

# RFH

## High efficiency heat recovery unit WITH MODULATING HEAT PUMP CIRCUIT and PLATE RECOVERY UNIT from 300 to 4.000 m<sup>3</sup>/h

The new RFH heat recovery units dedicated to exchange the air (with the possibility of varying the flow rate) and to its heat treatment (with the possibility of controlling the supply temperature in the rooms) have been designed and developed in order to reconcile many typical needs of both tertiary and commercial applications.

The RFH series consists of 4 sizes in a horizontal configuration only, for air flow rates ranging from 300 to 4000 m<sup>3</sup>/h.



HOTELS

OFFICES

SHOPPING CENTRE



HEAT PUMP



PLATES



EFFICIENCY

EC  
FANSINVERTER  
COMPRESSORS

PLUG&amp;PLAY

INDOOR  
INSTALLATIONOUTDOOR  
INSTALLATION

R410A

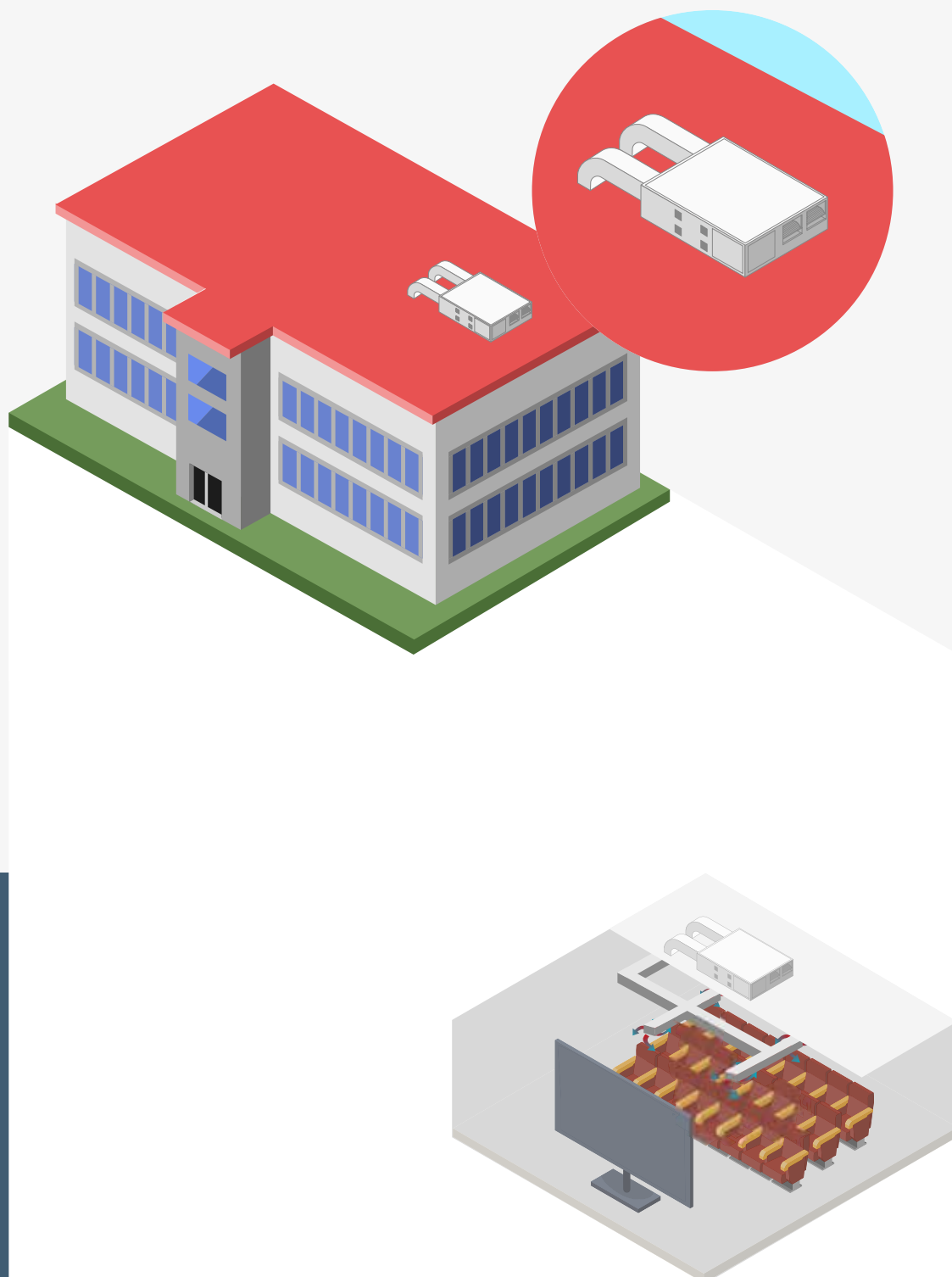
## ADVANTAGES

- High recovery efficiency
- Reduced energy consumption
- Indoor installation (in false ceiling) and outdoor installation (with roof)
- Integration with the most common supervision systems
- Compactness and ease of installation
- Integration of "ALL-IN-ONE" functions (air recirculation and heat treatment)

## RFH OPERATION

The units in the RFH range recover the air in the areas to be treated. They recover 70% of the expelled air temperature with integration of an existing heating and

cooling system. The internal loads of the returned air are neutralised thanks to the integration of the modulating refrigerant circuit.



## TECHNICAL SPECIFICATIONS

- Supporting frame in RAL 9002 pre-painted galvanised sheet metal;
- Double-shell closing panels with a thickness of 20 mm, in pre-painted galvanised sheet metal RAL 9002 outside and galvanised inside; hinged at the bottom for easy access to the internal components.
- Non-flammable thermoacoustic insulation in mineral wool with a density of 100 kg/m<sup>3</sup>.
- High efficiency static heat recovery unit (>70% under nominal conditions) of the cross-flow air-air type with aluminium exchange plates with additional sealing; lower condensate collection tank, extended to the entire area dedicated to heat treatment.
- Compact filters th. 96 mm with synthetic/fibre glass support in 3 non-intertwined layers. On external air intake, efficiency element and ISO ePM1 50%; on ambient air intake, 50% ISO ePM2.5 efficiency element.
- Lower or lateral access, centrifugal electric fans for inlet and exhaust with double intake forward blades equipped with EC motor and built-in control electronics.
- Refrigerant circuit, variable capacity, with continuous heat pump (R410A) consisting of hermetic rotary compressor equipped with EC motor and specific control driver, summer evaporating coil/winter condenser and summer condensing coil/winter evaporator with 7 rows (with hydrophilic treatment) with copper pipes and aluminium fins, bidirectional electronic expansion valve, liquid receiver, 4-way valve for reverse cycle, safety valve, high and low pressure transducers, high pressure switch, freon filter, double liquid light.
- Microprocessor regulation for automatic management of the inlet temperature, of the free-cooling (through optional kit), of hot/cold switching and defrosting of the recovery unit and of the winter evaporator; control panel with display for setting of the parameters and for displaying of the probe and set-point values with remote control up to 200 m from the unit.
- Possibility of connection to a supervision system based on Modbus/RS485 protocol, Modbus TCP/IP, BACNet TCP and Web server.

## ACCESSORIES

Sanitation module with UVC plasma and antivirus filter	Kvir-P
CO2 Sensor	AQS
Adjusting damper	SKR
On/Off Damper actuator	SSE
Additional electric PRE heater	SKE 1
Additional electric POST heater	SKE 2
External by-pass kit	BPL
Water coil module	SAF
ISO ePM1 85% (ex F9) class compact filter	FC9
Air filter pressure switch	PSTD
Flexible connection	GAT
Roof cover	TPR
External hood	CFA
PD2 support feet	PD2

## MODELS

RFH			5	13	24	36
Air flow available	Nom	m <sup>3</sup> /h	500	1300	2400	3600
Available static pressure	Nom	Pa	150	200	200	200
Radiated sound power	Nom	dB(A)	62	69	71	73
ELECTRICAL ABSORPTION			5	13	24	36
Total current	Nom (1)	A	6	10	19	25
	Nom (2)		7	11	20	26
	Max (3)		13	21	29	48
Total absorbed power	Nom (1)	kW	820	2310	4250	6210
	Nom (2)		730	2410	4580	6020
	Max (3)		1500	4000	7000	10000
Electrical power supply	V-Ph-Hz		230-1-50	400-3+N-50		
ENERGY RECOVERY (1)						
Recovered power		W	2920	7670	14430	21570
Recovery efficiency		%	70.2	71.0	72.3	72.1
Power transferred by the heat pump		W	2450	6290	11350	17120
Total power transferred		W	5370	13960	25780	38690
Input temperature		W/W	6.6	6.0	6.1	6.2
Input temperature		°C	25.0			
ENERGY RECOVERY (2)						
Recovered power		W	570	1500	2820	4220
Recovery efficiency		%	60.3	60.9	62.1	61.8
Power transferred by the heat pump		W	2430	6280	11540	17330
Total power transferred		W	3000	7780	14360	21550
Net EER		W/W	4.1	3.2	3.2	3.6
Input temperature		°C	20			
SKE						
Power		W	1500	2500	5000	7000
Maximum current absorbed		A	6,5	3,6	7,2	10,1
Electrical power supply		V-Ph-hz	230-1-50	400-3-50		
SAF						
Cooling power		W	1640	3980	9460	14950
Input air temperature		°C	18,1	18,3	17,3	17,0
Water flow rate		l/h	290	680	1630	2570
Water side load loss		kPa	4	6	8	12
Heat output		W	2510	6440	12990	19910
Input air temperature		°C	33,6	33,4	34,8	35,1
Pressure drop	Nom	Pa	70	60	75	65
	Min		35	30	45	45
	Max		100	75	90	75
OPERATING LIMITS (BASE UNIT)						
Winter outdoor air temperature min.			-7°C (ambient min. 19°C 50% UR (A))			
Summer outdoor air max.			36°C - 40% (ambient max. 27°C ) (B)			

(A) input temperature ≤ 24°C; balanced air flow rates

(B) input temperature ≥ 22°C; balanced air flow rates

(1) outdoor air at -5°C 80% RH, ambient air at 20°C 50% RH; nominal air flow rate

(2) outdoor air at 32°C 50% RH, ambient air at 26°C 50% RH; nominal air flow rate

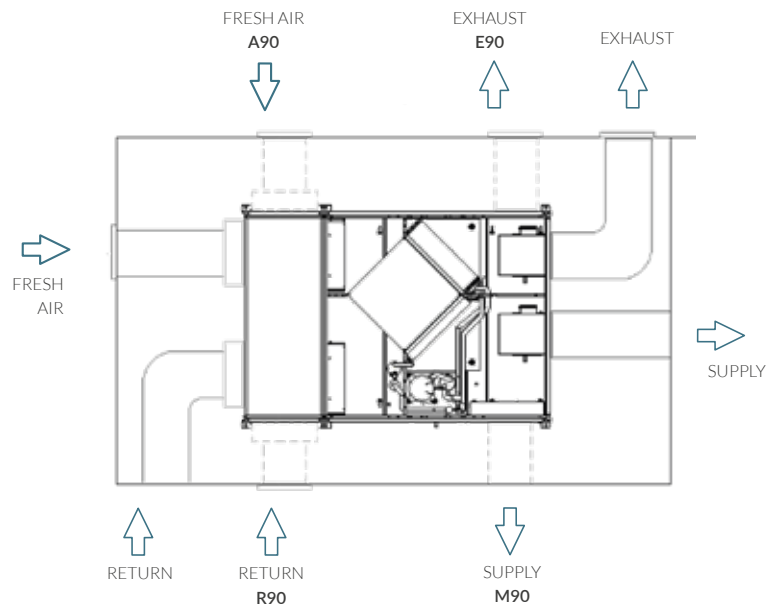
(3) with ventilation regulation signals and heat pump at the maximum permissible value

## POSSIBLE CONFIGURATIONS

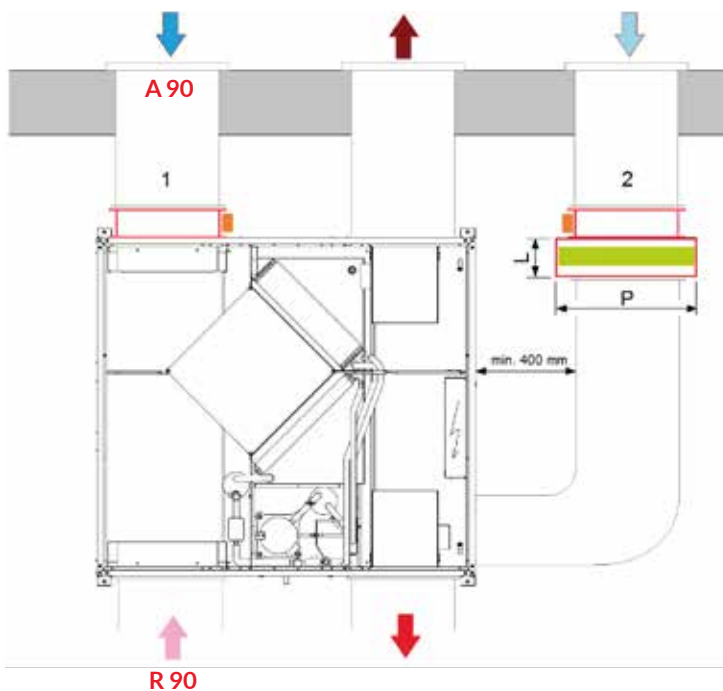
For each size, it is possible to adapt the fresh air and exhaust intakes to the system according to the configurations illustrated in the figure, even with unit already installed.

To change the position of the intakes simply exchange the filter panels with the corresponding panels.

The M90 configuration must necessarily be specified on the order as it involves exchanging the positions between the supply fan and the electrical panel, this operation that is not possible with the unit is already installed.



## BPL EXTERNAL BY-PASS SYSTEM



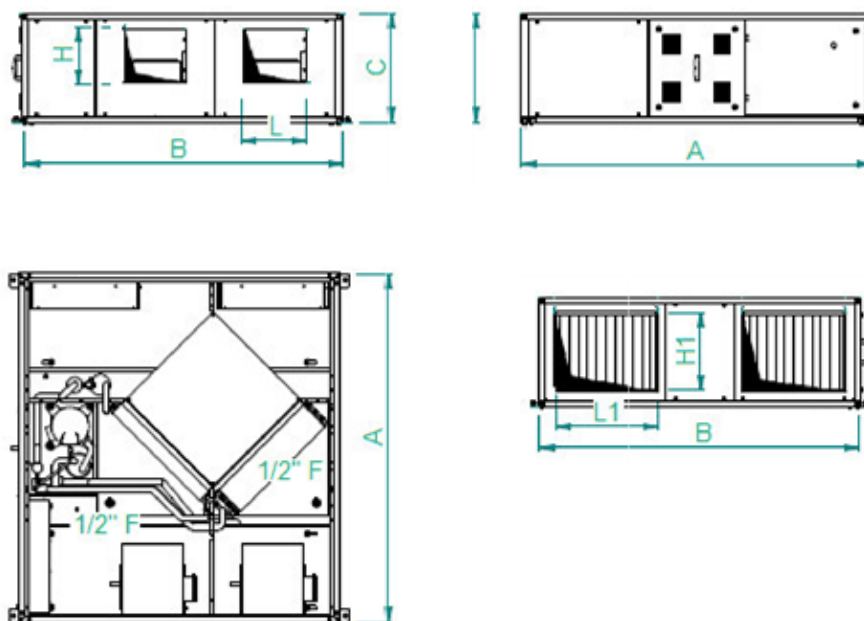
In figure : configuration is A90 and R90

A set of components installed (by the customer) outside the unit, required if the configuration of the unit is with M90 and E90 fans, able to create, commanded by the on-board electronics, an additional circuit of external air (free-cooling outdoor air) in direct communication with the supply fan. This kit consists of:

- Servomotor damper on the fresh air (1)
- Ducted module on free-cooling air duct with servomotor (opposed to the previous one) and an high efficiency filter extractable from below.

MODEL		5	13	24	36
L	mm	180	180	180	180
P	mm	350	420	580	640
H	mm	270	410	470	670
Weight	mm	3	5	8	10

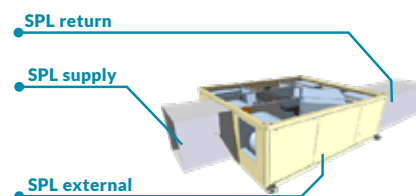
## DIMENSIONS AND WEIGHTS



RFH		5	13	24	36
A	mm	1390	1450	1700	1900
B	mm	1120	1230	1560	1700
C	mm	395	470	530	705
L	mm	162	235	303	335
H	mm	100	265	266	290
L1	mm	275	331	502	545
H1	mm	252	323	387	545
Weight	kg	165	240	275	425

## SOUND LEVELS

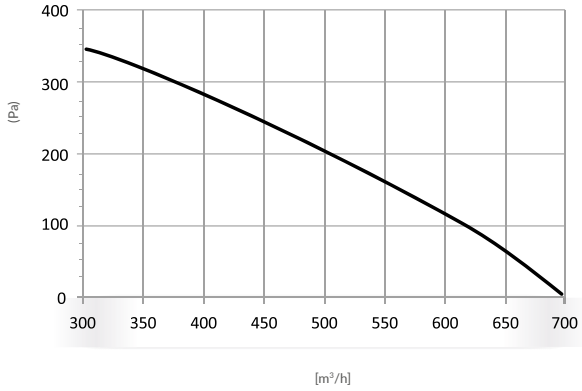
The table shows the sound power values (SWL) in octave band and the related results; the sound pressure values (SPL) at 1m, 5m and 10m in supply, in return and outside of the unit are also highlighted, under ducted unit conditions.



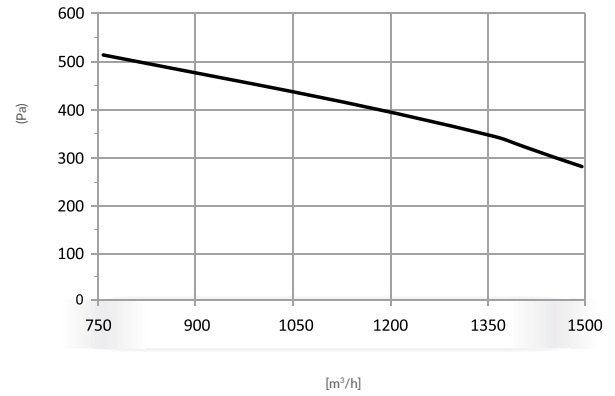
RFM	SWL [dB] IN OCTAVE BAND [HZ]								SWL		SPL SUPPLY			SPL RETURN			SPL EXTERNAL		
	63	125	250	500	1000	2000	4000	8000	dB	dB(A)	1 m	5 m	10 m	1 m	5 m	10 m	1 m	5 m	10 m
5	63	56	69	66	66	61	61	55	77	70	62	52	47	57	47	42	55	44	39
13	68	78	79	74	70	68	64	59	83	77	69	59	54	65	55	50	62	52	47
24	70	80	85	73	72	71	71	62	87	80	71	61	56	67	57	52	64	54	49
36	69	82	87	76	74	71	63	64	89	82	73	63	58	68	58	53	66	56	51

## PERFORMANCE

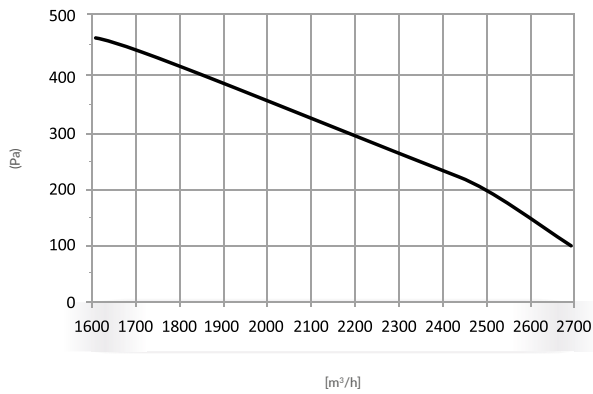
RFH 5



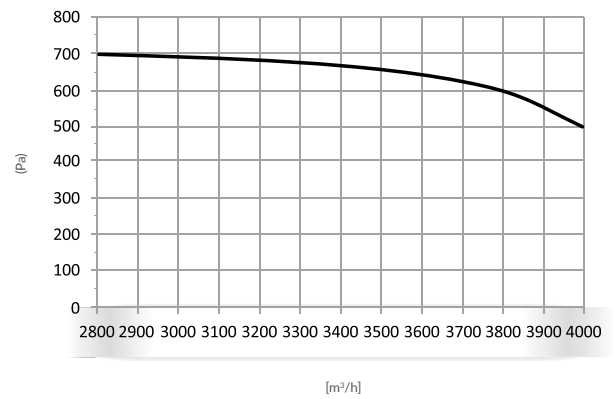
RFH 13



RFH 24



RFH 36



The graphs provide an indication of the useful static pressure (Pa) as the airflow [m³/h] supplied by the base inlet unit varies. Consult the technical bulletin to check the specific data of the unit's aerolic performance.