

# RXV/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 RXV/HE series are available in 6 sizes, with nominal air flow rates from 650 to 4000 m<sup>3</sup>/h. The units have been designed for ground installation (V) with vertical air flows and are available in the **ECO, PLUS, TOP** versions.



## MAIN CHARACTERISTICS

### STRUCTURE AND PANELS

The structure of the units can be realised in 2 types:

#### Type 1: Panels 50 mm Standard [T3/TB3]

50 x 50 mm extruded anodised aluminium profiles with mechanical resistance requirements according to EN 1886: D1 (M). 50 mm thick double-wall sandwich type panelling with exterior in prepainted steel RAL 9010 and interior in galvanised steel with polyurethane foam insulation with a density of 40 kg/m<sup>3</sup> or mineral wool (90 kg/m<sup>3</sup>). This structure has a tightness class L1 while the thermal transmittance and thermal bridge characteristic is class **T3/TB3** in accordance with EN1886.

#### Type 2: Panels 50 mm TB [T2/TB2]

50 x 50 mm thermal break profiles in extruded anodised aluminium, with mechanical resistance requirements in accordance with EN 1886: D1 (M). 50 mm thermal break sandwich type double-wall paneling with exterior in prepainted steel RAL 9010 and interior in galvanised steel with polyurethane foam insulation with a density of 40 kg/m<sup>3</sup> or mineral wool (90 kg/m<sup>3</sup>). This structure has a tightness class L1 while the thermal transmittance and thermal bridge characteristic is class **T2/TB2** in accordance with EN1886.

### AIR FILTERS

The filter sections on the return and fresh air are supplied with panel filters class ePM<sub>10</sub> 60% (M5) and ePM<sub>1</sub> 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 control of the airflow both in the supply and extract section, ensuring that all regulatory requirements such as SFP are met.

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

### HEAT RECOVERY

The units are equipped with a high-efficiency counter-flow heat exchanger made of aluminium.

The heat exchanger participates to the **Eurovent Certification** program and it is sized according to the **ECO Design** specification.

### CONTROLS

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

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

The unit can manage the automatic change of operating modes by comparing the temperature and humidity of the outside and room air.

The microprocessor also activates and modulates all the dampers of the unit and optimizes all the operating parameters of the refrigerant circuit.

The RS485 interface is standard (MODBUS protocol) to be used for connection to remote supervision and control systems.

The control can also be supplied with a second remotable control panel (optional).



LCD REMOTE GRAPHIC DISPLAY

## CONTROLS

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

**ECO**: complete with air temperature sensors installed on the fresh air intake and on room return air.

**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.

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

All the control systems 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. They also manages the summer/winter seasonal change over and programming for daily time bands.

The controls can also manages 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 systems 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.

VERSION	ECO	PLUS	TOP
EC Brushless supply and return fans	■	■	■
Supply and return differential pressure switches	■	■	■
100% by-pass damper with electric actuator	■	■	■
Microprocessor control	■	■	■
Remotable control panel with LCD graphic display	■	■	■
Built-in control sensors	■	■	■
Fans differential pressure transducers	■	■	■
MODBUS RS485 serial interface card	■	■	■
Water or electric coil management	■	■	■
VARIABLE AIRFLOW version	■	—	—
CONSTANT PRESSURE version	—	■	—
CONSTANT AIRFLOW version	—	—	■

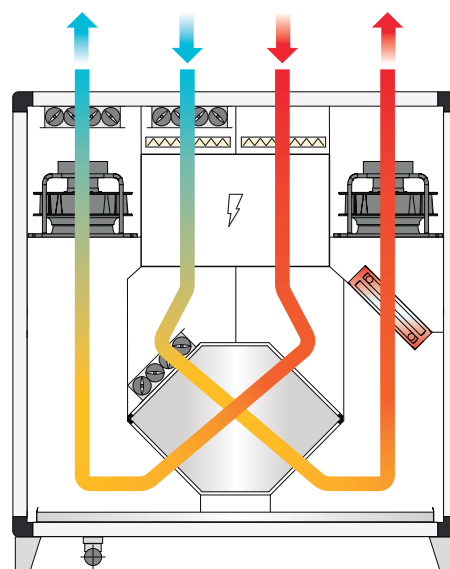
## OPERATING MODE

In winter, the ambient air with a higher thermal load passes through the plate heat exchanger, releasing heat and cooling down before being expelled. The fresh air passes through the exchanger in the opposite direction, warming up.

In summer, the ambient air with a lower thermal load passes through the exchanger, absorbing heat and warming up before being expelled. The fresh air passes through the exchanger in the opposite direction, cooling down before being introduced into the environment.

The airflow is modulated by varying the speed of the EC fans to control the supply air temperature.

In Free-Cooling mode, the unit opens the By-Pass damper, allowing external fresh air to enter without heat recovery when the external temperature is lower than the internal temperature.



## TECHNICAL DATA

MODEL		006	010	015	020	030	040
Nominal airflow rate	m <sup>3</sup> /h	650	1000	1500	2000	3000	4000
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 ( $\eta_{t\_nr\vee u}$ ) <sup>(1)</sup>	%	76,6	74,8	74,7	74,7	74,0	74,3
Winter Thermal Efficiency <sup>(2)</sup>	%	83,8	82,1	82,0	82,1	81,3	81,6
Nominal electric power input <sup>(2)</sup>	kW	0,21	0,38	0,52	0,70	1,18	1,61
Max electrical power absorbed	kW	0,36	0,68	1,00	1,00	2,20	4,80
Max electrical current absorbed	A	2,90	5,70	4,40	4,40	3,40	4,80
SFP <sub>int</sub>	W/(m <sup>3</sup> /s)	491	872	811	838	962	968
SFP <sub>lim</sub> 2018	W/(m <sup>3</sup> /s)	1182	1112	1090	1070	1005	974
External nominal pressure $\Delta p_{s, ext}$ <sup>(3)</sup>	Pa	150	150	150	150	150	150
Internal pressure drop $\Delta p_{s, int}$ on supply air	Pa	139	250	252	272	239	251
Fans static efficiency (UE) n.327/2011	%	54,1	56,1	61,8	63,5	58,2	53,1
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 $L_{WA}$ <sup>(4)</sup>	dB(A)	69	74	63	65	72	75
Sound pressure level <sup>(5)</sup>	dB(A)	53	57	47	48	56	58
Power supply	V/ph/Hz	230/1/50				400/3/50	

<sup>(1)</sup> 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

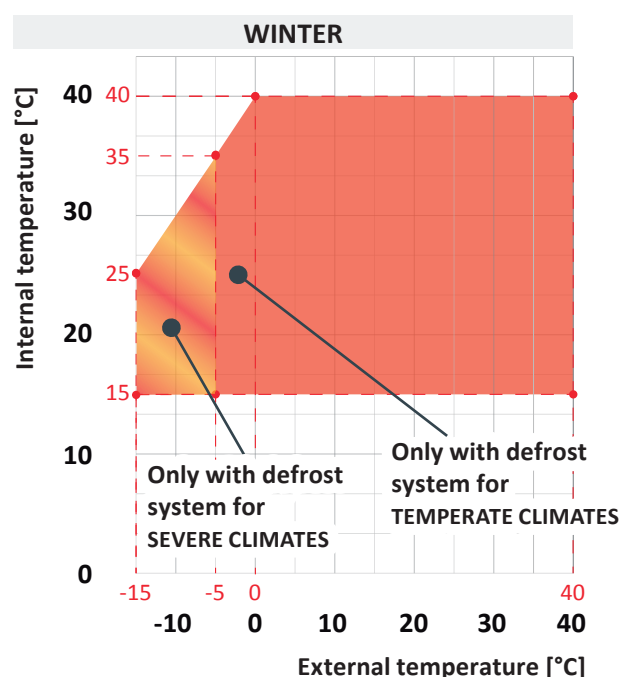
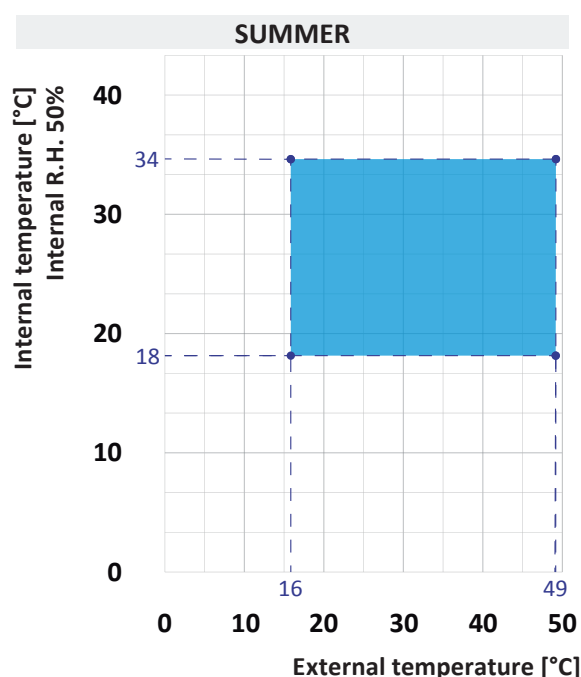
<sup>(2)</sup> outside air: -5 °C / 80 % RH - Inside air: 20 °C / 50 % RH

<sup>(3)</sup> performance with clean filters

<sup>(4)</sup> sound power level calculated in accordance with EN 3744

<sup>(5)</sup> sound pressure level measured at 1 m free field distance, ducted unit, in accordance with EN 3744

## OPERATING LIMITS



## ACCESSORIES

### ePM<sub>10</sub> 50% (G4) air pre-filter

Synthetic panel filter with low pressure drop.

### ePM<sub>10</sub> 60% (M5), ePM<sub>1</sub> 55% (F7), ePM<sub>1</sub> 80% (F9) air filters

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

### Defrost system for TEMPERATE CLIMATES (down to -5°C external)

To prevent frost formation on the heat exchanger, the unit manages an automatic defrost cycle through the unbalance of air flows. The defrost system consists of a specific device and a software that prevents an excessive drop of the temperature in the exhaust air by slowing down the supply air flow. The system is guaranteed for external temperatures down to -5°C.

### Defrost system for SEVERE CLIMATES (down to -15°C external)

To prevent frost formation on the heat exchanger, the unit manages an automatic defrost cycle through the unbalance of air flows. The defrost system (optional) consists of a specific device and a software that prevents an excessive drop of the temperature in the exhaust air by slowing down the supply air flow and opening the by-pass damper in the heat exchanger. This device requires pairing with a hot water coil kit + modulating valve or a self-regulating electric heater. The system is guaranteed for external temperatures down to -15°C.

### Electric heater for post-heating

Made up of steel electric heaters, supplied complete with PWM control system and safety thermostat wired.

### Hot / Cold water coil

Coil manufactured with copper pipes mechanically expanded in the aluminium fins to increase the thermal exchange rate. The section is supplied complete with condensate drain pan with water discharge (only for cold water coil).

### 3 way modulating valve

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

### Air damper with actuator

It operates 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.

### Flexible joints kit (4 pcs)

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

### CO<sub>2</sub> probe

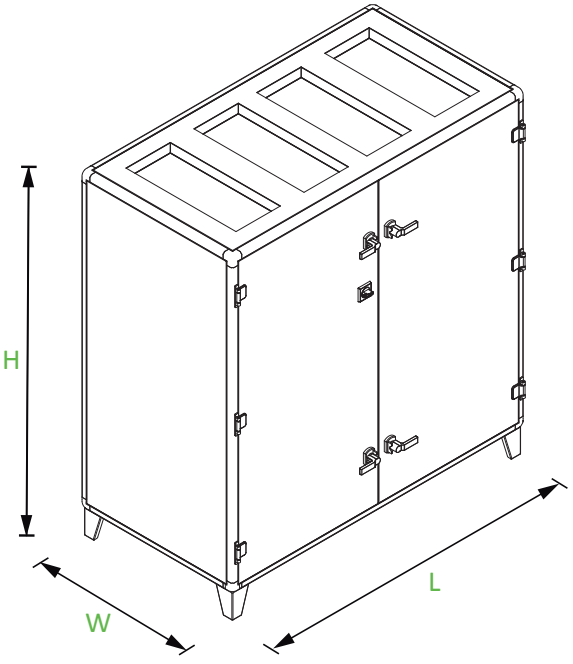
ECO version units can be equipped with air quality CO<sub>2</sub> probe. This accessory is installed and wired in the factory on the return air and it allows to determine the quantity of carbon dioxide present in the environment, increasing the quantity of external air to dilute its content.

NOTE: CO<sub>2</sub> probe is available in ECO version only.

MODEL	006	010	015	020	030	040
50 mm Thermal Break frame	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ePM <sub>10</sub> 50% (G4) pre-filter on supply and return air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ePM <sub>10</sub> 60% (M5) filter on supply and return air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ePM <sub>1</sub> 55% (F7) filter on supply and return air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ePM <sub>1</sub> 80% (F9) filter on supply and return air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbalanced airflows desfrost system for temperate climates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unbalanced airflows desfrost system for severe climates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electric post-heating coil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hot water coil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cold water coil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 way modulating valve	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fresh air / Exhaust air damper with On/Off actuator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flexible joints kit (4 pcs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CO <sub>2</sub> probe (available only for ECO version)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ Standard    □ Optional    – Not available

# DIMENSIONAL DRAWING

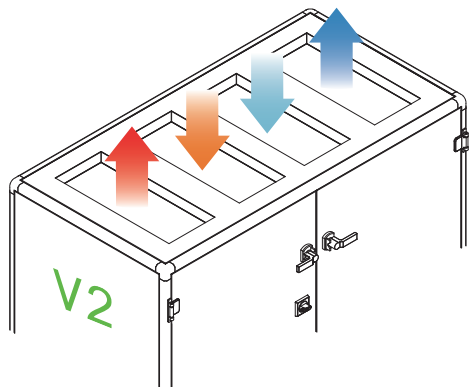
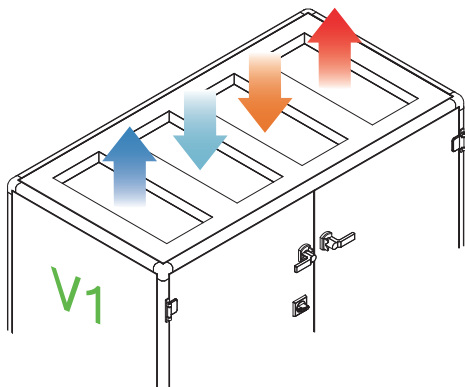


## DIMENSIONS AND WEIGHTS

MODEL	006	010	015	020	030	040
<b>L</b> (mm)	1260	1560	1560	1860	1860	2160
<b>W</b> (mm)	660	660	810	810	960	1260
<b>H</b> (mm)	1390	1540	1690	1840	1840	1840
<b>Weight</b> (kg)	215	233	302	397	472	690

Dimensions and weights referred to the standard configuration

## CONFIGURATIONS



→ RETURN AIR  
→ EXHAUST AIR

→ FRESH AIR INLET  
→ SUPPLY AIR