

Climaveneta Technical Bulletin  
HRD2\_050\_410\_201711\_EN



# HRD2

050 ÷ 410

426 ÷ 3685 m<sup>3</sup>/h

Ventilation unit with high efficiency air-to-air  
heat recovery



(The photo of the unit is purely indicative and may vary depending on the model)

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The data contained in this publication may be changed without prior notice.

## 1. GENERAL DESCRIPTION

HRD2 ventilation units with high efficiency heat recovery are designed and developed for not residential applications and allow the room air renewal with the highest energy saving; they specifically meet requirements of UE Regulation n°1253/2014 (Ecodesign Lot 6).

These units may be integrated with traditional heating and cooling systems, but they can operate also alone if equipped with the proper accessories.

The series, both horizontal and vertical configuration, consists of six sizes, and covers 426 ÷ 3685 m<sup>3</sup>/h airflow range.

## 2. UNIT DESCRIPTION

- Self-supporting body with 25 mm thickness sandwich panels, galvanized steel sheet metal inner skin, precoated steel sheet metal outer skin RAL 9002
- Non-flammable mineral wool thermal and acoustic insulation
- High efficiency (> 75%) counterflow heat recovery, aluminium heat exchanger plates with supplementary sealing and built-in motorized by-pass device; aluminium drain pan, fitted with 1/2" M condensation outlet (on side for horizontal unit, on bottom for vertical unit)
- Compact filters at both intakes with synthetic (external layers) and micro-glass (intermediate layer) media and galvanized steel frame, M5 efficiency class on return air, F7 efficiency class on fresh air, easily removable from bottom and side panels; efficiency according to EN 779:2012
- Direct driven EC motor plug fans; plastic fiberglassreinforced impeller for 05 and 10 size, aluminum impeller for bigger sizes
- Built-in electric box with electronic controller for a complete control of all typical functions of the unit; in particular:
  - manual control of EC fan motors
  - automatic control of EC fan motors (by pressure, temperature or air quality sensor)
  - heating/cooling water valve modulating control

- electric heater on/off control (both pre and re-heater)
- heat recovery defrost control
- free-cooling on/off mode control
- post-ventilation
- weekly programming
- alarm management
- remote on/off
- remote Summer/Winter mode
- EC fan motors management by fire alarm digital input
- BMS by Modbus protocol and RS485 connection

HRD2 units are suitable for working environment free of aggressive, corrosive and explosive agents, which can irreparably damage their components and structures. In the event of special application, please contact Climaveneta preventively for a feasibility study.

## 3. ELECTRONIC CONTROL

It is composed of electronic controller, placed inside the built-in electrical box close to supply fan section, NTC sensors (on fresh air, return air, exhaust air and supply air) and remote user interface for setting and displaying.

HRD2 electronics manages:

- manual control of fans (by changing fan speed % setting)
- automatic control of fans (by constant airflow mode via differential pressure transducer or by supply air temperature or room air quality via CO<sub>2</sub> sensor)
- modulating control of heating/cooling water valve (\*)
- water coil antifreeze protection (\*)
- dirty filter alarm (by pressure switch or filter service time setting)
- defrosting of heat recovery by on/off electric pre-heater or by fresh airflow reduction (both based on exhaust air temperature)
- modulating control of electric re-heater (based on comfort temperature setting)
- free-cooling mode by heat recovery by-pass (based on comparison between fresh air temperature and comfort temperature)
- post-ventilation after unit switch off signal in the event of previous electric heater working
- weekly programming with time bands and temperature settings; already prearranged for night mode silent working
- remote on/off
- heating/cooling mode output by free-voltage contact
- Summer/Winter mode by remote digital input

- ventilation control by fire alarm digital input (both fans off, both fans at max speed, exhaust fan at max speed and supply fan off)
- alarm management by visualization of current alarms and alarm recording
- BMS via Modbus protocol and RS485 connection

In case of any temperature treatment after basic unit, supply air temperature sensor shall move from basic unit to the last treatment section (for instance, water coil module) and can be also as an antifreeze sentinel:



## 4. TECHNICAL DATA SHEET

HRD2			050	090	140	210	300	410
<b>ELETTRICAL DATA</b>								
Power supply		V/ph/Hz	230/1/50	230/1/50	230/1/50	230/1/50	400/3+N/50	400/3+N/50
Overall power input Nominal		W	327	339	904	930	1841	1910
Overall power input Max		W	340	340	920	930	2000	2000
Overall current input Nominal		A	2,7	2,9	5,9	6	3,3	3,4
Overall current input Max		A	2,8	2,9	6,0	6,0	3,4	3,5
Fan speed control		V	0-10	0-10	0-10	0-10	0-10	0-10
<b>PERFORMANCE</b>								
Air flow rate		m <sup>3</sup> /h	426	776	1230	1843	2720	3685
Air flow rate		m <sup>3</sup> /s	0,118	0,216	0,342	0,512	0,756	1,024
External static pressure	(1)	Pa	218	153	265	172	194	200
Return sound pressure level	(2)	dB(A)	53	52	53	60	62	60
Supply sound pressure level	(2)	dB(A)	61	60	61	68	70	68
Recovery efficiency	(3)	%	86,2	86,9	83,7	85,3	84,8	85,0
Recovery capacity	(3)	W	3684	6768	10333	15777	23157	31435
Supply temperature	(3)	°C	16,3	16,5	15,6	16,0	15,9	16,0
<b>CONFORMITY TO (EU 1253/2014)</b>								
Recovery efficiency	(4)	%	81,4	80,1	77,9	77,4	76,8	76,8
Efficiency bonus		W/m <sup>3</sup> /s	252	213	147	132	114	114
Filter correction factor		-	0	0	0	0	0	0
SFP internal limit		W/m <sup>3</sup> /s	1337	1283	1201	1162	1113	1078
Total internal air pressure drop	(4)	Pa	601	679	570	583	633	636
Overall fan static efficiency	(5)	%	45,0	53,1	47,5	50,7	59,0	59,2
SFP internal		W/m <sup>3</sup> /s	1336	1279	1200	1150	1073	1074
<b>SIZE AND WEIGHT</b>								
Length	(6)	mm	1350	1470	1850	1850	2150	2150
Width	(6)	mm	680	820	1030	1460	1460	1840
Height	(6)	mm	330	370	455	455	590	590
Operating weight	(6)	kg	85	105	175	230	290	360

**Notes:**

- 1 Fresh air/supply air circuit
- 2 Sound pressure level in free field on a reflective surface, 1 m from fan front and 1 m from the ground.  
Non-binding value obtained from sound power level.
- 3 Size valued in the following hypothesis at wet conditions: outside air temp. -7 °C 80% RH; room air temperature 20 °C; 55% RH
- 4 Size valued in the following hypothesis at dry conditions: outside air temperature 5 °C; room air temperature 25 °C
- 5 Including motor&speed controller efficiency
- 6 Unit in standard configuration/execution, without optional accessories

## 5. OPERATING LIMITS

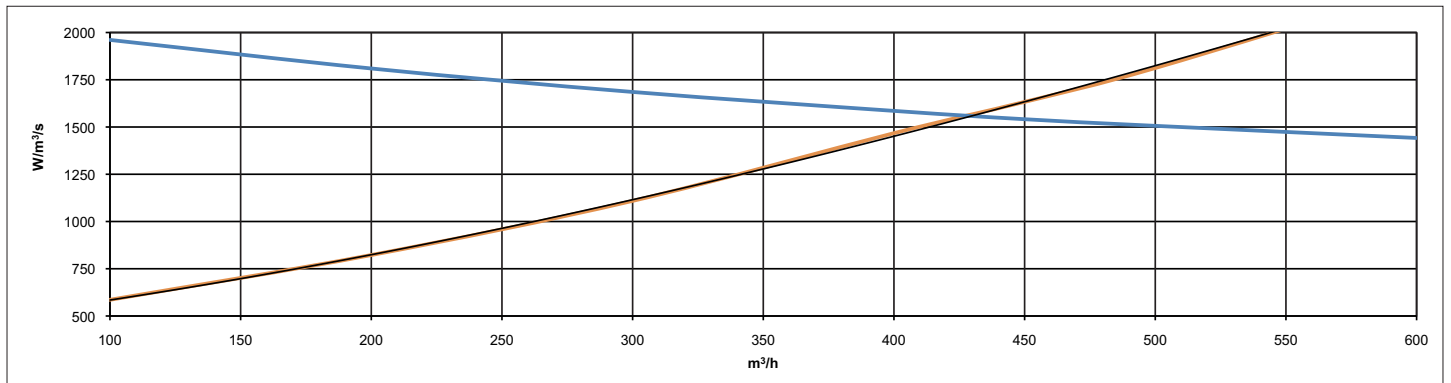
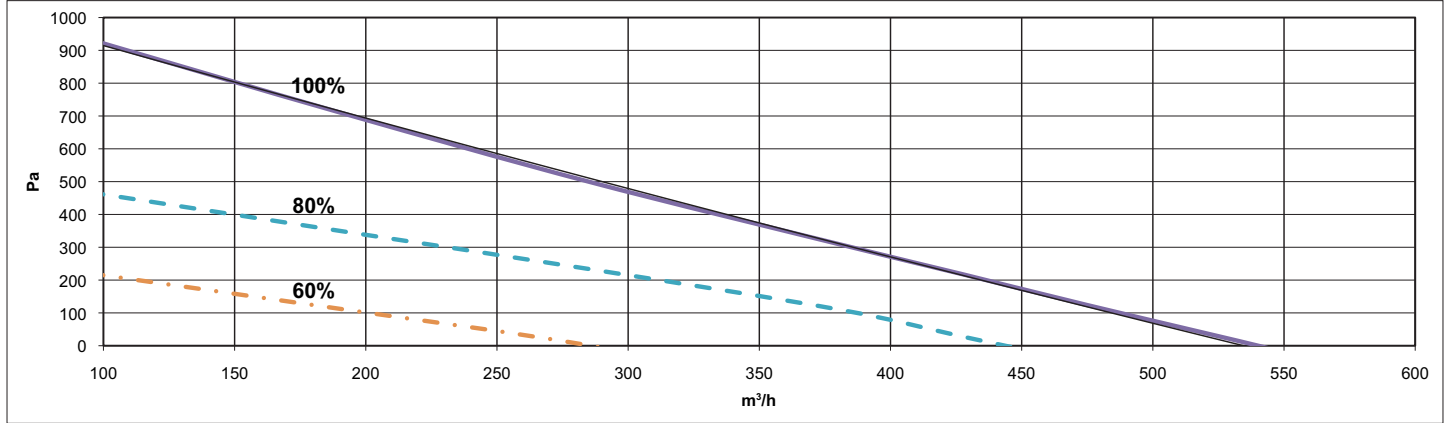
HRD2		050	090	140	210	300	410
Air temperature	°C	-20 ÷ 45					
Air relative humidity	%	10 ÷ 95					
Working environment	-	Not explosive, not corrosive, not chlorinated, not saline					

6. FAN PERFORMANCES CURVES

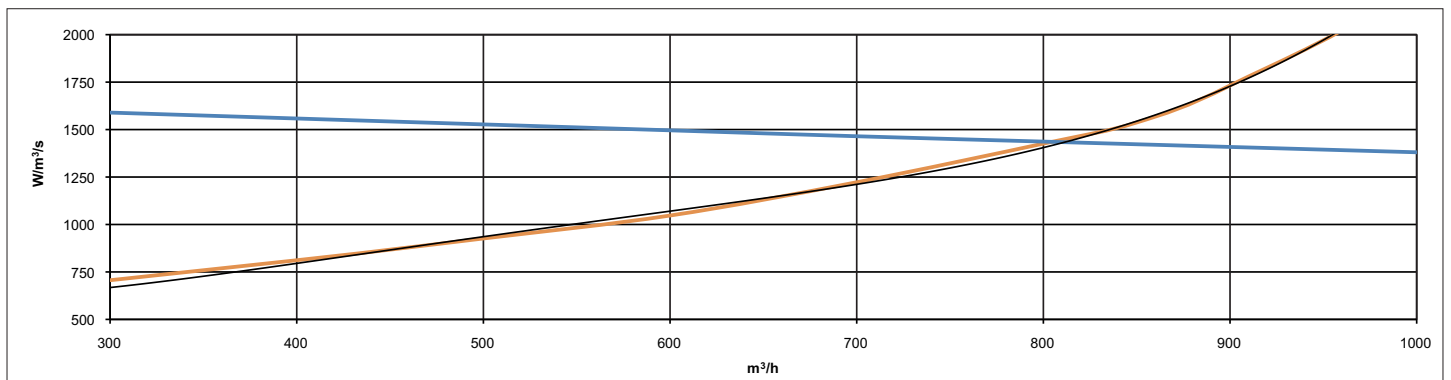
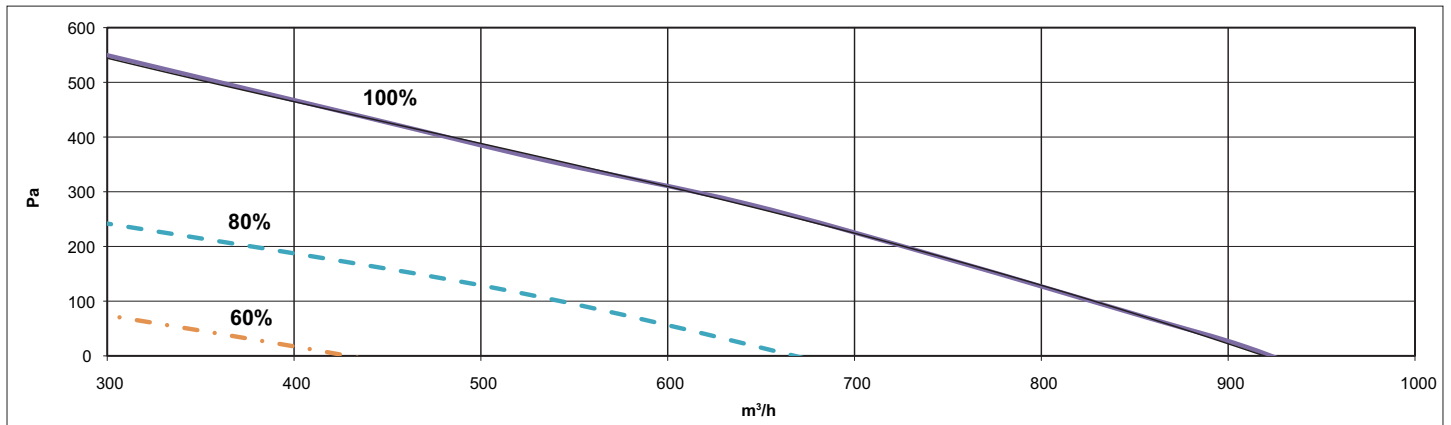
The following curves are, model by model, the supply side external static pressure delivered by the basic unit while changing the airflow (at 100%, 80%, 60% of nominal fan speed setting) and the working range, at max fan speed.

All the shown performances are referred to air filter kept properly clean and fully efficient.

HRD2 050

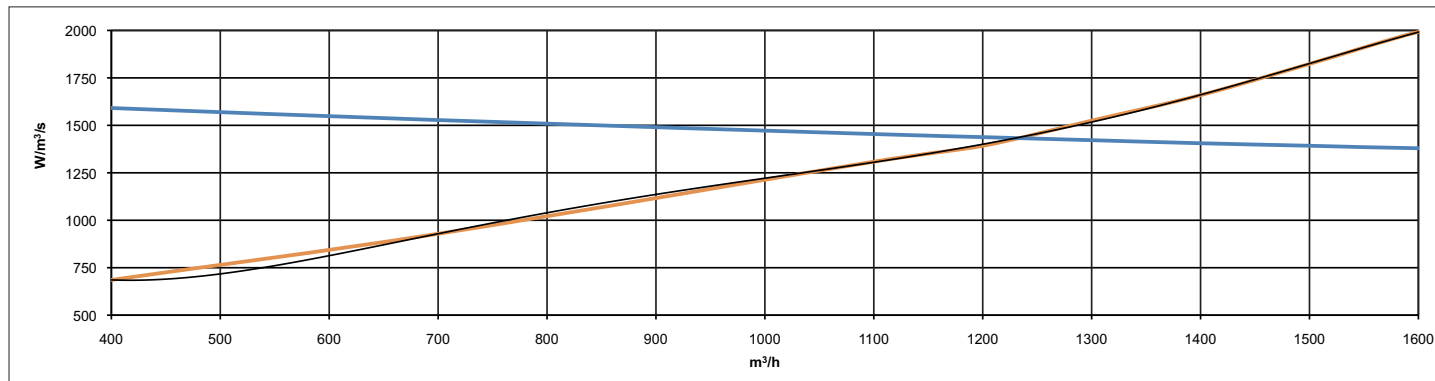
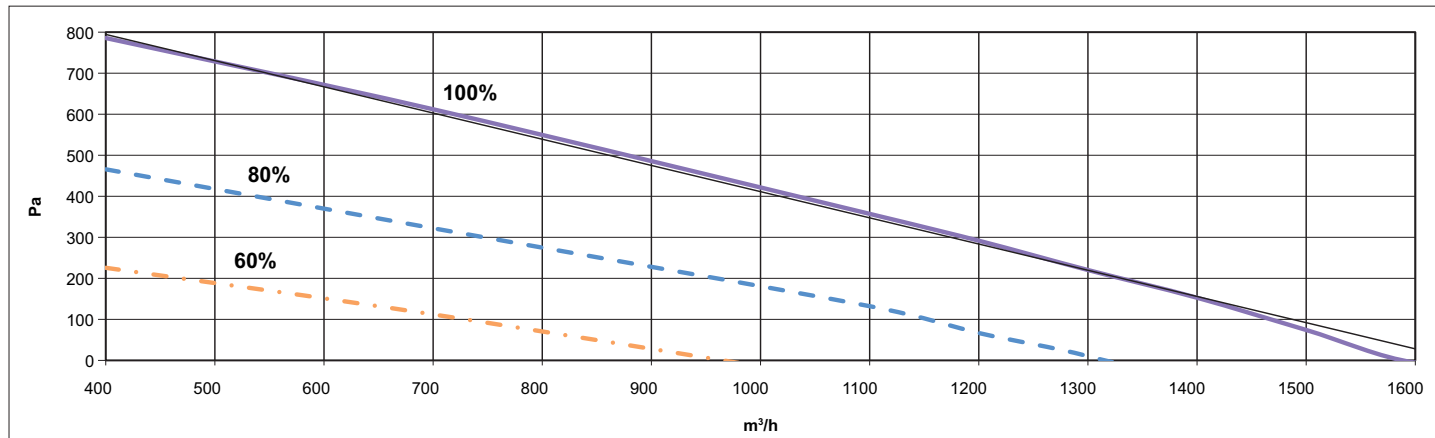


HRD2 090

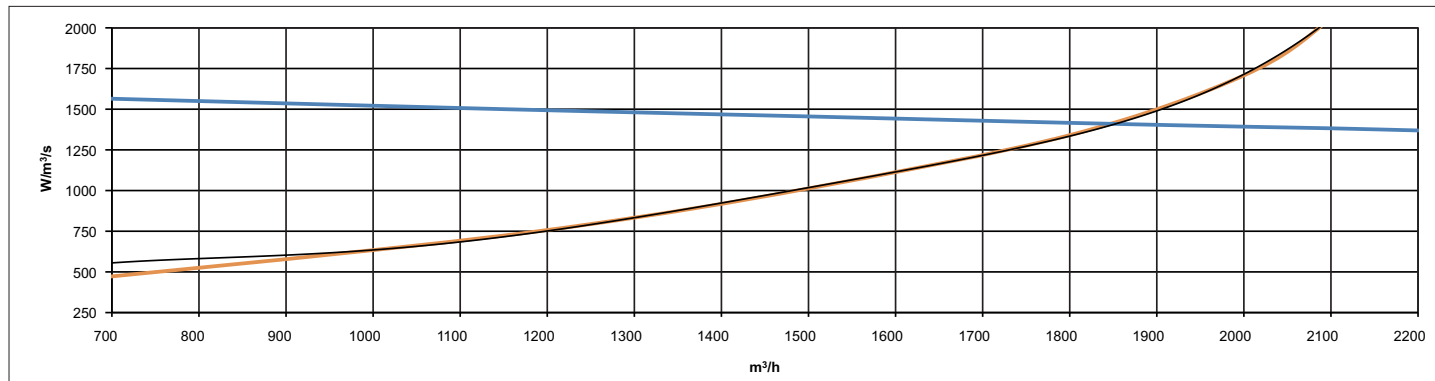
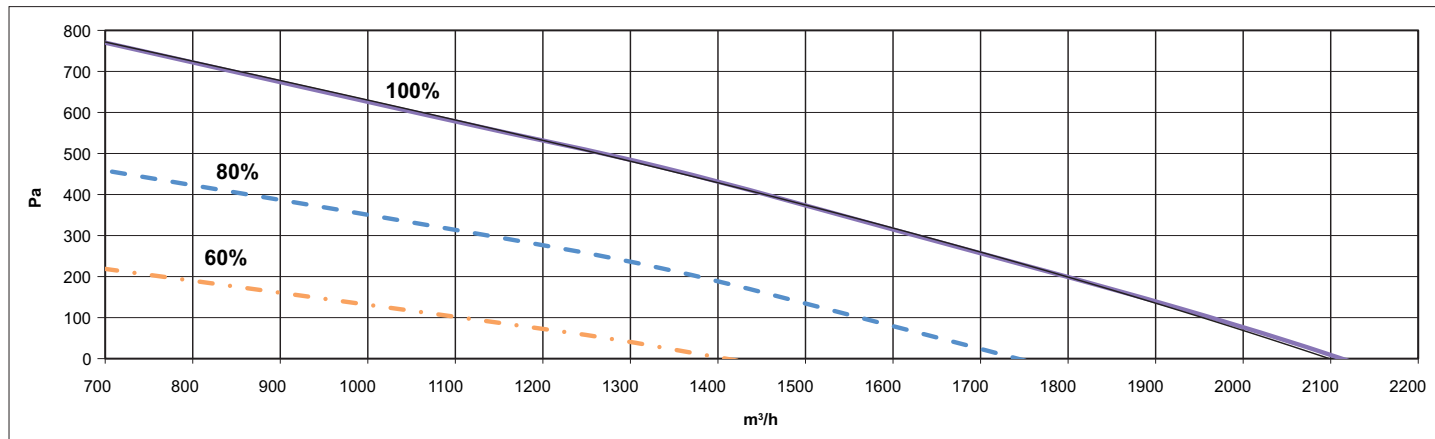


6. FAN PERFORMANCES CURVES

HRD2 140

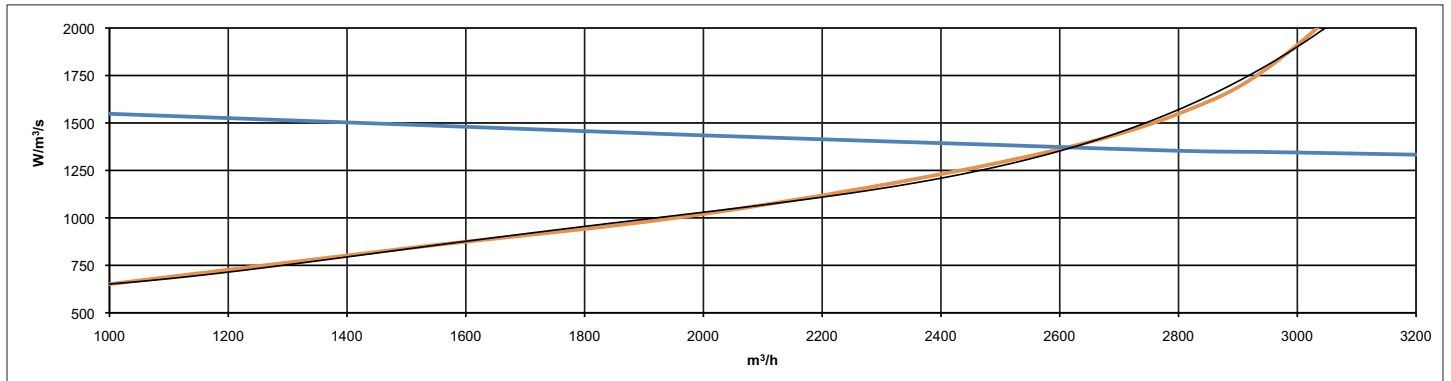
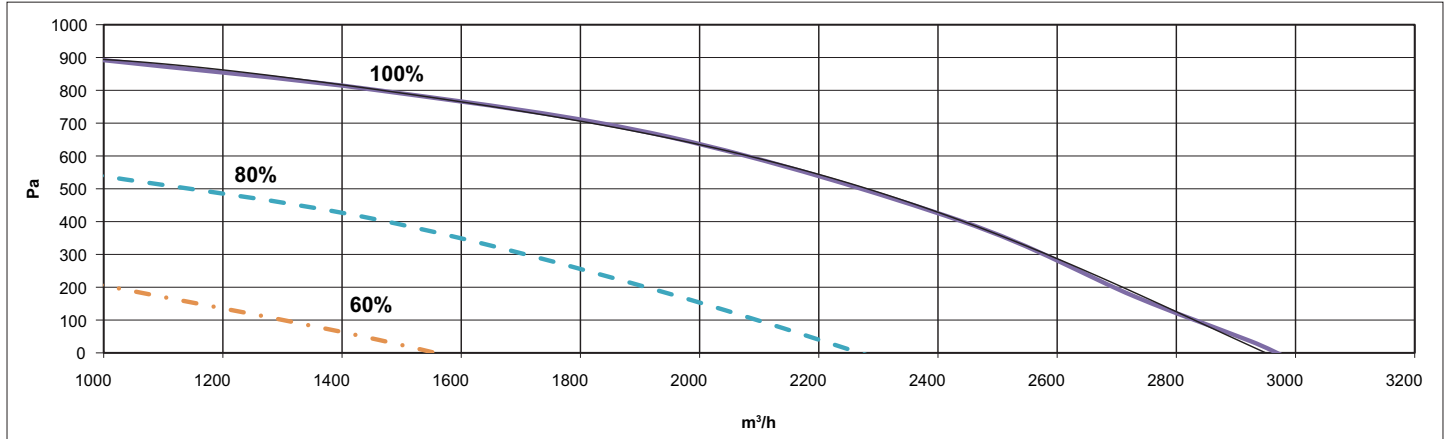


HRD2 210

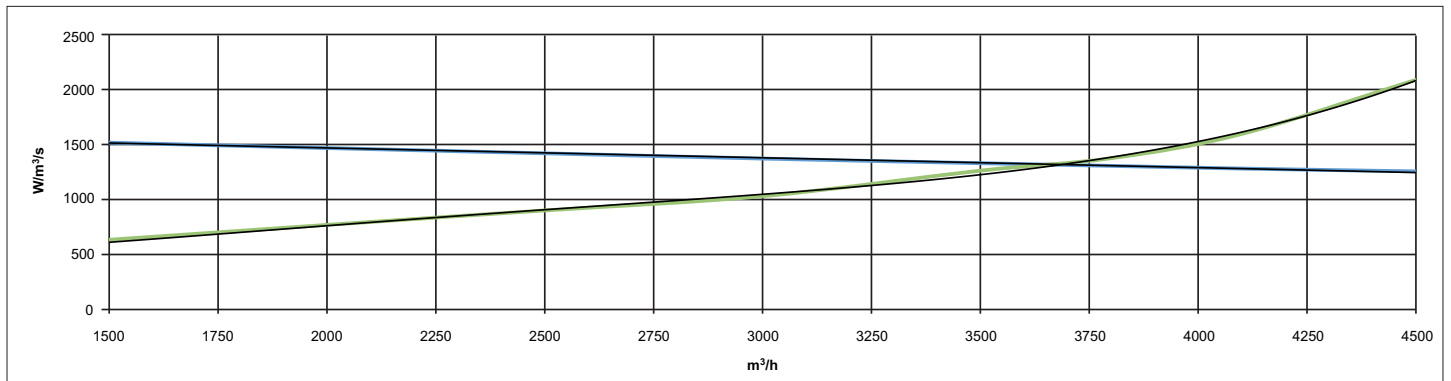
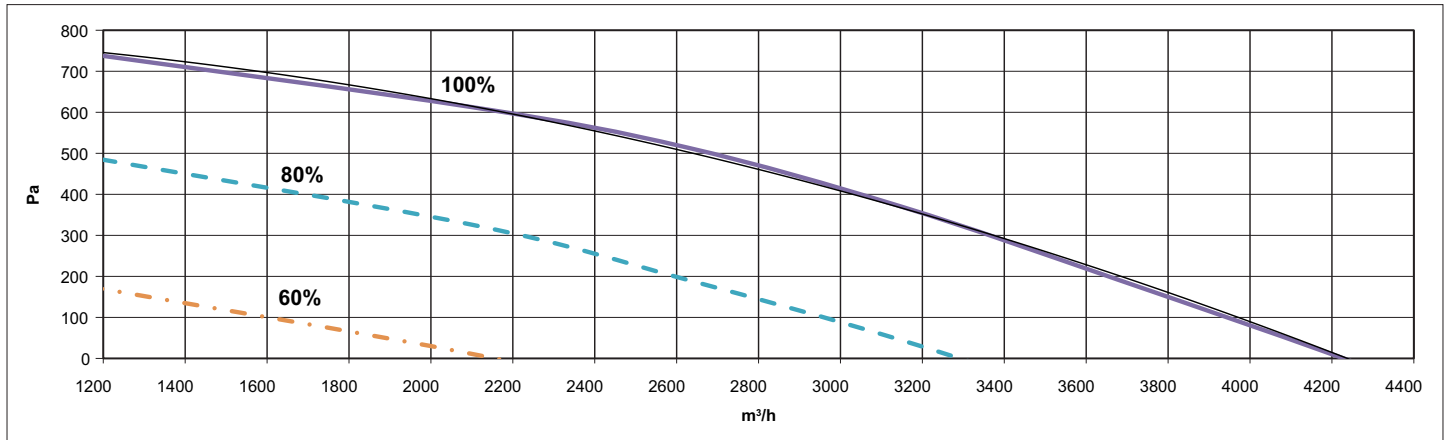


6. FAN PERFORMANCES CURVES

HRD2 300



HRD2 410



## 7. ACCESSORIES

### ELECTRIC HEATER

It is composed of filament type elements inside a galvanized steel frame installed inside the unit as a pre and/or re-heater and provided of both manual and automatic reset thermostat.

Technical data								
HRD2			050	090	140	210	300	410
Capacity		kW	1,5	2,5	4,0	5,0	7,5	10,5
ΔT	(1)	°C	8,8	8,2	8,4	7,0	7,4	7,5
Air pressure drop	(1)	Pa	5	6	10	10	11	12
Power supply		A	230-1-50				400-3-50	

1 at nominal airflow rate

### WATER HEATING / COOLING EXTERNAL SECTION

External section (for horizontal unit, for vertical unit) to be directly connected to the basic unit on supply air/return air side complete with 3-row water coil, suitable both for heating and cooling mode, and aluminium dray tray. For dimension and water connections see previous par. 8 DIMENSIONAL DATA AND WATER CONNECTIONS and for performance read the following table, referred to nominal airflow rate:

Technical data water coil module								
HRD2			050	090	140	210	300	410
Total cooling capacity	(1)	kW	2,46	4,47	6,83	10,62	16,14	20,68
Sensible cooling capacity	(1)	kW	1,35	2,41	3,76	5,84	8,72	11,37
Heating capacity	(2)	kW	3,30	5,86	9,34	14,03	20,83	27,50
Water flow rate	(1)	l/h	432	756	1188	1836	2772	3564
Water pressure drop	(1)	kPa	12	18	9	13	19	15
Air pressure drop	(1)	Pa	51	53	54	50	50	55
Weight		kg	28	31	35	42	52	58

1 air inlet condition 28,0°C 60% RH; in/out water temperature 7°/12°C

2 air inlet condition 13°C; in/out water temperature 45°/40°C

### 3-WAY MODULATING VALVE KIT

Kit consisting of 3-way water valve, combined with water coil module external section, and modulating electric actuator. Fittings and connecting pipes not included (by installer).

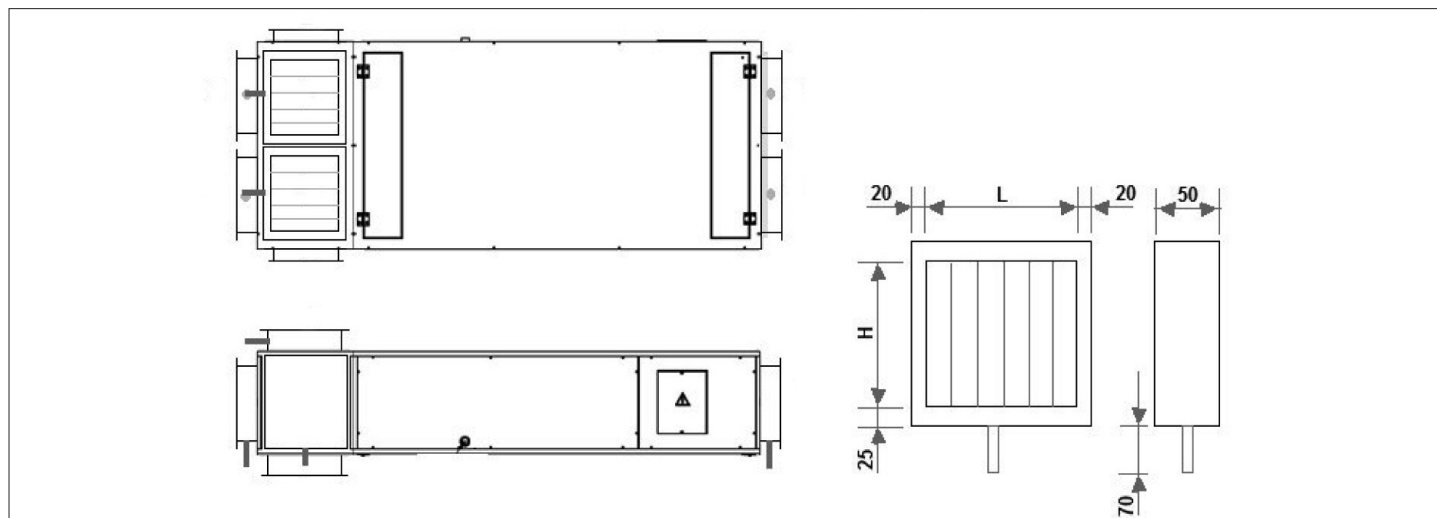
Technical data								
HRD2			050	090	140	210	300	410
Nominal pressure		-	PN16 (ISO7286/EN1333)					
Lift		mm	2,5				5,5	
Water connection		GAS	3/4" F		3/4" F		1" F	
Kvs		m³/h	2,5		4,0		10,0	
Water temperature		°C	+2 ÷ +95 (glic. max 40%)					
Power supply		V - Hz	24cc - 50/60					
Control signal		V	0 ÷ 10					



## 7. ACCESSORIES

### ADJUSTING DAMPER

It is made from aluminium frame and aluminium blades, controlled by optional on/off electrical actuator. It can be directly mounted on each air intake/outlet of basic unit or on water coil module.



Technical data		050	090	140	210	300	410
<b>HRD2</b>							
Air dimensions L x H	mm	250 x 230	290 x 270	370 x 355	610 x 355	610 x 490	770 x 490
Weight	kg	1,6	2,1	2,6	3,7	4,3	6,2

### DAMPER ACTUATOR

230V 50 Hz on/off type, 2 Nm torque and 1,5 W power consumption.



### FLEXIBLE CONNECTION

It allows the flexible connection between the basic unit or its possible external sections and the air ducts, to cut off the transmission of the mechanical vibrations due to the mobile parts of the unit. Their dimensions are the same of the corresponding damper.

### ROUND CONNECTION

It allows the connection between the basic unit or its possible external sections and round air ducts. They are made from galvanized steel and provided with coupling flange. Assembly sequence starting from the unit: Damper, antivibration joint, conveyor.

Technical data		050	090	140	210	300	410
<b>HRD2</b>							
Nominal connection diameter	mm	250	315	315	400	500	500
Connection strip	mm	100	100	100	100	100	100
Nominal air pressure drop	Pa	7	7	16	10	9	16

### AIR FILTER PRESSURE SWITCH

It is suitable for control of air filter dirt condition, by acting on an electrical circuit when set-point pressure value is achieved. Can be supplied already mounted on board of the units upon request.

## 7. ACCESSORIES

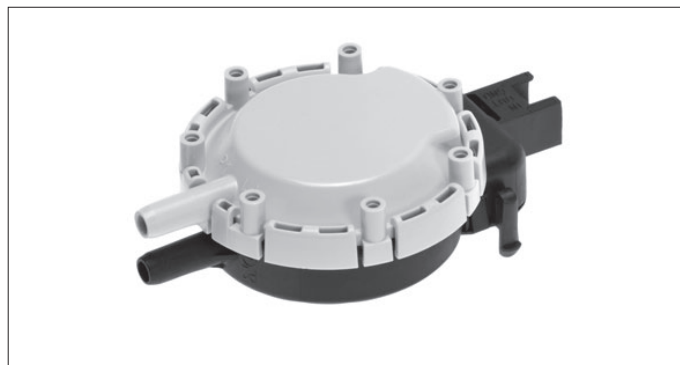
### AIR FILTER PRESSURE SWITCH

It is suitable for control of air filter dirt condition, by acting on an electrical circuit when set-point pressure value is achieved. Can be supplied already mounted on board of the units.



### DIFFERENTIAL PRESSURE TRANSDUCER

Differential pressure sensor for constant airflow control. Can be supplied already mounted on board of the units upon request.



### DUCTABLE CO<sub>2</sub> TRANSDUCER

CO<sub>2</sub> sensor, ductable type, to be placed on the return duct, it allows a continuous modulation of the airflow, based on air quality desired level.



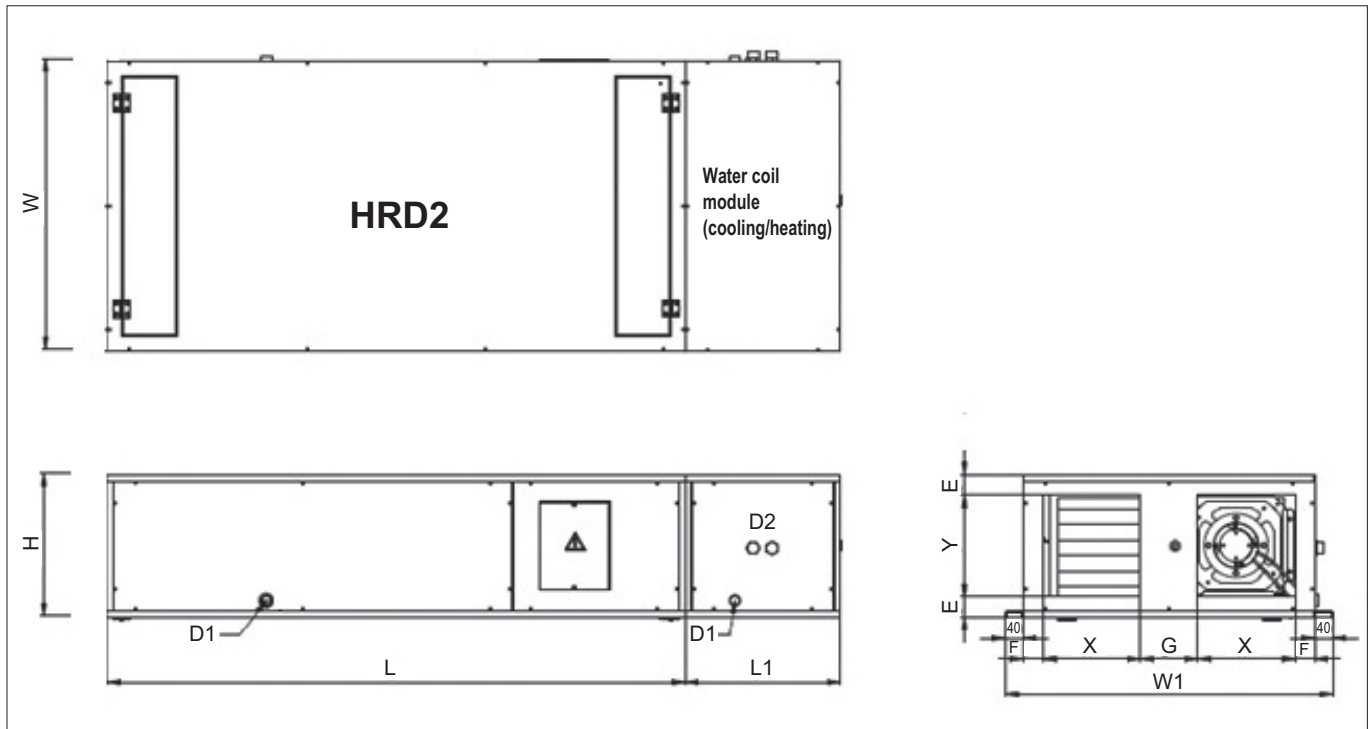
### ROOF COVER

The precoated roof cover is to be used when basic unit (horizontal; vertical) and its possible external sections (horizontal; vertical) are installed outdoor.

8. DIMENSIONAL DATA AND WATER CONNECTIONS

DIMENSIONS (HORIZONTAL VERSION)

The following table, corresponding to the views shown below, lists the dimensions and weights of the HRD2 series models and accessories, in the horizontal version.



Horizontal configurations

OR: fresh air supply from right with reference to the electrical panel (as in the drawing above)

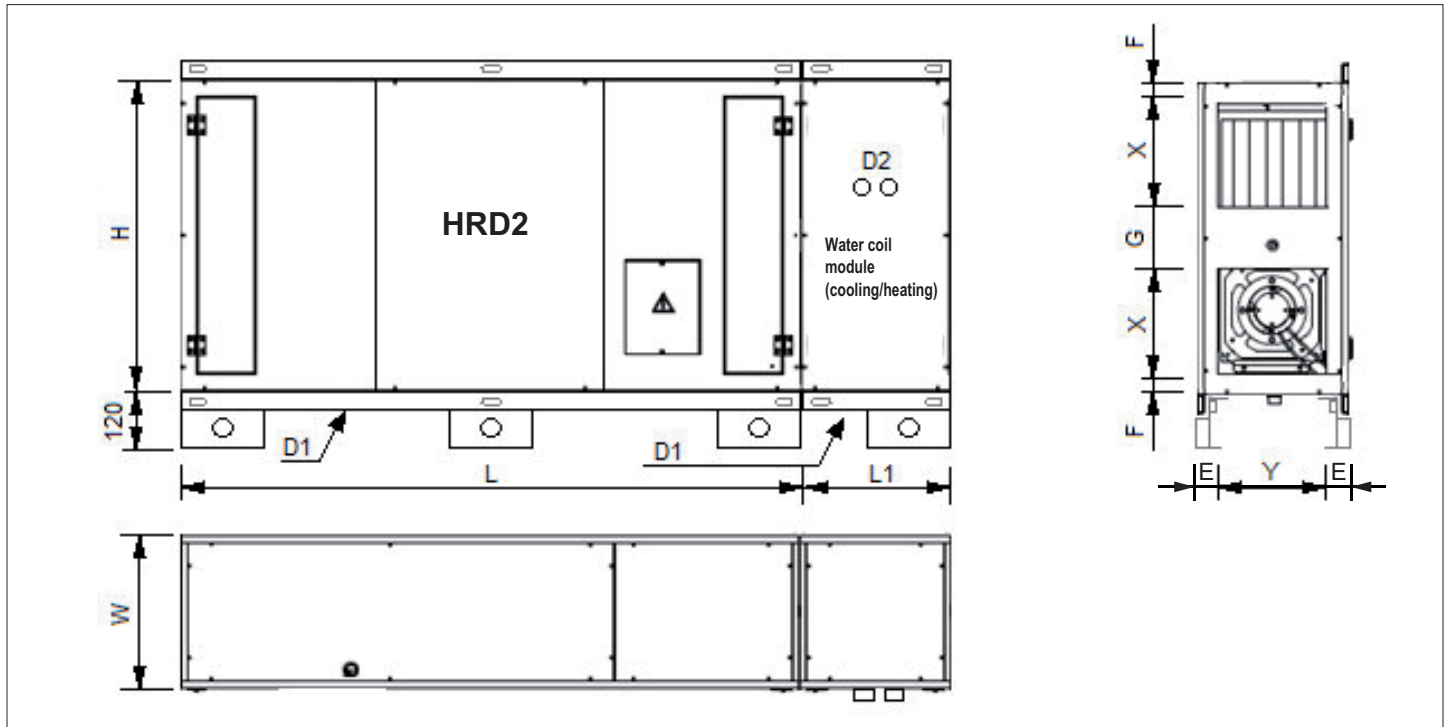
OL: fresh air supply from left with reference to the electrical panel

Model		050	090	140	210	300	410	
L	mm	1350	1470	1850	1850	2150	2150	
W	mm	680	820	1030	1460	1460	1840	
H	mm	330	370	455	455	590	590	
W1	mm	760	900	1110	1540	1540	1920	
X	mm	230	300	390	600	590	780	
Y	mm	225	265	350	350	485	485	
E	mm	52,5	52,5	52,5	52,5	52,5	52,5	
F	mm	46	46	46	46	55	55	
G	mm	128	130	158	170	170	170	
D1	mm	1/2" M						
D2	mm	3/4" M	3/4" M	3/4" M	3/4" M	1" M	1" M	
L1	mm	350	400	400	400	502	502	
Weight (basic unit)	kg	85	105	175	235	290	360	
Weight of the water coil module	kg	28	31	35	42	52	58	

8. DIMENSIONAL DATA AND WATER CONNECTIONS

**DIMENSIONS (VERTICAL VERSION)**

The following table, corresponding to the views shown below, lists the dimensions and weights of the HRD2 series models and accessories, in the vertical version.



**Vertical configurations**

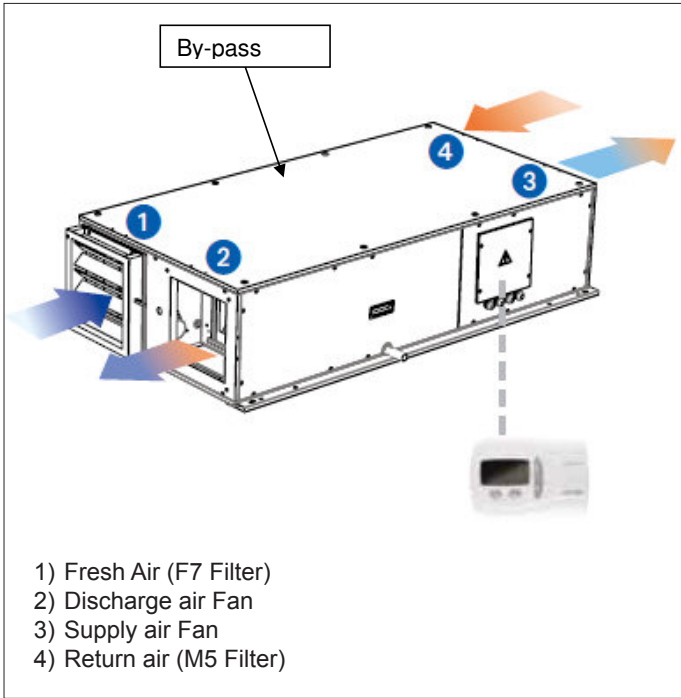
**VR:** fresh air supply from bottom right with reference to the electrical panel (as in the drawing above)

**VL:** fresh air supply from bottom left with reference to the electrical panel

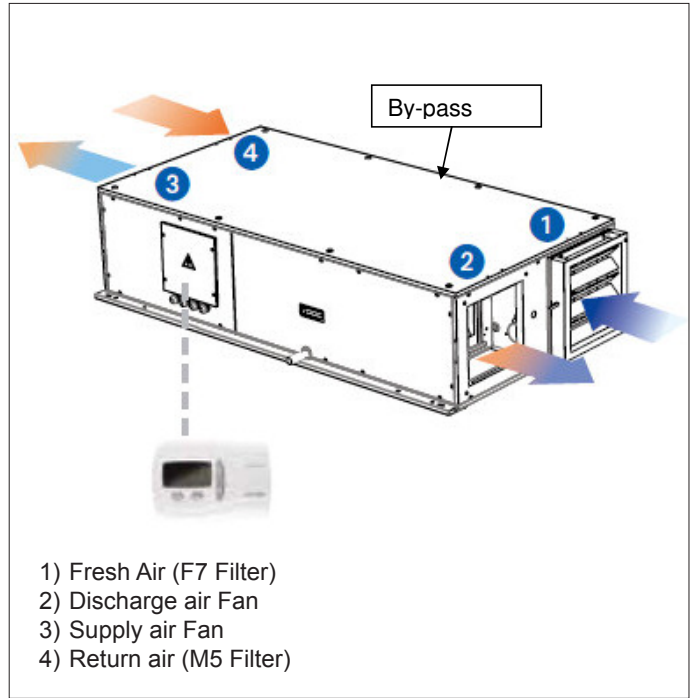
Model		050	090	140	210	300	410
<b>L</b>	mm	1350	1470	1850	1850	2150	2150
<b>W</b>	mm	330	370	455	455	590	590
<b>H</b>	mm	680	820	1030	1460	1460	1840
<b>X</b>	mm	230	300	390	600	590	780
<b>Y</b>	mm	225	265	350	350	485	485
<b>E</b>	mm	52,5	52,5	52,5	52,5	52,5	52,5
<b>F</b>	mm	46	46	46	46	55	55
<b>G</b>	mm	128	130	158	170	170	170
<b>D1</b>	mm	1/2" M					
<b>D2</b>	mm	3/4" M	3/4" M	3/4" M	3/4" M	1" M	1" M
<b>L1</b>	mm	350	400	400	400	502	502
<b>Weight (basic unit)</b>	kg	85	105	175	235	290	360
<b>Weight of the water coil module</b>	kg	28	31	35	42	52	58

9. HRD2 CONFIGURATIONS

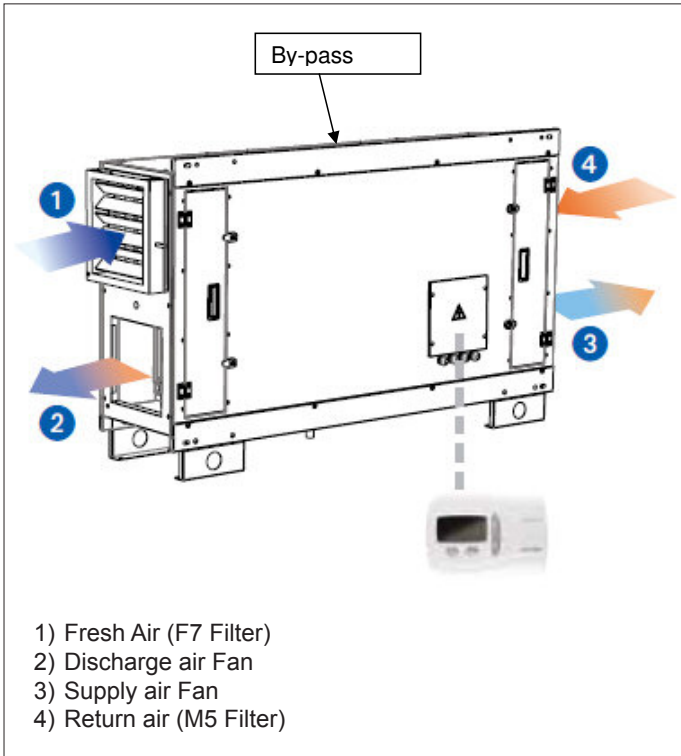
OR TYPE (RIGHT SUPPLY)



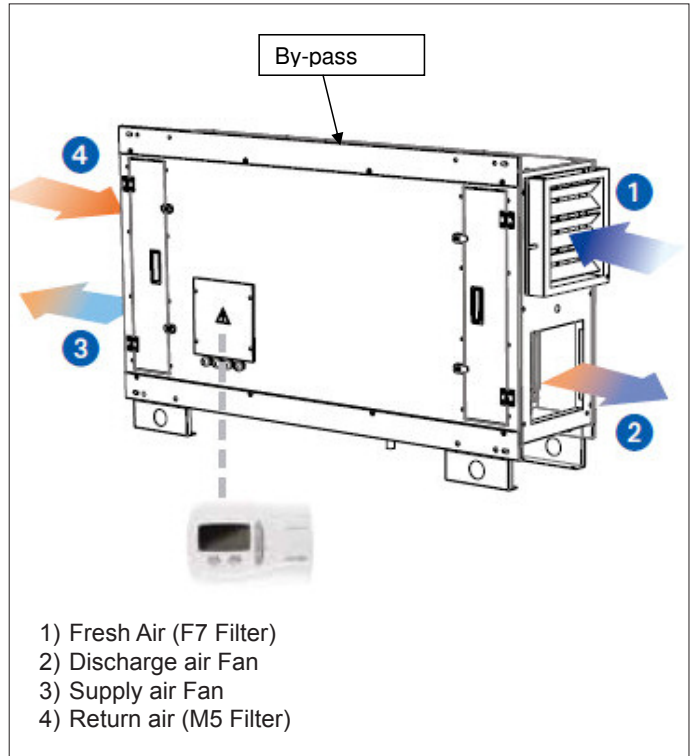
OL TYPE (LEFT SUPPLY)



VR TYPE



VL TYPE





for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



## MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

Head Office: Via Sarson 57/c - 36061 Bassano del Grappa (VI) - Italy

Tel (+39) 0424 509 500 - Fax (+39) 0424 509 509

[www.climaveneta.com](http://www.climaveneta.com)

[www.melcohit.com](http://www.melcohit.com)