

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:

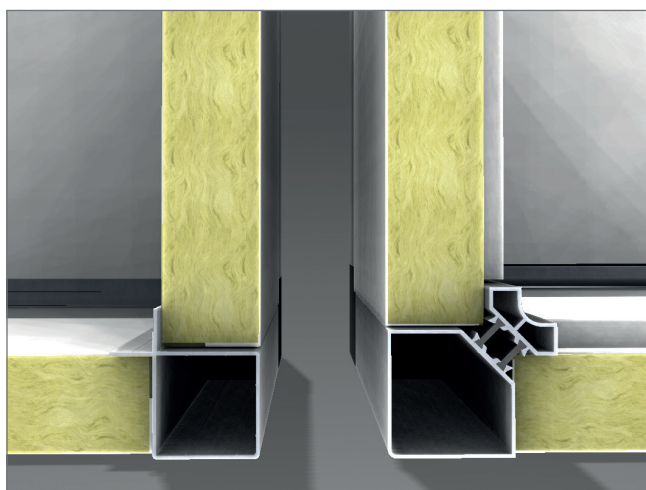
Profiles 50 x 50 mm in self-supporting extruded anodized aluminium, with mechanical strength requirements in accordance with EN 1886: D1 (M). 50 mm thick double-walled sandwich type paneling with exterior in pre-painted RAL 9010 galvanized sheet steel and interior in hot-dip galvanized sheet steel with interposed insulation made of polyurethane foam with a density of 40 kg/m³.

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/m³.

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

The units can host different types of filters, both in the room air extract and in the fresh air intake.

They are mounted on guides equipped with gaskets to guarantee 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

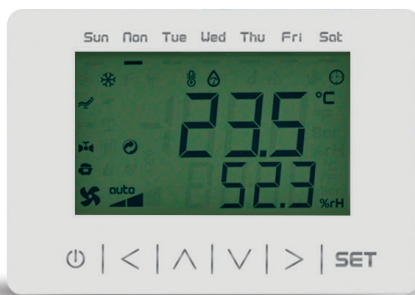
The units are equipped with an aluminium counter-flow heat exchanger used to transfer heat from the exhaust air to the fresh air. The heat exchange takes place in counter-flow with efficiency higher than 80% in dry air. The spacing between the fins is optimised in order to reduce air-side pressure drop 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. The heat exchanger participates to the **Eurovent Certification** program and it is sized according to the **ECO Design** specification.



CONTROL

The units are supplied complete with control system and available in the versions **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 version 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 versions 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 (η_{t_nrvu}) ⁽¹⁾	%	80,9	81,6	80,6	82,8	83,0
Winter Thermal Efficiency ⁽²⁾	%	88,0	88,5	87,8	89,5	89,7
Nominal airflow rate	m ³ /h	1000	2000	3000	4500	6000
Electrical power consumption	kW	0,46	0,92	1,48	2,14	2,81
Installed electrical power	kW	1,16	1,56	2,60	3,94	5,00
SFP _{int}	W/(m ³ /s)	801	904	1022	974	978
SFP _{lim} 2018	W/(m ³ /s)	1296	1273	1203	1206	1151
Front speed at design range	m/s	1,6	1,9	1,4	2,1	2,3
External nominal pressure $\Delta p_{s, ext}$ ⁽³⁾	Pa	250	250	250	250	250
Internal pressure drop $\Delta p_{s, int}$ Ret./Supp.	Pa	219/229	271/286	297/327	294/322	305/333
Fans static efficiency (UE) n.327/2011	%	55,2	60,9	60,3	62,6	64,5
External internal leakage (EN1886)		L1 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)	65	67	69	70	71
Sound pressure level ⁽⁵⁾	dB(A)	49	50	51	53	52
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/4	EC/4	EC/4	EC/4
Type of heat recovery system (HRS)	type/nr.	static counter-flow / 1				
Winter Thermal Efficiency (η_{t_nrvu}) ⁽¹⁾	%	84,5	83,0	81,2	83,5	83,2
Winter Thermal Efficiency ⁽²⁾	%	90,9	89,7	88,2	90,1	89,8
Nominal airflow rate	m ³ /h	8000	10000	13000	17000	21500
Electrical power consumption	kW	3,49	4,88	6,09	8,66	10,4
Installed electrical power	kW	9,30	10,00	10,00	18,60	21,30
SFP _{int}	W/(m ³ /s)	810	1066	954	1097	1076
SFP _{lim} 2018	W/(m ³ /s)	1145	1101	1045	1116	1107
Front speed at design range	m/s	1,7	2,4	2,1	2,2	2,1
External nominal pressure $\Delta p_{s, ext}$ ⁽³⁾	Pa	250	250	250	250	250
Internal pressure drop $\Delta p_{s, int}$ Ret./Supp.	Pa	219/280	336/374	297/309	325/363	354/389
Fans static efficiency (UE) n.327/2011	%	60,4	66,2	63,0	61,6	67,0
External internal leakage (EN1886)		L1 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)	71	76	74	72	73
Sound pressure level ⁽⁵⁾	dB(A)	52	57	54	52	53
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

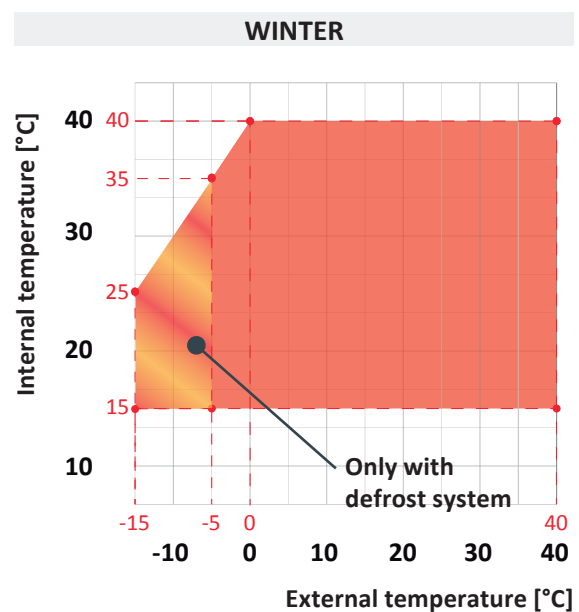
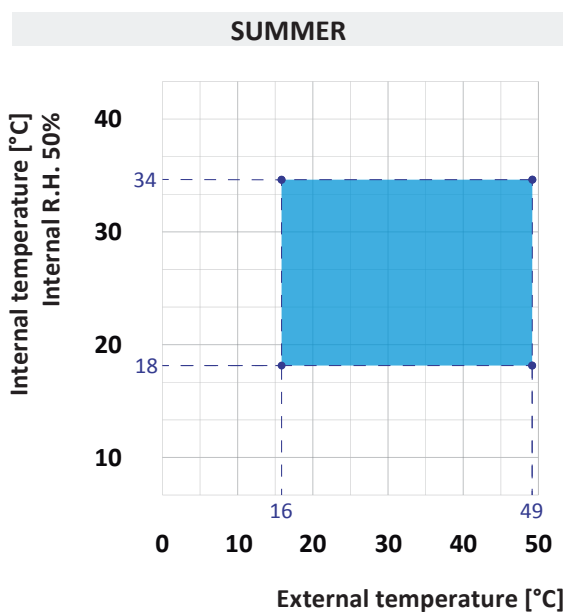
MODEL	010	020	030	045	060	080	100	130	170	240
EC Brushless fans on supply/return	■	■	■	■	■	■	■	■	■	■
Filters differential pressure switches on supply/return	■	■	■	■	■	■	■	■	■	■
Fans differential pressure transducers	■	■	■	■	■	■	■	■	■	■
100% by-pass damper with electric actuator	■	■	■	■	■	■	■	■	■	■
Microprocessor control system	■	■	■	■	■	■	■	■	■	■
Remotable control panel with LCD display ⁽¹⁾	■	■	■	■	■	■	■	■	■	■
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	□	□	□	□	□	□	□	□	□	□
ISO Coarse 40% (G2) grease pre-filter on return air	□	□	□	□	□	□	□	□	□	□
ePM ₁₀ 50% (G4) pre-filter on supply and return air	□	□	□	□	□	□	□	□	□	□
ePM ₁₀ 60% (M5) filter on supply and return air	□	□	□	□	□	□	□	□	□	□
Filters ePM ₁ 55% (F7) return and/or ePM ₁ 80% (F9) supply/return	□	□	□	□	□	□	□	□	□	□
Defrost kit with electric heater	□	□	□	□	□	□	□	□	□	□
Electric frost coil protection	□	□	□	□	□	□	□	□	□	□
Electric / Water heating coil	□	□	□	□	□	□	□	□	□	□
Cold water / direct expansion coil	□	□	□	□	□	□	□	□	□	□
3 way modulating valve ⁽¹⁾	□	□	□	□	□	□	□	□	□	□
Fresh air / Exhaust air damper	□	□	□	□	□	□	□	□	□	□
ON/OFF damper actuator	□	□	□	□	□	□	□	□	□	□
Roof for outdoor installation	□	□	□	□	□	□	□	□	□	□
45° hoods with bird trap (2 pcs)	□	□	□	□	□	□	□	□	□	□
Flexible joints for duct connections (4 pcs)	□	□	□	□	□	□	□	□	□	□
Circular duct flanges (4 pcs)	□	□	□	□	□	□	□	□	□	□
Sound attenuators ⁽²⁾	□	□	□	□	□	□	□	□	□	□
CO ₂ probe (available only for ECO version)	□	□	□	□	□	□	□	□	□	□

⁽¹⁾ supplied loose

⁽²⁾ mounted in a separate box

■ Standard □ Optional - Not available

OPERATING LIMITS



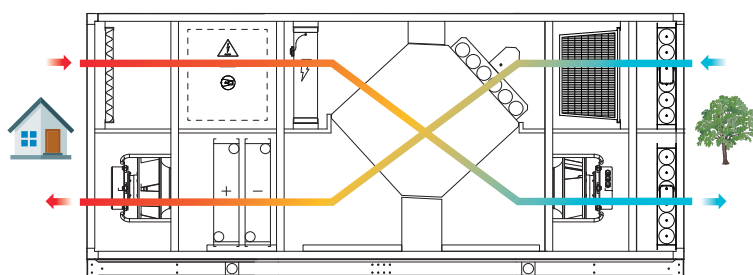
OPERATING MODE

● HEATING MODE

The return air from the room, with a higher thermal load than the fresh air, crosses the plate heat exchanger, where it gives up part of its thermal load and cools down before being exhausted. The fresh air, with a lower thermal load than the return one from the room, crosses the plate heat exchanger in the opposite direction and heats up before the introduction into the room. The modulation of the airflow rate, through variation of the rotation speed of the EC fans, will allow a precise control of the supply air temperature. During winter operation, in particular working conditions with low external temperatures, the heat exchanger could be subject to the formation of surface frost with consequent

loss of efficiency.

To prevent this from happening, the unit provides for the controlled management of an automatic defrosting cycle, obtained by means of a self-regulated electric battery in PWM mode, installed on the room air intake. The system increases the temperature of the exhaust air thus avoiding the risk of frost on the heat exchanger. The system is controlled by a specific temperature probe positioned on the air outlet and guarantees a considerable reduction of the power absorbed by the unit, compared to the traditional systems on the market.



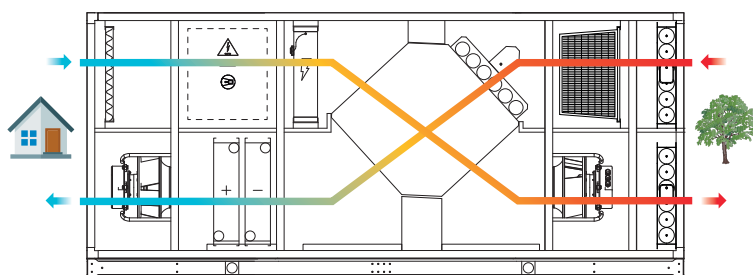
● COOLING MODE

The return air from the room, with a lower thermal load than the fresh air, crosses the plate heat exchanger, where it takes part of its thermal load and heats up before being exhausted.

The fresh air, with a higher thermal load than the room air, crosses the plate heat exchanger in the opposite direction

and cools down before the introduction into the room.

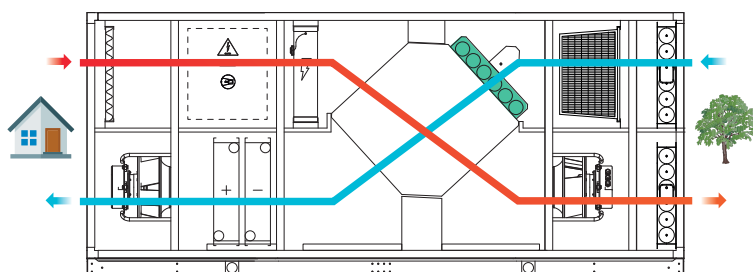
The modulation of the airflow rate, by varying the rotation speed of the EC fans, will allow a precise control of the supply air temperature.



● FREE-COOLING

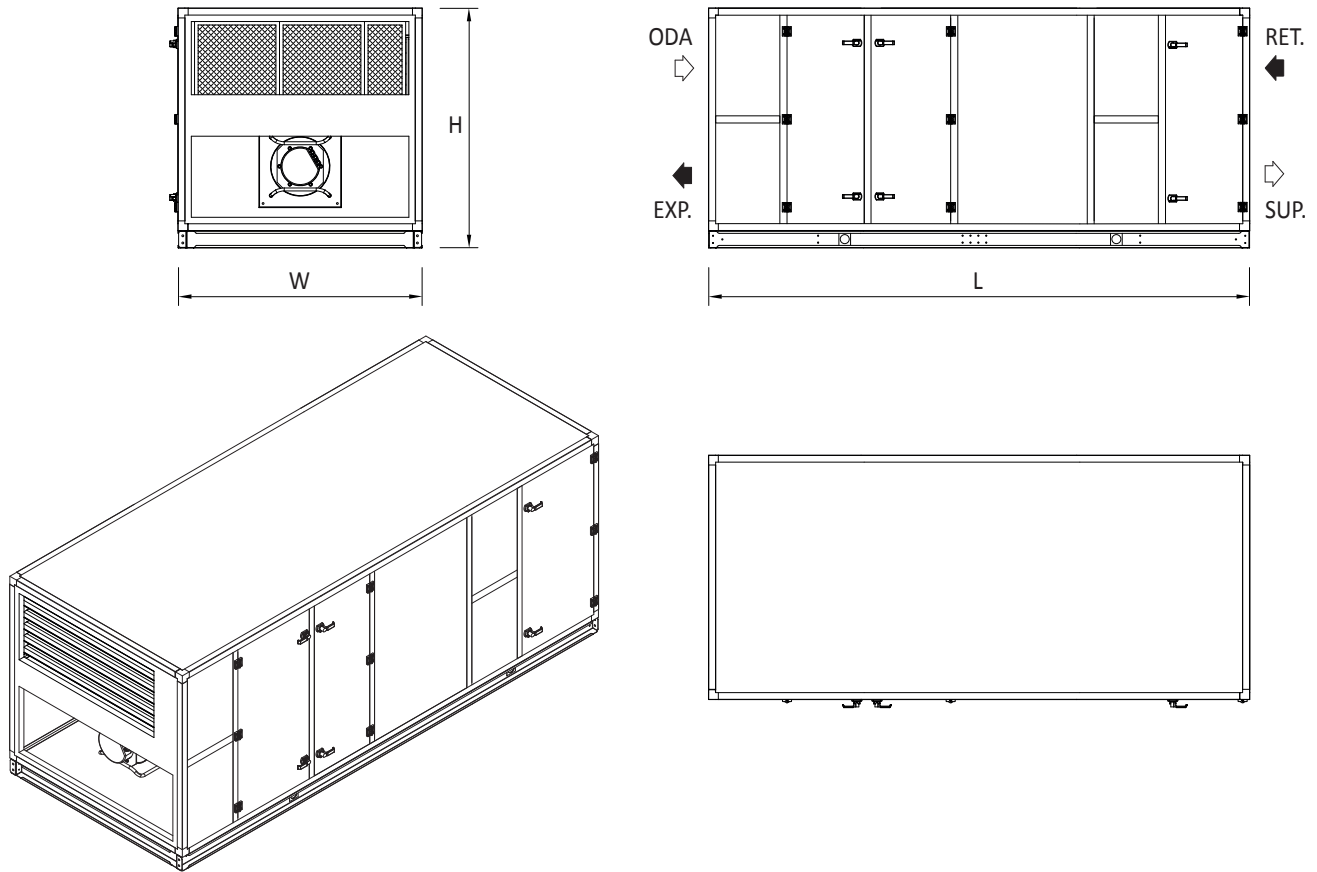
When the outdoor air temperature is lower than the temperature of the room to be air-conditioned and if the latter requires cooling, the unit operates in Free-Cooling

mode by opening the By-Pass damper positioned on the plate heat exchanger and thus allowing the entry of outdoor air without heat recovery.



DIMENSIONAL DRAWING

CONFIGURATION H1



DIMENSIONS AND WEIGHTS (50 mm profile Monoblock)

MODEL	010	020	030	045	060	080	100	130	170	240
L (mm)	2870	2980	3080	3380	3580	3930	3930	4480	4880	5280
W (mm)	750	950	1300	1300	1500	1880	1880	1880	2130	2380
H (mm)	1070	1320	1420	1520	1700	2050	2050	2100	2520	2720
Weight (kg)	324	403	537	643	825	1078	1173	1426	1895	2253

Dimensions and weights refer to standard version without accessories

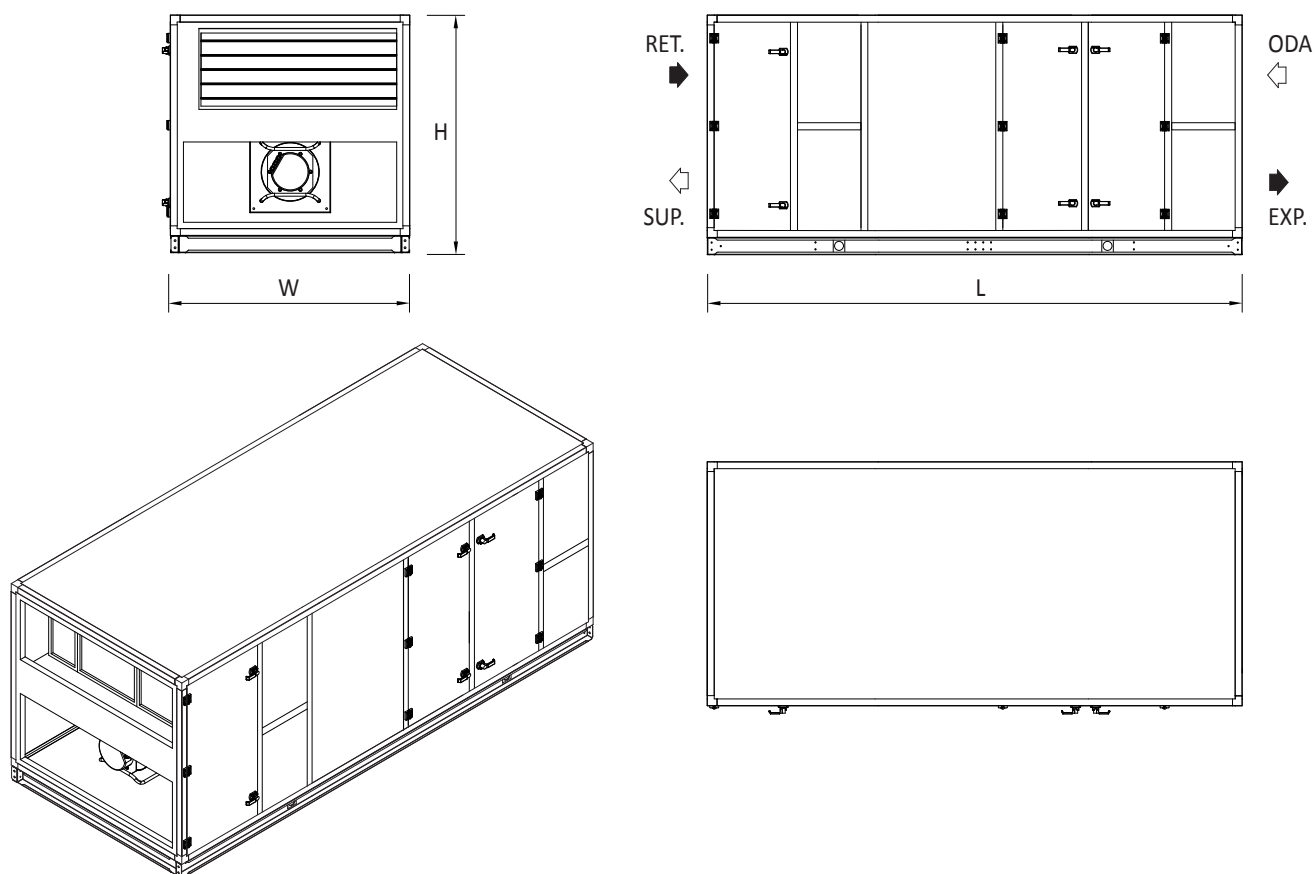
DIMENSIONS AND WEIGHTS (60 mm profile Monoblock)

MODEL	010	020	030	045	060	080	100	130	170	240
L (mm)	2890	3000	3100	3400	3600	3950	3950	4500	4900	5300
W (mm)	770	970	1320	1320	1520	1900	1900	1900	2150	2400
H (mm)	1090	1340	1440	1540	1720	2070	2070	2120	2540	2740
Weight (kg)	327	407	542	649	833	1089	1185	1440	1914	2275

Dimensions and weights refer to standard version without accessories

DIMENSIONAL DRAWING

CONFIGURATION H2



DIMENSIONS AND WEIGHTS (50 mm profile Monoblock)

MODEL	010	020	030	045	060	080	100	130	170	240
L (mm)	2870	2980	3080	3380	3580	3930	3930	4480	4880	5280
W (mm)	750	950	1300	1300	1500	1880	1880	1880	2130	2380
H (mm)	1070	1320	1420	1520	1700	2050	2050	2100	2520	2720
Weight (kg)	324	403	537	643	825	1078	1173	1426	1895	2253

Dimensions and weights refer to standard version without accessories

DIMENSIONS AND WEIGHTS (60 mm profile Monoblock)

MODEL	010	020	030	045	060	080	100	130	170	240
L (mm)	2890	3000	3100	3400	3600	3950	3950	4500	4900	5300
W (mm)	770	970	1320	1320	1520	1900	1900	1900	2150	2400
H (mm)	1090	1340	1440	1540	1720	2070	2070	2120	2540	2740
Weight (kg)	327	407	542	649	833	1089	1185	1440	1914	2275

Dimensions and weights refer to standard version without accessories