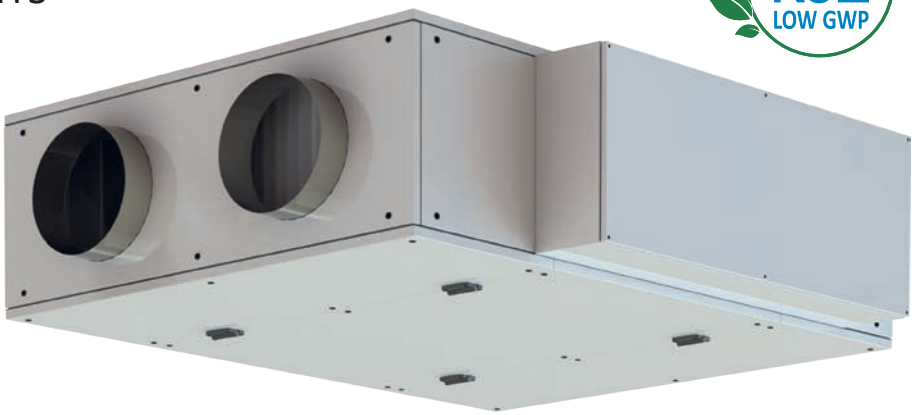
RXC/Hi

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.

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) or mineral wool (90 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.

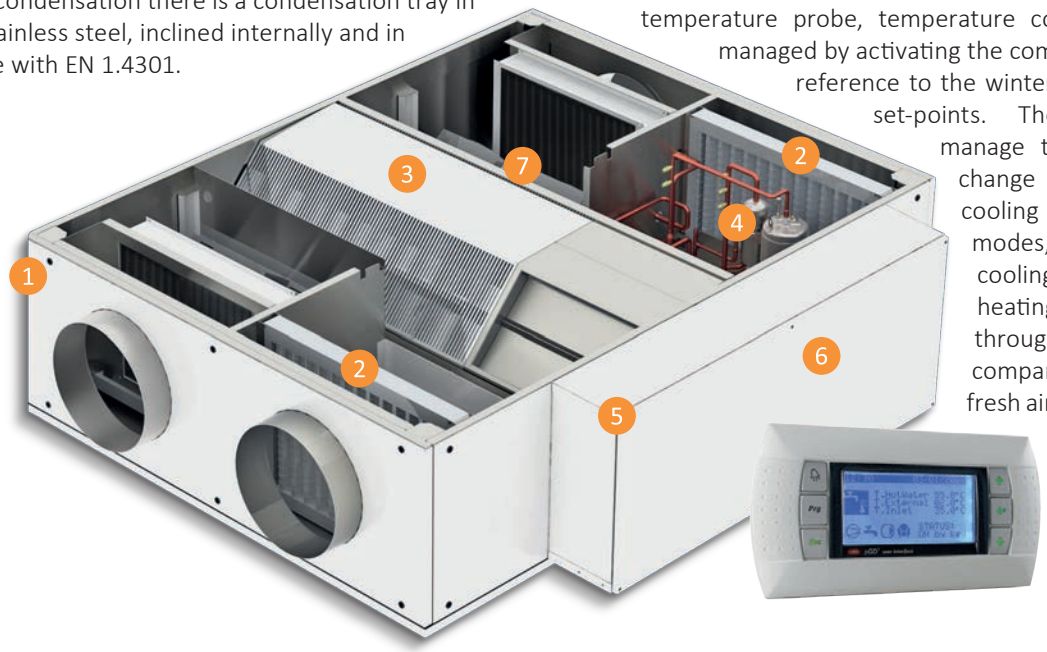
5 | ELECTRIC BOX

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.

6 | CONTROLS SYSTEM

The unit is complete with a microprocessor electronic board with dedicated software and a 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.



2 | AIR FILTERS

ePM$_{10}$ 60% (M5) filters in air extraction and ePM$_1$ 55% (F7) filters in fresh air intake, in compliance with international norms.

3 | HEAT RECOVERY (1° recovery stage)

The units are equipped with an aluminium counter-flow heat exchanger with efficiencies higher than 85%.
Through the integrated control system it is possible to manage the defrosting of the exchanger, also equipped with an additional by-pass damper for the management of the free-cooling and free-heating mode.

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 compressor with inverter, with continuous capacity control, loaded with R32 refrigerant. The circuit is complete with a combined cycle reversal valve and fresh air by-pass defrosting system.

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 backward blade centrifugal impellers with aerodynamic profile, made of galvanized steel.
The impellers are directly coupled to brushless EC brushless motors, with external rotor, operating via a 0-10V PWM or MODBUS-RTU modulating signal.

ADDITIONAL COIL (external module)

External module that can accommodate heating water coil.

TECHNICAL DATA

MODEL		005	011	015	021	031
Nominal airflow rate	m^3/h	500	1000	1500	2000	3000
Thermal efficiency recovery in cooling mode [1]	%	76,9	77,4	74,7	75,6	74,3
Total unit cooling capacity [1]	kW	4,50	8,24	11,1	15,5	18,1
Total unit EER [1]	W/W	3,85	4,43	4,13	4,16	4,76
Electrical power absorbed in cooling mode [1]	kW	1,17	1,86	2,69	3,73	3,80
Heating recovery thermal efficiency [2]	%	84,5	85,0	82,8	83,2	82,1
Total thermal power of unit [2]	kW	6,07	11,5	17,0	22,5	30,4
Total unit COP [2]	W/W	8,32	9,43	8,81	8,72	10,3
Electrical power absorbed in heating [2]	kW	0,73	1,22	1,93	2,58	2,96
Supply fan available static pressure	Pa	150	150	150	150	150
Return fan available static pressure	Pa	150	150	150	150	150
N° of compressors (DC inverter) / refrigerant circuits	n°	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Type of refrigerant / GWP		R32 / 675				
Refrigerant charge / CO_2 equivalents ton	n°	1,08 / 0,73	1,39 / 0,94	1,54 / 1,04	2,29 / 1,55	2,42 / 1,63
Max. electricity absorbed by the unit	A	12,6	11,5	14,8	14,5	17,4
Power supply	V/ph/Hz	230/1/50		400/3/50		
Type of filters for fresh air section		ePM_1 55% (F7)				
Type of filters for return air section		ePM_{10} 60% (M5)				
Sound power level [3]	dB(A)	69	72	75	77	78
Sound pressure level [4]	dB(A)	53	57	60	62	62

[1] fresh air inlet +35 °C / 50% RH, return air +27 °C / 50% RH

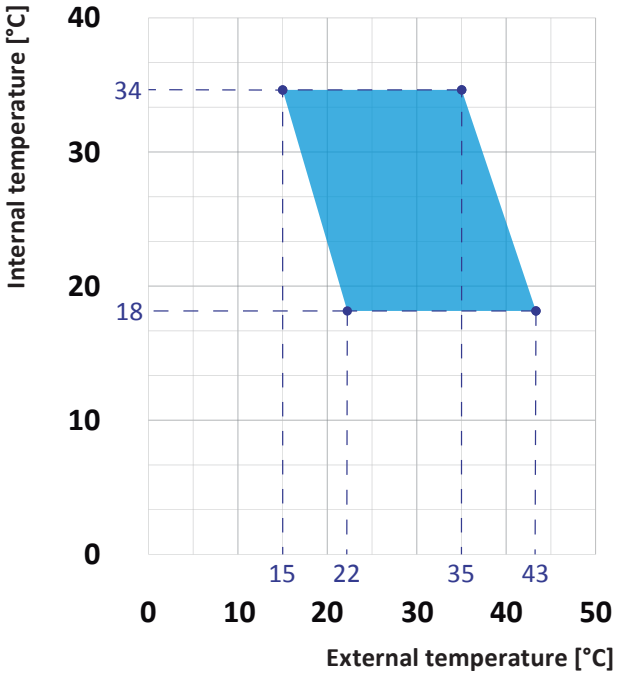
[2] fresh air inlet -5 °C / 80% RH, return air +20 °C / 50% RH

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

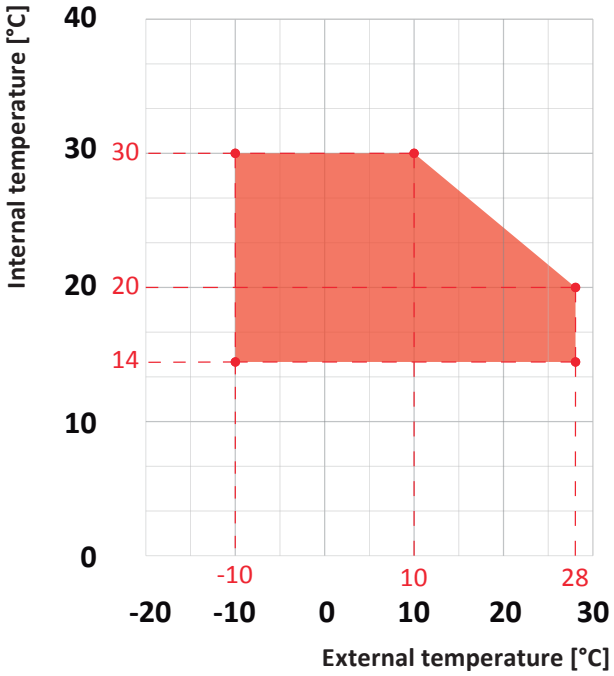
[4] sound pressure level measured at 1 m free field distance, ducted unit, in accordance with EN 3744

OPERATING LIMITS

COOLING MODE



HEATING MODE (heat pump)



ACCESSORIES

MODEL	005	011	015	021	031
EC Brushless fans on supply / return air	■	■	■	■	■
Filters differential pressure switches on supply / return air	■	■	■	■	■
Fans differential pressure transducers	■	■	■	■	■
100% by-pass damper with actuator	■	■	■	■	■
Microprocessor control system	■	■	■	■	■
Remotable control panel with LCD display	■	■	■	■	■
RS-485 serial port Modbus protocol	■	■	■	■	■
Inverter compressor	■	■	■	■	■
Integrated evaporator defrost system	■	■	■	■	■
25 mm frame + insulation in polyurethane 40 kg/m^3	□	□	□	□	□
25 mm frame + insulation in mineral wool 90 kg/m^3	□	□	□	□	□
ePM$_{10}$ 50% (G4) filter on supply / return air	□	□	□	□	□
ePM$_{10}$ 60% (M5) filter on supply / return air	□	□	□	□	□
ePM$_1$ 55% (F7) filter on supply / return air	□	□	□	□	□
ePM$_1$ 80% (F9) filter on supply / return air	□	□	□	□	□
Electric post-heating coil	□	□	□	□	□
Hot water coil [(1)]	□	□	□	□	□
3 way modulating valve [(2)]	□	□	□	□	□
Fresh air / exhaust air damper with On/Off actuator	□	□	□	□	□
Circular duct flanges (4 pcs)	□	□	□	□	□
Sound attenuator [(1)]	□	□	□	□	□
Feet for floor installation	□	□	□	□	□

■ Standard □ Optional – Not available

[(1)] mounted in a separated box

[(2)] supplied loose

ePM$_{10}$ 50% (G4), ePM$_{10}$60% (M5) air filters

Air filters with low pressure drop that can be installed in return air intake or supply air.

eMP$_1$55% (F7), ePM$_1$80% (F9) air filters

Filters with large filtering surface area that guarantees long operating life and less frequent replacements.

Electric re-heating coil

Consisting of armoured steel electric heaters complete of PWM control system and safety thermostat already wired.

Hot water coil

Coil manufactured with copper pipes mechanically expanded in the aluminium fins to increase the thermal exchange rate.

3 way modulating valve

Valve with modulating electric actuator for the control of the water flow of the hot water coil.
Connections not included (to be arrange for by the installer).

Air damper with actuator

It operate to exclude the fresh air intake and/or the room return air flow.
The damper is controlled by On/Off actuator for the opening or the closing, or with return closing spring.

Sound attenuator

Consists of a cylindrical and perforated section made in galvanized steel, containing a mineral wool sound-proofing material with class M0. The construction avoids any risk of mineral wool fraying.

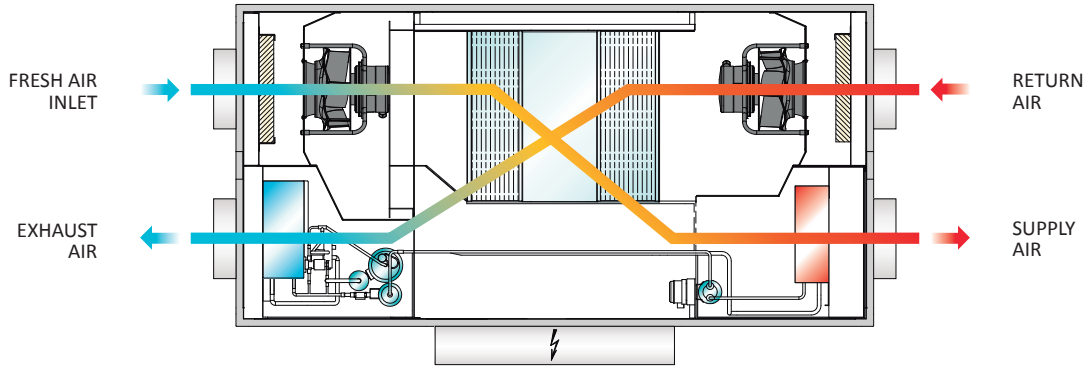
OPERATING MODE

• 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.

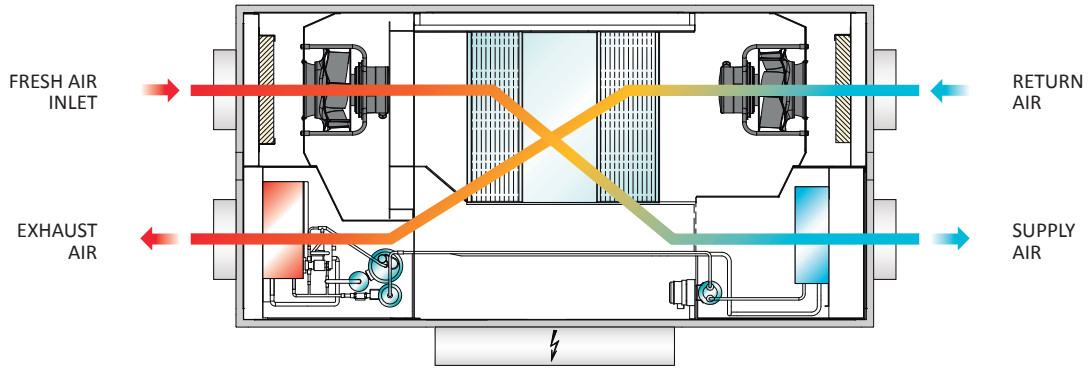
To prevent this from happening, the unit provides controlled management of a defrosting cycle obtained by reversing the refrigeration cycle. During this phase the return fans are stopped and the compressors forced at maximum speed. Through the additional heating resources present in the unit, water heating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



• COOLING MODE

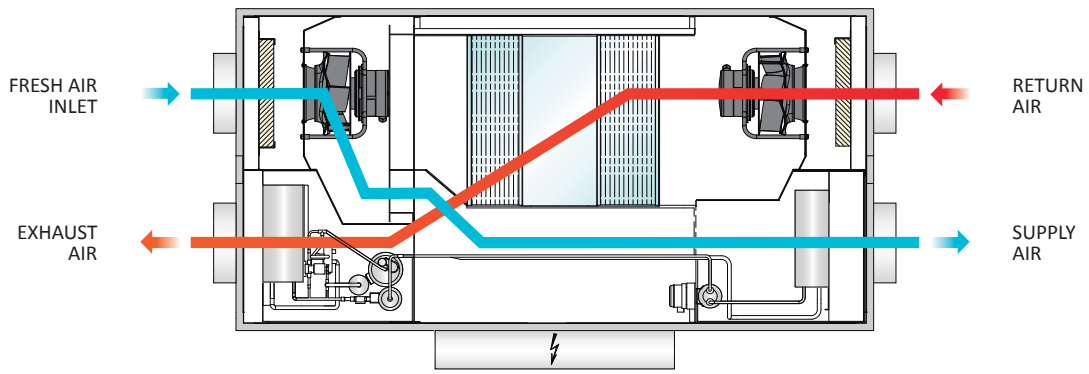
The return air, after passing through the cross-flow heat recovery, goes to feed the heat pump source exchanger, which operates as a condenser.

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.



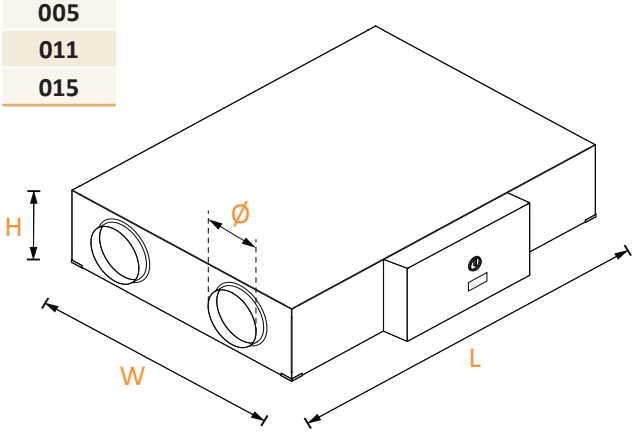
• FREE-COOLING

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.

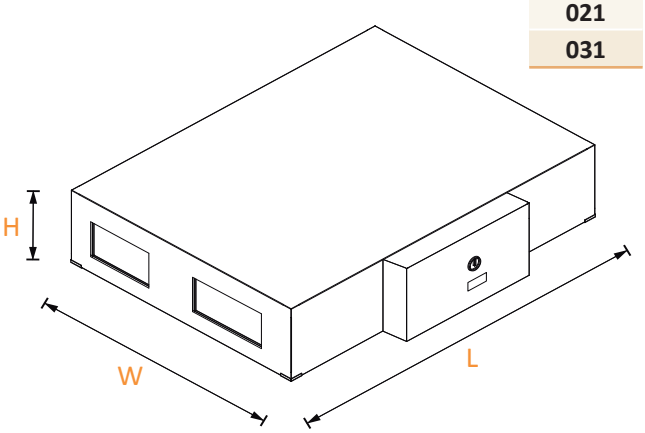


DIMENSIONAL DRAWING

MOD.
005
011
015



MOD.
021
031



DIMENSIONS AND WEIGHTS

MODEL		005	011	015	021	031
L	mm	1700	1700	1850	2200	2200
W	mm	1000	1300	1300	1650	1900
H	mm	380	500	500	580	580
Ø	mm	200	315	315	-	-
Weight *	kg	204	265	295	342	394

* Dimensions and weights are referred to standard configuration

CONFIGURATIONS *(plan view)*