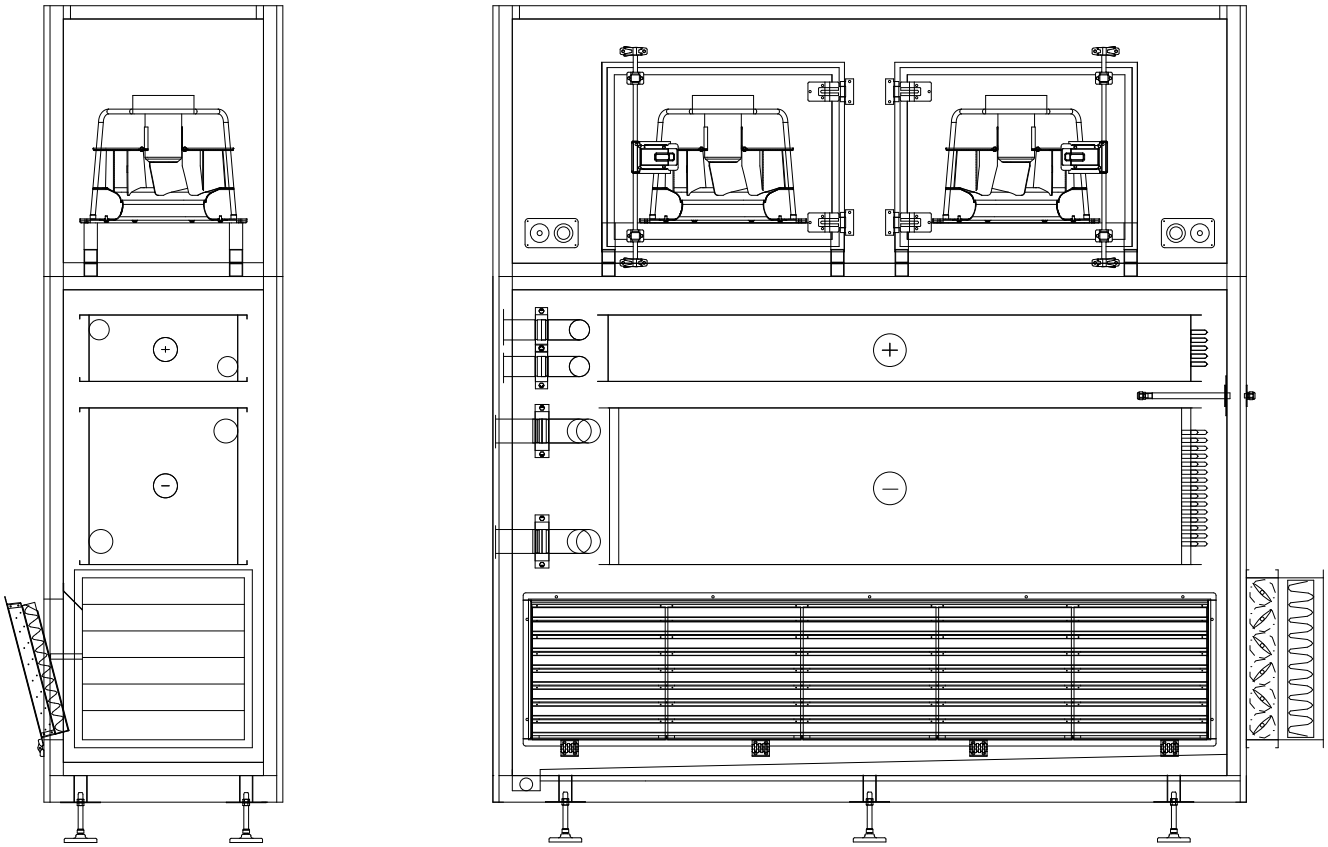
PLUG-FANS

CONFIGURATION AND TYPOLOGY

AHUs can be configured with a monobloc structure or divided into several sections to facilitate transport and facilitate the customer in handling and positioning on site, with horizontal (H) or vertical (V) configuration.



HORIZONTAL CONFIGURATION (H)



VERTICAL CONFIGURATION (V)

AIRCLEAN

HYGIENIC UNITS FOR FOOD INDUSTRY

INTRODUCTION

Hygiene is a top priority in food processing. In this respect, food safety is a subject that is attracting particular media attention today, causing consumer anxiety, and the authorities have clearly identified this as a **priority**.

According to European legislation, food safety must be guaranteed by means of **prevention**, and to this end the hygienic design of food equipment is compulsory under European Community law.

If the necessary precautions are not taken at the design stage, particular bacteriological contamination may occur within the air handling units, which can then be spread through the ducts to the various rooms, with consequent damage to human health or directly to the products being processed.

Expensive cleaning activities are therefore necessary inside the aeration systems, which also slow down the production process. These maintenance and cleaning costs quickly exceed the investment cost of the air handling unit.

In order to avoid all of this, in full compliance with the guidelines on hygienic design, the air handling units of the **AIRCLEAN** series have been developed.

CERTIFICATIONS

Good air quality means good quality of life. Certification in accordance with VDI 6022 ensures that the unit complies with the most stringent hygiene requirements in the industry. It also ensures that the supply air does not contain pathogenic spores or hazardous substances for the entire service life of the system, with a better indoor climate and optimal well-being and performance.

Materials certified according to VDI 6022 are subjected to extensive testing to ensure that they do not facilitate the growth of bacteria or fungi and are also tested for the release of hazardous substances.

Finally, the **AIRCLEAN** units are easy to clean because the surfaces are sealed and can withstand approved cleaning agents and disinfection methods.

This series has been designed specifically for applications in the food industry and for production processes where a very high degree of cleanliness is required.

It also represents the state of the art among the specific units for the food sector, and is suitable for use with high temperature differences between the air inside and outside, excellent sound reduction and absence of thermal bridges.

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FAC-SIMILE

Wien, 17.7.2017

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MAIN CHARACTERISTICS

DESCRIPTION

Air handling unit **COMPLETELY SANITIZED** suitable for process air treatment. AIR CLEAN units can be easily subjected to cleaning cycles and complete hygiene in every single part. The unit is therefore free of areas of potential risk of contamination by pathogens, they have been designed for the needs of the food industry, designed according to the procedures of HYGENIC DESIGN and certified, placing themselves at the highest levels in the category of this segment of units.

STRUCTURAL WORK

Screws in stainless steel AISI 304 or AISI 316, with special insert housed in the stainless steel frame.

Structural work and infills in AISI 304 stainless steel designed and built so as not to have protrusions, sharp edges or inaccessible corners in which dirt could accumulate.

The internal corners are connected with a radius that allows easy cleaning and disinfection.

HYGIENICAL INTERNAL PART

STAINLESS STEEL STRUCTURAL WORK

STRUCTURE

Monobloc or multi-module structure, made of 15/10 thick press-folded profiles in AISI 304 or 316 stainless steel, coupled by screws of the same material to 53 mm thick thermal break sandwich panels.
Absence of sharp edges inside the unit and internal corners connected with a wide radius to avoid stagnation of dirt and thus facilitate cleaning operations and achieve an excellent level of hygiene.

Possibility of choosing the EXTERNAL metal sheet among:
- pre-painted white galvanised steel (RAL 9010);
- AISI 304 or AISI 316 stainless steel;
- aluminium sheet with magnesium.

Possibility of choosing the INTERNAL structural work between:
- AISI 304 or AISI 316 stainless steel.

MAIN CHARACTERISTICS

PANELS

Sandwich panels **53 mm** thick made with an inner shell in stainless steel sheet AISI 304/316 with thermal insulation in isocyanate injected at high density (40 kg/m^3) and outer sheet of any sheet metal. An EPDM gasket is placed between the internal and external sheet metal of the sandwich panel to guarantee the thermal break of the panel. Absence of thermal bridges.

DETAIL OF THE PANEL

BASE FRAME

The **BASE FRAME** is made of thick stainless steel (minimum 20/10 mm) with variable height to allow the realization of the siphon of adequate height to the pressures at stake, with the possibility of adding the adjustable in height or fixed feet, in stainless steel AISI 304 as well.

BASE FRAME WITH FIXED FEET

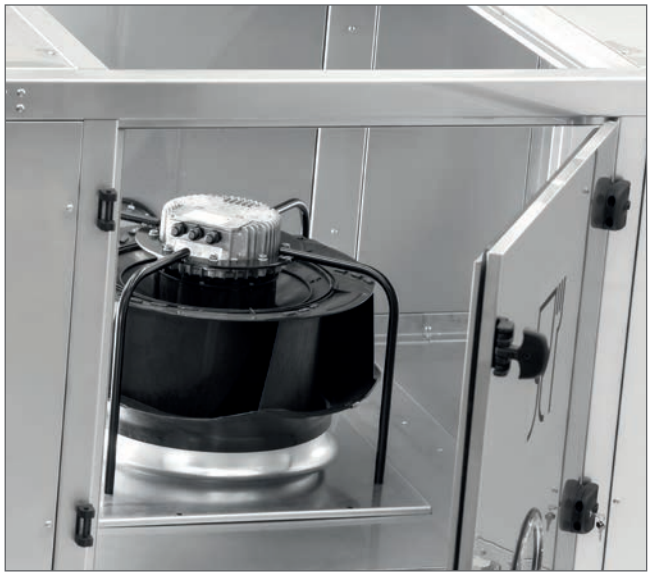
COMPONENTS

SLOPED DRAIN PANS in stainless steel AISI 304 TIG-welded on the bottom of the unit for complete drainage of condensation and hygienic detergents. They are positioned under the heat treatments and they have an inclination towards the side condensation discharge. Draining bottom panels and drain pipe are in correspondence with all the other sections of the unit.

SLOPED DRAIN PANS

Inspection **DOORS** completely recessed in the structure of the unit, of such dimensions as to allow easy access to all internal areas (for checks and/or maintenance) as well as to allow the disassembly and extraction of fans, coils, filters.

Installation on board of **ACCESSORIES** such as pressure switches and differential pressure gauges, flow meters, temperature probes and cable glands.

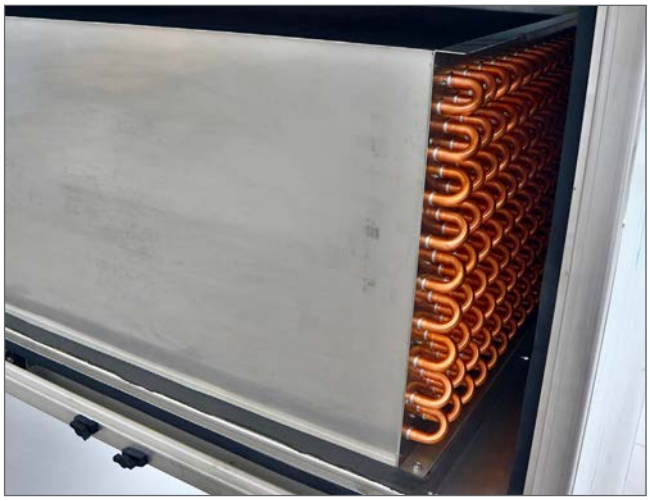


INSPECTABLE COMPONENTS

MAIN CHARACTERISTICS

AIRTIGHT DAMPERS

DAMPERS with airtight gaskets in closed position (L4).



EXTRACTABLE COILS

COILS of any type (glycol water, direct expansion, steam) and combination of materials.

BAG FILTERS

Possibility of adopting **FILTER SYSTEMS** of various efficiency classes (panel filters, soft and rigid bag filters, absolute filters) on AISI 304 stainless steel counterframes.

PLUG-FANS

Radial **FANS** with directly coupled motor.

MAINTENANCE

Accessibility to all internal components, such as batteries, filters, fans and/or internal compartments, for cleaning and/or washing, guaranteed by the possibility of disassembly of all the external panels regardless of the internal component.

EASY ACCESS TO ALL THE COMPONENTS

CONFIGURATION AND TYPOLOGY

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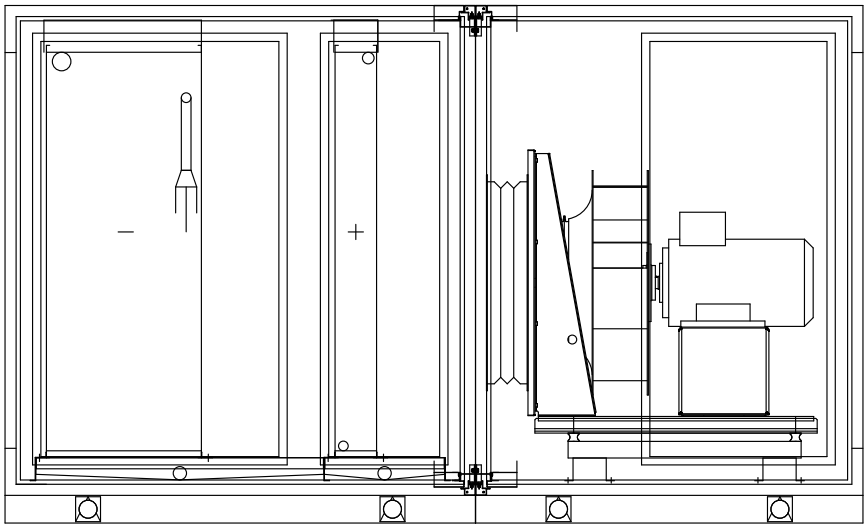
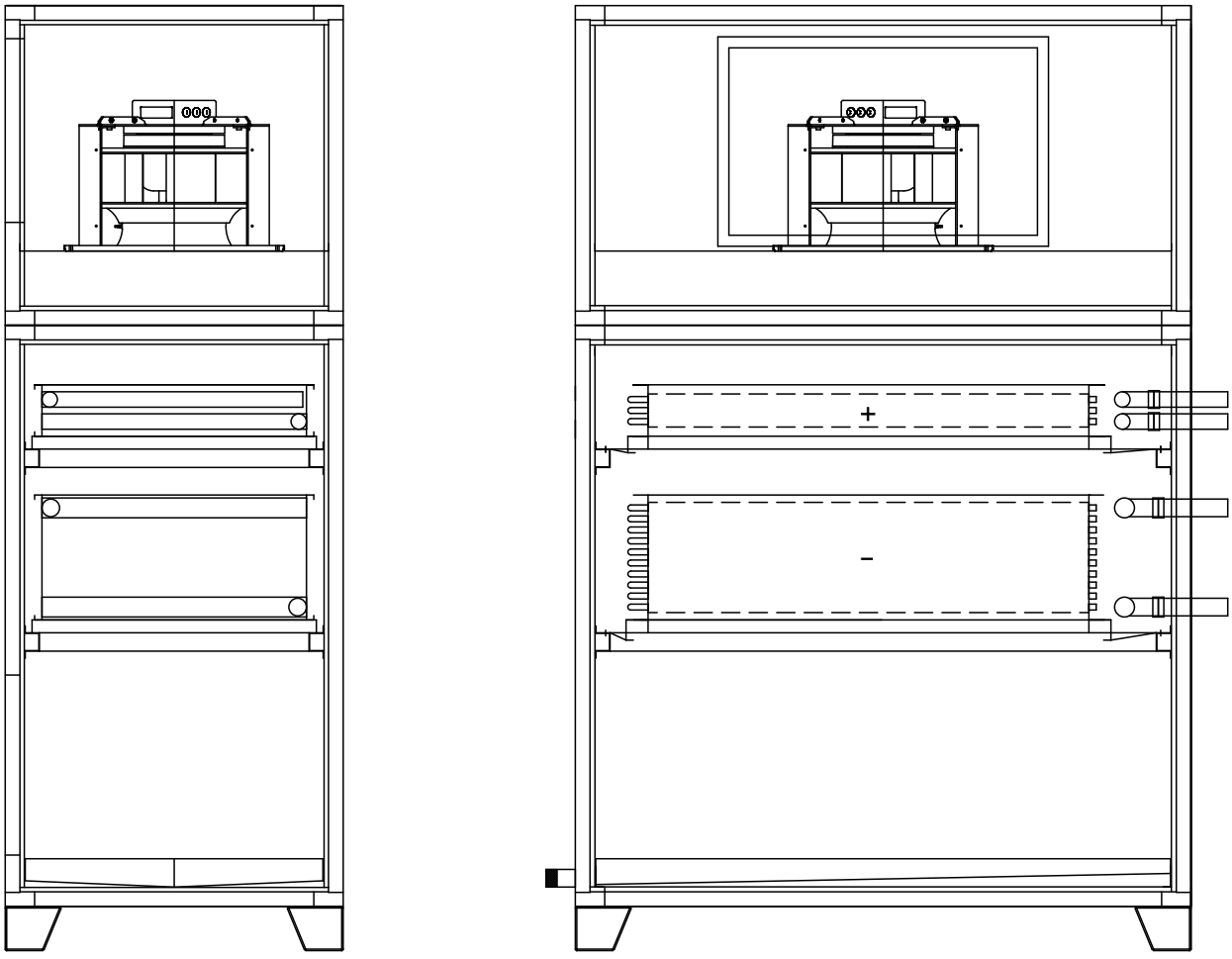


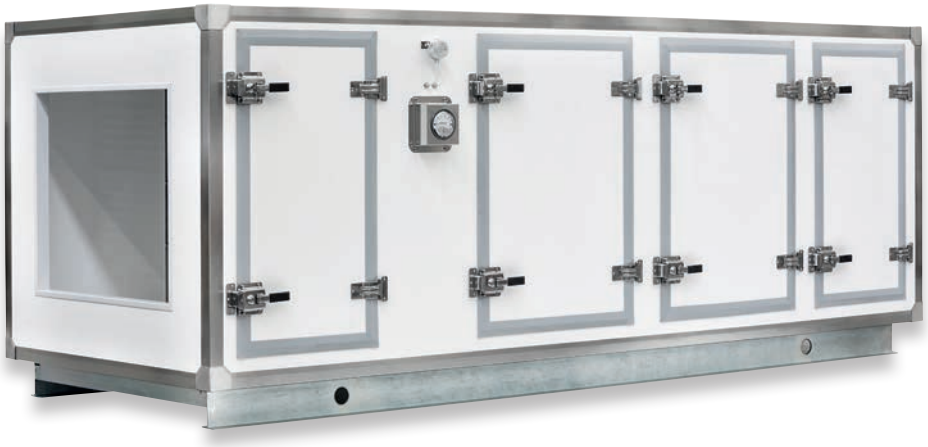
HORIZONTAL CONFIGURATION (H)



VERTICAL CONFIGURATION (V)

PROCLEAN

HYGIENIC UNITS FOR THE FOOD INDUSTRY



INTRODUCTION

The use of AISI 304 steel as a construction material for air handling units for food use has historically been the industry standard, but not because it is perfectly suited to this task; in fact, in systems where air is conveyed it is actually a compromise choice, because of its vulnerability to corrosion, elevate weight, the difficulty of controlling air leakages, and the high thermal transmittance factor.

The construction of composite air handling units has developed quite recently and has become necessary to provide the market with products with significantly superior characteristics, in terms of corrosion resistance, to the traditional units in AISI 304, but with much lower costs than those in AISI 316.

The use of glass fibre-reinforced polymers, on the other hand, allows the construction of lighter, more energy-efficient units, perfect for applications in the food industry.

The **PROCLEAN** series air handling units are specifically designed for this purpose; they are built with a self-supporting glass fibre-reinforced polymer monocoque structure and they are **COMPLETELY SANITIZED** and easily subjected to cleaning cycles and complete sanitization in every single part.

CERTIFICATIONS

Good air quality means good quality of life. Certification in accordance with VDI 6022 ensures that the unit complies with the most stringent hygiene requirements in the industry. It also ensures that the supply air does not contain pathogenic spores or hazardous substances for the entire service life of the system, with a better indoor climate and optimal well-being and performance.

Materials certified according to VDI 6022 are subjected to extensive testing to ensure that they do not promote the growth of bacteria or fungi and are also tested for the release of hazardous substances.

PROCLEAN units are designed to guarantee extreme flexibility and total adaptation to the user's technical premises and are developed with either vertical or horizontal layouts.

This series has been designed specifically for applications in the food industry and for production processes where a very high degree of cleanliness is required.

They are also easy to clean, as the surfaces are sealed and can withstand approved cleaning agents and disinfection methods.

Dipl.-Ing. Manfred Michalitsch

ÜBERPRÜFTE TECHNIK FÜR RLT-HYGIENE

gem. **ÖNORM H 6020** (15.3.2015)

Lüftungstechnische Anlagen für medizinisch genutzte Räume — Projektierung, Errichtung, Betrieb, Instandhaltung, technische und hygienische Kontrollen

Auftraggeber: Via B. Brugnoli 3
I–37063 Isola della Scala (VR)

Gerätefabrikat/Typen: CTL, STEEL CLEAN, AIR CLEAN

Die ÖNORM H 6020 gilt für raumlufttechnische Anlagen (RLT-Anlagen) und deren Komponenten in Gebäuden und Räumen des Gesundheits- und Sozialwesens, in denen medizinische Untersuchungen, Behandlungen und Eingriffe an Personen vorgenommen werden. Dazu zählen z. B.: Krankenanstalten und andere nach KAKuG bewilligte Einrichtungen des Gesundheitswesens wie z. B. Dialysezentren, Ambulatorien, Kuranstalten, Sanatorien und Pflegeeinrichtungen.

Die Auflagen der

ÖNORM H 6021$_{2016}$ „Lüftungstechnische Anlagen - Reinhaltung und Reinigung",
ÖNORM EN 1886$_{2009}$ „Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte – Mechanische Eigenschaften und Messverfahren",
ÖNORM EN 13053$_{2011}$ „Lüftung von Gebäuden - Zentrale raumlufttechnische Geräte – Leistungskenndaten für Geräte, Komponenten und Bau-einheiten"

sind einzuhalten.

Es sind jene Ausführungen (Gehäusedicken, Art der Dämmung) aus den Serien CTL, STEEL CLEAN, AIR CLEAN zu wählen, die die Mindest-Gehäuseeigenschaften gem. ÖNORM H 6020$_{2015}$ (das sind die Werte der jeweiligen Modelbox: L2, D2, T3, TB3, F9) nachweislich erfüllen.

Damit sind die Voraussetzungen des Herstellers im RLT-Geräteprogramm Typen CTL, STEEL CLEAN und AIR CLEAN zur Einhaltung obiger Normen nach Sachverständigenbeurteilung gegeben.

FAC-SIMILE

Wien, 17.7.2017

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MAIN CHARACTERISTICS

STRUCTURE

The structure of the unit is made of sandwich panels in glass fibre-reinforced polymers formed by impregnation of polyester resins and pressing with the vacuum technique, catalysis without the contribution of thermal accelerations (cold).

In this way, all the structural reinforcements provided are of the same nature as the panel and do not constitute a thermal bridge. The panels are made of polyurethane sheets enclosed by 25/10 P.R.F.V. laminates.

The total thickness of the panel is **53 mm**. Polyurethane foams (density 34/35 kg/mc) expanded with gases not harmful to the atmosphere (pentane cycle).

Internal and external surfaces of sandwich panels made of plastic laminates, with a totally smooth surface, formulated with isophthalic gelcoats suitable for food use.

COMPONENTS DETAIL

The external perimeter profiles are made of satinized AISI304 stainless steel.

Rounded internal edges to ensure a high standard of hygiene. Internal floors sloped towards the drains to avoid water stagnation.

Inserts for fixing internal components in aluminium alloy which does not give rise to rust drawing. Internal partitions and bulkheads in AISI 304 stainless steel.

The structure of the unit has been designed to ensure very high resistance to the use of detergents even acid or alkaline based.

BASE FRAME

The hot-dip galvanised steel **BASE FRAME** is made up of 2 IPE 160 beams + UPN 80 supports for the coils + IPE 160 or UPN140 supports for the fans.

COMPONENTS

Internal platform of the central unit has the function of a condensate collection pan of the full section, draining type to avoid water stagnation.

DRAINING FLOOR

The inspection **DOORS** can be of variable quantity and size according to the needs of internal hygiene and inspection for maintenance. Doors adjusted to the structure with grey rubber sealing gasket (4 plates).

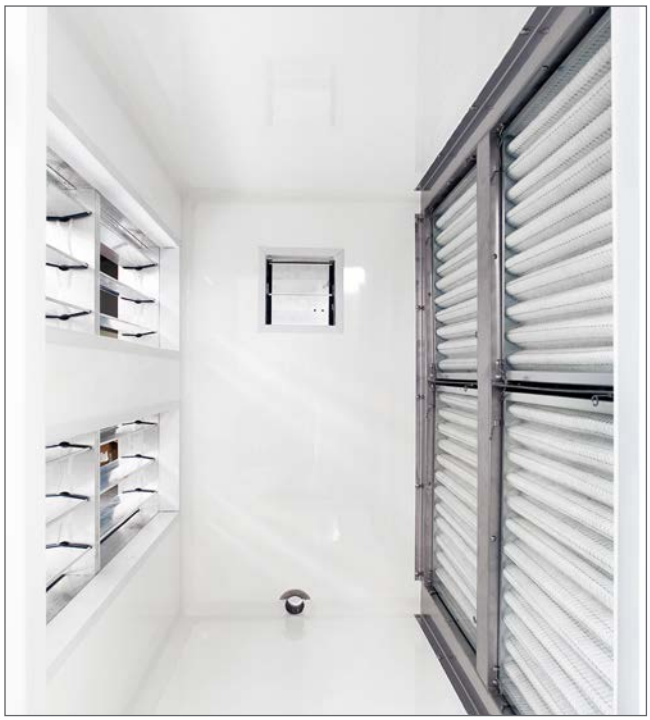
Closing **HANDLES** and hinges in AISI 304 stainless steel.

HANDLE DETAIL

MAIN CHARACTERISTICS

DAMPERS with airtight gaskets in closed position. (class L4).

COILS of any type (water-glycol, direct expansion, steam) and combination of materials (stainless steel, copper tubes, aluminum, copper, stainless steel fins, with cataphoresis treatment...) with frames in stainless steel AISI 304.



DAMPERS WITH AIRTIGHT GASKETS

SPECIAL TREATMENT COILS

Possibility of adopting **FILTER SYSTEMS** of various efficiency classes (panel filters, soft bag, rigid bag filters and absolute filters) on AISI 304 stainless steel counterframes.

PLUG-FANS treated with epoxy coating.

BAG FILTERS

PLUG-FANS

RXC/SE

HEAT RECOVERY UNITS WITH PLATE HEAT EXCHANGER

ErP 2018 COMPLIANT EcoDesign

CE

Eff. ≥90%

EC

INTRODUCTION

The sick building syndrome is a disease recognized by the World Health Organization that presents a series of symptoms due to the presence of toxic elements in the workplace.

The main sources of pollution originate both from factors inside and outside the building.

Replacing the air, not wasting energy, is the solution. Thanks to the installation of Controlled Mechanical Ventilation systems it is possible to guarantee the correct air exchange and filtration.

The heat recovery units provide the air exchange together with the recovery of a part of the thermal energy of the extracted air which is given to the fresh air at practically no cost; therefore a pre-heating in winter or a pre-cooling in summer of the introduced air is obtained, moreover they bring other advantages such as air filtration and a smaller sizing of the heating and cooling systems, allowing savings both during the purchase and the conduction of the same.

The recovery units of the RXC/SE series are available in 7 sizes, with nominal air flow rates from 400 to 4000 m^3/h. The units have been designed for false ceiling installation and are available in the **ECO**, **PLUS**, **TOP** configurations.

MAIN CHARACTERISTICS

1 | STRUCTURE

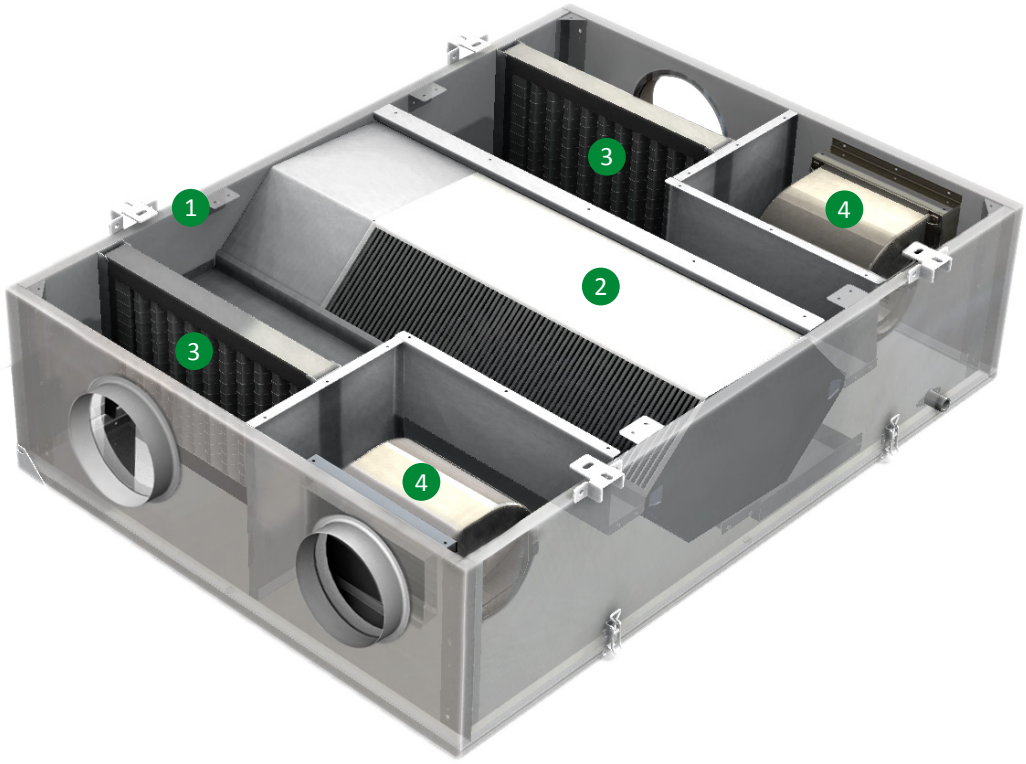
Self-supporting structure in sandwich panels with internal insulation made of high density polyurethane foam (40 kg/m3). The panels are 25 mm thick and are made of 6/10" thick steel sheets, the external side is pre-painted RAL 9010, the internal side is hot-dip galvanized Z140. The structure is made according to the EN1886 standard, class D1 mechanical resistance. A particularly adaptable and resilient neoprene gasket guarantee the air tightness. Screws that ensure an adequate and constant pressure on the gaskets fix the opening panels. In all areas subject to condensation is present a condensate drip tray, inclined internally and in compliance with EN 1.4301.
All internal components are accessible from below by means of removable panels in order to guarantee the correct ordinary and extraordinary maintenance.

3 | FILTERS

ePM10 60% (M5) filters in return air and ePM1 55% (F7) filters in fresh air. Both types of filters are mounted on slides equipped with gaskets to ensure effective sealing. Their position, upstream of the internal components, also guarantees their protection.

4 | FANS

Independently controllable, they consist of aerodynamically balanced, statically and dynamically balanced forward blade centrifugal impellers with aerodynamic profile, made of galvanized steel. The impellers are directly coupled to EC brushless motors, with internal rotor, operating via a 0-10V signal.



2 | HEAT RECOVERY

The units are equipped with an aluminium counter-flow heat exchanger used to transfer heat from the exhaust air to the fresh air.

The spacing between the fins is optimised in order to reduce air-side pressure drop and fan power consumption.

The heat recovery is also equipped with an additional by-pass damper for the management of the free-cooling and free-heating mode as per ERP regulation.

By-pass damper 100% of the airflow rate.

DEFROST SYSTEM (optional)

The automatic defrost system (optional) supplied with the units consists of a self-regulating electric coil in PWM mode of the input power, installed on the return air intake. The system is controlled by a special temperature probe positioned on the exhaust air and guarantees a considerable reduction of the input power compared to the traditional systems available on the market.

ADDITIONAL COILS (external module)

External module that can accommodate heating and/or cooling coils with a high number of rows. The module can also accommodate combined coils (water cooling, water and/or electric heating).

TECHNICAL DATA

MODEL		005	006	010	015	020	030	040
Type of ventilation unit		UVNR-B (Non Residential Ventilation Units - Bidirectional)						
Type of drive installed		Analog signal on EC fan (0-10Vdc)						
Type of fans	type/nr.	EC/2	EC/2	EC/4	EC/2	EC/2	EC/2	EC/2
Type of heat recovery system (HRS)	type/nr.	static counter-flow / 1						
Winter Thermal Efficiency (ηt_nrvu) (1)	%	77,4	78,6	77,5	77,7	78,2	78,3	77,8
Winter Thermal Efficiency (2)	%	84,5	85,6	84,6	85,7	86,1	86,9	86,6
Nominal airflow rate	m^3/h	410	650	1000	1620	2150	3040	3980
Electrical power consumption	kW	0,24	0,33	0,60	0,95	1,33	1,47	1,84
Installed electrical power	kW	0,36	0,36	0,72	1,45	1,50	2,06	2,06
SFP_{int}	$W/(m^3/s)$	1121	907	1171	1159	1151	881	1032
SFP_{lim} 2018	$W/(m^3/s)$	1215	1252	1194	1174	1166	1132	1078
Front speed at design range	m/s	2,18	1,61	2,03	2,14	1,93	2,21	2,41
External nominal pressure $\Delta p_{s,\ ext}$ (3)	Pa	150	150	150	150	150	150	150
Internal pressure drop $\Delta p_{s,\ int}$ Ret./Supp.	Pa	161/171	110/122	165/185	178/194	169/190	186/207	228/259
Fans static efficiency (UE) n.327/2011	%	29,1	27,6	29,1	31,2	30,7	43,0	45,0
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)						
Filter pressure switch		present						
Sound power level (4)	dB(A)	73,3	75,1	77,3	79,9	82,0	82,3	82,8
Sound pressure level (5)	dB(A)	57,8	59,6	61,8	64,4	66,5	66,8	67,3
Power supply	V/ph/Hz	230/1/50					400/3/50	

(1) ratio between the thermal gain of the inlet air (0 °C) and the thermal loss of the exhaust air (20 °C), both referred to the external temperature, measured under dry reference conditions, with balanced mass flow and a thermal difference of the internal/external air of 20K, excluding the thermal gain generated by the fan motors and the internal leakage, in accordance with the provisions of attached V of EU Regulation No 1253/2014

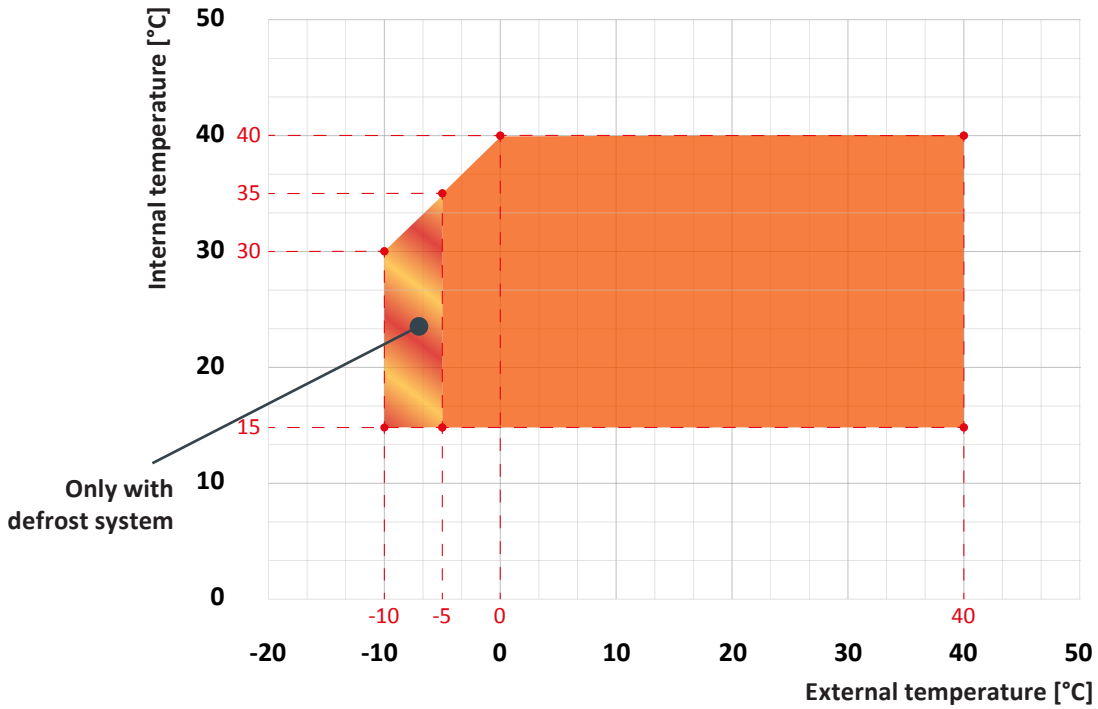
(2) outside air: -5 °C / 80 % RH - Inside air: 20 °C / 50 % RH

(3) performance with clean filters

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

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

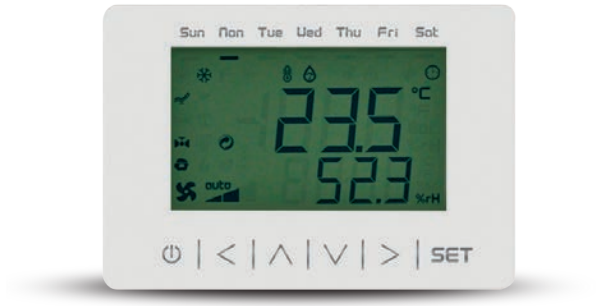
OPERATING LIMITS



CONTROL

The units are supplied complete with control system and available in the configurations **ECO**, **PLUS** and **TOP**.

ECO: complete with air temperature sensors installed on the fresh air intake and on room return air. The control allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control, summer/winter seasonal change over, and programming for daily time zones. An optional hot water or cold water coil may also be managed, controlled by a 3-way modulating valve through the room return air sensor. The optional electric post-heating coil is also managed in modulating mode (always via the room return air sensor). The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.



LCD REMOTE DISPLAY
(ECO configuration only)

PLUS: this control option is set to operate at constant pressure, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air.

The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control.

It also manages the summer/winter seasonal change over and programming for daily time zones.

The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.

The same logic can also be used to manage an electric post-heating coil, if present. The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.

TOP: this control option is set to operate at constant air-flow, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air.

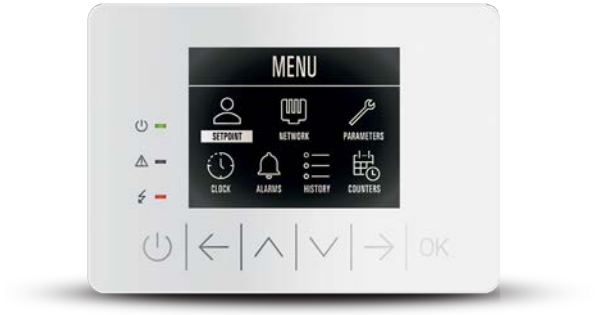
The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control.

It also manages the summer/winter seasonal change over and programming for daily time zones.

The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.

The same logic can also be used to manage an electric post-heating coil, if present.

The system alerts to the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm and this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.



LCD REMOTE GRAPHIC DISPLAY
(PLUS and TOP configurations only)

ACCESSORIES

	MODEL	005	006	010	015	020	030	040
ECO	EC Brushless supply and return fans	■	■	■	■	■	■	■
	ePM1 55% (F7) filter on supply	■	■	■	■	■	■	■
	ePM10 60% (M5) filter on return	■	■	■	■	■	■	■
	Supply and return differential pressure switches	■	■	■	■	■	■	■
	100% by-pass damper with electric actuator	■	■	■	■	■	■	■
	Microprocessor control	■	■	■	■	■	■	■
	Remotable control panel with LCD segments display (2)	■	■	■	■	■	■	■
	Built-in control sensors	■	■	■	■	■	■	■
	MODBUS RS485 serial interface card	■	■	■	■	■	■	■
	Water or electric coil managment	■	■	■	■	■	■	■
PLUS	EC Brushless supply and return fans	■	■	■	■	■	■	■
	ePM1 55% (F7) filter on supply	■	■	■	■	■	■	■
	ePM10 60% (M5) filter on return	■	■	■	■	■	■	■
	Supply and return differential pressure switches	■	■	■	■	■	■	■
	Fans differential pressure transducers	■	■	■	■	■	■	■
	100% by-pass damper with electric actuator	■	■	■	■	■	■	■
	Microprocessor control	■	■	■	■	■	■	■
	Remotable control panel with LCD graphic display (2)	■	■	■	■	■	■	■
	Built-in control sensors	■	■	■	■	■	■	■
	MODBUS RS485 serial interface card	■	■	■	■	■	■	■
	Water or electric coil managment	■	■	■	■	■	■	■
	Constant PRESSURE configuration	■	■	■	■	■	■	■
TOP	EC Brushless supply and return fans	■	■	■	■	■	■	■
	ePM1 55% (F7) filter on supply	■	■	■	■	■	■	■
	ePM10 60% (M5) filter on return	■	■	■	■	■	■	■
	Supply and return differential pressure switches	■	■	■	■	■	■	■
	Fans differential pressure transducers	■	■	■	■	■	■	■
	100% by-pass damper with electric actuator	■	■	■	■	■	■	■
	Microprocessor control	■	■	■	■	■	■	■
	Remotable control panel with LCD graphic display (2)	■	■	■	■	■	■	■
	Built-in control sensors	■	■	■	■	■	■	■
	MODBUS RS485 serial interface card	■	■	■	■	■	■	■
	Water or electric coil managment	■	■	■	■	■	■	■
	Constant FLOW configuration	■	■	■	■	■	■	■
Accessories	ePM1 55% (F7) filter on return	□	□	□	□	□	□	□
	ePM1 80% (F9) filter on supply and return	□	□	□	□	□	□	□
	ISO Coarse 45% (G4) pre-filters on supply and return	□	□	□	□	□	□	□
	Return grease ISO Coarse 40% (G2) filter	□	□	□	□	□	□	□
	Defrost system	□	□	□	□	□	□	□
	Electric post-heating coil	□	□	□	□	□	□	□
	Hot / Cold water coil (1)	□	□	□	□	□	□	□
	3 way modulating valve (2)	□	□	□	□	□	□	□
	Circular duct flanges (4 pcs.)	□	□	□	□	□	□	□
	Fresh air / Exhaust air damper	□	□	□	□	□	□	□
	On/Off damper actuator	□	□	□	□	□	□	□
	Sound attenuator (2)	□	□	□	□	□	□	□

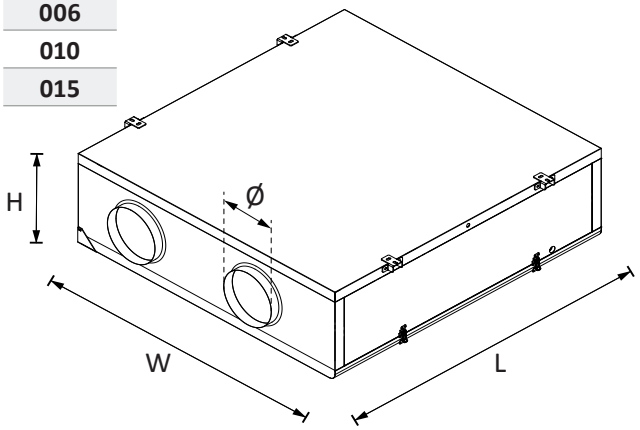
■ Standard □ Opzionale – Non disponibile

(1) *Installato in cassonetto esterno*

(2) *Fornito separatamente*

DIMENSIONAL DRAWING

MOD.
005
006
010
015



MOD.
020
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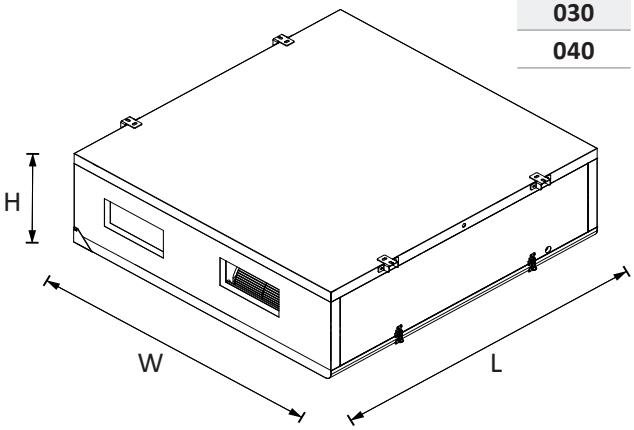
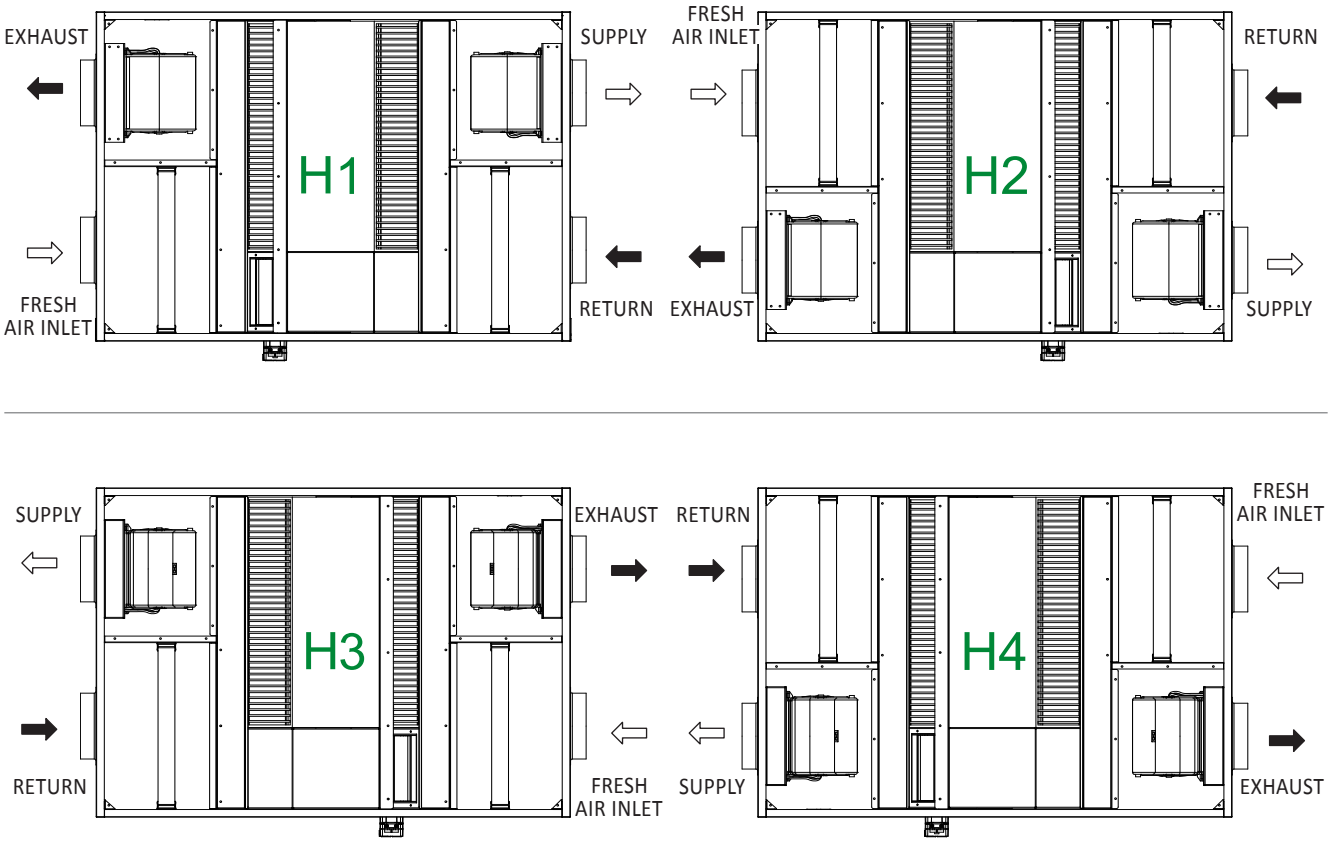


WEIGHTS AND DIMENSIONS

MODEL		005	006	010	015	020	030	040
L	mm	1250	1350	1350	1600	1600	1900	1900
W	mm	700	1000	1300	1300	1550	1650	1900
H	mm	340	380	380	500	500	580	580
Ø	mm	150	200	200	200	-	-	-
Weight *	kg	89	108	138	172	212	284	354

* Weight is referred to the basic version

CONFIGURATIONS

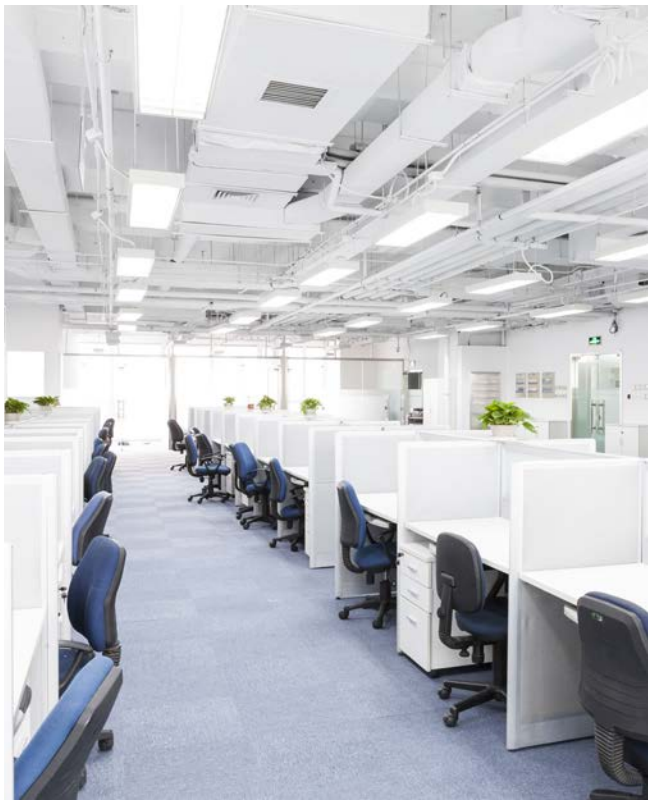


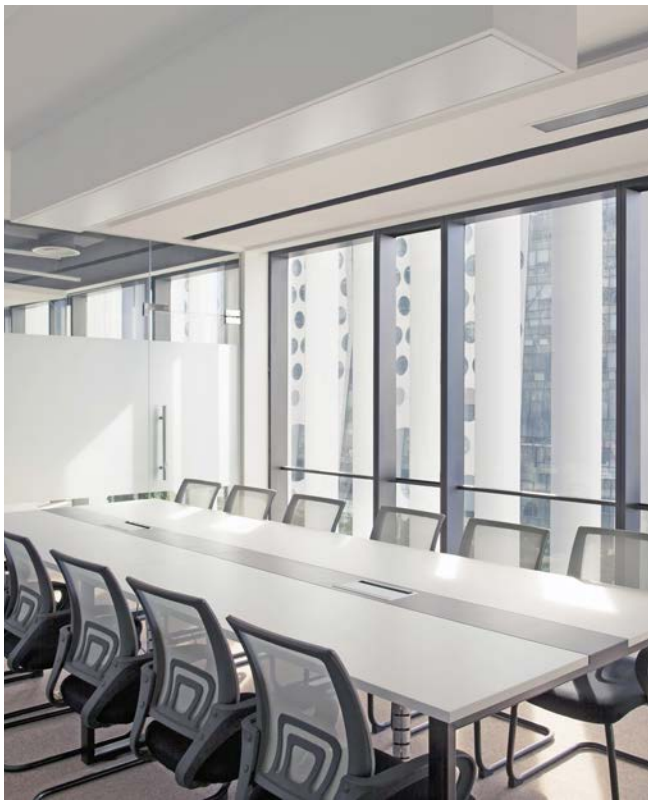
RXC/HE

HEAT RECOVERY UNITS WITH PLATE HEAT EXCHANGER

INTRODUCTION

The sick building syndrome is a disease recognized by the World Health Organization that presents a series of symptoms due to the presence of toxic elements in the workplace.
The main sources of pollution originate both from factors inside and outside the building.
Replacing the air, not wasting energy, is the solution. Thanks to the installation of Controlled Mechanical Ventilation systems it is possible to guarantee the correct air exchange and filtration.
The heat recovery units provide the air exchange together with the recovery of a part of the thermal energy of the extracted air which is given to the fresh air at practically no cost; therefore a pre-heating in winter or a pre-cooling in summer of the introduced air is obtained, moreover they bring other advantages such as air filtration and a smaller sizing of the heating and cooling systems, allowing savings both during the purchase and the conduction of the same.
The recovery units of the RXC/HE series are available in 7 sizes, with nominal air flow rates from 400 to 4000 m^3/h. The units have been designed for false ceiling installation and are available in the **ECO**, **PLUS**, **TOP** configurations.





CONSTRUCTION CHARACTERISTICS

1 | STRUCTURE

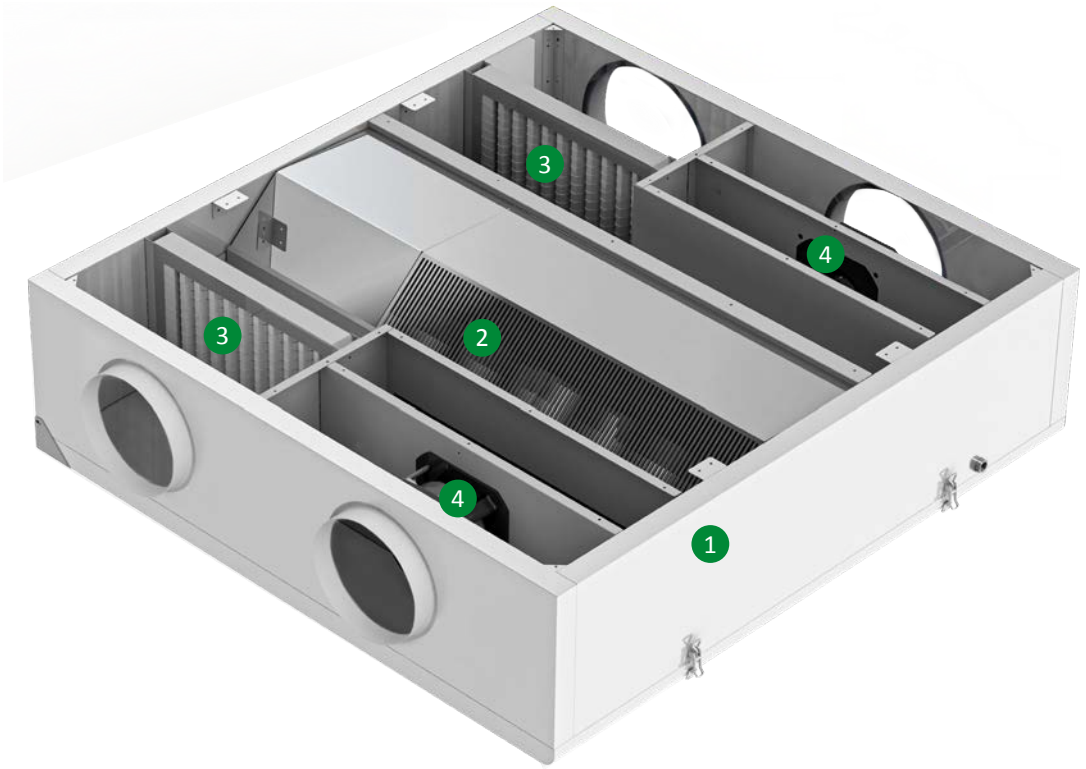
Structure in RAL 9010 steel profiles, pre-painted at 180°C with polyurethane powder paint and 50 mm thick panels.
Sheets with 6/10" thickness covered with protective film, in galvanized steel.
The internal insulation is made of high density polyurethane foam (40 kg/m^3).
The casing is made according to EN1886 standard, class D1 mechanical strength.
The air tightness is guaranteed by a particularly adaptable and resilient neoprene gasket, the tightening of the opening panels is made by means of push screws that ensure an adequate and constant pressure on the gaskets. In all areas subject to condensation there is a condensation tray, inclined internally and in compliance with EN 1.4301.

3 | FILTERS

ePM10 60% filters in return air and ePM1 55% filters in fresh air. Both types of filters are mounted on slides equipped with gaskets to ensure effective sealing. Their position, upstream of the internal components, also guarantees their protection.

4 | FANS

Independently controllable, they are made up of centrifugal impellers with reversed blades, directly coupled to electronically commuted bearing motors (EC brushless), external rotor, single-phase or three-phase (depending on the model), integral thermal protectors and able to adapt the performance to the needs of the moment (modulating air flow regulation), ensuring low consumption and reduced noise emissions.



2 | HEAT RECOVERY

The units are equipped with an aluminium counter-flow heat exchanger used to transfer heat from the exhaust air to the fresh air. The heat exchange takes place in counter-flow with efficiency higher than 80% in dry air, according to the ECO Design and Eurovent approval.

The spacing between the fins is optimised in order to reduce air side pressure drop and fan power consumption. The heat recovery is also equipped with an additional by-pass damper for the management of the free-cooling and free-heating mode as per ERP regulation.

By-pass damper 100% of the airflow rate.

DEFROST SYSTEM (optional)

The automatic defrost system (optional) supplied with the units consists of a self-regulating electric coil in PWM mode of the input power, installed on the return air intake. The system is controlled by a special temperature probe positioned on the exhaust air and guarantees a considerable reduction of the input power compared to the traditional systems available on the market.

ADDITIONAL COILS (optional + external module)

External module that can accommodate heating and/or cooling coils with a high number of rows. The module can also accommodate combined coils (water cooling, water and/or electric heating).

TECHNICAL DATA

MODEL		005	006	010	015	020	030	040
Type of ventilation unit		UVNR-B (Non Residential Ventilation Units - Bidirectional)						
Type of drive installed		Analog signal on EC fan (0-10Vdc)						
Type of fans	type/nr.	EC/2	EC/2	EC/4	EC/4	EC/2	EC/2	EC/2
Type of heat recovery system (HRS)	type/nr.	static counter-flow / 1						
Winter Thermal Efficiency (ηt_nrvu) [1]	%	81,2	82,5	81,4	81,6	82,1	82,1	81,7
Winter Thermal Efficiency [2]	%	87,7	88,8	87,8	88,9	89,3	90,2	89,9
Nominal airflow rate	m^3/h	410	650	1000	1620	2150	3040	3980
Electrical power consumption	kW	0,155	0,219	0,374	0,637	0,888	1,348	1,754
Installed electrical power	kW	0,33	0,33	0,67	0,67	1,00	1,50	2,46
SFP_{int}	$W/(m^3/s)$	749	554	752	862	913	1016	1076
SFP_{lim} 2018	$W/(m^3/s)$	1329	1358	1311	1291	1283	1246	1195
Front speed at design range	m/s	2,17	1,61	2,03	2,14	1,93	2,22	2,42
External nominal pressure $\Delta p_{s,\ ext}$ [3]	Pa	150	150	150	150	150	150	150
Internal pressure drop $\Delta p_{s,\ int}$ Ret./Supp.	Pa	179/186	120/132	177/199	224/242	221/255	256/269	303/328
Fans static efficiency (UE) n.327/2011	%	47,5	44,0	48,7	52,6	50,9	49,9	57,2
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)						
Filter pressure switch		present						
Sound power level L_{WA} [4]	dB(A)	68,6	72,5	73,0	73,8	79,0	83,2	83,4
Sound pressure level [5]	dB(A)	53,1	57,0	57,5	58,3	63,5	67,7	67,9
Power supply	V/ph/Hz	230/1/50						400/3/50

[1] ratio between the thermal gain of the inlet air (0 °C) and the thermal loss of the exhaust air (20 °C), both referred to the external temperature, measured under dry reference conditions, with balanced mass flow and a thermal difference of the internal/external air of 20K, excluding the thermal gain generated by the fan motors and the internal leakage, in accordance with the provisions of attached V of EU Regulation No 1253/2014

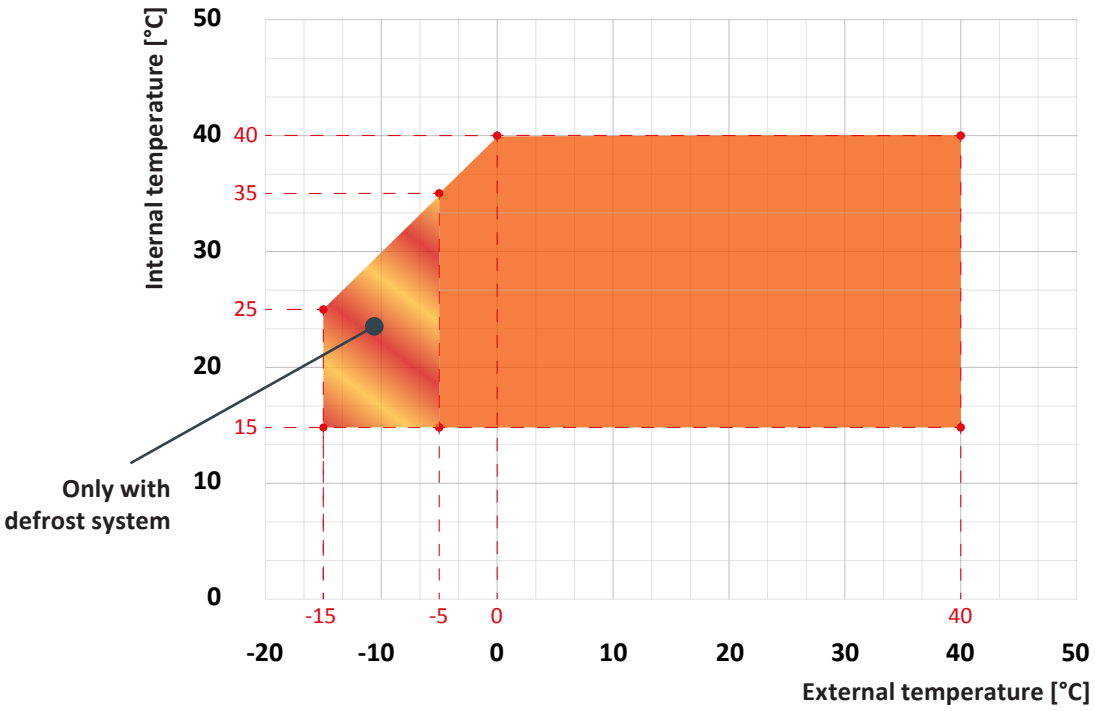
[2] outside air: -5 °C / 80 % RH - Inside air: 20 °C / 50 % RH

[3] performance with clean filters

[4] sound power level calculated in accordance with EN 3744

[5] sound pressure level measured at 1 m free field distance, in accordance with EN 3744

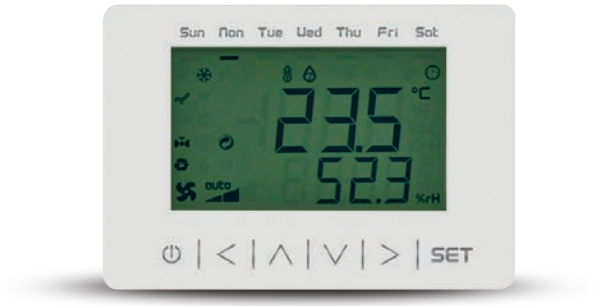
OPERATING LIMITS



CONTROL

The units are supplied complete with control system and available in the configurations **ECO**, **PLUS** and **TOP**.

ECO: complete with air temperature sensors installed on the fresh air intake and on room return air. The control allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control, summer/winter seasonal change over, and programming for daily time zones. An optional hot water or cold water coil may also be managed, controlled by a 3-way modulating valve through the room return air sensor. The optional electric post-heating coil is also managed in modulating mode (always via the room return air sensor). The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.



LCD REMOTE DISPLAY
(ECO configuration only)

PLUS: this control option is set to operate at constant pressure, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air.

The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control.

It also manages the summer/winter seasonal change over and programming for daily time zones.

The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.

The same logic can also be used to manage an electric post-heating coil, if present. The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.

TOP: this control option is set to operate at constant air-flow, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air.

The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control.

It also manages the summer/winter seasonal change over and programming for daily time zones.

The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.

The same logic can also be used to manage an electric post-heating coil, if present.

The system alerts to the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm and this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.

LCD REMOTE GRAPHIC DISPLAY
(PLUS and TOP configurations only)

ACCESSORIES

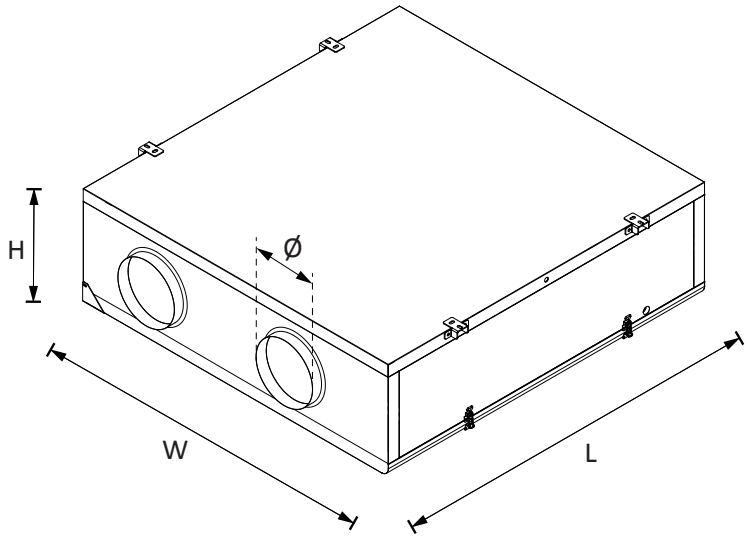
	MODEL	005	006	010	015	020	030	040
ECO	EC Brushless supply and return fans	■	■	■	■	■	■	■
	ePM1 55% (F7) filter on supply	■	■	■	■	■	■	■
	ePM10 60% (M5) filter on return	■	■	■	■	■	■	■
	Supply and return differential pressure switches	■	■	■	■	■	■	■
	100% by-pass damper with electric actuator	■	■	■	■	■	■	■
	Microprocessor control	■	■	■	■	■	■	■
	Remotable control panel with LCD segments display (2)	■	■	■	■	■	■	■
	Built-in control sensors	■	■	■	■	■	■	■
	MODBUS RS485 serial interface card	■	■	■	■	■	■	■
	Water or electric coil managment	■	■	■	■	■	■	■
PLUS	EC Brushless supply and return fans	■	■	■	■	■	■	■
	ePM1 55% (F7) filter on supply	■	■	■	■	■	■	■
	ePM10 60% (M5) filter on return	■	■	■	■	■	■	■
	Supply and return differential pressure switches	■	■	■	■	■	■	■
	Fans differential pressure transducers	■	■	■	■	■	■	■
	100% by-pass damper with electric actuator	■	■	■	■	■	■	■
	Microprocessor control	■	■	■	■	■	■	■
	Remotable control panel with LCD graphic display (2)	■	■	■	■	■	■	■
	Built-in control sensors	■	■	■	■	■	■	■
	MODBUS RS485 serial interface card	■	■	■	■	■	■	■
	Water or electric coil managment	■	■	■	■	■	■	■
	Constant PRESSURE configuration	■	■	■	■	■	■	■
TOP	EC Brushless supply and return fans	■	■	■	■	■	■	■
	ePM1 55% (F7) filter on supply	■	■	■	■	■	■	■
	ePM10 60% (M5) filter on return	■	■	■	■	■	■	■
	Supply and return differential pressure switches	■	■	■	■	■	■	■
	Fans differential pressure transducers	■	■	■	■	■	■	■
	100% by-pass damper with electric actuator	■	■	■	■	■	■	■
	Microprocessor control	■	■	■	■	■	■	■
	Remotable control panel with LCD graphic display (2)	■	■	■	■	■	■	■
	Built-in control sensors	■	■	■	■	■	■	■
	MODBUS RS485 serial interface card	■	■	■	■	■	■	■
	Water or electric coil managment	■	■	■	■	■	■	■
	Constant FLOW configuration	■	■	■	■	■	■	■
Accessories	ePM1 55% (F7) filter on return	□	□	□	□	□	□	□
	ePM1 80% (F9) filter on supply and return	□	□	□	□	□	□	□
	ISO Coarse 45% (G4) pre filters on supply and return	□	□	□	□	□	□	□
	Return grease ISO Coarse 40% (G2) filter	□	□	□	□	□	□	□
	Defrost system	□	□	□	□	□	□	□
	Electric post-heating coil	□	□	□	□	□	□	□
	Hot / Cold water coil (1)	□	□	□	□	□	□	□
	3 way modulating valve (2)	□	□	□	□	□	□	□
	Circular duct flanges (4 pcs.)	□	□	□	□	□	□	□
	Fresh air / Exhaust air damper	□	□	□	□	□	□	□
	On/Off damper actuator	□	□	□	□	□	□	□
	Sound attenuator (2)	□	□	□	□	□	□	□

■ Standard □ Optional – Not available

(1) *Mounted in a separate box*

(2) *Supplied loose*

DIMENSIONAL DRAWING

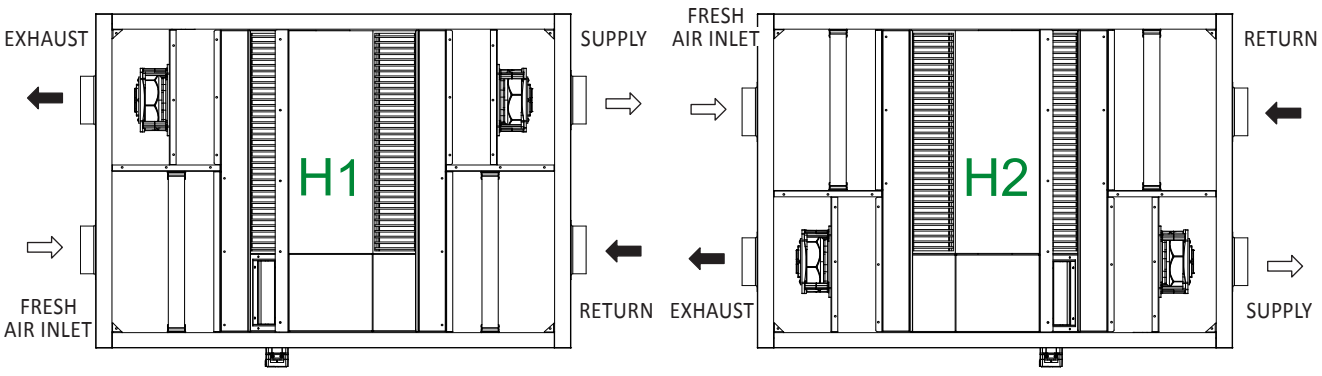


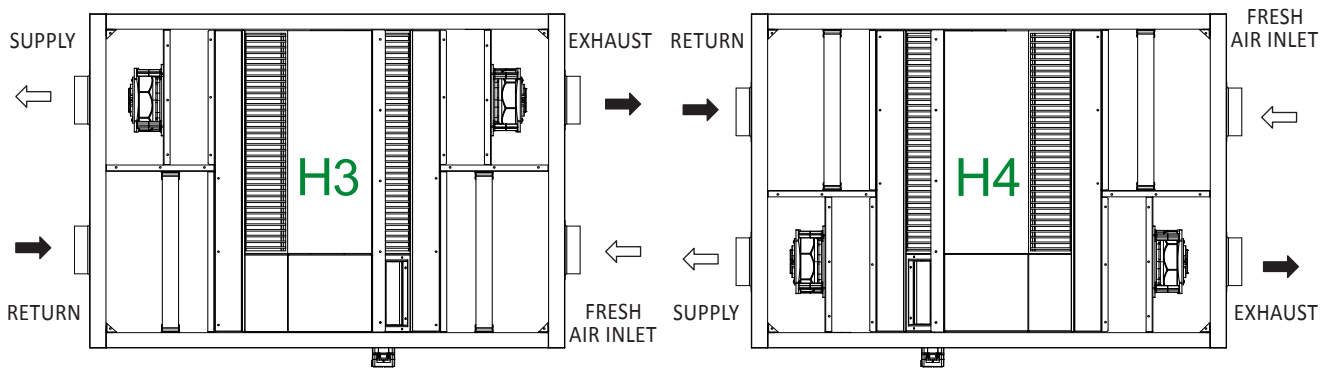
WEIGHTS AND DIMENSIONS

MODEL		005	006	010	015	020	030	040
L	mm	1300	1400	1400	1650	1650	1950	1950
W	mm	750	1050	1350	1350	1600	1700	1950
H	mm	390	430	430	550	550	630	630
Ø	mm	150	150	180	200	250	315	315
Weight *	kg	117	133	180	226	288	338	369

* Weight is referred to the basic version

CONFIGURATIONS





RLHE

HEAT RECOVERY UNITS WITH PLATE HEAT EXCHANGER

DESCRIPTION

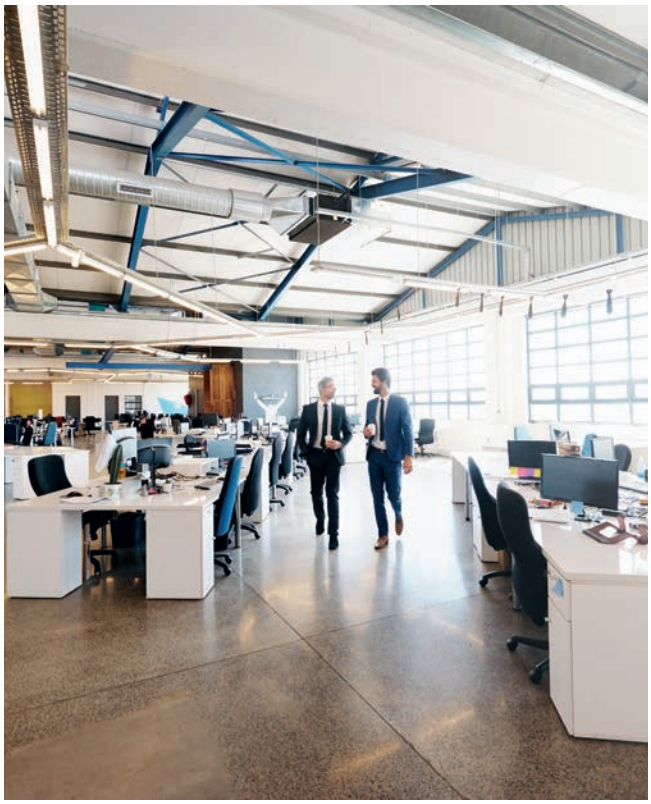
The range of RLHE heat recovery units consists of 6 models, with nominal airflow rates of 500, 1000, 1500, 2000, 3000, 4000 m^3/h. Each model is available in horizontal installation (H), for false ceiling or floor installation (on request) or vertical installation (V).

All models are also available in the following configurations:

BASIC (unit without control);
CEM (unit with electro-mechanical control);
PLUS (constant pressure unit);
TOP (constant flow unit);
PREMIUM (unit with CO_2 probe and constant pressure).

TECHNICAL SPECIFICATIONS

- Complies with European Regulation 1253-2014EU version 2018 (ERP 2018).
- Static heat recovery in counter-flow efficiency.
- Backward blade fans with brushless EC motors.
- Reduced sound emission levels.
- Reduced heights for horizontal (false ceiling or floor) or vertical installation.
- Possibility to change the position and orientation of the airflows on site.
- Plug & Play installation with factory pre-testing.
- Possibility of control and regulation of ventilation with constant flow rate, constant pressure or CO_2 control.



MAIN CHARACTERISTICS

1 | STRUCTURE

- Structure in 40 mm anodized aluminium profiles.
- Double panelling (sandwich), thickness 23 mm.
- Internal insulation in polyurethane foam, density 40 kg/m^3.
- External panel, 0.6 mm thick, in pre-painted steel, covered with protective film.
- Internal panel, 0.6 mm thick, in galvanized steel.
- Feet and brackets, for floor or false ceiling installation.
- Removable panels for direct access to filters and internal components.

2 | HEAT RECOVERY

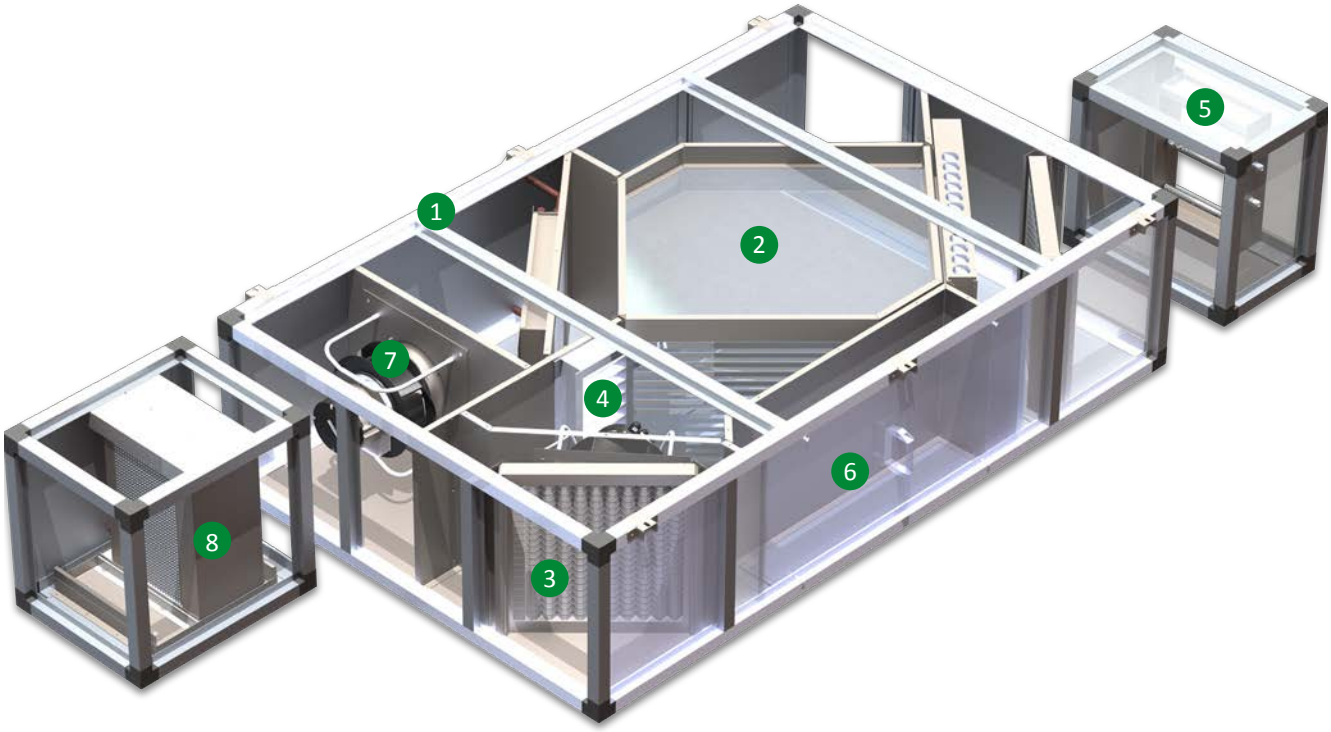
The RLHE range is equipped with aluminium heat exchanger, of the counter-flow type, whose Eurovent certified efficiency at nominal flow rate is between 85% and 92% depending on the model.
By-pass damper for 100% of the airflow rate.

6 | CONTROLS AND SAFETY DEVICES

All RLHE versions (with the exception of the BASIC version, without any control) are supplied complete with differential pressure switch filters and main door lock switch as standard.

The CEM versions are also complete with a remote control panel that integrates two trimmers to regulate the rotation speed of the supply and return EC fans, which can be managed independently, the control for summer/winter setting and filter clogging indicator light.

The units are also equipped with ON/OFF servocontrol to activate free-cooling mode.
The remote panel is complete with key lock.



3 | FILTERS

ISO Coarse 45% (G4) filters for air extraction and ePM1 55% (F7) filters for fresh air intake. Both types of filters are mounted on slides equipped with gaskets to ensure effective sealing.

Their position, upstream of the internal components, also guarantees their protection.

4 | RECIRCULATION DAMPER (optional)

Internal recirculation damper with automatic actuation by servocontrol.

5 | KIT WINTER PACK (external module)

Defrosting system with electric coil, complete with casing and integrated control.

7 | FANS

Independently controllable, they are made up of centrifugal impellers with reversed blades, directly coupled to electronically commuted bearing motors (EC brushless), external rotor, single-phase or three-phase (depending on the model), integral thermal protectors and able to adapt the performance to the needs of the moment (modulating air flow regulation), ensuring low consumption and reduced noise emissions.

8 | ADDITIONAL COILS (external module)

External module that can contain heating and/or cooling coils with a high number of rows.
The module can also contain combined coils (water cooling, water and/or electric heating).

TECHNICAL DATA

MODEL		005	010	015	020	030	040
Type of ventilation unit		UVNR-B (Non Residential Ventilation Units - Bidirectional)					
Type of drive installed		Analog signal on EC fan (0-10Vdc)					
Type of fans	type/nr.	EC/2	EC/2	EC/2	EC/2	EC/2	EC/2
Type of heat recovery system (HRS)	type/nr.	static counter-flow / 1					
Winter Thermal Efficiency (ηt_nrvu) (1)	%	81,2	81,9	82,3	82,9	84,7	82,7
Winter Thermal Efficiency (2)	%	88,8	90,8	91,3	92,1	92,9	90,6
Nominal airflow rate	m^3/h	500	1000	1500	2000	3000	4000
Electrical power consumption	kW	0,21	0,45	0,69	0,84	1,36	2,02
Installed electrical power	kW	0,34	1,00	1,50	1,50	2,40	3,60
SFP_{int}	$W/(m^3/s)$	858	985	1009	919	1017	1059
SFP_{lim} 2018	$W/(m^3/s)$	1175	1175	1167	1164	1176	1074
Front speed at design range	m/s	2,05	2,46	2,33	2,01	2,20	2,07
External nominal pressure $\Delta p_{s,\ ext}$ (3)	Pa	150	150	150	150	150	150
Internal pressure drop $\Delta p_{s,\ int}$ Ret./Supp.	Pa	216/215	274/281	319/345	291/311	331/366	309/339
Fans static efficiency (UE) n.327/2011	%	48,1	52,4	58,8	59,4	61,6	52,7
Max. external / internal leakage percentage	%	max 3,5 % at -400 Pa | max 5,0 % at +250 Pa					
Energy classification filters		ePM1 50% (F7) | ePM10 50% (G4)					
Filter pressure switch		present					
Sound power level (4)		70,6	75,5	74,8	76,9	78,0	85,4
Sound pressure level (5)	dB(A)	48,9	53,8	53,1	55,2	56,3	63,7
Power supply	V/ph/Hz	230/1/50				400/3/50	

(1) ratio between the thermal gain of the inlet air (0 °C) and the thermal loss of the exhaust air (20 °C), both referred to the external temperature, measured under dry reference conditions, with balanced mass flow and a thermal difference of the internal/external air of 20K, excluding the thermal gain generated by the fan motors and the internal leakage, in accordance with the provisions of attached V of EU Regulation No 1253/2014

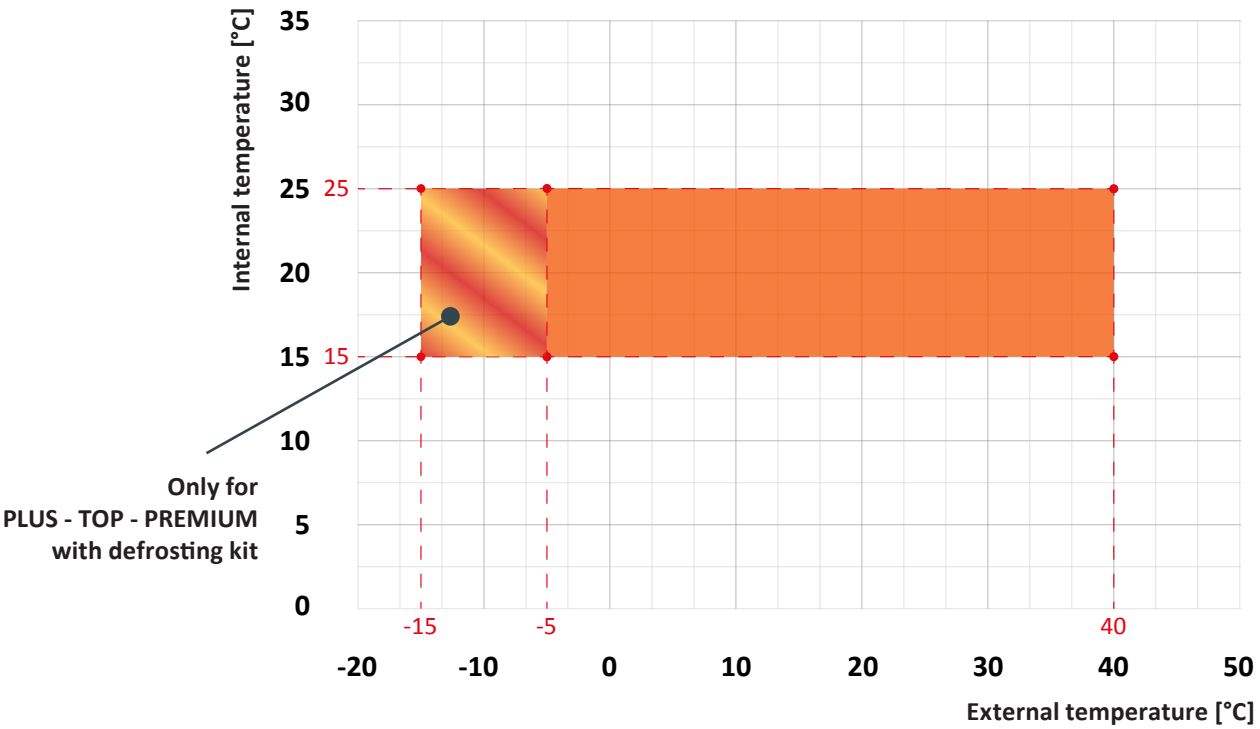
(2) outside air: -5 °C / 80 % RH - Inside air: 20 °C / 50 % RH.

(3) performance with clean filters

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

(5) sound pressure level measured at 3 m free field distance, in accordance with EN 3744

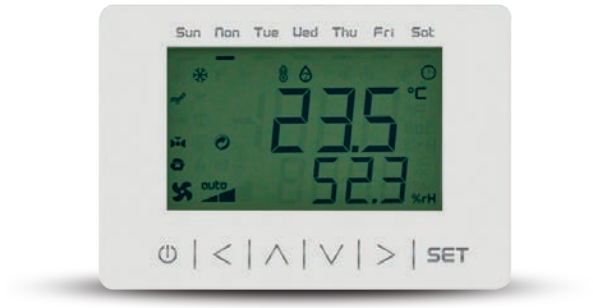
OPERATING LIMITS



CONTROL

The PLUS, TOP and PREMIUM versions are complete with control panel and thermoregulation for the management of the unit with the following specifications:

- General alert contact.
- ON/OFF remote control.
- Summer/winter season change.
- External air temperature probe.
- Supply air temperature probe.
- Return air temperature probe.
- Pressure switches to signal dirty filters.
- Remote control panel with LCD display.
- RS-485 serial port Modbus protocol.
- Management of unit daily time slots.
- Free-cooling damper management.
- Defrosting management.
- Pressure differential transducer.
- Fan speed control with 0-10 Vdc signal.
- Water and electric coils management.
- Management of additional dampers.
- Electro-mechanical remote control panel with 0-10 V regulation trimmers *(CEM versions only)*.
- Constant pressure rate unit management *(PLUS versions only)*.
- Constant flow unit management *(TOP versions only)*.
- CO_2 probe management *(PREMIUM versions only)*.



LCD REMOTE DISPLAY

REMOTE CONTROL PANEL (CEM)

CO_2 PROBE

ACCESSORIES

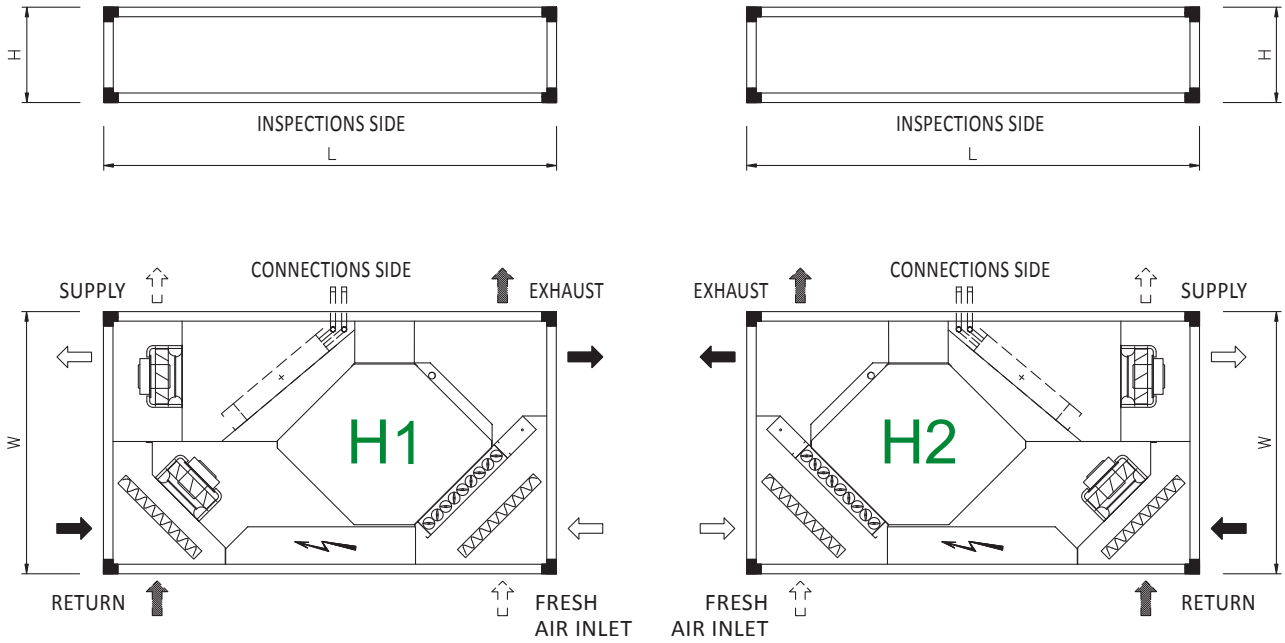
MODEL	005	010	015	020	030	040
Brushless EC supply / return fans	■	■	■	■	■	■
Supply ePM1 55% (F7) filtration	■	■	■	■	■	■
Return ISO Coarse 45% (G4) filtration	■	■	■	■	■	■
Pressure switches to signal dirty filters	■	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■	■
Return ePM1 55% (F7) filtration	□	□	□	□	□	□
Soundproofed version	□	□	□	□	□	□
Water post heating coil (internal) *	□	□	□	□	□	□
Water cooling coil (external module) *	□	□	□	□	□	□
Direct expansion cooling coil (external module) *	□	□	□	□	□	□
Electric post-heating coil (internal) *	□	□	□	□	□	□
Winter Pack electric defrosting kit (external module) *	□	□	□	□	□	□
Remote control panel with LCD display	□	□	□	□	□	□
Dampers on fresh, exhaust, supply, return air	□	□	□	□	□	□
Recirculation damper	□	□	□	□	□	□
Round connections kit	□	□	□	□	□	□
Rain roof	□	□	□	□	□	□
Rainhood with bird screen	□	□	□	□	□	□
CO_2 probe	□	□	□	□	□	□

■ Standard □ Optional – Not available

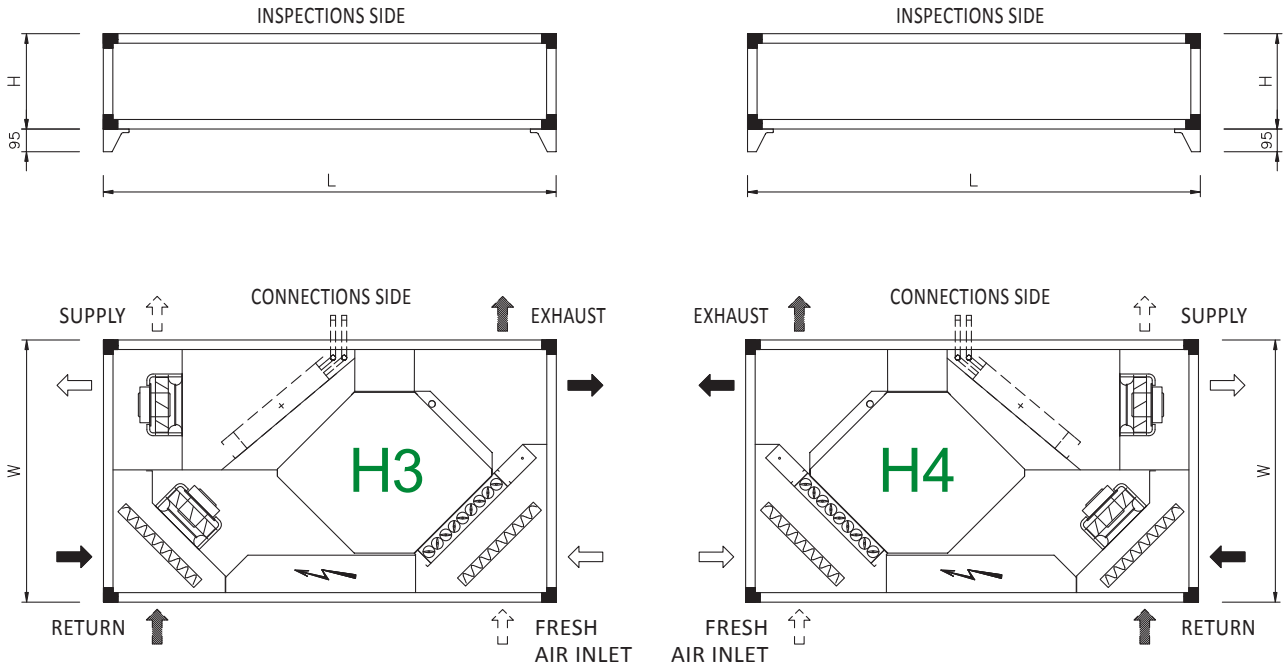
** All coils can be combined with each other in order to obtain the desired thermo-hygrometric treatment.*

DIMENSIONAL DRAWINGS

HORIZONTAL CONFIGURATION FOR FALSE CEILING



HORIZONTAL CONFIGURATION FOR GROUND INSTALLATION



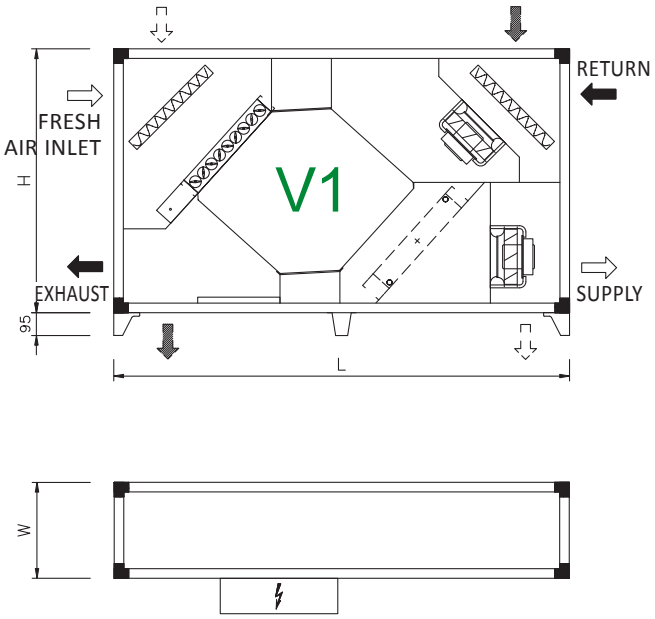
DIMENSIONS AND WEIGHTS

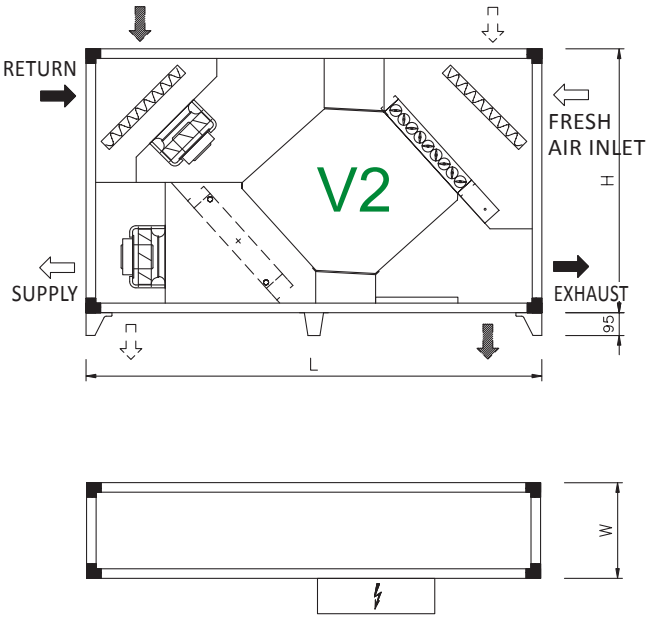
MODEL		005	010	015	020	030	040
L	mm	1400	1900	1980	2200	2400	3000
W	mm	970	1100	1200	1400	1550	1900
H	mm	400	400	470	550	680	680
Weight *	kg	96	137	176	230	300	435

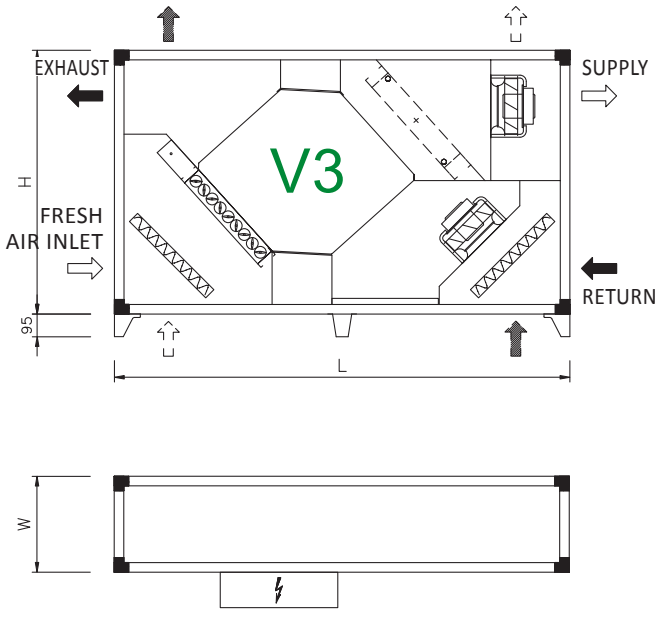
* Weight is referred to the basic version

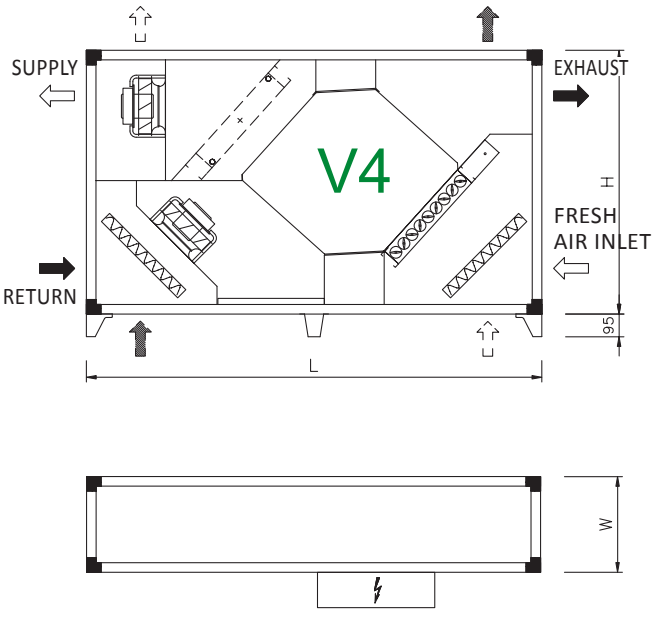
DIMENSIONAL DRAWINGS

VERTICAL CONFIGURATION









DIMENSIONS AND WEIGHTS

MODEL		005	010	015	020	030	040
L	mm	1400	1900	1980	2200	2400	3000
W	mm	400	400	470	550	680	680
H	mm	970	1100	1200	1400	1550	1900
Weight *	kg	93	137	190	224	298	412

* Weight is referred to the basic version

RXH/HE

HEAT RECOVERY UNITS WITH PLATE HEAT EXCHANGER

INTRODUCTION

Any occupied room requires the correct supply of fresh air and, at the same time, the control of the internal thermo-hygrometric conditions, through the recovery of energy from the air extracted from the room, by means of static counter-flow heat recoveries, the level of well-being of the occupants is guaranteed, both in summer and winter.

For buildings that require air changes and are not equipped with dedicated air conditioning systems, the installation of such units allows the supply of primary air at controlled temperature without substantially changing the internal conditions in the occupied spaces.

These units also make it possible to guarantee support for the air conditioning system in the intermediate seasons using free-cooling or free-heating modes.
These units, if installed on existing buildings, guarantee the energy requalification of the system through the management of the air change without additional charges; in the case of new installations, instead, the air change is completely carried out allowing to reduce the size of the main air conditioning system.
In the intermediate seasons the building will benefit from free or partially-generated cooling from these units, which during the partial load phases allow the main system to operate with higher efficiency.

MAIN CHARACTERISTICS

STRUCTURE AND PANELS

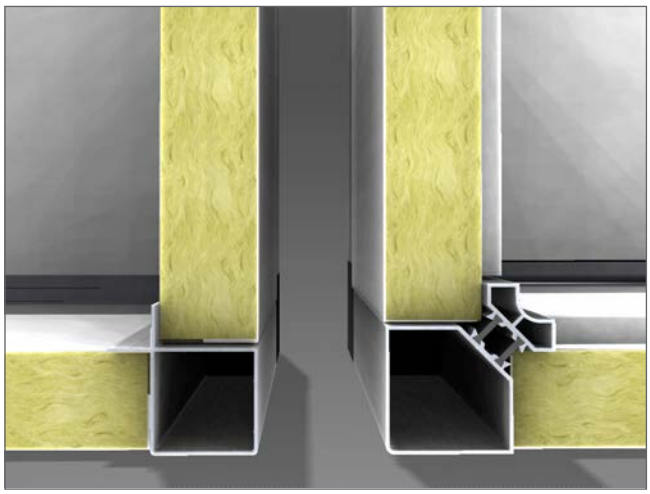
The structure of the units can be realized in two versions:

VERSION 1:

Profiles 50 x 50 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 50 mm thick double-walled sandwich type paneling with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T3/TB4 according to EN1886.

VERSION 2:

Thermal break profiles 60 x 60 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 63 mm thermal break sandwich-type double-walled sandwich type panels with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T2/TB2 according to EN1886.



PROFILE 50 mm | PROFILE 60 mm

Safety microswitches are applied to the inspection doors to allow internal access to the various compartments of the unit only when the unit is completely switched off.
The main access and inspection panels consist of inspection doors with perimeter hinges made of non-corrosive polyamide and handles.

All units can be supplied in both monobloc and modular sections for on-site assembly when required.

AIR FILTERS

ePM10 60% (M5) filters in return air and ePM1 55% (F7) rigid bag filters in fresh air. Both types of filters are mounted on slides equipped with gaskets to ensure effective sealing. Their position, upstream of the internal components, also guarantees their protection.

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 regulation of the airflow both in the supply and extract section, ensuring that all regulatory requirements such as SFP are met with. The airflow rate of the fan is managed through the integrated electronic control system thus ensuring, according to the needs of the system, that the correct operation of the unit is maintained with consequent saving of the energy absorbed by the unit.
The fans are fixed to the frame by means of selfcentering brackets to ensure the correct distance between the impeller and the nozzle, thus optimizing performance.

PLUG FANS

HEAT RECOVERY

The units are equipped with an aluminium counter-flow heat exchanger used to transfer heat from the exhaust air to the fresh air.

The heat exchange takes place in counter-flow with efficiency higher than 80% in dry air, according to the ECO Design and Eurovent approval.

The spacing between the fins is optimised in order to reduce air-side pressure drop and fan power consumption. In some conditions of low outside air temperature and high humidity, the exchanger may start to frost.

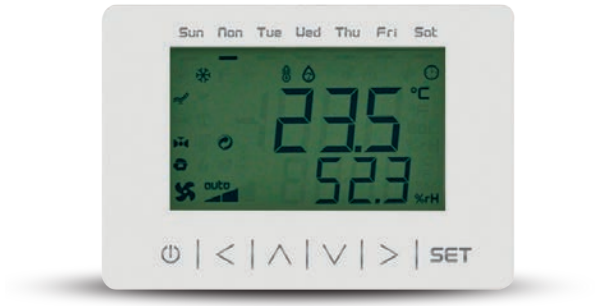
The units are equipped with a defrost system required in case of very low ambient conditions. The defrost system can either be electric or by hot water.

The heat recovery is also equipped with an additional by-pass damper for the management of the free-cooling and free-heating mode.

CONTROL

The units are supplied complete with control system and available in the configurations **ECO**, **PLUS** and **TOP**.

ECO: complete with air temperature sensors installed on the fresh air intake and on room return air. The control allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control, summer/winter seasonal change over, and programming for daily time zones. An optional hot water or cold water coil may also be managed, controlled by a 3-way modulating valve through the room return air sensor. The optional electric post-heating coil is also managed in modulating mode (always via the room return air sensor). The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.



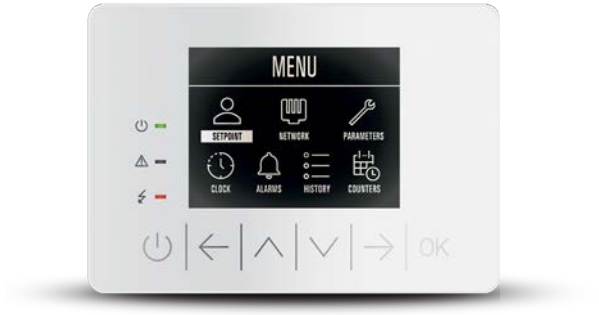
LCD REMOTE DISPLAY
(ECO configuration only)

PLUS: this control option is set to operate at constant pressure, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air. The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control. It also manages the summer/winter seasonal change over and programming for daily time zones.

The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.

The same logic can also be used to manage an electric post-heating coil, if present. The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.

TOP: this control option is set to operate at constant air-flow, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air.
The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control.
It also manages the summer/winter seasonal change over and programming for daily time zones. The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.
The same logic can also be used to manage an electric post-heating coil, if present.
The system alerts to the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm and this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.



LCD REMOTE GRAPHIC DISPLAY
(PLUS and TOP configurations only)

TECHNICAL DATA

MODEL		010	020	030	045	060
Type of ventilation unit		UVNR-B (Non Residential Ventilation Units - Bidirectional)				
Type of drive installed		Analog signal on EC fan (0-10Vdc)				
Type of fans	type/nr.	EC/2	EC/2	EC/2	EC/2	EC/2
Type of heat recovery system (HRS)	type/nr.	static counter-flow / 1				
Winter Thermal Efficiency (ηt_nrvu) (1)	%	80,7	81,1	80,5	81,4	81,3
Winter Thermal Efficiency (2)	%	89,5	90,7	90,2	91,8	91,9
Nominal airflow rate	m^3/h	1000	2000	3000	4500	6000
Electrical power consumption	kW	0,45	0,86	1,30	2,10	2,78
Installed electrical power	kW	1,00	1,50	2,46	3,80	5,00
SFP_{int}	$W/(m^3/s)$	770	782	816	910	944
SFP_{lim} 2018	$W/(m^3/s)$	1289	1260	1200	1165	1099
Front speed at design range	m/s	1,07	1,24	1,21	1,67	1,67
External nominal pressure $\Delta p_{s, ext}$ (3)	Pa	250	250	250	250	250
Internal pressure drop $\Delta p_{s, int}$ Ret./Supp.	Pa	191 / 212	220 / 245	238 / 256	246 / 275	277 / 311
Fans static efficiency (UE) n.327/2011	%	52,2	59,7	61,3	59,1	63,8
Max. external (EN1886) / internal leakage	%	L1 | max 5,0 % at +250 Pa				
Energy classification filters		ePM1 65% (F7) | ePM10 65% (M5)				
Filter pressure switch		present				
Sound power level (4)	dB(A)	63,0	66,0	63,0	69,0	69,0
Sound pressure level (5)	dB(A)	51,0	54,0	51,0	57,0	57,0
Power supply	V/ph/Hz	230/1/50		400/3/50		

MODEL		080	100	130	170	240
Type of ventilation unit		UVNR-B (Non Residential Ventilation Units - Bidirectional)				
Type of drive installed		Analog signal on EC fan (0-10Vdc)				
Type of fans	type/nr.	EC/2	EC/2	EC/4	EC/4	EC/4
Type of heat recovery system (HRS)	type/nr.	static counter-flow / 1				
Winter Thermal Efficiency (ηt_nrvu) (1)	%	81,0	83,4	81,5	82,0	82,7
Winter Thermal Efficiency (2)	%	91,6	93,2	90,8	93,4	92,6
Nominal airflow rate	m^3/h	8000	10000	13000	17000	24000
Electrical power consumption	kW	3,92	4,68	5,83	7,97	12,27
Installed electrical power	kW	5,80	6,90	10,00	11,60	22,80
SFP_{int}	$W/(m^3/s)$	1021	959	860	935	1051
SFP_{lim} 2018	$W/(m^3/s)$	1040	1112	1055	1070	1091
Front speed at design range	m/s	1,65	1,75	2,19	2,07	2,29
External nominal pressure $\Delta p_{s, ext}$ (3)	Pa	250	250	250	250	250
Internal pressure drop $\Delta p_{s, int}$ Ret./Supp.	Pa	304 / 342	278 / 318	240 / 273	262 / 297	292 / 328
Fans static efficiency (UE) n.327/2011	%	62,9	63,2	60,7	60,8	59,2
Max. external (EN1886) / internal leakage	%	L1 | max 5,0 % at +250 Pa				
Energy classification filters		ePM1 65% (F7) | ePM10 65% (M5)				
Filter pressure switch		present				
Sound power level (4)	dB(A)	72,0	73,0	67,0	68,0	75,0
Sound pressure level (5)	dB(A)	60,0	61,0	55,0	56,0	63,0
Power supply	V/ph/Hz	400/3/50				

(1) ratio between the thermal gain of the inlet air (0 °C) and the thermal loss of the exhaust air (20 °C), both referred to the external temperature, measured under dry reference conditions, with balanced mass flow and a thermal difference of the internal/external air of 20K, excluding the thermal gain generated by the fan motors and the internal leakage, in accordance with the provisions of attached V of EU Regulation No 1253/2014

(2) outside air: -5 °C / 80 % RH - Inside air: 20 °C / 50 % RH

(3) performance with clean filters

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

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

ACCESSORIES

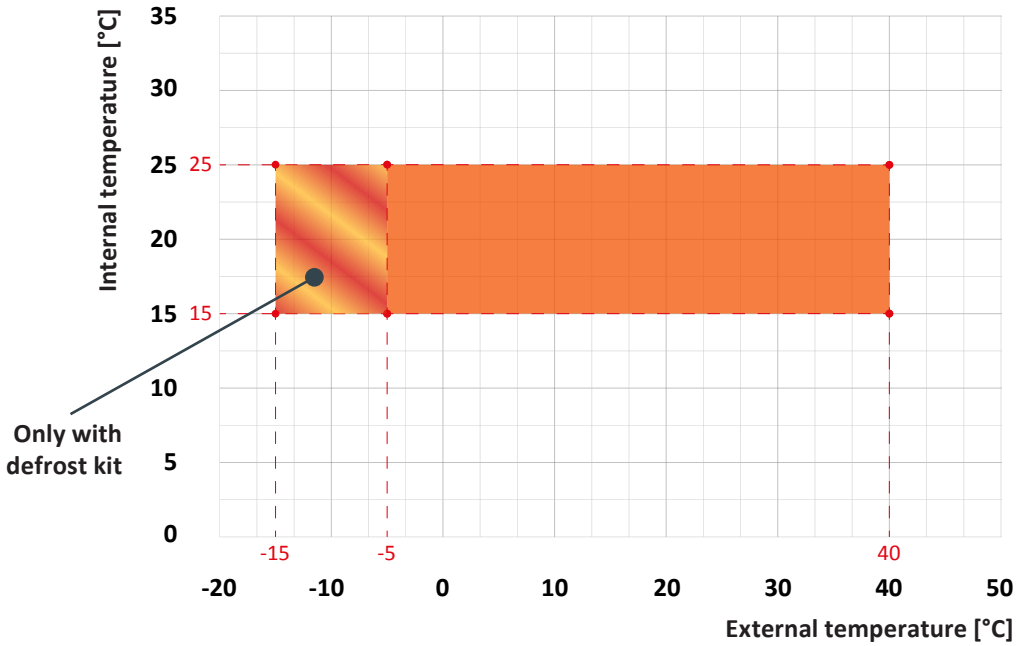
MODEL	010	020	030	045	060	080	100	130	170	240
Filters ePM10 60% (M5) on return / ePM1 55% (F7) on supply	■	■	■	■	■	■	■	■	■	■
By-pass damper 100% motorized	■	■	■	■	■	■	■	■	■	■
EC brushless fans on supply/return	■	■	■	■	■	■	■	■	■	■
Filters differential pressure switches	■	■	■	■	■	■	■	■	■	■
Fans differential pressure transducers	■	■	■	■	■	■	■	■	■	■
Microprocessor control system with display	■	■	■	■	■	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■	■	■	■	■	■
50 mm frame or 60 mm thermal break frame	□	□	□	□	□	□	□	□	□	□
40 kg/m^3 polyurethane panels thermal insulation	□	□	□	□	□	□	□	□	□	□
90 kg/m^3 mineral wool panels thermal insulation	□	□	□	□	□	□	□	□	□	□
Filters ePM1 55% (F7) return and/or ePM1 80% (F9) supply/return	□	□	□	□	□	□	□	□	□	□
Pre-filters ISO Coarse 45% (G4) on supply/return	□	□	□	□	□	□	□	□	□	□
Return grease ISO Coarse 40% (G2) filter	□	□	□	□	□	□	□	□	□	□
Defrost kit with electric heater	□	□	□	□	□	□	□	□	□	□
Electric frost coil protection	□	□	□	□	□	□	□	□	□	□
Electric heating coil	□	□	□	□	□	□	□	□	□	□
Hot water/cold water [1] / direct expansion coil [1]	□	□	□	□	□	□	□	□	□	□
3 way modulating valve [1]	□	□	□	□	□	□	□	□	□	□
Circular duct flanges (4 pcs)	□	□	□	□	□	□	□	□	□	□
Exhaust/Fresh air damper	□	□	□	□	□	□	□	□	□	□
ON/OFF damper actuator	□	□	□	□	□	□	□	□	□	□
Sound attenuator [1]	□	□	□	□	□	□	□	□	□	□
Roof for outdoor installation	□	□	□	□	□	□	□	□	□	□
45° hoods with bird trap (2 pcs)	□	□	□	□	□	□	□	□	□	□
Flexible joints for duct connections (4 pcs)	□	□	□	□	□	□	□	□	□	□
Remote control panel [2]	□	□	□	□	□	□	□	□	□	□

■ Standard □ Optional – Not available

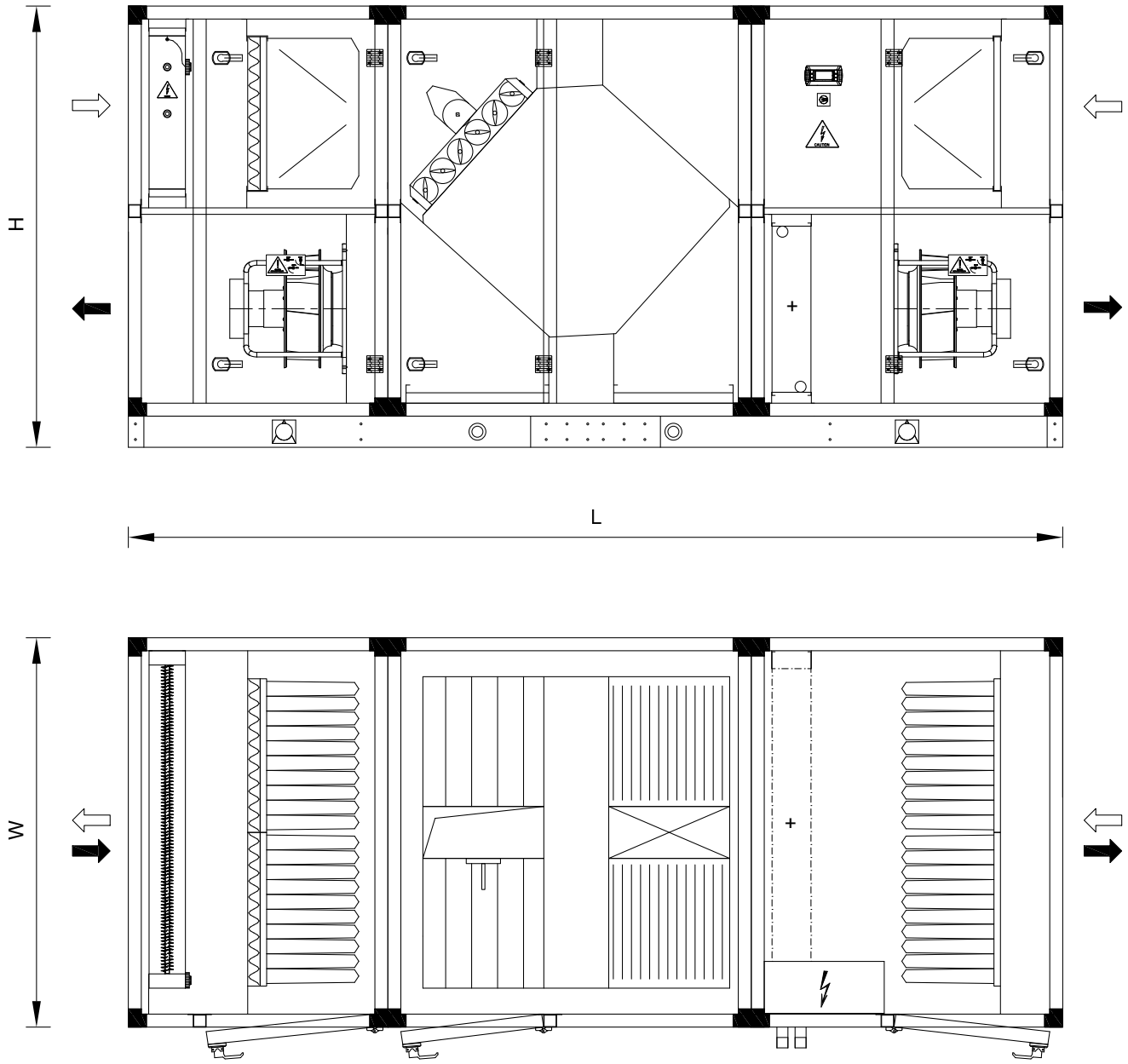
[1] mounted in a separated box

[2] supplied loose

OPERATING LIMITS



DIMENSIONAL DRAWING



DIMENSIONS AND WEIGHTS

MODEL	010	020	030	045	060	080	100	130	170	240
L (mm)	2700	2700	2950	3350	3600	3850	4100	4500	4800	5150
W (mm)	750	950	1300	1300	1500	1750	1880	1880	2130	2380
H (mm)	1070	1320	1420	1520	1700	1900	2050	2120	2520	2820
Weight (kg)	278	342	455	537	670	870	970	1160	1500	1810

Dimensions and weights are referred to standard version

RWH/HE

HEAT RECOVERY UNITS WITH ROTARY WHEEL

INTRODUCTION

Any occupied room requires the correct supply of fresh air and, at the same time, the control of the internal thermo-hygrometric conditions, through the recovery of energy from the air extracted from the room, by means of rotary wheel heat recovery, the level of well-being of the occupants is guaranteed, both in summer and winter.

For buildings that require air changes and are not equipped with dedicated air conditioning systems, the installation of such units allows the supply of primary air at controlled temperature without substantially changing the internal conditions in the occupied spaces.

These units also make it possible to guarantee support for the air conditioning system in the intermediate seasons using free-cooling or free-heating modes.
These units, if installed on existing buildings, guarantee the energy requalification of the system through the management of the air change without additional charges; in the case of new installations, instead, the air change is completely carried out allowing to reduce the size of the main air conditioning system.
In the intermediate seasons the building will benefit from free or partially-generated cooling from these units, which during the partial load phases allow the main system to operate with higher efficiency.

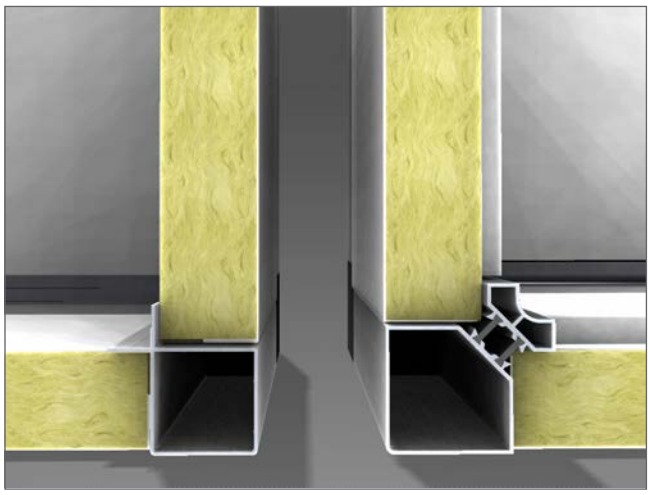
MAIN CHARACTERISTICS

STRUCTURE AND PANELS

The structure of the units can be realized in two versions:

VERSION 1:
Profiles 50 x 50 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with BS EN 1886: D1 (M). 50 mm thick double wall sandwich type paneling with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T3/TB4 according to EN1886.

VERSION 2:
Thermal break profiles 60 x 60 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with BS EN 1886: D1 (M). 63 mm thermal break sandwich-type double-walled sandwich-type panels with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T2/TB2 according to EN1886.



PROFILE 50 mm | PROFILE 60 mm

Safety microswitches are applied to the inspection doors to allow internal access to the various compartments of the unit only when the unit is completely switched off.
The main access and inspection panels consist of inspection doors with perimeter hinges made of non-corrosive polyamide and handles.

All units can be supplied in both monobloc and modular sections for on-site assembly when required.

AIR FILTERS

ePM10 60% (M5) filters in return air and ePM1 55% (F7) rigid bag filters in fresh air. Both types of filters are mounted on slides equipped with gaskets to ensure effective sealing. Their position, upstream of the internal components, also guarantees their protection.

AIR FILTERS

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 regulation of the airflow both in the supply and return 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 thus ensuring, according to the needs of the system, that the correct operation of the unit is maintained with consequent saving of the energy absorbed by the unit. The fans are fixed to the frame by means of self-centering brackets to ensure the correct distance between the impeller and the nozzle, thus optimizing performance.

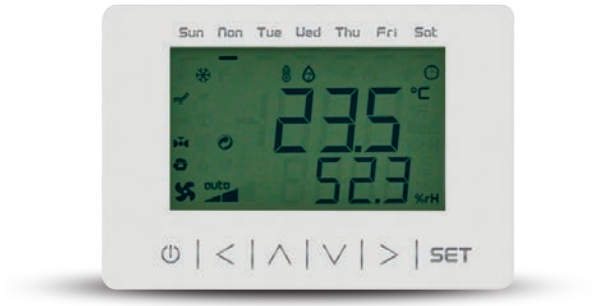
HEAT RECOVERY

The units are equipped with an air-to-air rotary heat recovery unit, consisting by a cylindrical rotor containing thousands of channels and characterised by an extremely elevate surface development, a supporting frame (complete di brush seals to minimize the air leakage between supply and exhaust air flows), and an eletric motor drive system. The heat exchange surface, very high in relation to the volume, allows very high thermal performances when compared to other types of heat recovery systems, reaching efficiencies even above 80%. In rotary wheel heat recovery units the heat exchange takes place by accumulating the heat in the rotor; as a matter of fact while the cylinder rotates slowly, the exhaust air volume crosses half of the casing and gives its heat to the rotor matrix, which accumulates it. The fresh air, crossing the other half, absorbs the accumulated heat. The parts absorbing and releasing the heat are continuosly inverted, as the rotation proceeds, and the process may continue indefinitely.

CONTROL

The units are supplied complete with control system and available in the configurations **ECO**, **PLUS** and **TOP**.

ECO: complete with air temperature sensors installed on the fresh air intake and on room return air. The control allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control, summer/winter seasonal change over, and programming for daily time zones. An optional hot water or cold water coil may also be managed, controlled by a 3-way modulating valve through the room return air sensor. The optional electric post-heating coil is also managed in modulating mode (always via the room return air sensor). The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.



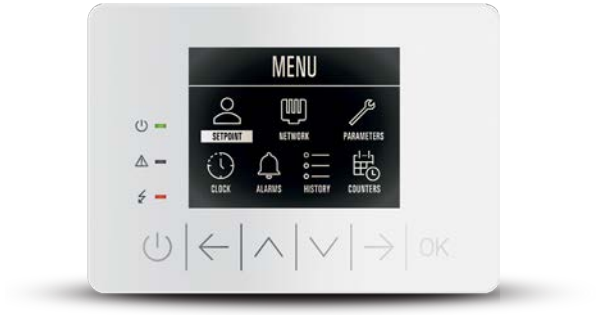
LCD REMOTE DISPLAY
(ECO configuration only)

PLUS: this control option is set to operate at constant pressure, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air. The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control. It also manages the summer/winter seasonal change over and programming for daily time zones.

The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.

The same logic can also be used to manage an electric post-heating coil, if present. The control alerts the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm; this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.

TOP: this control option is set to operate at constant air-flow, it is supplied complete with pressure transducer and air temperature sensors installed on the fresh air intake and room return air.
The control system allows to select, in stepless mode, the supply and return fan speeds and automatically manages the heat recovery by-pass damper through the motorized On/Off control.
It also manages the summer/winter seasonal change over and programming for daily time zones. The control can also manage an optional hot water or cold water coil through a 3-way modulating valve and an additional supply air sensor in order to maintain a fixed point operating logic.
The same logic can also be used to manage an electric post-heating coil, if present.
The system alerts to the user when filters need replacing (the clogged state of the filters is monitored by a pair of differential pressure switches supplied as standard) or the onset of any alarm and this may also be integrated into modern home automation systems via RS485 serial port with Modbus protocol.



LCD REMOTE GRAPHIC DISPLAY
(PLUS and TOP configurations only)

TECHNICAL DATA

MODEL		010	020	030	045	060
Type of ventilation unit		UVNR-B (Non Residential Ventilation Units - Bidirectional)				
Type of drive installed		Analog signal on EC fan (0-10Vdc)				
Type of fans	type/nr.	EC/2	EC/2	EC/2	EC/2	EC/2
Type of heat recovery system (HRS)	type/nr.	rotary wheel / 1				
Winter Thermal Efficiency (ηt_nrvu) (1)	%	81,1	80,9	80,7	80,7	80,9
Nominal airflow rate	m^3/h	1000	2000	3000	4500	6000
Electrical power consumption	kW	0,49	0,91	1,29	2,28	2,82
Installed electrical power	kW	1,03	1,54	2,50	3,84	5,18
SFP_{int}	$W/(m^3/s)$	822	802	750	1031	829
SFP_{lim} 2018	$W/(m^3/s)$	1301	1254	1206	1144	1087
Front speed at design range	m/s	1,07	1,24	1,21	1,67	1,67
External nominal pressure $\Delta p_{s,\ ext}$ (2)	Pa	250	250	250	250	250
Internal pressure drop $\Delta p_{s,\ int}$ Ret./Supp.	Pa	205 / 226	226 / 251	216 / 234	290 / 319	240 / 274
Fans static efficiency (UE) n.327/2011	%	52,3	59,8	60,8	60,1	62,5
Max. external / internal leakage percentage	%	L1 | max 5,0 % at +250 Pa				
Energy classification filters		ePM1 65% (F7) | ePM10 65% (M5)				
Filter pressure switch		present				
Sound power level (3)	dB(A)	64,0	66,0	63,0	69,0	69,0
Sound pressure level (4)	dB(A)	52,0	54,0	51,0	57,0	57,0
Power supply	V/ph/Hz	230/1/50		400/3/50		

MODEL		080	100	130	170	240
Type of ventilation unit		UVNR-B (Non Residential Ventilation Units - Bidirectional)				
Type of drive installed		Analog signal on EC fan (0-10Vdc)				
Type of fans	type/nr.	EC/2	EC/2	EC/4	EC/4	EC/4
Type of heat recovery system (HRS)	type/nr.	rotary wheel / 1				
Winter Thermal Efficiency (ηt_nrvu) (1)	%	80,7	80,6	79,0	79,1	79,0
Nominal airflow rate	m^3/h	8000	10000	12800	16700	21500
Electrical power consumption	kW	3,79	4,73	6,46	8,32	10,59
Installed electrical power	kW	5,98	7,08	10,37	11,97	23,17
SFP_{int}	$W/(m^3/s)$	890	911	959	954	949
SFP_{lim} 2018	$W/(m^3/s)$	1031	1028	980	983	980
Front speed at design range	m/s	1,65	1,75	2,16	2,03	2,03
External nominal pressure $\Delta p_{s,\ ext}$ (2)	Pa	250	250	250	250	250
Internal pressure drop $\Delta p_{s,\ int}$ Ret./Supp.	Pa	253 / 291	261 / 301	282 / 314	278 / 313	274 / 305
Fans static efficiency (UE) n.327/2011	%	62,5	62,8	62,0	61,6	61,4
Max. external / internal leakage percentage	%	L1 | max 5,0 % at +250 Pa				
Energy classification filters		ePM1 65% (F7) | ePM10 65% (M5)				
Filter pressure switch		present				
Sound power level (3)	dB(A)	70,0	72,0	67,0	68,0	72,0
Sound pressure level (4)	dB(A)	58,0	60,0	55,0	56,0	60,0
Power supply	V/ph/Hz	400/3/50				

(1) ratio between the thermal gain of the inlet air (0 °C) and the thermal loss of the exhaust air (20 °C), both referred to the external temperature, measured under dry reference conditions, with balanced mass flow and a thermal difference of the internal/external air of 20K, excluding the thermal gain generated by the fan motors and the internal leakage, in accordance with the provisions of attached V of EU Regulation No 1253/2014

(2) performance with clean filters

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

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

ACCESSORIES

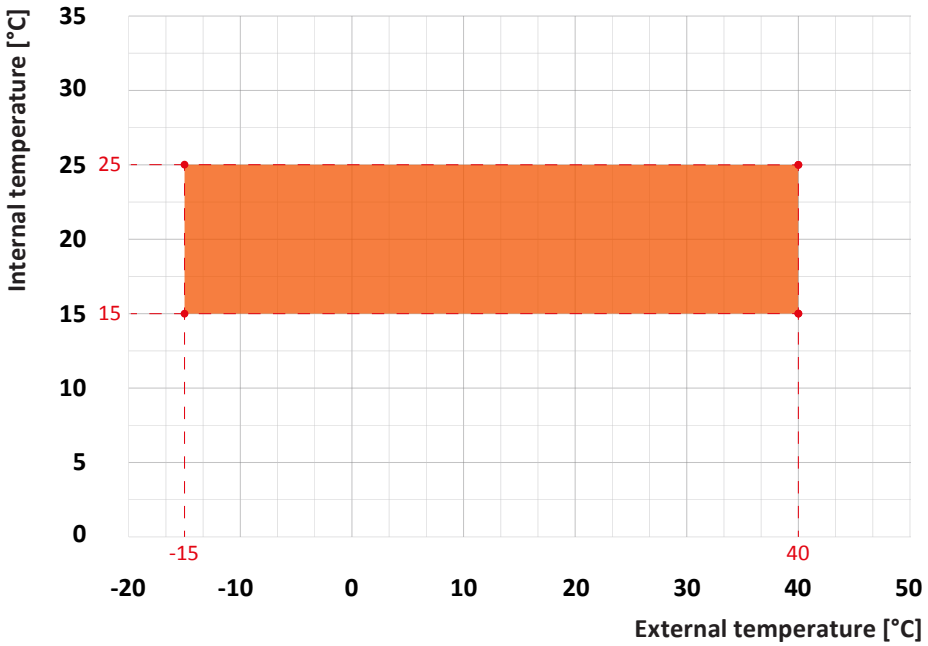
MODEL	010	020	030	045	060	080	100	130	170	240
Filters ePM10 60% (M5) on return / ePM1 55% (F7) on supply	■	■	■	■	■	■	■	■	■	■
EC brushless fans on supply/return	■	■	■	■	■	■	■	■	■	■
Filters differential pressure switches	■	■	■	■	■	■	■	■	■	■
Fans differential pressure transducers	■	■	■	■	■	■	■	■	■	■
Microprocessor control system with display	■	■	■	■	■	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■	■	■	■	■	■
50 mm frame or 60 mm thermal break frame	□	□	□	□	□	□	□	□	□	□
40 kg/m^3 polyurethane panels thermal insulation	□	□	□	□	□	□	□	□	□	□
90 kg/m^3 mineral wool panels thermal insulation	□	□	□	□	□	□	□	□	□	□
Filters ePM1 55% (F7) return and/or ePM1 80% (F9) supply/return	□	□	□	□	□	□	□	□	□	□
Pre-filters ISO Coarse 45% (G4) on supply/return	□	□	□	□	□	□	□	□	□	□
Return grease ISO Coarse 40% (G2) filter	□	□	□	□	□	□	□	□	□	□
Electric frost coil protection	□	□	□	□	□	□	□	□	□	□
Electric heating coil [1]	□	□	□	□	□	□	□	□	□	□
Hot water/cold water/direct expansion coil [1]	□	□	□	□	□	□	□	□	□	□
3 way modulating valve [1]	□	□	□	□	□	□	□	□	□	□
Circular duct flanges (4 pcs)	□	□	□	□	□	□	□	□	□	□
Exhaust/Fresh air damper	□	□	□	□	□	□	□	□	□	□
ON/OFF damper actuator	□	□	□	□	□	□	□	□	□	□
Sound attenuator [1]	□	□	□	□	□	□	□	□	□	□
Roof for outdoor installation	□	□	□	□	□	□	□	□	□	□
45° hoods with bird trap (2 pcs)	□	□	□	□	□	□	□	□	□	□
Flexible joints for duct connections (4 pcs)	□	□	□	□	□	□	□	□	□	□
Remote control panel [2]	□	□	□	□	□	□	□	□	□	□

■ Standard □ Optional – Not available

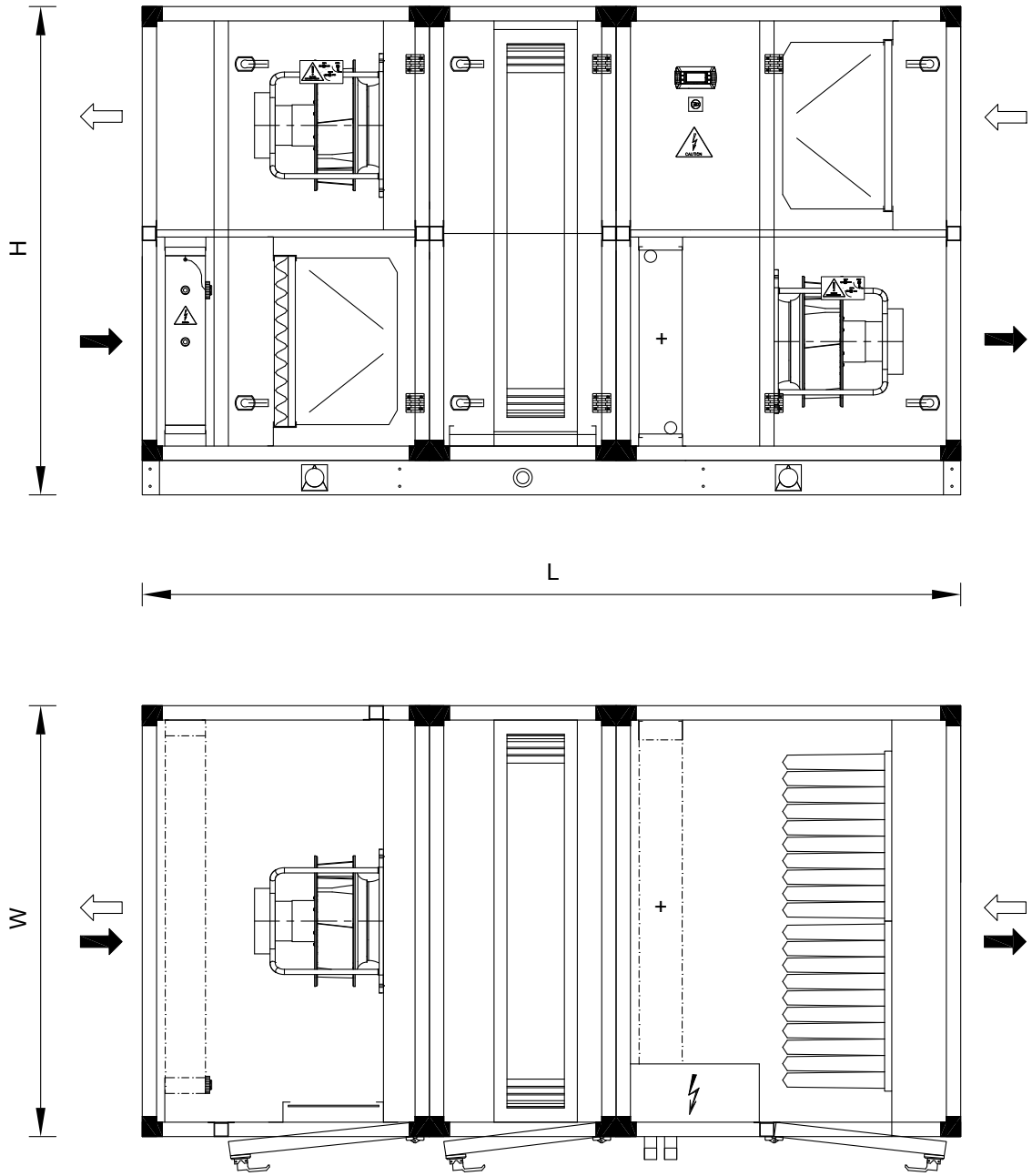
[1] mounted in a separated box

[2] supplied loose

OPERATING LIMITS



DIMENSIONAL DRAWING



DIMENSIONS AND WEIGHTS

MODEL	010	020	030	045	060	080	100	130	170	240
L (mm)	2250	2250	2550	2550	2850	3100	3150	2950	2950	3100
W (mm)	750	950	1300	1300	1500	1750	1880	1880	2130	2380
H (mm)	1070	1320	1420	1520	1700	1900	2050	2120	2520	2850
Weight (kg)	245	300	410	455	565	760	835	910	1110	1315

Dimensions and weights are referred to standard version

RXC/Hi

INTEGRATED REFRIGERANT CIRCUIT HEAT RECOVERY UNITS

INTRODUCTION

Any occupied room requires the correct supply of fresh air and at the same time the control of the internal thermo-hygrometric conditions.
Through the recovery of energy from the air extracted from the room, through the use of systems with integrated heat pump technology, we offer a highly efficient solution to meet the needs of thermo-hygrometric well-being and air exchange in civil and tertiary air conditioning systems such as offices, bars, restaurants, etc., both in summer and winter and without additional charges in the management of primary air.
The RXC/Hi units are particularly efficient since they use a high efficiency plate heat recovery, combined with a cooling circuit in heat pump operating with inverter compressor. The use of the high-efficiency plate heat recovery makes it possible to significantly reduce the period of use of the cooling circuit during the year, thus reducing its use to short periods, thus limiting electricity consumption to a minimum.
The compact dimensions of the units allow for easy installation even in false ceilings while maintaining excellent accessibi-lity for the maintenance of all internal components.

The numerous accessories available on request complete the functions of the unit, which generally has to be combined with an air conditioning system.

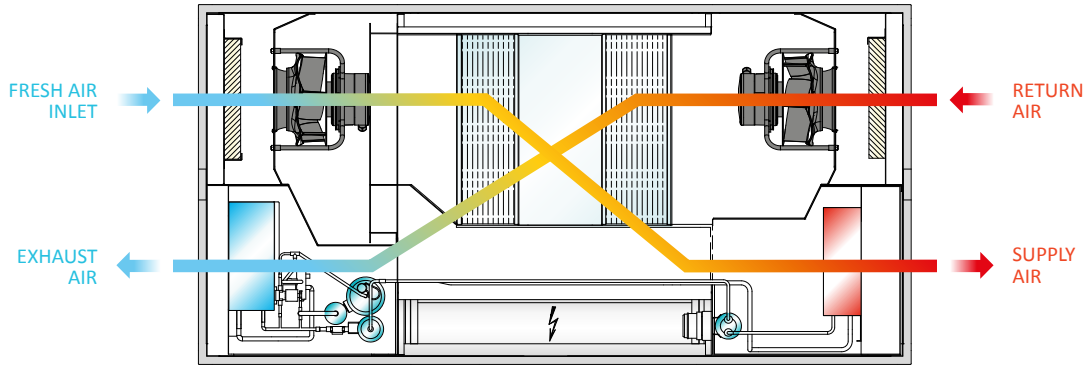
OPERATING MODE

• HEATING MODE

The return air, after passing through the cross-flow heat recovery, goes to feed the heat pump source exchanger that operates as an evaporator.

Through the vapour compression refrigeration cycle, the fresh air, coming out of the cross-flow heat recovery, is heated by the heat pump user exchanger, which operates as a condenser. The modulation of the thermal capacity, obtained through the inverter compressor, will allow to precisely control the supply air temperature.
During heating operation, the evaporator of the heat pump may be subject to the formation of surface frost with consequent loss of efficiency.

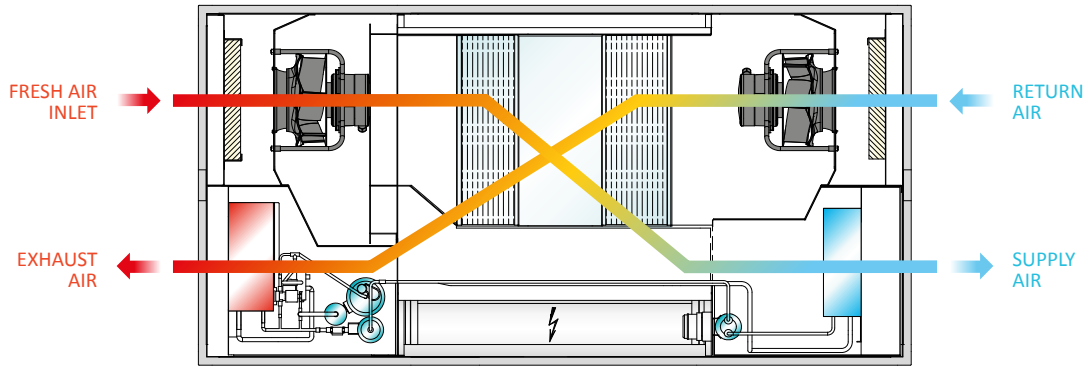
To prevent this from happening, the unit provides controlled management of a defrosting cycle obtained by reversing the refrigeration cycle. During this phase the return fans are stopped and the compressors forced at maximum speed. Through the additional heating resources present in the unit, water heating coils or electrical resistances, the supply air temperature is maintained at a suitable value so as not to disturb the internal environment.



• COOLING MODE

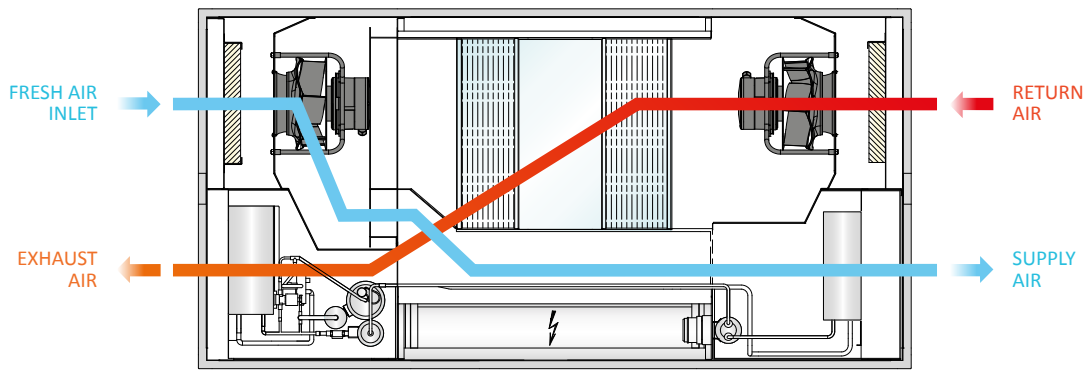
The return air, after passing through the cross-flow heat recovery, goes to feed the heat pump source exchanger, which operates as a condenser.

The fresh air, after passing through the cross-flow heat recovery, is cooled by the heat pump user heat exchanger, which operates as an evaporator.



• FREE-COOLING

When the outside temperature is lower than the inside temperature of the room to be air-conditioned, if this needs cooling, the units operate in free-cooling mode and all integrated heat recovery stages are disabled.



MAIN CHARACTERISTICS

1 | STRUCTURE AND PANELS

Structure in RAL 9010 steel profiles, pre-painted at 180°C with polyurethane powder paint and 25 mm thick panels. Sheets with 6/10" thickness covered with protective film, in galvanized steel. The internal insulation is made of high density polyurethane foam (40 kg/m^3). The frame is made according to EN1886 standard, class D1 mechanical resistance, class T3 thermal transmittance, air tightness class L1, thermal break factor TB3.
The air tightness is guaranteed by a particularly adaptable and resilient neoprene gasket, the tightening of the opening panels is made by means of push screws that ensure an adequate and constant pressure on the gaskets. In all areas subject to condensation there is a condensation tray in AISI 304 stainless steel, inclined internally and in compliance with EN 1.4301.

2 | AIR FILTERS

ePM10 60% (M5) filters in air extraction and ePM1 55% (F7) filters in fresh air intake, in compliance with international norms. Both types of filters are mounted on slides equipped with gaskets to guarantee an effective seal. Their position, upstream of the internal components, also guarantees their protection.

3 | HEAT RECOVERY (1° recovery stage)

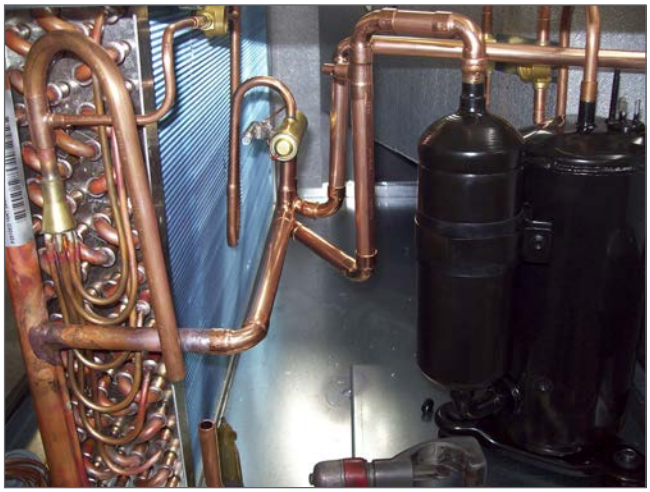
The units are equipped with an aluminium counter-flow heat exchanger used to transfer heat from the exhaust air to the incoming fresh air.
The heat exchange takes place in counter-flow with efficiencies higher than 85%. The spacing between the fins is optimized in order to reduce air side pressure drop and fan power consumption. In some conditions of low fresh air temperature and high humidity, the exchanger may start to frost. Through the integrated control system it is possible to manage the defrosting of the exchanger through the activation of different stages of electrical resistances (pre-heaters), or through the activation of the recirculation damper. The heat recovery is also equipped with an additional by-pass damper for the management of the free-cooling and free-heating mode.

HEAT RECOVERY

4 | REFRIGERANT CIRCUIT IN HEAT PUMP

(2° recovery stage)

The efficiency of the unit is further increased thanks to a second phase of indirect recovery, obtained through a heat pump refrigeration circuit compression system. The cooling circuit is equipped with a rotary or Scroll



REFRIGERANT CIRCUIT

compressor with inverter, with continuous capacity regulation. The compressor is complete with thermal protection, crankcase heater, low and high pressure switches and vibration isolators suitable to isolate vibrations. The refrigerant circuit is of direct expansion type loaded with R32 refrigerant. Each refrigerant circuit is factory tested both in terms of tightness (pressure test) and functionality. The main components are: finned pack heat exchangers and source, electronic expansion devices, solid-cartridge anti-acid filters, safety pressure switches on high and low refrigerant pressure side, receiver and liquid separator on suction side, liquid / humidity sight glass, cycle reversal valve, non-return valves, safety valves on high pressure side. The circuit is complete with a combined hot gas injection and fresh air by-pass defrosting system that operate both on the plate heat recovery and the source heat exchanger.

5 | ELECTRIC BOX

The electric box is manufactured according to IEC 204-I / EN 60204-I standards and complete with door block disconnector, CE insulation transformer. All motors and auxiliary circuits are protected against overload and short circuits by fuses and/or circuit breakers. The electrical panel also includes the following components: General alarm contact, remote control ON/OFF, summer/winter seasonal changeover contact, outdoor air temperature probe, supply air temperature probe, return air temperature probe, recirculation air probe, defrost recovery probe, source exchanger defrost probe, pressure switches for supply and return dirty filters.

MAIN CHARACTERISTICS

6 | CONTROL SYSTEM

The unit is complete with adjustment by means of 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 to visualize the operating states and possible alarm conditions present.

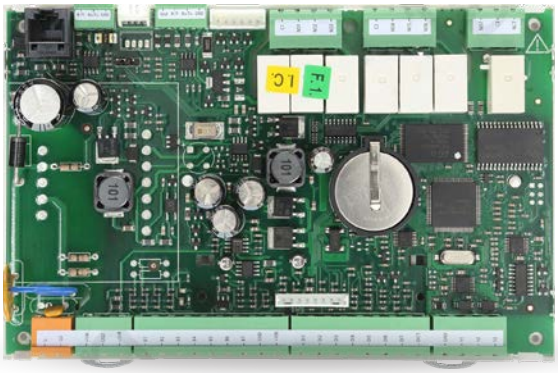
Through the values acquired by the room and air supply temperature probe, temperature control will be managed by activating the compressors with reference to the winter and summer set-points. The unit can manage the automatic change of the room cooling or heating modes, the free-cooling and free-heating conditions through the comparison with the fresh air temperature.
The heat capacity delivered by the heat pump unit will be continuously modulated through the speed variation of the inverter refrigeration compressor. This variable mainly depends on the value of the supply air temperature with reference to the fresh air conditions. This characteristic allows the operation at partial loads with a much higher energy saving compared to a traditional group equipped with ON/OFF compressors.

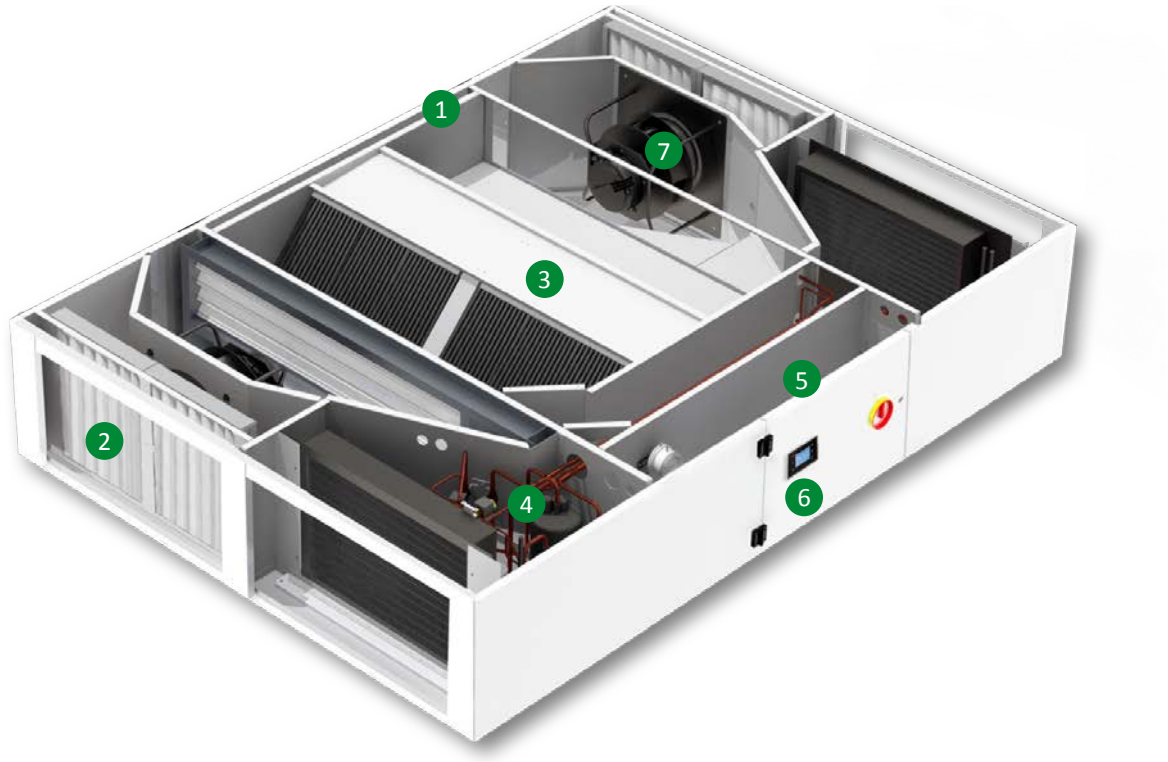
7 | FANS

Independently controllable, they consist of aerodynamically balanced, statically and dynamically balanced forward blade centrifugal impellers with aerodynamic profile, made of galvanized steel. The impellers are directly coupled to brushless EC brushless motors, with internal rotor, operating via a 0-10V PWM or MODBUS-RTU modulating signal.

ADDITIONAL COILS (external module)

External module that can accommodate heating and/or cooling coils with a high number of rows. The module can also accommodate combined coils (water cooling, water and / or electric heating).





MODEL		005	010	015	025	035
Nominal airflow rate	m^3/h	500	1000	1500	2500	3500
Thermal efficiency recovery in cooling mode (1)	%	74,3	74,7	72,8	72,2	73,2
Total unit cooling capacity (1)	kW	6,3	9,4	14,1	30,3	36,0
Total unit EER (1)	-	4,5	4,9	4,5	4,2	4,1
Electrical power absorbed in cooling mode (1)	kW	0,76	1,10	1,85	4,24	5,25
Heating recovery thermal efficiency (2)	%	90,5	91,8	90,0	89,5	91,3
Total thermal power of unit (2)	kW	9,57	17,4	25,1	41,3	50,1
Total unit COP (2)	-	4,5	4,6	4,7	4,5	4,9
Electrical power absorbed in heating (2)	kW	0,87	1,51	2,25	3,99	4,55
Supply fan available static pressure	Pa	200	200	200	200	200
Return fan available static pressure	Pa	150	150	150	150	150
N° of refrigerant circuits	n°	1	1	1	1	1
Type of refrigerant				R32		
Number of compressors: Inverter	n°	1	1	1	1	1
Max. electricity absorbed by the unit	A	10,7	12,6	16,6	22,6	19,8
Power supply	V/ph/Hz	230/1/50				400/3/50
Type of filters for fresh air section		F7	F7	F7	F7	F7
Type of filters for return air section		M5	M5	M5	M5	M5
SFP factor filters	W/(l/s)	670	680	820	930	970
Sound power level (3)	dB(A)	65,0	66,0	68,0	73,0	74,0
Sound pressure level (4)	dB(A)	50,5	50,7	52,7	57,2	57,9

(1) *fresh air inlet +35 °C / 40% RH, return air +26 °C / 50% RH*

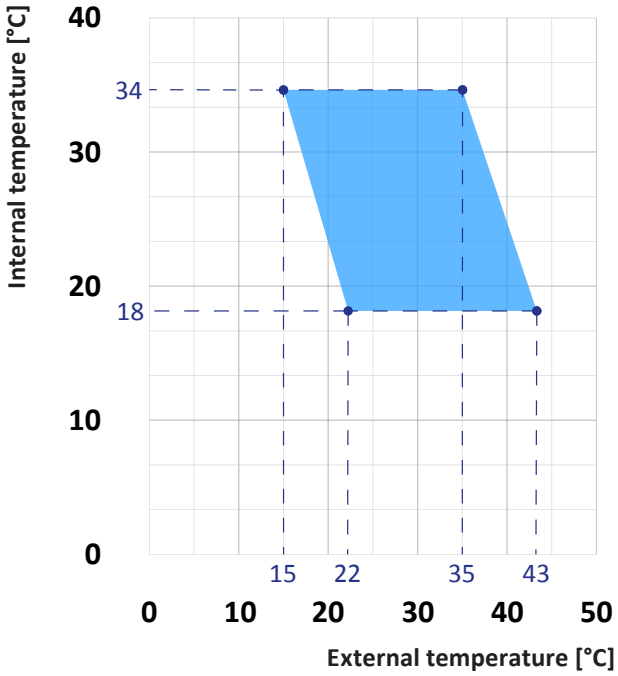
(2) *fresh air inlet -5 °C / 80% RH, return air +20 °C / 50% RH*

(3) *sound power level calculated in accordance with EN 3744*

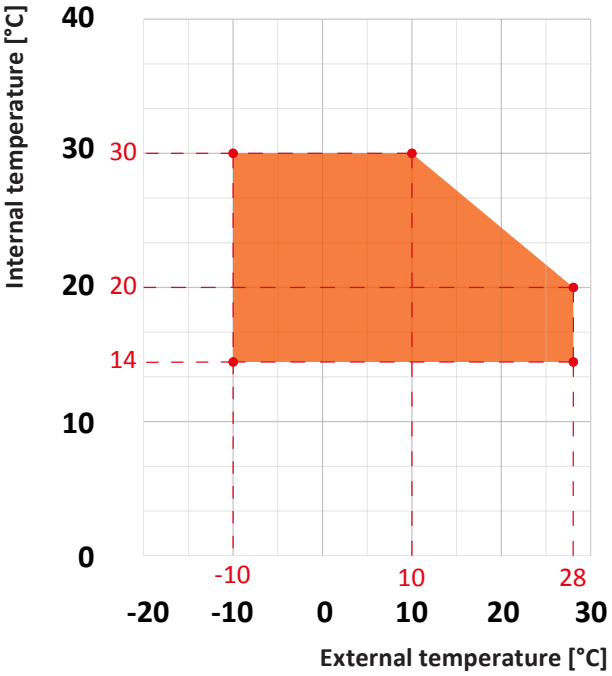
(4) *sound pressure level measured at 1 m free field distance, in accordance with EN 3744*

OPERATING LIMITS

COOLING MODE



HEATING MODE (heat pump)



ACCESSORIES

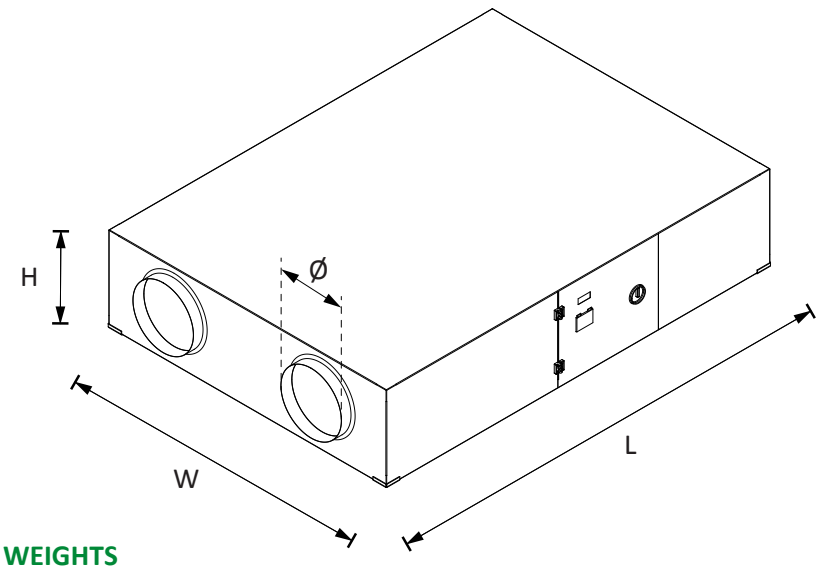
MODEL	005	006	010	015	020	030	040
Supply and return EC fans	■	■	■	■	■	■	■
Counter-flow plate heat recovery	■	■	■	■	■	■	■
ePM1 55% (F7) supply filter	■	■	■	■	■	■	■
ePM10 60% (M5) return filter	■	■	■	■	■	■	■
Inverter compressor	■	■	■	■	■	■	■
Filters differential pressure switches	■	■	■	■	■	■	■
100% by-pass damper with actuator	■	■	■	■	■	■	■
Microprocessor control system with display	■	■	■	■	■	■	■
Integrated defrost system	■	■	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■	■	■
Remotable control panel (2)	■	■	■	■	■	■	■
Filters ePM1 55% (F7) return and/or ePM1 80% (F9) supply/return	□	□	□	□	□	□	□
Pre-filters ISO Coarse 45% (G4) on supply/return	□	□	□	□	□	□	□
Electric heating coil (1)	□	□	□	□	□	□	□
Hot water / cold water coil (1)	□	□	□	□	□	□	□
3 way modulating valve (1)	□	□	□	□	□	□	□
Circular duct flanges (4 pcs)	□	□	□	□	□	□	□
Exhaust / Fresh air damper	□	□	□	□	□	□	□
ON/OFF damper actuator	□	□	□	□	□	□	□
Sound attenuator (1)	□	□	□	□	□	□	□

■ Standard □ Optional – Not available

(1) mounted in a separated box

(2) supplied loose

DIMENSIONAL DRAWING



DIMENSIONS AND WEIGHTS

MODEL		005	010	015	025	035
L	mm	1500	1800	1800	1900	2100
W	mm	1000	1300	1300	1650	1850
H	mm	380	500	500	580	580
Ø	mm	200	200	250	315	315
Weight *	kg	204	265	295	342	394

* Dimensions and weights are referred to standard version

RXH/Hi

INTEGRATED REFRIGERANT CIRCUIT HEAT RECOVERY UNITS

INTRODUCTION

Any room requires the correct supply of outside air and at the same time the control of the internal thermohygrometric conditions. Through the recovery of energy from the air extracted from the environment, through the use of systems with integrated heat pump technology, an economic way in the installation of energy-efficient power plants is offered, which also ensures the degree of comfort to the occupants, both in summer and winter and without added costs in the management of primary air.

For buildings that require air exchange and are not equipped with dedicated air conditioning systems, the installation of these units allows the introduction of primary air at a controlled temperature without disturbing the internal conditions in the occupied spaces.

It is therefore not necessary to use additional systems to heat or cool the incoming primary air. Moreover, these units allow to guarantee a support to the air conditioning system in the intermediate seasons by exploiting the free-cooling or free-heating periods. If installed on existing buildings, they guarantee the energy upgrading of the system through the management of the air exchange without additional charges. On new installations, on the other hand, the air exchange is completely carried out allowing to reduce the size of the main air conditioning system.

In the intermediate seasons the building will benefit from the free or partial cooling generated by these units, which during the partial load phases allow the main system to operate with higher efficiencies.

OPERATING MODE

• HEATING

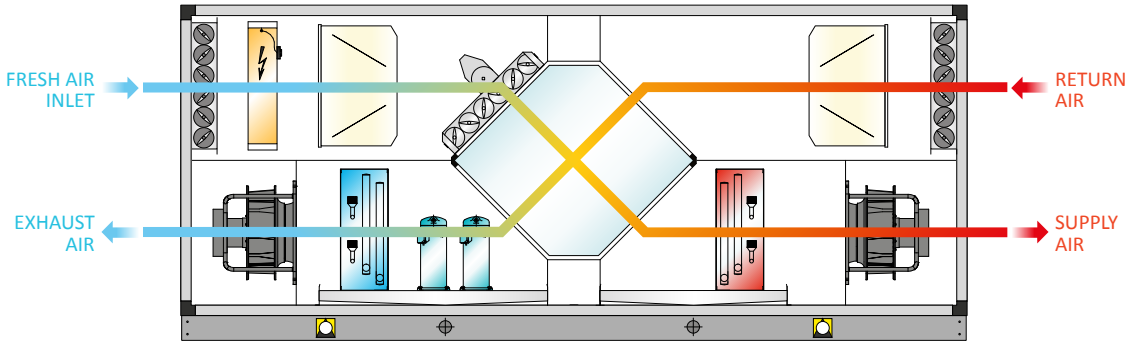
The return air, after crossing the crossflow heat recovery, feeds the heat pump source exchanger that acts as an evaporator. Through the steam compression refrigeration cycle, the fresh air, leaving first recovery stage, is heated by the heat pump user exchanger, which acts as a condenser.

The modulation of the thermal capacity, obtained by means of the compressor, will allow the temperature of the supply air to be precisely controlled. During heating operation, the evaporator of the heat pump, may be subject to the formation of surface frost resulting in loss of efficiency.

To prevent this from happening, the unit provides for the controlled management of a defrosting cycle obtained by reversing the refrigeration cycle.

During this phase, the return fans are stopped and the compressors are forced at maximum speed.

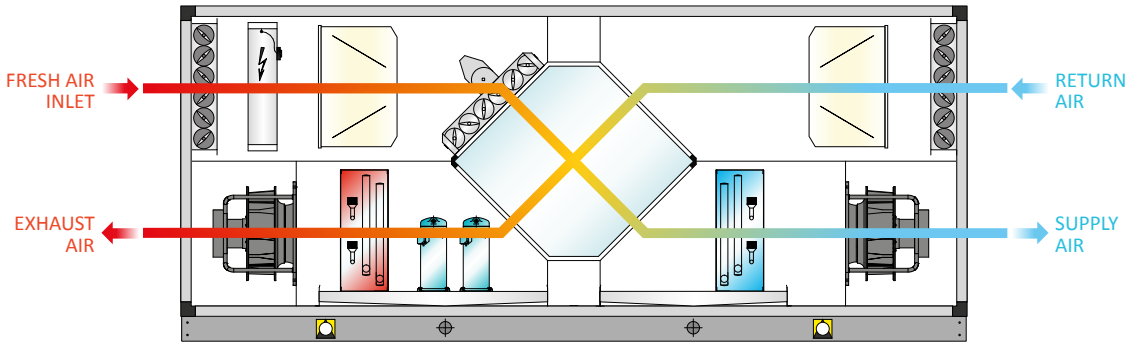
Through the other additional heating resources present in the unit, water heating coils, electric heaters or other refrigeration compressors temporarily not working, the temperature of the supply air is maintained at an appropriate value so as not to disturb the internal environment.



• COOLING

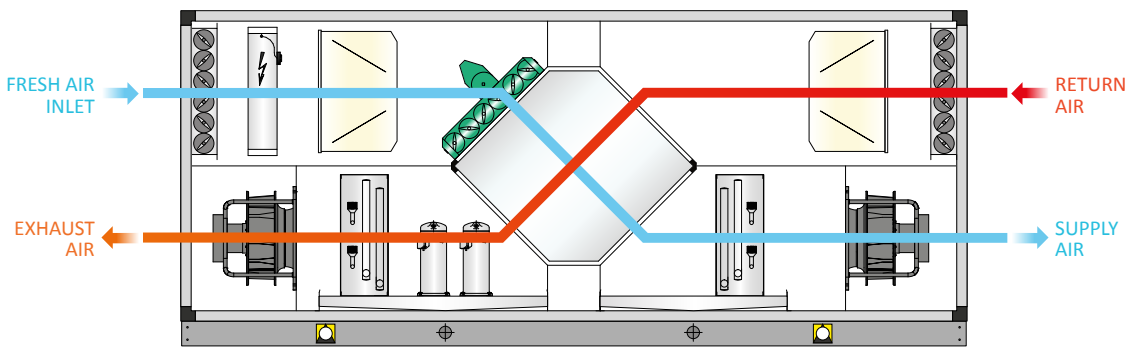
The return air, after crossing the cross-flow heat recovery, feeds the heat pump source exchanger, which acts as a condenser.

The external air, after crossing the cross-flow heat recovery, is cooled by the heat pump user exchanger, which acts as an evaporator.



• FREE-COOLING

When the outdoor temperature is lower than the indoor temperature of the room to be air conditioned, if this requires cooling, the units operate in free-cooling mode and all stages of integrated heat recovery are disabled.



MAIN CHARACTERISTICS

STRUCTURE AND PANELS

The structure of the units can be realized in two versions:

VERSION 1:
Profiles 50 x 50 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 50 mm thick double wall sandwich type paneling with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T3/TB4 according to EN1886.

VERSION 2:
Thermal break profiles 60 x 60 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 63 mm thermal break sandwich-type double-walled sandwich-type panels with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T2/TB2 according to EN1886.

Safety microswitches are applied to the inspection doors to allow internal access to the various compartments of the unit only when the unit is completely switched off.
The main access and inspection panels consist of inspection doors with perimeter hinges made of non-corrosive polyamide and handles.

All units can be supplied in both monobloc and modular sections for on-site assembly when required.

AIR FILTERS

The filter sections on the return air are made up of panel filters class ePM10 60% (M5) while for the fresh air section bag filters class ePM1 55% (F7) in accordance with international norms.

As an option, the unit can be equipped with differential-type gauges for monitoring the air-side pressure drop of the filtering sections.

AIR DAMPERS

All adjustment dampers are made of aluminium with a low pressure drop wing profile and opposing wings.

Each damper is equipped with an electric actuator already assembled and directly managed by the electronic control on board.

FANS

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

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

PLUG-FANS

The air flow rate of the fan is managed through the integrated electronic control system, thus ensuring, according to the needs of the system, that the correct functioning of the unit is maintained, with consequent savings in the energy absorbed by the unit. Through a reliable pressure sensor installed on the unit it is possible to select and control the air flow through a constant flow regulation, or at a fixed useful static pressure defined on the delivery section towards the environment. The fans are fixed to the frame by means of self-centring brackets to guarantee the correct distance between the impeller and the nozzle, thus optimising performance. On request, it is possible to supply the fan sections with portholes and low consumption internal lighting elements supplied directly from the electrical panel on board the machine or from an independent external source.

ELECTRONIC FLOW RATE CONTROL

MAIN CHARACTERISTICS

FINNED PACK HEAT EXCHANGERS

The evaporative-condensing coils positioned inside the supply and exhaust air sections consist of internally and mechanically expanded striped copper tubes and pre-painted aluminium fins. The direct expansion coil is equipped with an electronic expansion valve managed by the control integrated in the unit and operated in such a way as to guarantee the correct overheating of the refrigerant that reaches the refrigeration compressor in the various operating situations. The use of hydrophilic painted aluminium finned coils guarantees rapid drainage of condensation and dragging effects both during dehumidification and defrosting. The same surface coating of the exchanger allows to increase the resistance to corrosion, due to acids or pollutants contained in the treated air. All coils are tested before being installed with a pressure test with dry air at 42 bar.
The stainless steel condensate drain pan is tilted internally and complies with ASHRAE 62-89 self-draining standards with ductable outlet.

HEAT RECOVERY

The units are equipped with an counter-flow heat exchanger in aluminium (painted on request) used in cooling/heating mode to transfer the heat from the exhaust air to the inlet fresh air. The heat exchange is counter-flow with efficiencies higher than 80%. The spacing between the fins is optimized in order to reduce the pressure drop on the air side and the electrical consumption of the fan. Under certain conditions of low outside air temperature and high humidity, the heat recovery may start to frost.

Through the integrated control system it is possible to manage the defrosting of the heat recovery by activating different stages of electrical resistances (pre-heaters), or by activating the recirculation damper. The heat recovery is also equipped with an additional by-pass damper for the management of the free-cooling and free-heating mode.

HEAT RECOVERY

CONTROL

The unit is complete with regulation by means of 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 compressors with reference to the winter and summer set-points. The unit can manage the automatic change of cooling or room heating modes, free-cooling and free-heating conditions by comparing them with the outside air temperature. The thermal capacity delivered by the heat pump unit will be continuously modulated through the speed variation of the DC brushless rotary or scroll refrigeration compressor.

This variable depends mainly on the value of the supply air temperature with reference to the external air conditions. This characteristic allows the operation at partial loads with a much higher energy saving compared to a traditional system equipped with ON/OFF compressors.

CONTROL

THERMODYNAMIC RECOVERY
(2nd stage of recovery)

The efficiency of the unit is further improved thanks to a second phase of indirect recovery, obtained through a compression system of the refrigeration circuit in heat pump. The thermodynamic recovery sections integrated in the unit are equipped with variable speed compressors so as to continuously regulate the thermal capacity transferred to the fresh air.
In this way it is possible to adjust the temperature of the supply air to the correct value, thus optimising the energy efficiency of the air handling unit.

COMPRESSORS

The main refrigerant circuit is equipped with hermetic Twin or Scroll rotary compressors with a single 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, low and high pressure switches and vibration dampers suitable for isolating vibrations. The additional cooling circuits are supplied with hermetic rotary compressors and ON/OFF scrolls.
These compressors allow you to increase the cooling or heating capacity by being used as boosters with inverter, which will allow you to precisely adjust the capacity with respect to the required load.
On request, the compressors can be equipped with a soundproofing hood to lower the noise level emitted by the unit.

REFRIGERATION CIRCUIT

The refrigerant circuit is of direct expansion type loaded with refrigerant R410a. Each refrigerant circuit is tested at the factory with reference to both its tightness (pressure test) and its functionality. The main components are: evaporative-condensing finned pack heat exchangers, electronic expansion devices, solid cartridge acid filters, high and low refrigerant pressure switches, receiver and suction liquid separator, liquid/humidity indicator light, cycle reversal valve, non-return valves, high pressure safety valves.

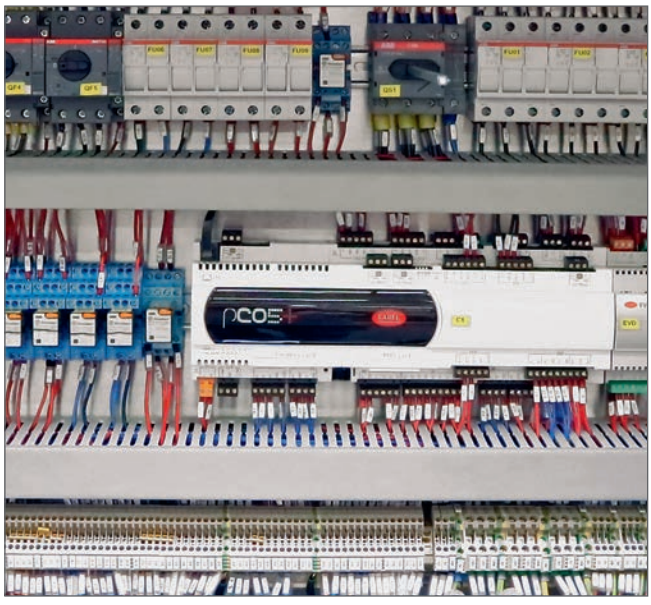
The circuit is complete with a combined hot gas injection and fresh air by-pass defrosting system that operate both on the plate heat recovery and the source heat exchanger.

ELECTRIC BOX

It is housed in a dedicated IP54 technical compartment, equipped with a double door to ensure both internal and external installation of the unit.

The electrical panel is manufactured according to IEC 204-I / EN 60204-I standards and complete with door block disconnector, CE isolation transformer and internal thermostated anti-condensation resistors for outdoor units. All motors and auxiliary circuits are protected against overload and short circuit by fuses and/or circuit breakers.

REFRIGERATION CIRCUIT



ELECTRIC BOX

TECHNICAL DATA

MODEL		011	021	031	041	061	081	101
Nominal airflow rate	m^3/h	1000	2000	3000	4500	6000	8000	10000
Thermal efficiency recovery in cooling mode (1)	%	77,90	78,40	77,90	77,90	78,10	78,50	74,90
Total unit cooling capacity (1)	kW	6,59	14,75	21,98	33,82	43,70	54,24	66,46
Total EER of unit (1)	-	6,79	5,57	5,97	5,98	5,46	6,09	5,63
Electrical power absorbed in cooling mode (1)	kW	1,63	3,88	5,62	8,67	11,93	14,11	17,79
Heating recovery thermal efficiency (2)	%	92,90	94,20	94,40	94,60	94,70	95,30	89,10
Total thermal power of unit (2)	kW	12,73	24,74	40,31	56,69	77,91	98,73	122,72
Total COP of unit (2)	-	12,60	13,98	11,10	13,03	11,63	12,36	10,31
Electrical power absorbed in heating (2)	kW	1,67	2,95	5,52	7,26	10,54	13,00	17,68
Supply fan available static pressure	Pa	250	250	250	250	250	250	250
Return fan available static pressure	Pa	200	200	200	200	200	200	200
N° of refrigerant circuits	n°	1	1	1	1	1	1	1
Type of refrigerant		R410A						
Number of compressors: Inverter	n°	1	1	1	1	1	1	1
Max. electricity absorbed by the unit	A	26,90	26,80	34,00	44,40	53,50	60,20	64,20
Power supply	V/ph/Hz	400 V +- 10% / 3 / 50 + N + ⏚						
Type of filters for fresh air section		F7	F7	F7	F7	F7	F7	F7
Type of filters for return air section		M5	M5	M5	M5	M5	M5	M5
SFP factor filters	W/(l/s)	2,09	1,96	2,15	2,18	2,18	2,19	1,99
Supply sound power level (3)	dB(A)	80	80	80	84	84	85	85
Return sound power level (3)	dB(A)	66	65	68	69	73	73	72
Sound pressure level in scale A (ISO EN 3744) (4)	dB(A)	57	56	54	59	59	60	60

MODEL		062	082	102	132	172	242
Nominal airflow rate	m^3/h	6000	8000	10000	13000	17000	24000
Thermal efficiency recovery in cooling mode (1)	%	78,10	78,50	74,90	75,10	75,30	74,90
Total unit cooling capacity (1)	kW	43,80	55,00	67,49	93,77	116,77	149,75
Total EER of unit (1)	-	5,41	5,92	5,62	5,32	5,36	5,76
Electrical power absorbed in cooling mode (1)	kW	12,03	14,50	17,99	25,87	32,36	42,08
Heating recovery thermal efficiency (2)	%	94,70	95,30	89,10	89,70	90,20	89,80
Total thermal power of unit (2)	kW	78,06	100,25	126,22	156,99	204,52	265,78
Total COP of unit (2)	-	11,92	12,69	10,40	11,97	11,95	15,18
Electrical power absorbed in heating (2)	kW	10,39	12,91	17,92	21,17	27,54	32,87
Supply fan available static pressure	Pa	250	250	250	250	250	250
Return fan available static pressure	Pa	200	200	200	200	200	200
N° of refrigerant circuits	n°	2	2	2	2	2	2
Type of refrigerant		R410A					
Number of compressors: Inverter + On/Off	n°	1 + 1	1 + 1	1 + 1	1 + 2	1 + 2	1 + 2
Max. electricity absorbed by the unit	A	51,40	53,40	73,60	84,70	99,70	103,70
Power supply	V/ph/Hz	400 V +- 10% / 3 / 50 + N + ⏚					
Type of filters for fresh air section		F7	F7	F7	F7	F7	F7
Type of filters for return air section		M5	M5	M5	M5	M5	M5
SFP factor filters	W/(l/s)	2,18	2,19	1,99	2,13	2,09	2,26
Supply sound power level (3)	dB(A)	84	85	85	92	94	96
Return sound power level (3)	dB(A)	73	73	72	76	77	85
Sound pressure level in scale A (ISO EN 3744) (4)	dB(A)	59	60	60	61	63	63

(1) *fresh air inlet +35 °C / 40% RH, return air +26 °C / 50% RH*

(2) *fresh air inlet -10 °C / 90% RH, return air +20 °C / 50% RH*

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

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

ACCESSORIES

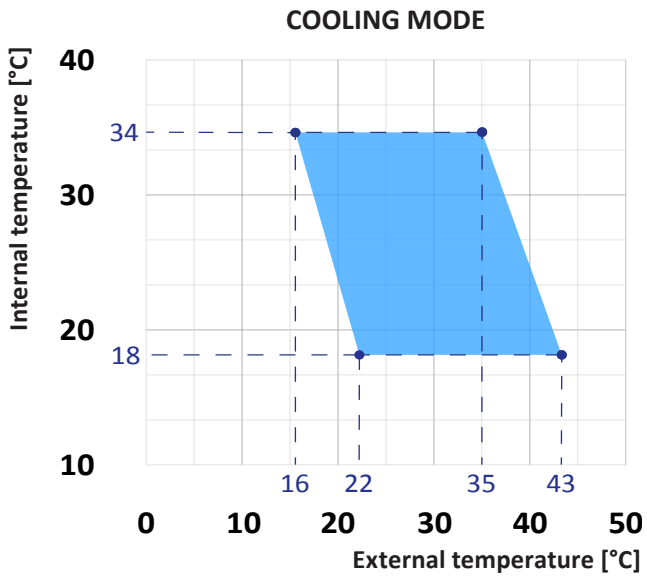
MODEL	011	021	031	041	061	062	081	082	101	102	132	172	242
Supply and return EC fans	■	■	■	■	■	■	■	■	■	■	■	■	■
Counter-flow plate heat recovery	■	■	■	■	■	■	■	■	■	■	■	■	■
ePM10 60% (M5) return filter / ePM1 55% (F7) supply filter	■	■	■	■	■	■	■	■	■	■	■	■	■
Inverter compressor	■	■	■	■	■	■	■	■	■	■	■	■	■
Filters differential pressure switches	■	■	■	■	■	■	■	■	■	■	■	■	■
Fans differential pressure transducers	■	■	■	■	■	■	■	■	■	■	■	■	■
100% by-pass damper with actuator	■	■	■	■	■	■	■	■	■	■	■	■	■
Microprocessor control system with display	■	■	■	■	■	■	■	■	■	■	■	■	■
Integrated defrost system	■	■	■	■	■	■	■	■	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■	■	■	■	■	■	■	■	■
50 mm frame or 60 mm thermal break frame	□	□	□	□	□	□	□	□	□	□	□	□	□
40 kg/m^3 polyurethane panels thermal insulation	□	□	□	□	□	□	□	□	□	□	□	□	□
90 kg/m^3 mineral wool panels thermal insulation	□	□	□	□	□	□	□	□	□	□	□	□	□
Filters ePM1 55% (F7) return and/or ePM1 80% (F9) supply/return	□	□	□	□	□	□	□	□	□	□	□	□	□
Pre-filters ISO Coarse 45% (G4) on supply/return	□	□	□	□	□	□	□	□	□	□	□	□	□
Return grease ISO Coarse 40% (G2) filter	□	□	□	□	□	□	□	□	□	□	□	□	□
Electric frost coil protection	□	□	□	□	□	□	□	□	□	□	□	□	□
Electric heating coil [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
Hot water / cold water / direct expansion coil [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
3 way modulating valve [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
Circular duct flanges (4 pcs)	□	□	□	□	□	□	□	□	□	□	□	□	□
Exhaust / Fresh air damper	□	□	□	□	□	□	□	□	□	□	□	□	□
ON/OFF damper actuator	□	□	□	□	□	□	□	□	□	□	□	□	□
Sound attenuator [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
Roof for outdoor installation	□	□	□	□	□	□	□	□	□	□	□	□	□
45° hoods with bird trap (2 pcs)	□	□	□	□	□	□	□	□	□	□	□	□	□
Remote control panel [2]	□	□	□	□	□	□	□	□	□	□	□	□	□

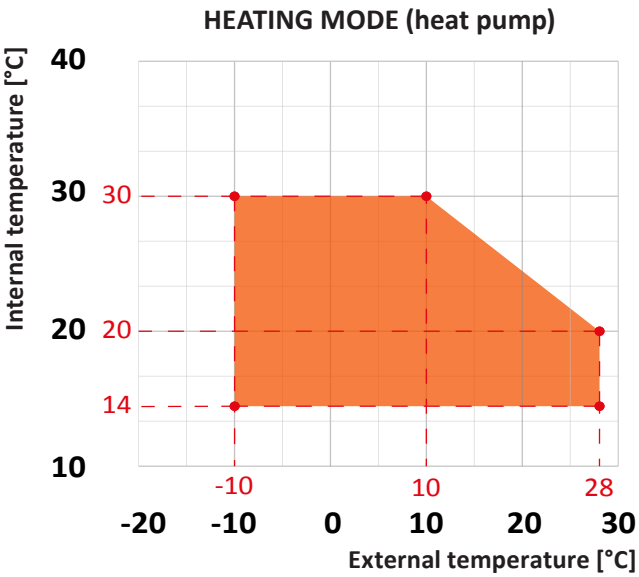
■ Standard □ Optional – Not available

[1] mounted in a separated box

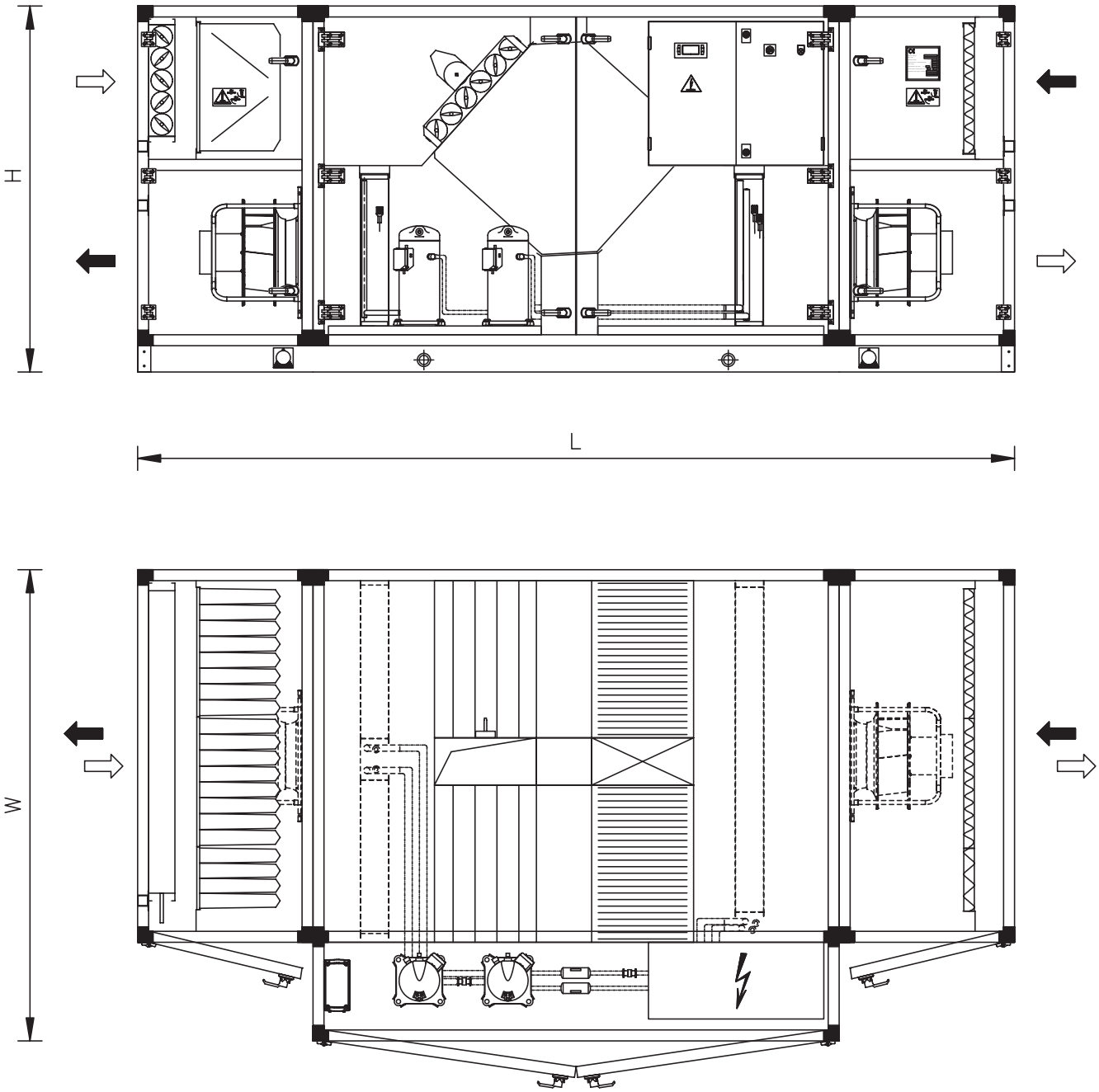
[2] supplied loose

OPERATING LIMITS





DIMENSIONAL DRAWING



DIMENSIONS AND WEIGHTS

MODEL	011	021	031	041	061	062	081	082	101	102	132	172	242
L (mm)	2860	2900	3250	3650	3650	3650	3900	3900	4000	4000	4360	4900	5300
W (mm)	1150	1350	1500	1650	1900	1900	2150	2150	2250	2250	2280	2380	2380
H (mm)	1020	1270	1300	1550	1700	1700	1700	1700	1820	1820	2220	2550	2750
Weight (kg)	319	464	581	714	929	929	1043	1043	1160	1160	1375	1706	1932

Dimensions and weights referred to the standard version

RWH/Hi

INTEGRATED REFRIGERANT CIRCUIT HEAT RECOVERY UNITS

INTRODUCTION

Any room requires the correct supply of outside air and at the same time the control of the internal thermohygrometric conditions. Through the recovery of energy from the air extracted from the environment, through the use of systems with integrated heat pump technology, an economic way in the installation of energy-efficient power plants is offered, which also ensure the degree of comfort to the occupants, both in summer and winter and without added costs in the management of primary air.

For buildings that require air exchange and are not equipped with dedicated air conditioning systems, the installation of these units allows the introduction of primary air at a controlled temperature without disturbing the internal conditions in the occupied spaces.

It is therefore not necessary to use additional systems to heat or cool the incoming primary air. Moreover, these units allow to guarantee a support to the air conditioning system in the intermediate seasons by exploiting the free-cooling or free-heating periods.

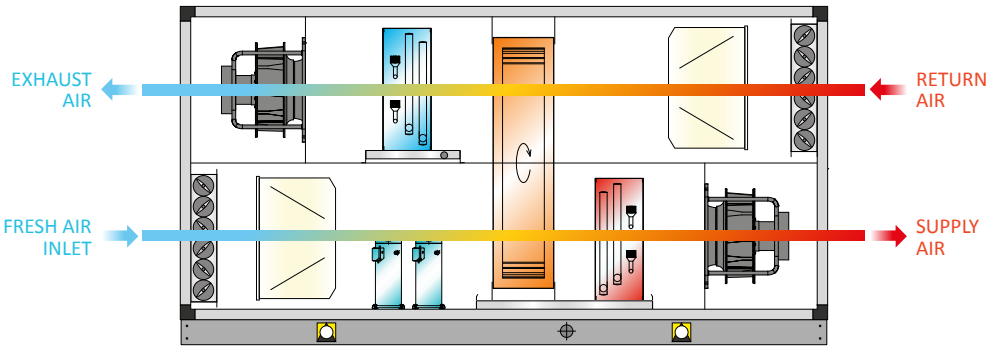
If installed on existing buildings, they guarantee the energy upgrading of the system through the management of the air exchange without additional charges. On new installations, on the other hand, the air exchange is completely carried out allowing to reduce the size of the main air conditioning system. In the intermediate seasons the building will benefit from the free or partial cooling generated by these units, which during the partial load phases allow the main system to operate with higher efficiencies.

OPERATING MODE

• HEATING

The return air, after crossing the heat wheel recovery, feeds the heat pump source exchanger that acts as an evaporator. Through the steam compression refrigeration cycle, the fresh air, leaving first recovery stage, is heated by the heat pump user exchanger, which acts as a condenser. The modulation of the thermal capacity, obtained by means of the compressor, will allow the temperature of the supply air to be precisely controlled.
During heating operation, the evaporator of the heat pump, may be subject to the formation of surface frost resulting in loss of efficiency.

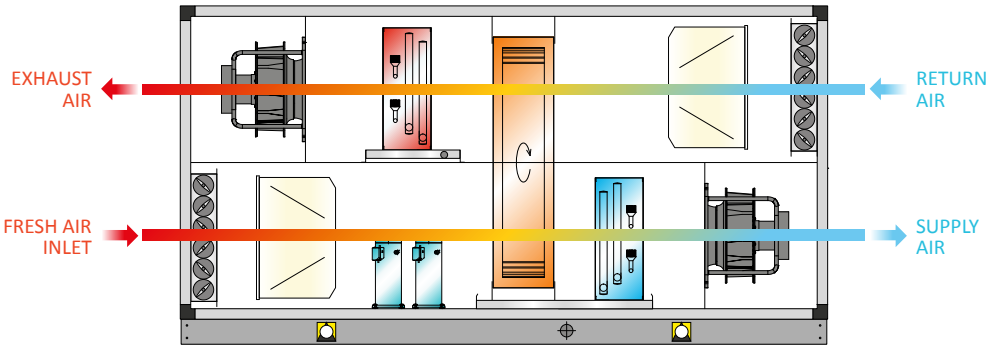
To prevent this from happening, the unit provides for the controlled management of a defrosting cycle obtained by reversing the refrigeration cycle. During this phase, the return fans are stopped and the compressors are forced at maximum speed.
Through the other additional heating resources present in the unit, water heating coils, electric heaters or other refrigeration compressors temporarily not working, the temperature of the supply air is maintained at an appropriate value so as not to disturb the internal environment.



• COOLING

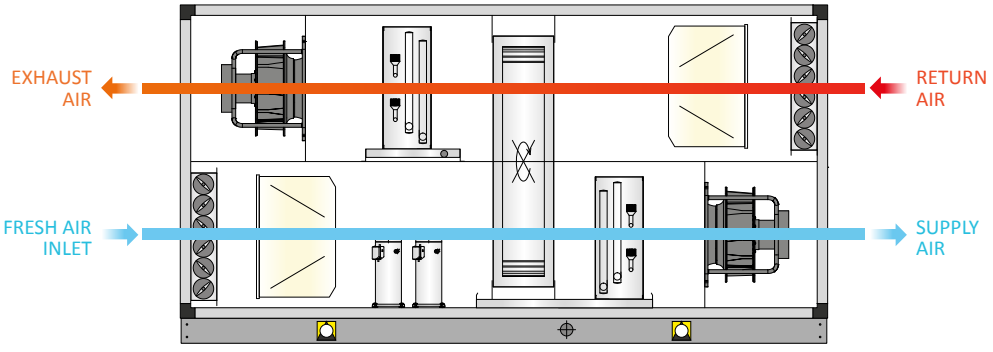
The return air, after crossing the heat wheel recovery, feeds the heat pump source exchanger, which acts as a condenser.

The external air, after crossing the heat wheel recovery, is cooled by the heat pump user exchanger, which acts as an evaporator.



• FREE-COOLING

When the outdoor temperature is lower than the indoor temperature of the room to be air conditioned, if this requires cooling, the units operate in free-cooling mode and all stages of integrated heat recovery are disabled.



MAIN CHARACTERISTICS

STRUCTURE AND PANELS

The structure of the units can be realized in two versions:

VERSION 1:
Profiles 50 x 50 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 50 mm thick double wall sandwich type paneling with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T3/TB4 according to EN1886.

VERSION 2:
Thermal break profiles 60 x 60 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 63 mm thermal break sandwich-type double-walled sandwich-type panels with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T2/TB2 according to EN1886.

Safety microswitches are applied to the inspection doors to allow internal access to the various compartments of the unit only when the unit is completely switched off.
The main access and inspection panels consist of inspection doors with perimeter hinges made of non-corrosive polyamide and handles.

All units can be supplied in both monobloc and modular sections for on-site assembly when required.

AIR FILTERS

The filter sections on the return air are made up of panel filters class ePM10 60% (M5) while for the fresh air section bag filters class ePM1 55% (F7) in accordance with international norms.

As an option, the unit can be equipped with differential-type gauges for monitoring the air-side pressure drop of the filtering sections.

AIR DAMPERS

All adjustment dampers are made of aluminium with a low pressure drop wing profile and opposing wings.

Each damper is equipped with an electric actuator already assembled and directly managed by the electronic control on board.

FANS

The units are equipped with high efficiency plug-fans with built-in brushless EC motor. In this way it is possible to guarantee an accurate regulation of the air flow both in the supply and return section, ensuring that all regulatory requirements such as SFP are met.

PLUG-FANS

The airflow rate of the fan is managed through the integrated electronic control system, thus ensuring, according to the needs of the system, that the correct functioning of the unit is maintained, with consequent savings in the energy absorbed by the unit. Through a reliable pressure sensor installed on the unit it is possible to select and control the air flow through a constant flow regulation, or at a fixed useful static pressure defined on the delivery section towards the environment. The fans are fixed to the frame by means of self-centring brackets to guarantee the correct distance between the impeller and the nozzle, thus optimising performance. On request, it is possible to supply the fan sections with portholes and low consumption internal lighting elements supplied directly from the electrical panel on board the machine or from an independent external source.

ELECTRONIC FLOW RATE CONTROL

MAIN CHARACTERISTICS

FINNED PACK HEAT EXCHANGERS

The evaporative-condensing coils positioned inside the supply and exhaust air sections consist of internally and mechanically expanded striped copper tubes and pre-painted aluminium fins. The direct expansion coil is equipped with an electronic expansion valve managed by the control integrated in the unit and operated in such a way as to guarantee the correct overheating of the refrigerant that reaches the refrigeration compressor in the various operating situations. The use of hydrophilic painted aluminium finned coils guarantees rapid drainage of condensation and dragging effects condensation and dragging effects both during dehumi-dification and defrosting. The same surface coating of the exchanger allows to increase the resistance to corrosion, due to acids or pollutants contained in the treated air.
All coils are tested before being installed with a pressure test with dry air at 42 bar.

The stainless steel condensate drain pan is tilted internally and complies with ASHRAE 62-89 self-draining standards with ductable outlet.

HEAT RECOVERY

The units are equipped with an air-to-air rotary heat recovery unit, consisting by a cylindrical rotor containing thousands of channels and characterised by an extremely elevate surface development, a supporting frame (complete di brush seals to minimize the air leakage between supply and exhaust air flows), and an eletric motor drive system. The heat exchange surface, very high in relation to the volume, allows very high thermal performances when compared to other types of heat recovery systems, reaching efficiencies even above 80%.

In rotary wheel heat recovery units the heat exchange takes place by accumulating the heat in the rotor; as a matter of fact while the cylinder rotates slowly, the exhaust air volume crosses half of the casing and gives its heat to the rotor matrix, which accumulates it. The fresh air, crossing the other half, absorbs the accumulated heat. The parts absorbing and releasing the heat are continuosly inverted, as the rotation proceeds, and the process may continue indefinitely.

HEAT RECOVERY

CONTROL

The unit is complete with regulation by means of 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 compressors with reference to the winter and summer set-points. The unit can manage the automatic change of cooling or room heating modes, free-cooling and free-heating conditions by comparing them with the outside air temperature.
The thermal capacity delivered by the heat pump unit will be continuously modulated through the speed variation of the DC brushless rotary or scroll refrigeration compressor.

This variable depends mainly on the value of the supply air temperature with reference to the external air conditions.
This characteristic allows the operation at partial loads with a much higher energy saving compared to a traditional system equipped with ON/OFF compressors.

CONTROL

THERMODYNAMIC RECOVERY
(2nd stage of cascade recovery)

The efficiency of the unit is further improved thanks to a second phase of indirect recovery, obtained through a compression system of the refrigeration circuit in heat pump.The thermodynamic recovery sections integrated in the unit are equipped with variable speed compressors so as to continuously regulate the thermal capacity transferred to the fresh air. In this way it is possible to adjust the temperature of the supply air to the correct value, thus optimising the energy efficiency of the air handling unit.

COMPRESSORS

The main refrigerant circuit is equipped with hermetic Twin or Scroll rotary compressors with a single 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, low and high pressure switches and vibration dampers suitable for isolating vibrations.
The additional cooling circuits are supplied with hermetic rotary compressors and ON/OFF scrolls.
These compressors allow you to increase the cooling or heating capacity by being used as boosters with inverter, which will allow you to precisely adjust the capacity with respect to the required load.On request, the compressors can be equipped with a soundproofing hood to lower the noise level emitted by the unit.

REFRIGERATION CIRCUIT

The refrigerant circuit is of direct expansion type loaded with refrigerant R410a. Each refrigerant circuit is tested at the factory with reference to both its tightness (pressure test) and its functionality.

The main components are: evaporative-condensing finned pack heat exchangers, electronic expansion devices, solid cartridge acid filters, high and low refrigerant pressure switches, receiver and suction liquid separator, liquid/humidity indicator light, cycle reversal valve, non-return valves, high pressure safety valves. The circuit is complete with a hot gas injection defrosting system that operate on the source heat exchanger.

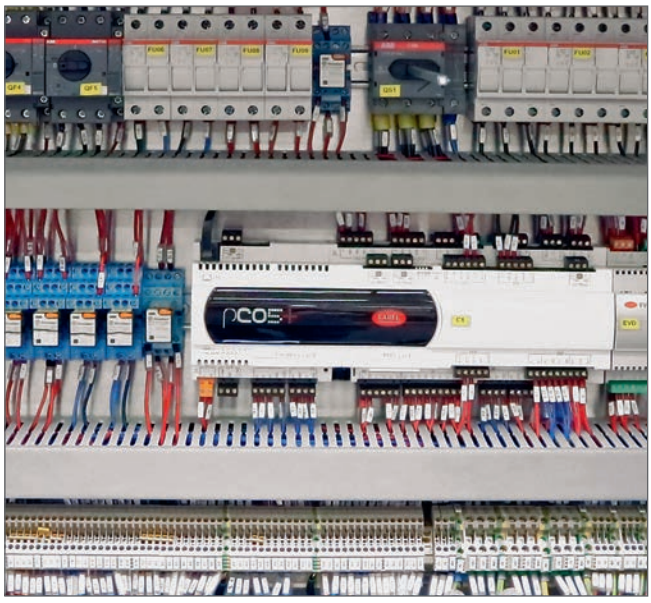
ELECTRIC BOX

It is housed in a dedicated IP54 technical compartment, equipped with a double door to ensure both internal and external installation of the unit.

The electrical panel is manufactured according to IEC 204-I / EN 60204-I standards and complete with door block disconnector, CE isolation transformer and internal thermostated anti-condensation resistors for outdoor units.

All motors and auxiliary circuits are protected against overload and short circuit by fuses and/or circuit breakers.

REFRIGERATION CIRCUIT



ELECTRIC BOX

TECHNICAL DATA

MODEL		011	021	031	041	061	081	101
Nominal airflow rate	m^3/h	1000	2000	3000	4500	6000	8000	10000
Thermal efficiency recovery in cooling mode (1)	%	81,70	80,90	80,00	80,10	80,30	80,40	80,10
Total unit cooling capacity (1)	kW	7,35	15,10	23,12	33,94	45,20	54,70	66,50
Total EER of unit (1)	-	5,53	5,43	5,82	6,06	5,43	5,76	5,54
Electrical power absorbed in cooling mode (1)	kW	1,97	3,91	5,68	8,34	11,70	13,95	17,39
Heating recovery thermal efficiency (2)	%	81,90	81,20	80,50	80,40	80,60	80,80	80,50
Total thermal power of unit (2)	kW	16,15	29,89	44,78	68,22	91,60	114,40	139,10
Total COP of unit (2)	-	11,88	15,33	15,66	14,27	15,02	16,39	18,80
Electrical power absorbed in heating (2)	kW	1,99	3,04	4,52	7,41	9,39	11,25	12,60
Supply fan available static pressure	Pa	250	250	250	250	250	250	250
Return fan available static pressure	Pa	200	200	200	200	200	200	200
N° of refrigerant circuits	n°	1	1	1	1	1	1	1
Type of refrigerant		R410A						
Number of compressors: Inverter	n°	1	1	1	1	1	1	1
Max. electricity absorbed by the unit	A	26,90	26,80	34,00	44,40	53,50	59,80	62,60
Power supply	V/ph/Hz	400 V +- 10% / 3 / 50 + N + ⏚						
Type of filters for fresh air section		F7	F7	F7	F7	F7	F7	F7
Type of filters for return air section		M5	M5	M5	M5	M5	M5	M5
SFP factor filters	W/(l/s)	2,02	1,82	1,86	1,98	1,86	1,83	1,76
Supply sound power level (3)	dB(A)	80	79	79	83	82	84	84
Return sound power level (3)	dB(A)	72	71	75	68	72	71	71
Sound pressure level in scale A (ISO EN 3744) (4)	dB(A)	57	55	53	58	57	58	59

MODEL		062	082	102	132	172	242
Nominal airflow rate	m^3/h	6000	8000	10000	13000	17000	24000
Thermal efficiency recovery in cooling mode (1)	%	80,30	80,40	80,10	80,00	79,00	78,00
Total unit cooling capacity (1)	kW	45,20	55,58	67,80	95,20	113,61	151,40
Total EER of unit (1)	-	5,39	5,77	5,53	5,34	5,64	5,97
Electrical power absorbed in cooling mode (1)	kW	11,76	14,09	17,66	25,78	30,93	40,97
Heating recovery thermal efficiency (2)	%	80,60	80,80	80,50	80,00	78,00	78,00
Total thermal power of unit (2)	kW	95,77	124,10	154,77	173,19	228,93	300,90
Total COP of unit (2)	-	11,44	13,13	12,96	14.08	17,89	19,29
Electrical power absorbed in heating (2)	kW	11,66	13,72	17,14	19,92	23,10	30,42
Supply fan available static pressure	Pa	250	250	250	250	250	250
Return fan available static pressure	Pa	200	200	200	200	200	200
N° of refrigerant circuits	n°	2	2	2	2	2	2
Type of refrigerant		R410A					
Number of compressors: Inverter + On/Off	n°	1 + 1	1 + 1	1 + 1	1 + 2	1 + 2	1 + 2
Max. electricity absorbed by the unit	A	51,40	53,40	73,60	84,70	99,70	103,70
Power supply	V/ph/Hz	400 V +- 10% / 3 / 50 + N + ⏚					
Type of filters for fresh air section		F7	F7	F7	F7	F7	F7
Type of filters for return air section		M5	M5	M5	M5	M5	M5
SFP factor filters	W/(l/s)	1,86	1,83	1,76	2,04	2,13	2,20
Supply sound power level (3)	dB(A)	82	84	84	92	94	96
Return sound power level (3)	dB(A)	72	71	71	75	77	85
Sound pressure level in scale A (ISO EN 3744) (4)	dB(A)	57	58	59	61	63	63

(1) *fresh air inlet +35 °C / 40% RH, return air +26 °C / 50% RH*

(2) *fresh air inlet -10 °C / 90% RH, return air +20 °C / 50% RH*

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

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

ACCESSORIES

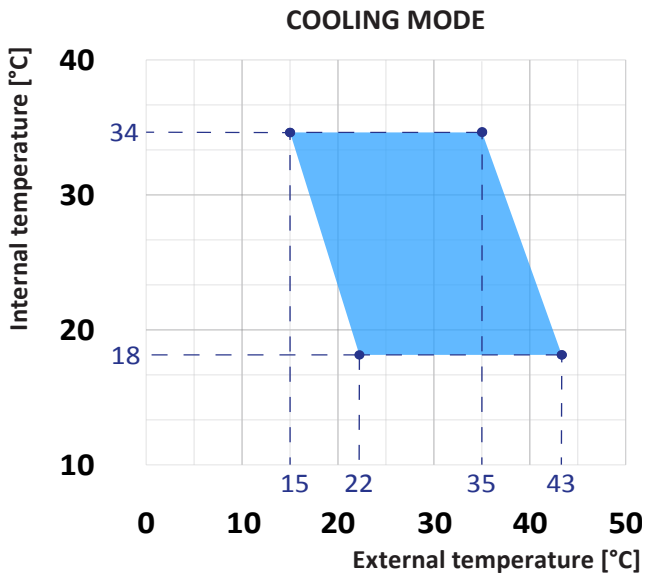
MODEL	011	021	031	041	061	062	081	082	101	102	132	172	242
Supply and return EC fans	■	■	■	■	■	■	■	■	■	■	■	■	■
Rotary heat recovery	■	■	■	■	■	■	■	■	■	■	■	■	■
ePM10 60% (M5) return filter / ePM1 55% (F7) supply filter	■	■	■	■	■	■	■	■	■	■	■	■	■
Inverter compressor	■	■	■	■	■	■	■	■	■	■	■	■	■
Filters differential pressure switches	■	■	■	■	■	■	■	■	■	■	■	■	■
Fans differential pressure transducers	■	■	■	■	■	■	■	■	■	■	■	■	■
Microprocessor control system with display	■	■	■	■	■	■	■	■	■	■	■	■	■
Hot gas injection defrost system	■	■	■	■	■	■	■	■	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■	■	■	■	■	■	■	■	■
50 mm frame or 60 mm thermal break frame	□	□	□	□	□	□	□	□	□	□	□	□	□
40 kg/m^3 polyurethane panels thermal insulation	□	□	□	□	□	□	□	□	□	□	□	□	□
90 kg/m^3 mineral wool panels thermal insulation	□	□	□	□	□	□	□	□	□	□	□	□	□
Filters ePM1 55% (F7) return and/or ePM1 80% (F9) supply/return	□	□	□	□	□	□	□	□	□	□	□	□	□
Pre-filters ISO Coarse 45% (G4) on supply/return	□	□	□	□	□	□	□	□	□	□	□	□	□
Return grease ISO Coarse 40% (G2) filter	□	□	□	□	□	□	□	□	□	□	□	□	□
Electric frost coil protection	□	□	□	□	□	□	□	□	□	□	□	□	□
Electric heating coil [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
Hot water / cold water / direct expansion coil [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
3 way modulating valve [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
Circular duct flanges (4 pcs)	□	□	□	□	□	□	□	□	□	□	□	□	□
Exhaust / Fresh air damper	□	□	□	□	□	□	□	□	□	□	□	□	□
ON/OFF damper actuator	□	□	□	□	□	□	□	□	□	□	□	□	□
Sound attenuator [1]	□	□	□	□	□	□	□	□	□	□	□	□	□
Roof for outdoor installation	□	□	□	□	□	□	□	□	□	□	□	□	□
45° hoods with bird trap (2 pcs)	□	□	□	□	□	□	□	□	□	□	□	□	□
Remote control panel [2]	□	□	□	□	□	□	□	□	□	□	□	□	□

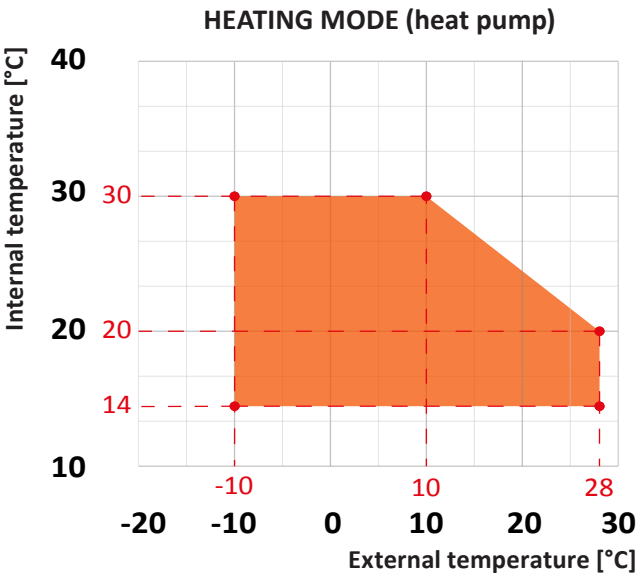
■ Standard □ Optional – Not available

[1] mounted in a separated box

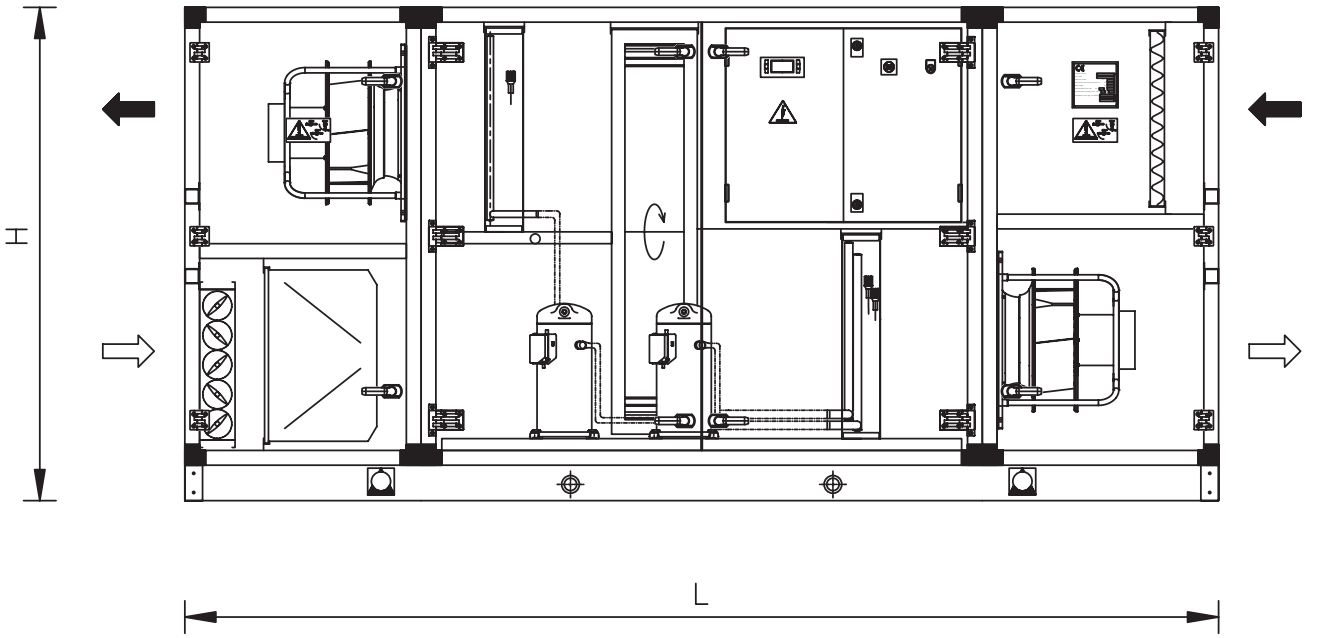
[2] supplied loose

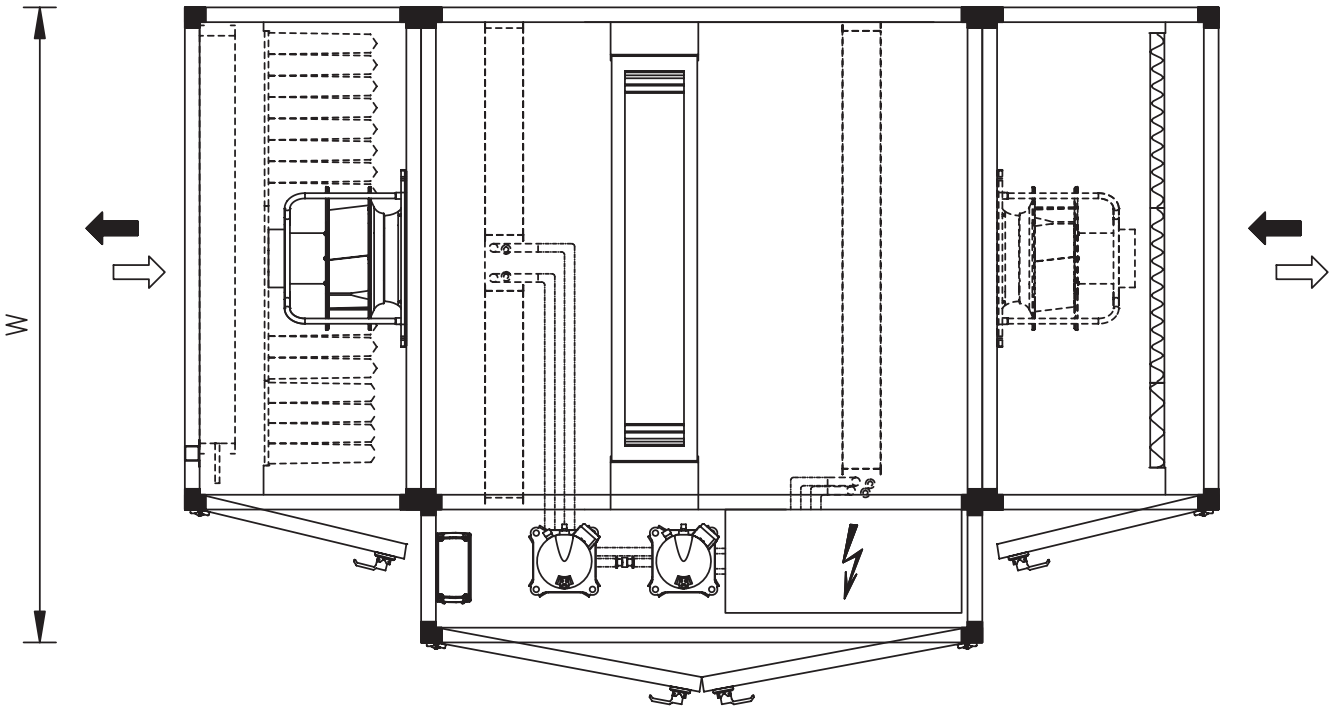
OPERATING LIMITS





DIMENSIONAL DRAWING





DIMENSIONS AND WEIGHTS

MODEL	011	021	031	041	061	062	081	082	101	102	132	172	242
L (mm)	2860	2900	3250	3250	3450	3450	3450	3450	3550	3550	3300	3500	4900
W (mm)	1150	1350	1500	1650	1900	1900	2150	2150	2250	2250	2280	2380	2380
H (mm)	1020	1270	1300	1550	1700	1700	1900	1900	2050	2050	2220	2550	2750
Weight (kg)	330	469	589	699	871	871	998	998	1197	1197	1269	1499	1887

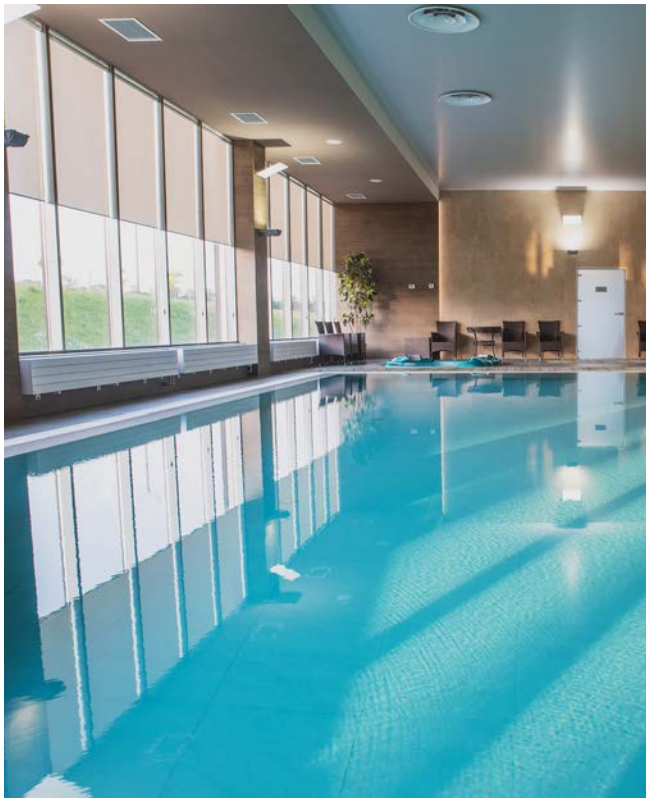
Dimensions and weights referred to the standard version

SNV/DE

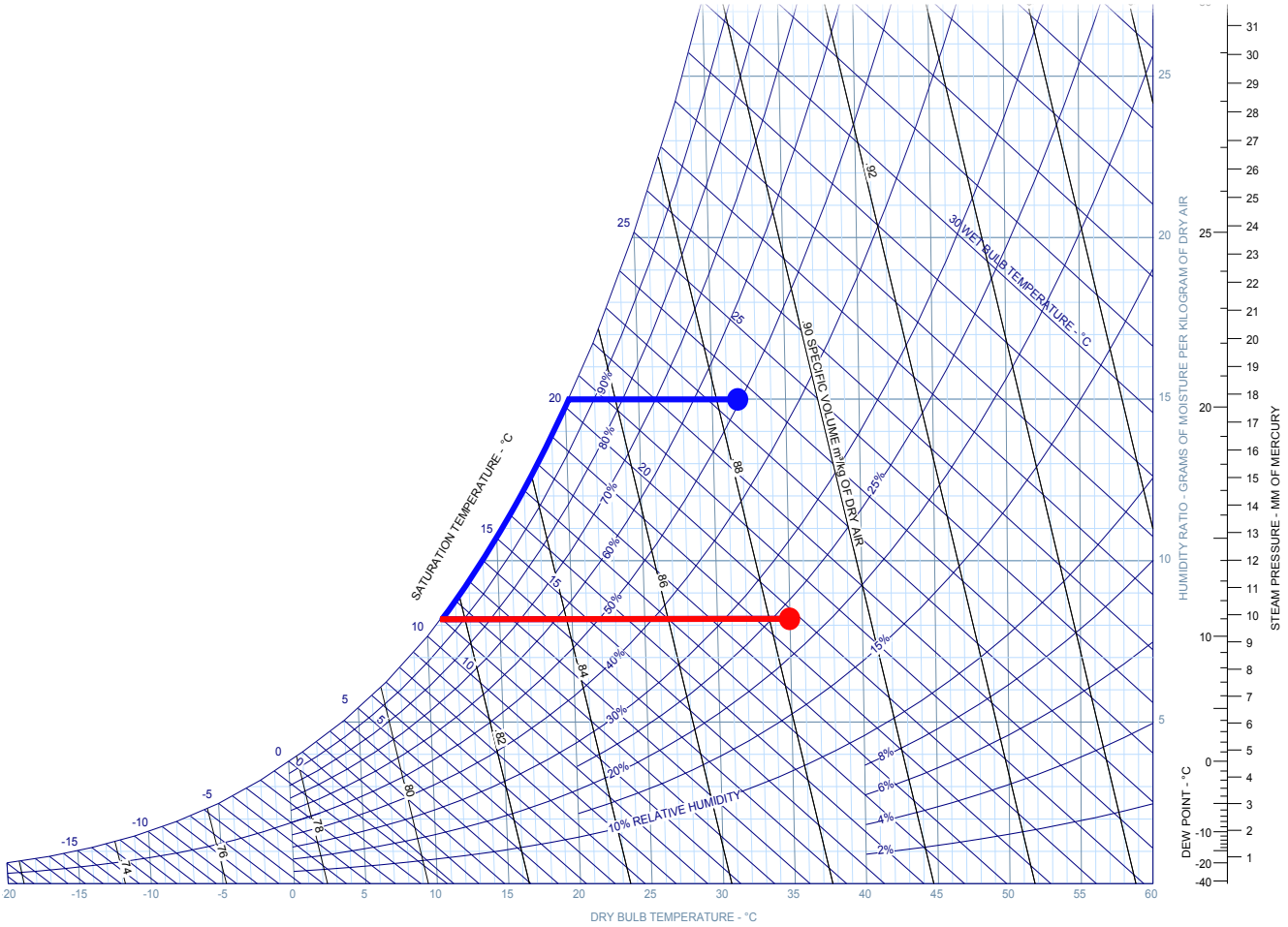
SWIMMING POOL DEHUMIDIFIERS

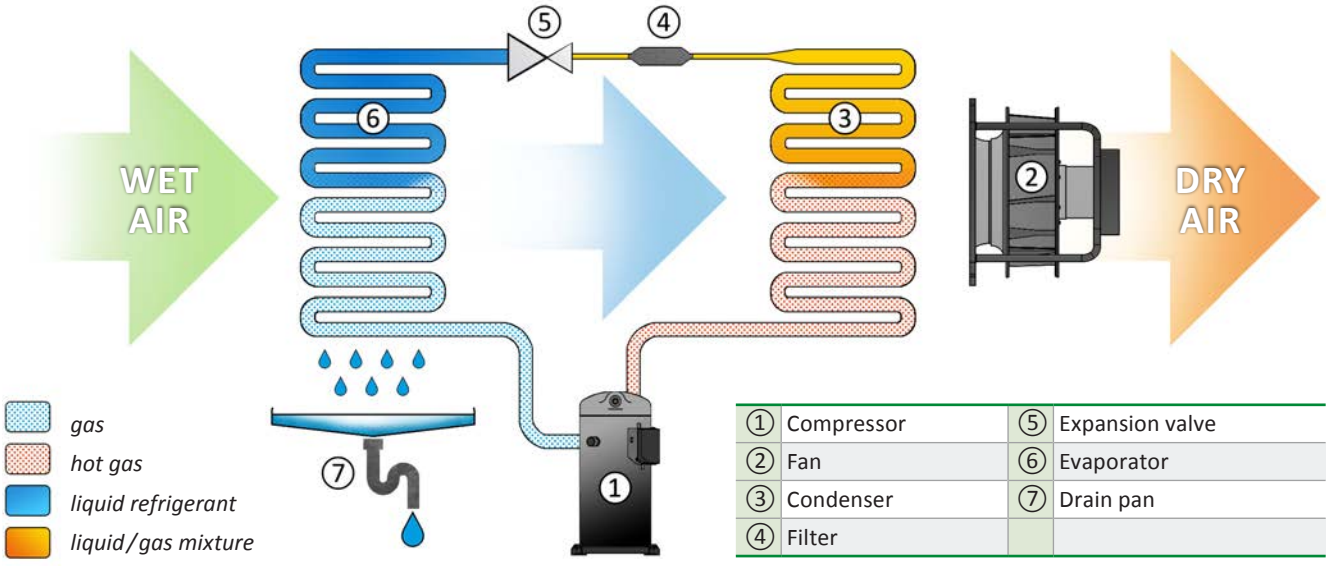
INTRODUCTION

In indoor pools, the air temperature normally varies between 28 °C and 35 °C and, in general, the air temperature inside the rooms is always warmer than the outside air. In these rooms, the high degree of evaporation of the water, leads to a high level of humidity and the unpleasant feeling of an oppressive heat. If you do not control the humidity, not only is the time spent in an indoor pool perceived as unpleasant, but there is a risk that the humidity contained in the water vapor will condense on cooler surfaces, such as metal components, external walls or glass surfaces.
This can lead to the formation of mould and cause corrosion. In addition, the ventilation of swimming pool rooms involves considerable energy consumption and the costs of a good heat recovery system, in private or small applications and with moderate outside temperatures, do not allow returns on investment in a satisfactory time. For this reason, in private pools, hotel pools, wellness centers and therapeutic areas and in all those applications where the use of fresh air is not required by specific regulations, dehumidifiers with full recirculation can be used.These units are normally installed in a central service room with supply and return air ducts to the pool area. The air recirculation process guarantees an energy-efficient dehumidification system.
All the thermal energy recovered from the high-performance heat pump circuit is completely returned to the environment, helping to reduce heating costs.



OPERATING MODE





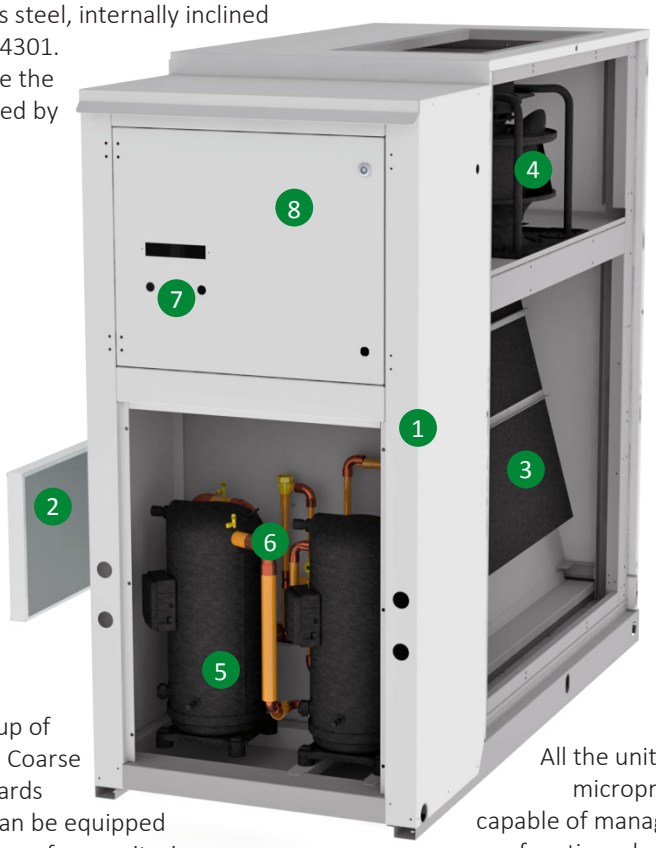
①	Compressor	⑤	Expansion valve
②	Fan	⑥	Evaporator
③	Condenser	⑦	Drain pan
④	Filter		

In practice, in a dehumidifier operating with a refrigeration cycle, the air passes through a finned evaporator, in which it is cooled by evaporation of the refrigerant gas; the dew temperature is reached and the water vapour condenses in the form of drops on the fins of the evaporator.
The droplets are collected in the drain pan and evacuated through the drain pipe. Then, the freshly cooled and dehumidified air in the evaporator passes through the condenser where it absorbs the condensation heat of the system. At this point, the air is reintroduced into the environment at a higher temperature and with a lower water vapour content. It is important to underline that the dehumidification treatment with refrigeration cycle is always solved with an increase in the air supply temperature. This aspect must be taken into consideration in installations where temperature control is necessary.

MAIN CHARACTERISTICS

1 | STRUCTURE

The unit consists of RAL 9010 steel profiles, pre-painted at 180°C with polyurethane powder paint. The panels have a thickness of 25 mm with insulation in high density polyurethane foam (40 kg/m^3). The frame is made according to EN1886 standard. Mechanical resistance class D1, thermal transmittance class T3, dispersion class L1. All internal structural reinforcements are fixed with systems that avoid thermal bridges; the value class is TB3. Air tightness is guaranteed by a particularly adaptable and resilient neoprene gasket. The panels that can be opened are tightened using a system of push locks that ensure adequate and constant pressure on the seals.
In all areas subject to condensation there is a removable drain pan in AISI 304 stainless steel, internally inclined and in compliance with EN 1.4301.
The units can be placed inside the buildings, or outside, protected by a special roof (supplied as an option).



2 | FILTERS

The filter sections are made up of corrugated filters in class ISO Coarse 45% (G4), according to standards laws. As an option, the unit can be equipped with differential pressure gauges for monitoring pressure drops on the air side of the filter sections.

3 | FINNED HEAT EXCHANGERS

Finned heat exchangers consist of mechanically expanded copper tubes and painted aluminium fins. The painting on the heat exchanger allows a better resistance to corrosion in aggressive environments. All heat exchangers are tested with dry air at 42 bar before installation.

4 | FANS

All units are equipped with high efficiency backward curved centrifugal impeller fans with built-in brushless EC motor. These fans ensure accurate air flow regulation and guarantee compliance with all the requirements of the ERP 2018. The fans are fixed to the frame by self-aligning brackets to ensure the correct distance between the impeller and nozzle, thereby optimizing performance.
The electric motor has an IP54 degree of protection.

5 | COMPRESSORS

The compressors are scroll type with electric heater incorporated in the crankcase and thermal overload protections incorporated in the motor windings. They are mounted on rubber anti-vibration mounts and are supplied, on request, with a sound-absorbing mat to reduce the noise emission.

6 | REFRIGERATION CIRCUIT

The refrigeration circuit is built according to the international standards ISO 97/23. The refrigerant gas R410a is used. The units are supplied with mechanical expansion valve with external equalizer, sight glass, filter drier, high and low pressure switches, safety device, according to the PED standard.

7 | CONTROL

All the units are equipped with an advanced microprocessor with integrated software capable of managing and controlling the following functions: humidity and ambient temperature regulation by means of mechanical or electronic devices, modulating valve regulation (if present), display of operating alarms, frost protection, compressor timing, automatic compressor start sequence, alarm reset, potentially free contact for remote general alarm, remote management via RS485 serial card (on request).

8 | ELECTRIC BOX

The electrical panel is accessible through an inspection panel interlocked by a main switch with a high degree of protection, which also makes it safe to install the unit outside the building. The electronic control system with user keypad and alphanumeric LED display is installed inside the electrical compartment. When the unit is installed outside the building, the electrical resistance against condensation is supplied as standard.

TECHNICAL DATA

MODEL		031	041	051	071	081	091	122	152	172	202	242
Moisture removed at 30°C - 80% (1)	l/24h	382.0	442.0	557.0	749.0	915.0	1066.0	1334.0	1604.0	1664.0	2255.0	2316.0
Nominal input power at 30°C - 80% (2)	kW	4.9	6.1	6.9	9.5	11.3	14.5	15.8	19.7	21.1	27.9	29.7
Maximum input power (2)	kW	7.2	11.8	14.0	17.4	18.3	17.9	20.5	26.7	28.6	35.9	38.2
Maximum input current (2)	A	12.9	17.8	19.3	26.8	30.4	39.2	47.5	53.0	56.3	86.0	86.0
Supplementary electric heater	kW	6.0	9.0	9.0	12.0	12.0	15.0	18.0	24.0	24.0	24.0	24.0
Maximum starting current	A	69.0	78.0	104.0	144.0	151.0	179.2	129.0	141.0	144.0	216.0	216.0
Hot water coil (3)	kW	33.0	41.7	53.8	65.0	80.0	86.3	114.0	138.0	168.0	199.0	225.0
Air volume	m^3/h	3500	4500	5500	7000	8500	9500	12000	15000	17000	20000	24000
Available static pressure	Pa	250	250	250	250	250	250	250	250	250	250	250
Compressors / Refrigerant circuit	nr.	1/1	1/1	1/1	1/1	1/1	1/1	2/2	2/2	2/2	2/2	2/2
Refrigerant gas		R410A										
Refrigerant charge	kg	2.5	2.7	4.2	5.2	6.8	6.8	9.6	10.4	12.0	15.0	15.0
Global warming potential (GWP)		2088										
Equivalent CO_2 charge	t	5.2	5.6	8.8	10.9	14.2	14.2	20.1	21.7	25.1	31.3	31.3
Sound power (4)	db(A)	81.8	84.0	83.2	84.4	88.6	91.3	90.5	96.4	91.6	90.6	90.6
Sound pressure (5)	db(A)	66.1	68.3	67.1	68.0	72.0	74.7	73.2	78.9	74.1	72.7	72.7
Power supply	V/ph/Hz	400 / 3 / 50										

(1) *According to EN810 standards.*

(2) *Unit without additional electric heater.*

(3) *Room temperature 30°C; water temperature 80/70°C, compressor OFF.*

(4) *Sound Power level according to EN 3744, ducted unit.*

(5) *Sound pressure level measured at 1 mt from the unit in free field conditions according to EN 3744. Ducted unit.*

UNIT TEST

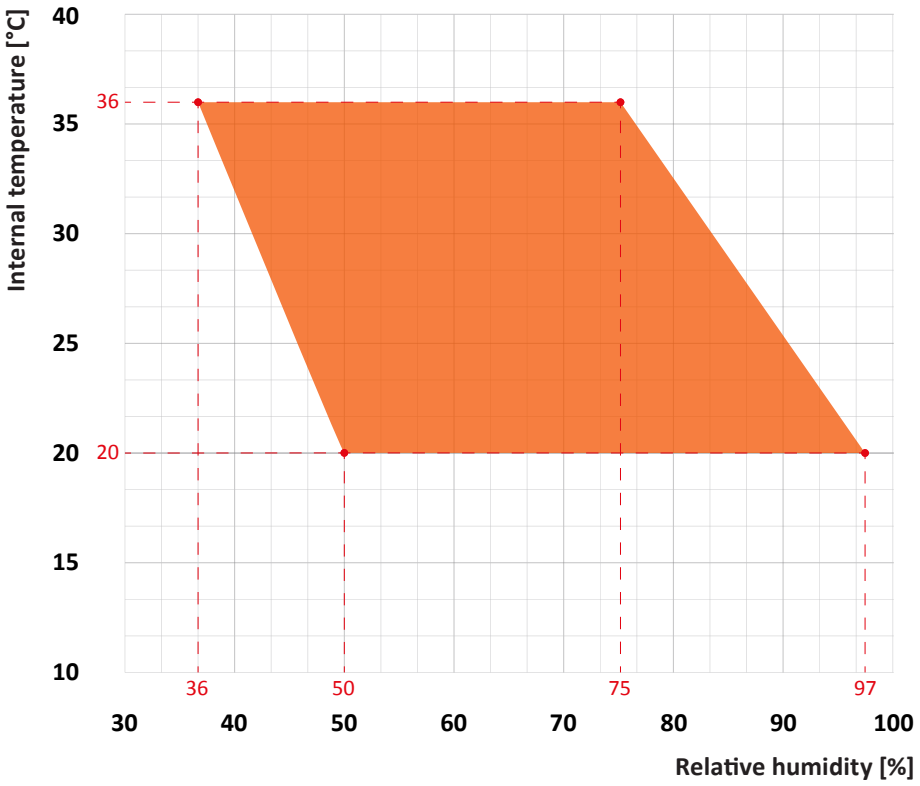
All units are fully assembled and wired at the factory, carefully vacuumed and dried after pressure tightness tests and loaded with R410A refrigerant, all subjected to functional testing before shipment.
The units comply with European Directives, are individually marked with the CE mark and have a Declaration of Conformity.

ACCESSORIES

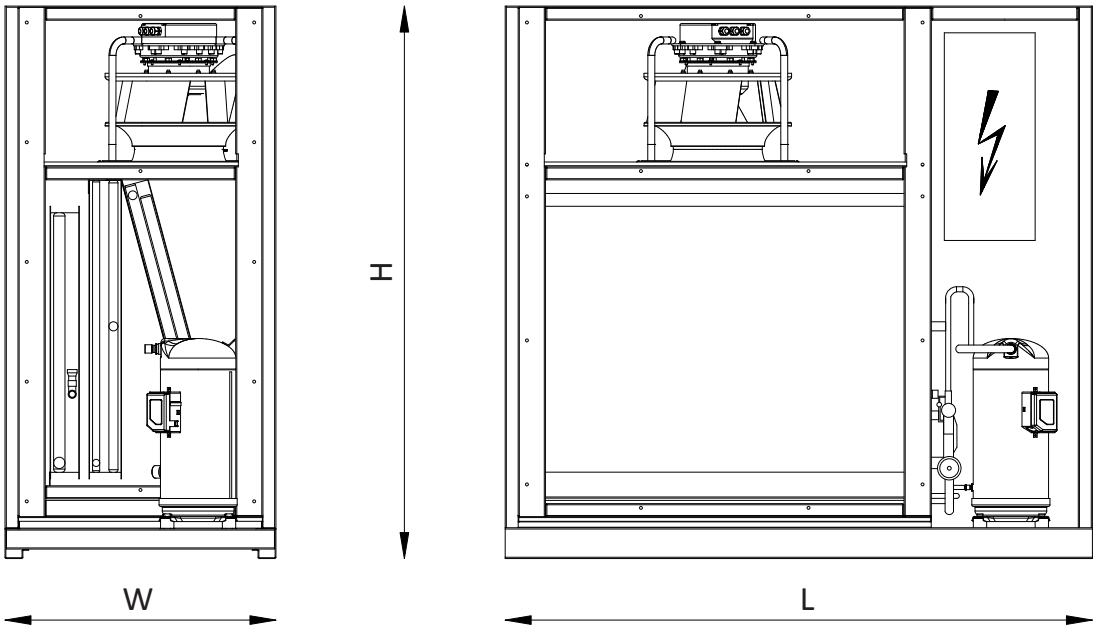
MODEL	031	041	051	071	081	091	122	152	172	202	242
High efficiency E.C. fans ≤ 200 Pa	■	■	■	■	■	■	■	■	■	■	■
Supply flange	■	■	■	■	■	■	■	■	■	■	■
Mechanical expansion valve	■	■	■	■	■	■	■	■	■	■	■
Main switch	■	■	■	■	■	■	■	■	■	■	■
Remote mechanical hygrostat	□	□	□	□	□	□	□	□	□	□	□
Humidity & Temp. electronic probe sensor	□	□	□	□	□	□	□	□	□	□	□
Hot water coil	□	□	□	□	□	□	□	□	□	□	□
3 Way modulating valve kit installed	□	□	□	□	□	□	□	□	□	□	□
Electric heater kit 6 kW (400/3~/50)	□	□	□	□	□	□	□	□	□	□	□
Electric heater kit 12 kW (400/3~/50)	–	–	–	□	□	□	□	□	□	□	□
Serial interface card RS485	□	□	□	□	□	□	□	□	□	□	□
Remote control panel	□	□	□	□	□	□	□	□	□	□	□
Low noise version	□	□	□	□	□	□	□	□	□	□	□
Partial heat recovery	□	□	□	□	□	□	□	□	□	□	□
Stainless steel frame and panels	□	□	□	□	□	□	□	□	□	□	□
Roof for external installation	□	□	□	□	□	□	□	□	□	□	□
Frame for ducted installation	□	□	□	□	□	□	□	□	□	□	□
Flexible connections for ducts	□	□	□	□	□	□	□	□	□	□	□
High efficiency E.C. fans ≥ 200 Pa	□	□	□	□	□	□	□	□	□	□	□
Rigid bag filter ePM1 55% (F7) box	□	□	□	□	□	□	□	□	□	□	□

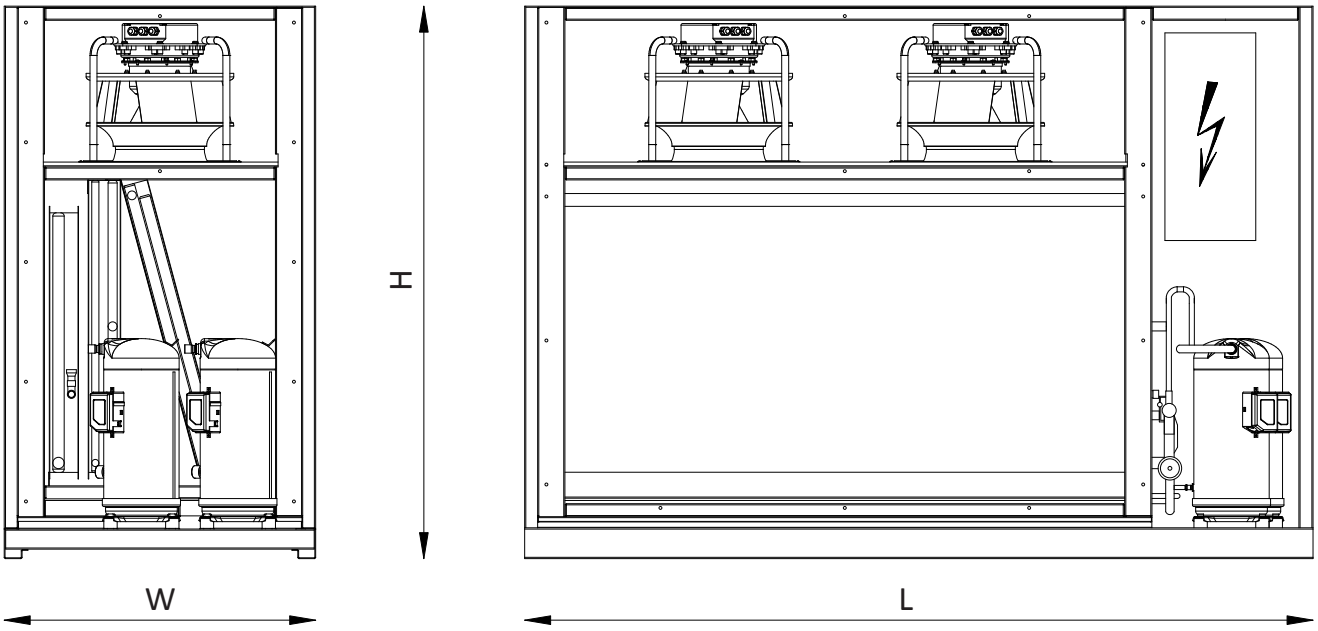
■ Standard □ Optional – Not available

OPERATING LIMITS



DIMENSIONAL DRAWING





DIMENSIONS AND WEIGHTS

MODEL	031	041	051	071	081	091	122	152	172	202	242
L (mm)	1250	1250	1610	1610	1810	1810	2130	2130	2430	2780	2780
W (mm)	1340	1340	1430	1575	1625	1625	1900	2080	1875	2060	2060
H (mm)	750	750	750	850	850	850	960	960	960	960	960
Weight (kg)	319	338	404	443	512	532	780	832	857	1025	1058

SXH/HP

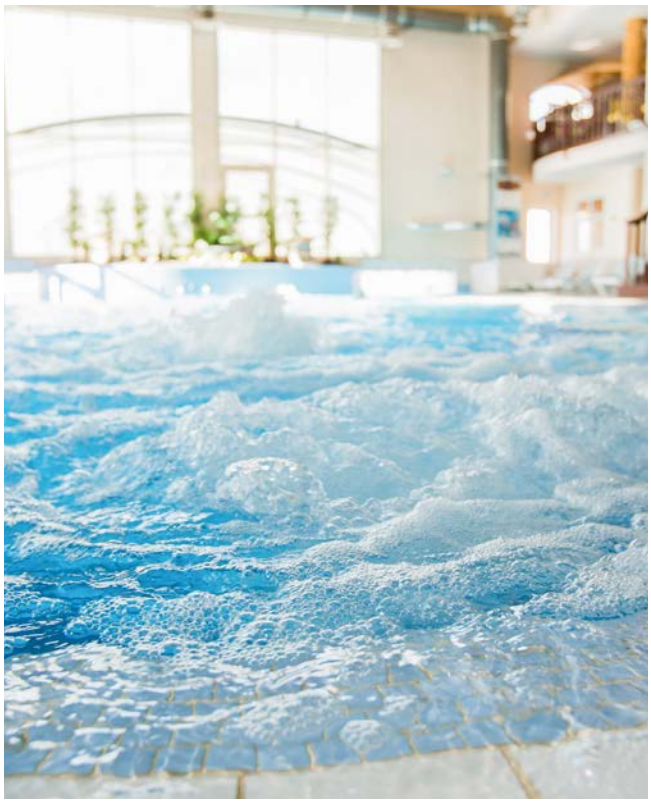
SWIMMING POOL HEAT PUMP AIR HANDLING UNITS

INTRODUCTION

Public 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 regulation 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.



SELECTION PRINCIPLES

The water surface and the use of the pool are key factors in calculating the evaporation of the pool water. Evaporation is as high as the difference in pressure between the saturation water vapour at the pool water temperature and the partial water vapour pressure in the pool air. Based on these factors, the mass of evaporated water can be determined.

EXAMPLE OF CALCULATION OF DEHUMIDIFICATION AND FRESH AIRFLOW IN INDOOR SWIMMING POOLS

SWIMMING POOL DATA

Room volume	m3	1.0
Pool surface	m2	100.0
Pool water temperature	°C	28.0
Vapour pressure: Water 100% R.H.	mbar	37.79
Room temperature	°C	30.0
Relative humidity	%	60.0
Vapour pressure: Air	mbar	25.45
Full operation factor:		1.0
Stand-by factor:		0.5

EVAPORATION CALCULATION

Max. evaporation:	kg/h	11.03
Max. evaporation:	kg/24h	264.79
Min. evaporation:	kg/h	5.52
Min. evaporation:	kg/24h	132.40

FRESH AIRFLOW RATE CALCULATION

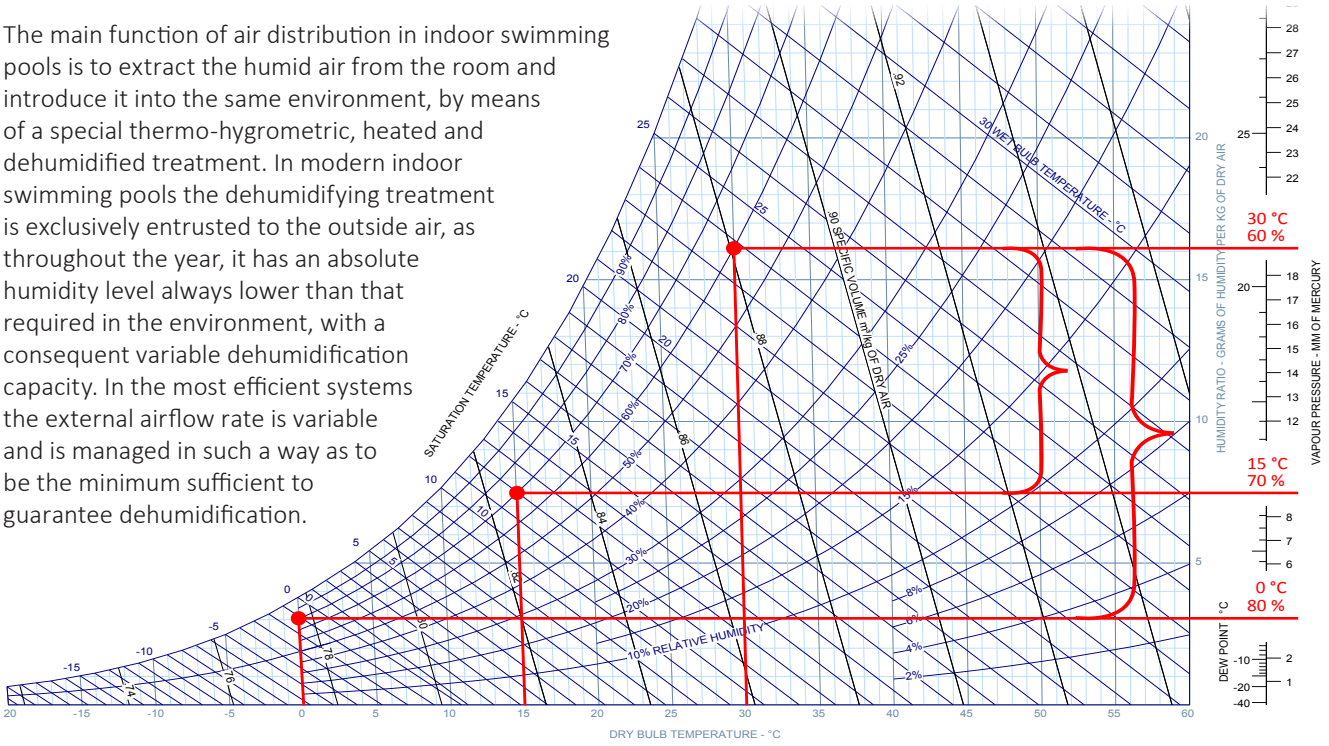
Fresh airflow (VDI 2089 B1-94)	m3/h	1.365
Fresh airflow (Italian law 16/03)	m3/h	2.000

= input data = output data

USE FACTORS:

0.3 = swimming pools not in function (with cover)
0.6 = swimming pools not in function (without cover)
1.0 = private swimming pools
1.5 = hotel swimming pools
2.0 / 2.5 = public swimming pools (2.2 average factor)
2.7 = wave pools, children's slides
3.0 = whirlpools, waterfalls or other attractions

The main function of air distribution in indoor swimming pools is to extract the humid air from the room and introduce it into the same environment, by means of a special thermo-hygrometric, heated and dehumidified treatment. In modern indoor swimming pools the dehumidifying treatment is exclusively entrusted to the outside air, as throughout the year, it has an absolute humidity level always lower than that required in the environment, with a consequent variable dehumidification capacity. In the most efficient systems the external airflow rate is variable and is managed in such a way as to be the minimum sufficient to guarantee dehumidification.



The design parameters normally used in the various environments are shown in the following table:

Air temperature		Water temperature		Fresh airflows	
Swimming pool	30- 34 °C	Public pools	28 °C	Hall	5 m3/hm2
Locker rooms	22- 28 °C	Leisure pools	28 - 32 °C	Locker rooms	15 m3/hm2
Showers	26- 34 °C	Children's pools	32 °C	Infirmary	25 m3/hm2
Offices	22- 26 °C	Therapeutic pools	36 °C	WC (unitary)	100 m3/h
Hall	> 20 °C	Whirlpools	36 °C	Showers (unitary)	220 m3/h
Connecting area	> 20 °C	Cold water pools	15 °C		

INSTALLATION IN THE POOL

In indoor swimming pools, the correct sizing and positioning of the air diffusers is a fundamental requirement to ensure good comfort for bathers; in particular, the distribution system must remove excess humidity, ensure a uniform temperature and avoid annoying drafts in the passage areas.

Generally, the supply air duct should form a "U" around the three sides of the pool, so that the airflow "washes" the perimeter glass surfaces and external walls with drier air. In such a system, the correct airflow on external walls, windows and doors eliminates or minimizes the formation of condensation on cold surfaces.

The air intake grilles are normally placed on the free side and in the upper part of the room where warm and humid air tends to stratify. In general, 4/6 air changes per hour are sufficient to ensure that all these requirements are met.

The materials used for the construction of air distribution ducts must be suitable for humid environments where, among other things, corrosive chemicals contained in the treated air are present.

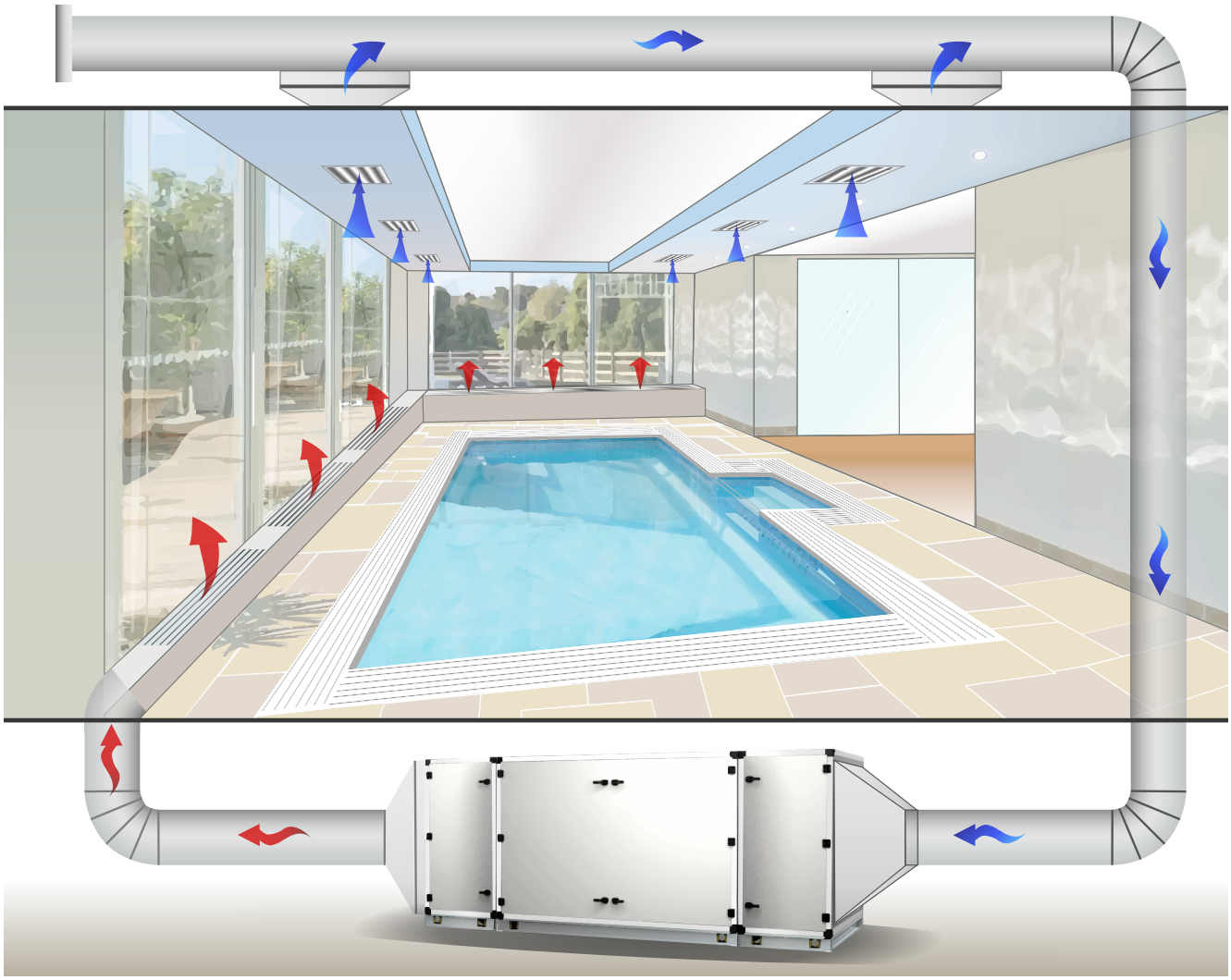
Generally, aluminium and plastic are the preferred materials for grilles, control dampers and diffusers, while the distribution ducts are made of painted steel or aluminium.

During cleaning and disinfection of the pool water, by-products are formed which flow into the pool air. A further task of the air distribution system is to prevent the concentration of these substances so that they do not reach dangerous concentrations for bathers.

The most widely used product for the disinfection of swimming pool water is chlorine. If used correctly, it allows an excellent control of the value of microorganisms and bacteria, however, decomposing into hypochlorus acids and hypochloryte ions also reacts with sweat, skin cells, urine and other organic compounds present in the water creating disinfectant by-products such as trichloramine and cyanogen chloride.

These by-products transported by the air stream can be hazardous to health and must be properly removed.

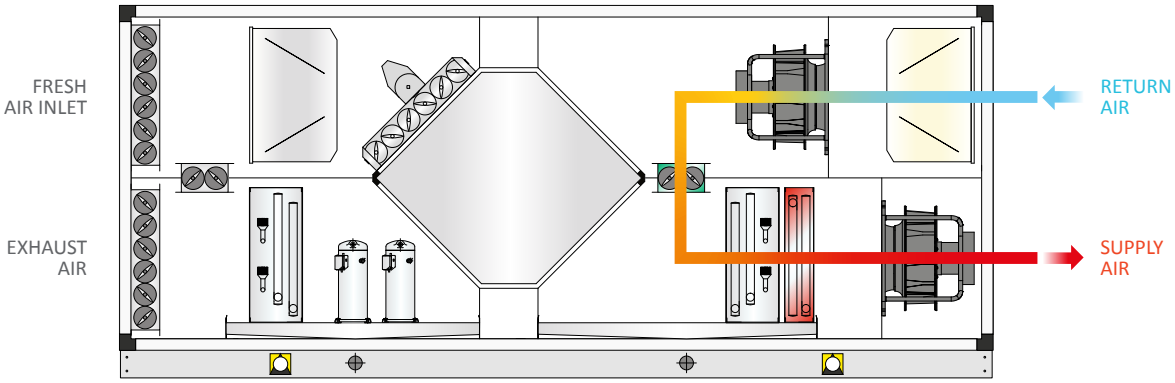
Chloramines are compounds that irritate the eyes, lungs and skin of swimmers and occupants. They are also responsible for the typical "pool smell" which is often confused with "chlorine smell". In fact, "pool smell" is a symptom of insufficient chlorination.



OPERATING MODE

• START-UP MODE OR NIGHT HEATING MODE

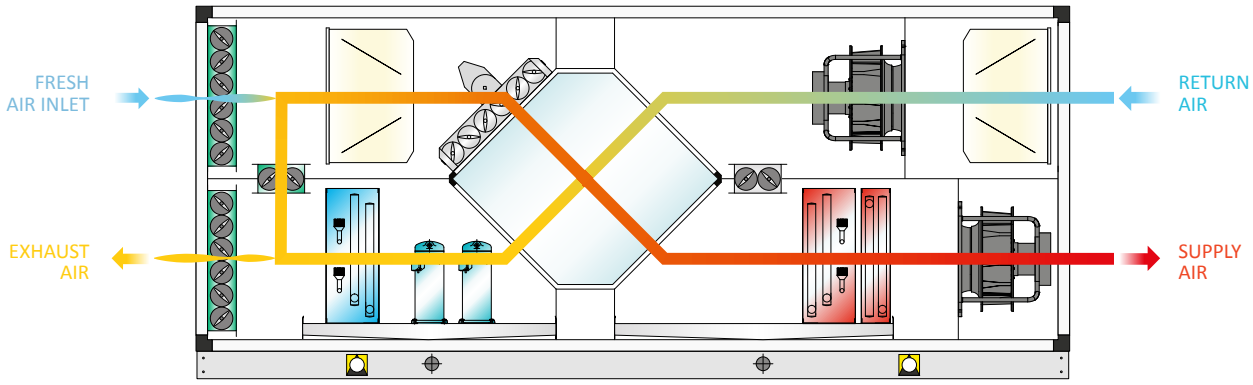
The unit operates in 100% recirculation mode without external air supply. The air in the pool room is recirculated and heated by the water coil in the unit and supplied by an external energy source (e.g. boiler). The heat pump circuit is in stand-by. The fans operate in flow modulation to minimize the power consumption of the unit.



• DEHUMIDIFICATION MODE WITH "ALPHA" CYCLE

The unit operates with the minimum amount of fresh air to ensure the hygiene requirements of the pool room. In this mode, the fresh air is sufficient to ensure adequate dehumidification of the room, if this is not sufficient, part of the air downstream of the heat pump evaporator (dehumidified) is recirculated to supplement the dehumidification.

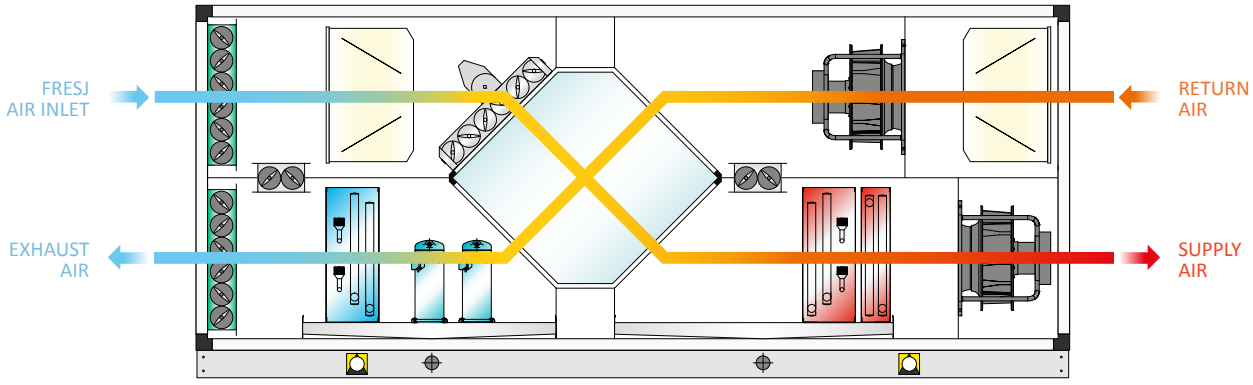
In this way a percentage (variable) of the airflow is expelled, fully integrated with fresh air. The fresh air is pre-heated in the heat recovery and then in the condenser of the heat pump; in case the temperature is not yet warm enough, it will be integrated with the hot water coil.



• DEHUMIDIFICATION MODE WITH FRESH AIR

The unit operates with 100% fresh air. The by-pass damper on the heat recovery pack of the cross-flow heat recovery is closed and the unit operates by heating all the fresh air.

Dehumidification takes place using fresh air. The heat pump circuit recovers the energy expelled from the room and heats the supply air.



MAIN CHARACTERISTICS

STRUCTURE AND PANELS

The structure of the units can be realized in two versions:

VERSION 1:
Profiles 50 x 50 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 50 mm thick double-wall sandwich type paneling with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.
This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T3/TB4 according to EN1886.

VERSION 2:
Thermal break profiles 60 x 60 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 63 mm thermal break sandwich-type double-walled sandwich-type panels with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m^3.

This structure has a seal class L1 while the thermal transmittance and the thermal bridge characteristic is class T2/TB2 according to EN1886.

AIR FILTERS

The filter sections on the return and fresh air are supplied with bag filters class 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.

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 regulation 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 thus ensuring, according to the needs of the system, that the correct operation of the unit is maintained with consequent saving of the energy absorbed by the unit.

COMPRESSORS

The compressors are scroll type with electric heater incorporated in the crankcase and thermal overload protections incorporated in the motor windings. They are mounted on rubber anti-vibration dampers.

REFRIGERANT CIRCUIT

The refrigerant circuit is of direct expansion type loaded with R410a refrigerant. Each refrigerant circuit is factory tested both in terms of tightness (pressure test) and functionality.

CONTROL

The unit is equipped with a microprocessor control system, able to manage the different operating modes, ensuring maximum energy saving in all conditions of use.
The electronic regulation, according to the needs of the environment, can operate in different modes such as:
- dehumidification with external air;
- dehumidification with Alpha cycle;
- heating with external air;
- recirculation heating;
- activation of pool water heat recovery.

The microprocessor also activates and modulates all the dampers of the unit and optimizes all the operating parameters of the cooling 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 remote control panel (optional).

TECHNICAL DATA

MODEL		021	031	041	061	081
Nominal airflow rate	m^3/h	2000	3000	4500	6000	8000
External air flow	%	0 ÷ 100	0 ÷ 100	0 ÷ 100	0 ÷ 100	0 ÷ 100
Thermal efficiency recovery (1)	%	79,5	78,9	79,9	79,7	79,4
Thermal power recovery (1)	kW	16,3	24,4	37,1	49,6	65,9
Thermal power of refrigerant circuit (1)	kW	8,5	14,2	20,0	28,1	34,3
Total thermal power of unit (1)	kW	24,8	38,6	57,1	77,7	100,2
Electrical power absorbed of compressor (1)	kW	1,2	1,7	2,0	3,5	4,7
Electrical power absorbed of supply fans	kW	0,65	0,94	1,44	1,93	2,70
Electrical power absorbed of return fans	kW	0,57	0,85	1,31	1,74	2,44
Total electrical power absorbed (1)	kW	2,42	3,49	4,75	7,17	9,84
COP refrigerant circuit (1)	w/w	4,4	4,3	4,3	4,4	4,2
SFP factor (3)	W/(l/s)	1,54	1,56	1,68	1,67	1,76
Supply fan available static pressure	Pa	350	350	350	350	350
Return fan available static pressure	Pa	300	300	300	300	300
Thermal power of water coil (1) (2)	kW	23,6	35,1	49,3	67,1	90,2
Number of compressors	n°	1	1	1	1	1
Number of refrigerant circuits	n°	1	1	1	1	1
Type of refrigerant		R410A				
Energy classification filters		ePM1 65% (F7) | ePM10 65% (M5)				
Power supply	V/ph/Hz	400/3/ 50				

MODEL		101	131	171	241
Nominal airflow rate	m^3/h	10000	13000	17000	24000
External air flow	%	0 ÷ 100	0 ÷ 100	0 ÷ 100	0 ÷ 100
Thermal efficiency recovery (1)	%	79,3	80,0	79,5	78,3
Thermal power recovery (1)	kW	81,5	106,0	140,6	181,6
Thermal power of refrigerant circuit (1)	kW	43,2	64,1	80,7	104,0
Total thermal power of unit (1)	kW	124,7	170,1	221,3	285,6
Electrical power absorbed of compressor (1)	kW	5,8	8,2	9,5	16,0
Electrical power absorbed of supply fans	kW	3,29	4,03	5,51	8,14
Electrical power absorbed of return fans	kW	2,92	3,65	4,98	7,45
Total electrical power absorbed (1)	kW	12,01	15,88	19,99	31,59
COP refrigerant circuit (1)	w/w	4,3	4,5	4,4	4,5
SFP factor (3)	W/(l/s)	1,68	1,61	1,69	1,84
Supply fan available static pressure	Pa	350	350	350	350
Return fan available static pressure	Pa	300	300	300	300
Thermal power of water coil (1) (2)	kW	113,5	136,1	183,3	248,0
Number of compressors	n°	1	1	1	1
Number of refrigerant circuits	n°	1	1	1	1
Type of refrigerant		R410A			
Energy classification filters		ePM1 65% (F7) | ePM10 65% (M5)			
Power supply	V/ph/Hz	400/3/50			

(1) *100% external air flow, external air conditions 0°C / 80% R.H. ambient air conditions 30°C / 60% R.H.*

(2) *inlet/outlet water temperature 70/60°C*

(3) *in compliance with EN 13779*

ACCESSORIES

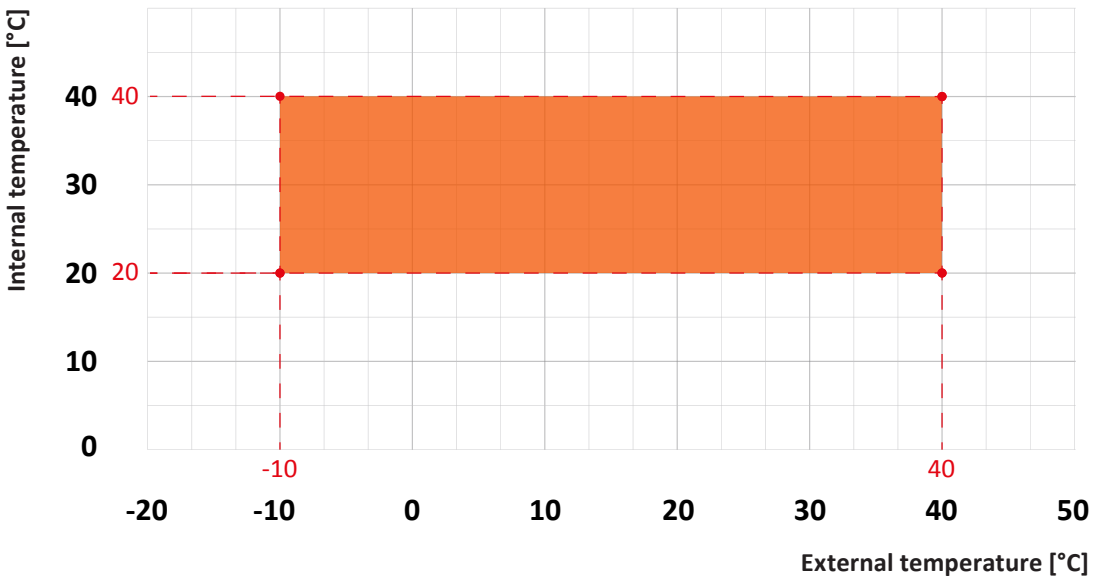
MODELLO	021	031	041	061	081	101	131	171	241
RAL 9010 painted frame	■	■	■	■	■	■	■	■	■
Supply and return EC fans	■	■	■	■	■	■	■	■	■
Counter-flow plate heat recovery	■	■	■	■	■	■	■	■	■
ISO Coarse 45% (G4) + ePM1 55% (F7) supply filter	■	■	■	■	■	■	■	■	■
ISO Coarse 45% (G4) + ePM1 55% (F7) return filter	■	■	■	■	■	■	■	■	■
Hot water coil with 3 way modulating valve	■	■	■	■	■	■	■	■	■
Filters differential pressure switches	■	■	■	■	■	■	■	■	■
Fans differential pressure transducers	■	■	■	■	■	■	■	■	■
Dampers with actuators	■	■	■	■	■	■	■	■	■
Microprocessor control system with display	■	■	■	■	■	■	■	■	■
Refrigerant circuit with scroll compressor	■	■	■	■	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■	■	■	■	■
50 mm frame	□	□	□	□	□	□	□	□	□
60 mm thermal break frame	□	□	□	□	□	□	□	□	□
40 kg/m^3 polyurethane panels thermal insulation	□	□	□	□	□	□	□	□	□
80 kg/m^3 mineral wool panels thermal insulation	□	□	□	□	□	□	□	□	□
Electric frost coil pre-heater	□	□	□	□	□	□	□	□	□
Circular duct flanges (4 pcs.)	□	□	□	□	□	□	□	□	□
Sound attenuator [1]	□	□	□	□	□	□	□	□	□
Roof for outdoor installation	□	□	□	□	□	□	□	□	□
45° hoods with bird trap (2 pcs.)	□	□	□	□	□	□	□	□	□
Flexible joints for duct connections (4 pcs.)	□	□	□	□	□	□	□	□	□
Remote control panel [2]	□	□	□	□	□	□	□	□	□

■ Standard □ Optional – Not available

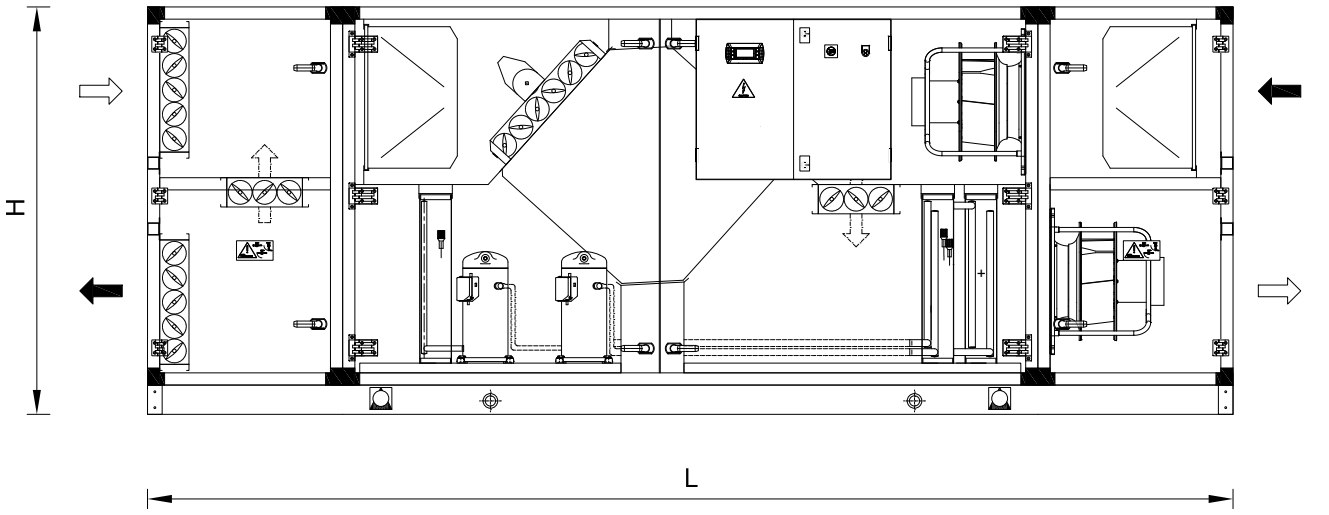
[1] *mounted in a separated box*

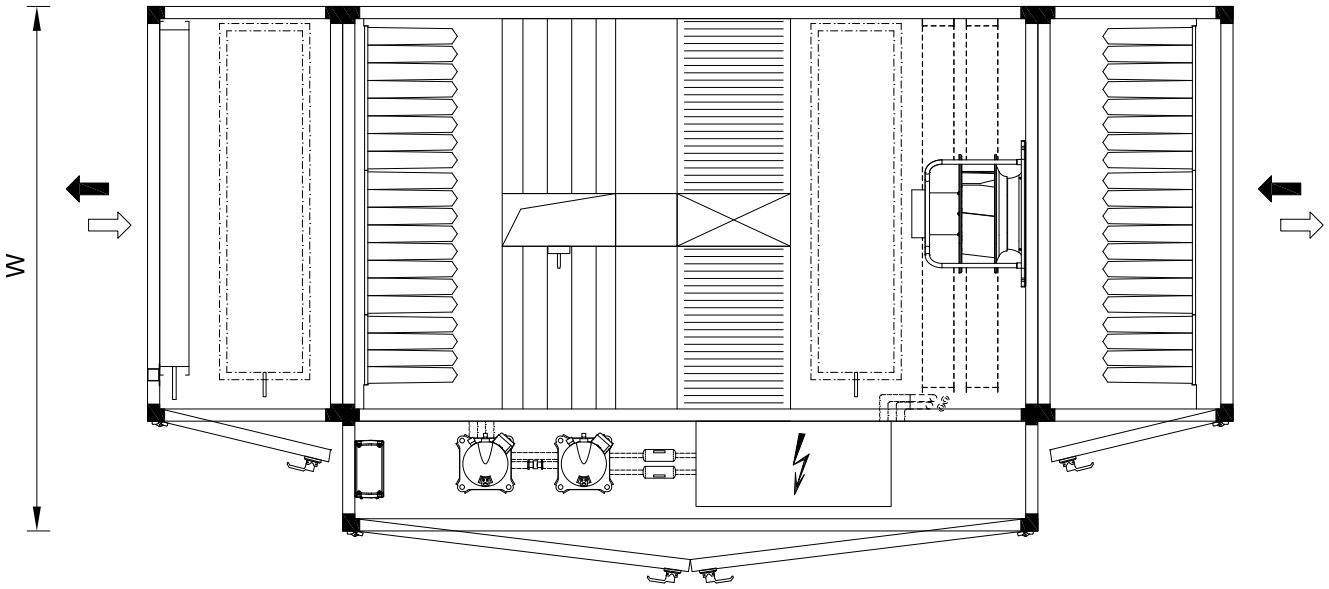
[2] *supplied loose*

OPERATING LIMITS



DIMENSIONAL DRAWING





DIMENSIONS AND WEIGHTS

MODEL	021	031	041	061	081	101	131	171	241
L (mm)	3500	3900	4400	4400	4700	4800	5250	5900	6300
W (mm)	1350	1500	1650	1900	2150	2250	2280	2380	2380
H (mm)	1270	1300	1550	1700	1700	1820	2220	2550	2750
Weight (kg)	510	639	785	1022	1147	1276	1512	1876	2125

NOTES

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