



VORT NRG FLAT EVO

High efficiency heat recovery units with plate heat exchanger and 50mm thick insulated panels

INTRODUCTION

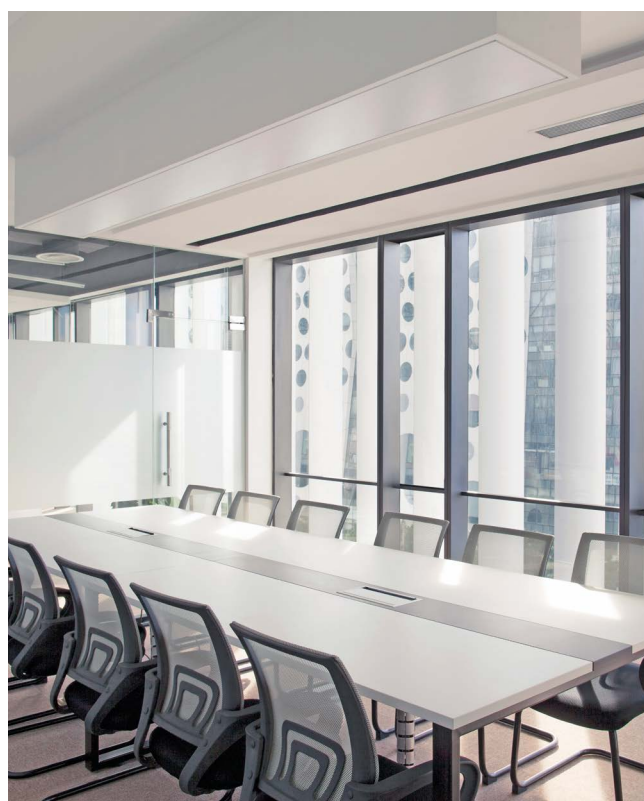
The sick building syndrome is a disease recognised by the World Health Organization that presents a series of symptoms due to the presence of toxic elements in the workplace. The main sources of pollution originate both from factors inside and outside the building.

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 m³/h. The units have been designed for false ceiling installation (H) or ground installation (V) and are available in the ECO, PLUS, TOP versions.





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/m³).

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

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.

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



DEFROST SYSTEM (optional)

The automatic defrosting system can be carried out either electrically (consists of a self-regulating electric coil installed on the return air intake), or with unbalanced airflows (consists of a specific device and software that avoid an excessive drop of the exhaust air temperature).

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).

5 | LCD REMOTE GRAPHIC DISPLAY

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



AIR HANDLING UNITS

VORT NRG RANGE

TECHNICAL DATA

MODEL		400	600	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/4	EC/4	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⁾	%	80,8	81,4	81,6	81,8	82,0	82,2	82,0
Winter Thermal Efficiency ⁽²⁾	%	88,0	88,4	88,5	88,7	88,9	89,0	88,9
Nominal airflow rate	m ³ /h	410	650	1000	1620	2150	3040	3980
Electrical power consumption	kW	0,15	0,22	0,35	0,56	0,82	1,32	1,58
Installed electrical power	kW	0,35	0,35	0,70	0,72	1,16	1,56	2,29
SFP _{int}	W/(m ³ /s)	786	580	714	764	840	1011	1004
SFP _{lim} 2018	W/(m ³ /s)	1318	1326	1315	1297	1282	1248	1206
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 $\Delta p_{s, int}$ Supp./ Ret.	Pa	203/178	141/120	187/166	238/208	230/209	279/229	334/301
Fans static efficiency (UE) n.327/2011	%	48,4	45,2	49,4	53,0	52,2	50,5	62,9
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)	63	71	69	76	80	84	84
Sound pressure level ⁽⁵⁾	dB(A)							
Power supply	V/ph/Hz							

⁽¹⁾ ratio between the thermal gain of the inlet air and the thermal loss of the exhaust air, 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

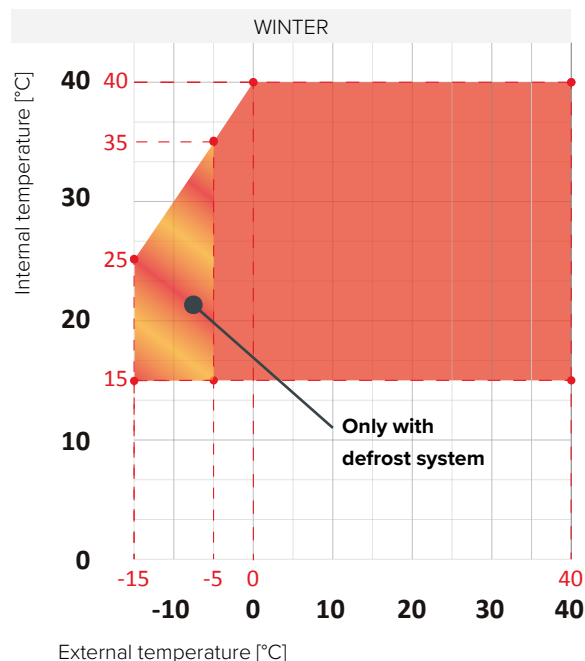
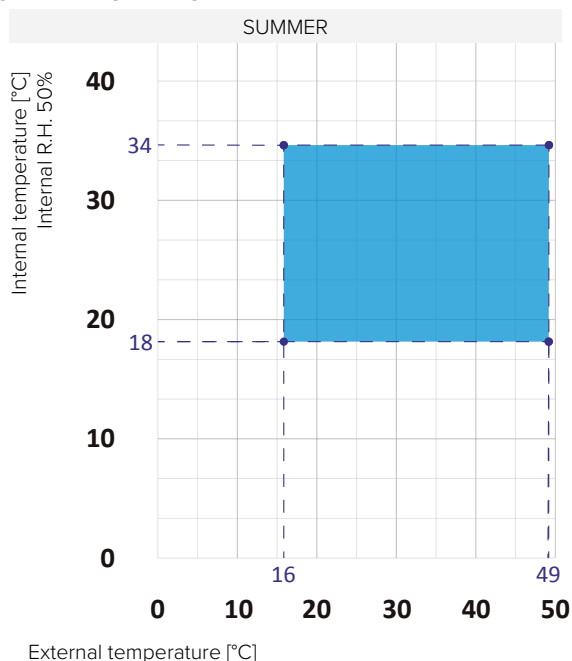
⁽²⁾ outside air: -5 °C / 80 % RH- Inside air: 20 °C / 50 % RH

⁽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, ducted unit, in accordance with EN 3744

OPERATING LIMITS



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.

ACCESSORIES

ISO coarse 40% (G2) grease air pre-filter

Filter used in presence of large pollutants suspended in the air or in case of filtration of oily mists. The material is washable and it may be installed with ePM10 60% (M5), ePM1 55% (F7) or ePM1 80% (F9) filters.

ePM10 50% (G4) air pre-filter

Filter with low pressure drop and it may be installed with the ePM10 60% (M5), ePM1 55% (F7) or ePM1 80% (F9) filters.

ePM10 60% (M5), ePM1 55% (F7), ePM1 80% (F9) air filters

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

Additional filter rails

They are used when a second filter, in series with the one used as standard, is required.

Electric defrost system

Consists of an electric coil installed on the return air and controlled by a temperature probe positioned on the exhaust air. It's guarantees a considerable reduction of the input power compared to other traditional systems.

Unbalanced airflows defrost system

Consists of a specific device and a software that avoid an excessive drop of the exhaust air temperature.

This system is normally supplied in combination with the hot water coil (optional).

Electric re-heating battery (internal)

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.

Hot / Cold water coil (external)

Manufactured with copper pipes mechanically expanded in the aluminium fins, it is supplied in a dedicated section with the same features of the main unit, to be installed in the supply air-flow side and fixed with a dedicated installation kit supplied with it. On request, it is possible to install coils with different capacities from the standard ones. The cooling coil section is supplied complete with condensate drain pan with side water discharge.

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 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.

CO2 probe

ECO version units can be equipped with air quality CO2 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, NOTE: CO2 probe is not available in PLUS and TOP versions.



AIR HANDLING UNITS



VORT NRG RANGE

ACCESSORIES

MODEL		400	600	1000	1500	2000	3000	4000
ECO	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 ⁽²⁾	■	■	■	■	■	■	■
	Built-in control sensors	■	■	■	■	■	■	■
	MODBUS RS485 serial interface card	■	■	■	■	■	■	■
PLUS	EC Brushless supply and return fans	■	■	■	■	■	■	■
	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	■	■	■	■	■	■	■
	Constant PRESSURE version	■	■	■	■	■	■	■
TOP	EC Brushless supply and return fans	■	■	■	■	■	■	■
	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	■	■	■	■	■	■	■
	Constant AIRFLOW version	■	■	■	■	■	■	■
Accessories	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	□	□	□	□	□	□	□
	ePM ₁ 55% (F7) filter on supply and return air	□	□	□	□	□	□	□
	ePM ₁ 80% (F9) filter on supply and return air	□	□	□	□	□	□	□
	Additional filter rails	□	□	□	□	□	□	□
	Electric defrost system	□	□	□	□	□	□	□
	Unbalanced airflows desfrost system	□	□	□	□	□	□	□
	Electric post-heating coil	□	□	□	□	□	□	□
	Hot water coil ⁽¹⁾	□	□	□	□	□	□	□
	Cold water coil ⁽¹⁾	□	□	□	□	□	□	□
	Kit 3 way modulating valve ⁽²⁾	□	□	□	□	□	□	□
	Fresh air / Exhaust air damper	□	□	□	□	□	□	□
	On/Off damper actuator	□	□	□	□	□	□	□
	Rounded outlets kit (4 Pcs.)	–	–	–	–	–	□	□
	Sound attenuator ⁽¹⁾	□	□	□	□	□	□	–
	CO ₂ probe (available only for ECO version)	□	□	□	□	□	□	□

■ Standard □ Optional – Not available

⁽¹⁾ Mounted in a separate box

⁽²⁾ Supplied loose





OPERATING 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.

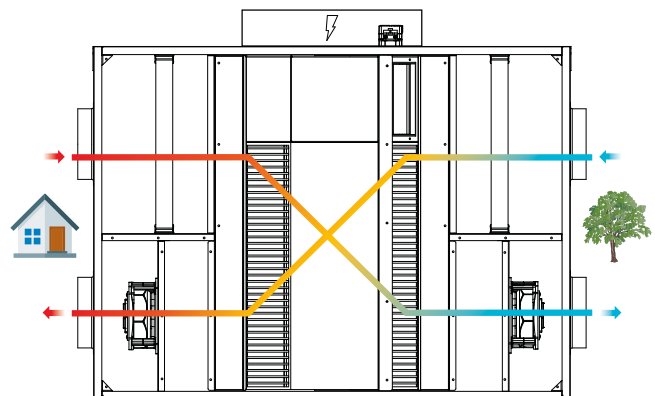
The fresh air, with a lower thermal load than the return one from the room, crosses the plate heat exchanger in the opposite direction and heats up before the introduction into the room. The modulation of the airflow rate, through variation of the rotation speed of the EC fans, will allow a precise control 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

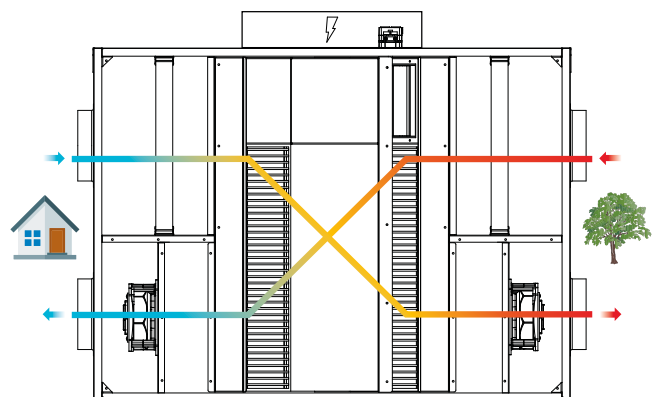


● COOLING MODE

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.

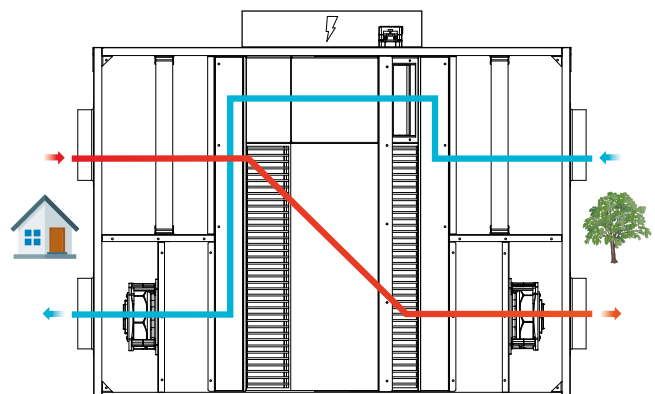
The fresh air, with a higher thermal load than the room air, crosses the plate heat exchanger in the opposite direction and cools down before the introduction into the room.

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.



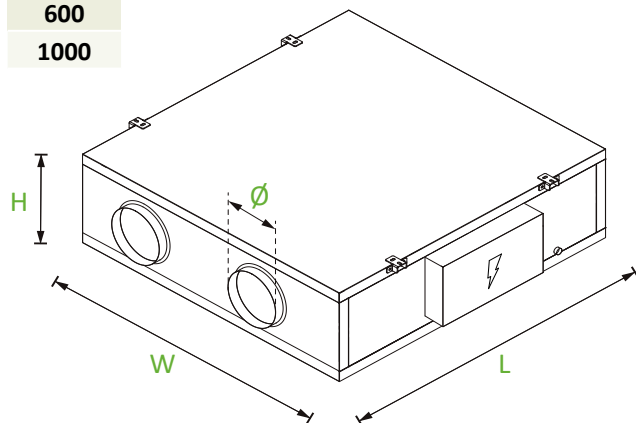
● FREE-COOLING

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.

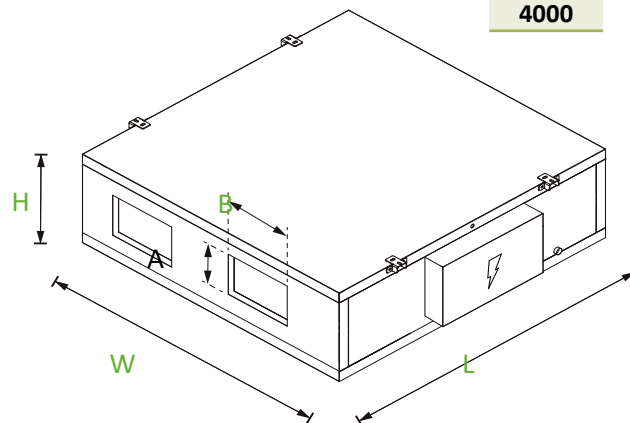


DIMENSIONAL DRAWING - Configurations H

MOD.	1500
400	2000
600	
1000	



MOD.	3000
4000	

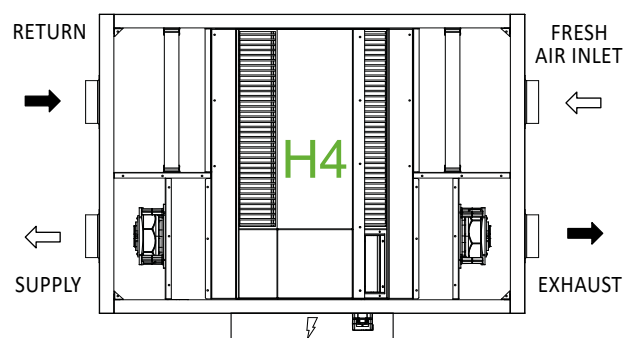
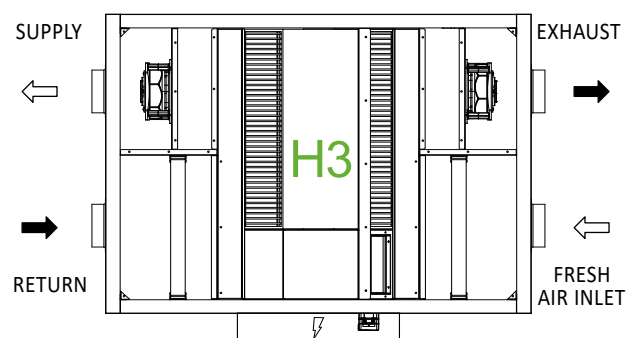
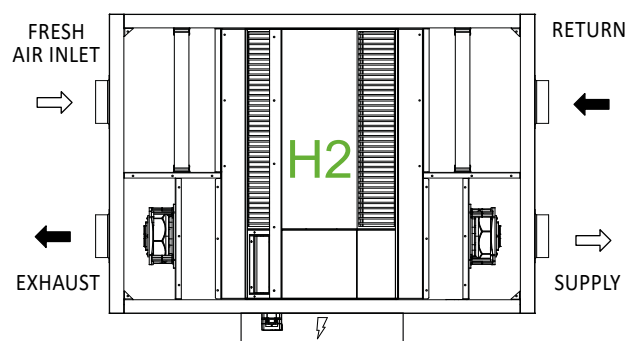
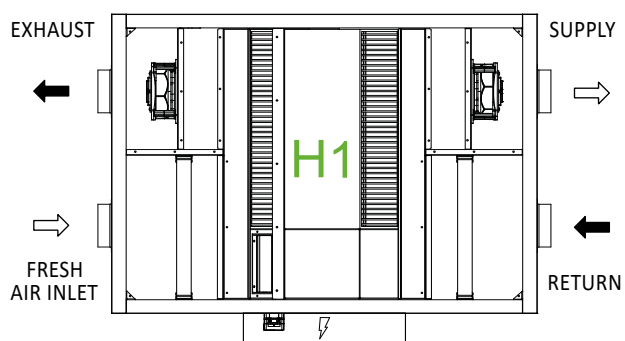


WEIGHTS AND DIMENSIONS

MODEL		400	600	1000	1500	2000	3000	4000
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 / BxA	mm	Ø 150	Ø 200	Ø 250	Ø 250	Ø 250	450x350	450x350
Weight *	kg	117	133	180	226	288	338	369

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

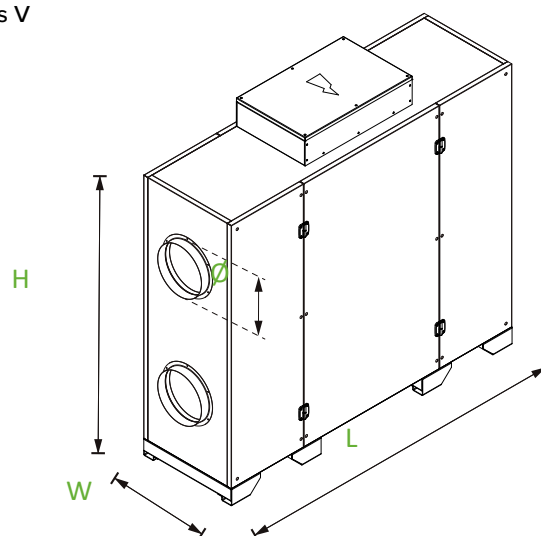
CONFIGURATIONS (plan view)





DIMENSIONAL DRAWING - configurations V

MOD.
005
006
010
015
020



WEIGHTS AND DIMENSIONS

MODEL		400	600	1000	1500	2000	3000	4000
L	mm	1300	1400	1400	1650	1650	-	-
W	mm	390	430	430	550	550	-	-
H	mm	822	1122	1422	1422	1672	-	-
Ø	mm	Ø 150	Ø 200	Ø 250	Ø 250	Ø 250	-	-
Weight *	kg	120	137	184	232	294	-	-

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

CONFIGURATIONS (front view)

