

# > RFA

## PACKAGED AIR CONDITIONERS AND HEAT PUMPS ROOF TOP FOR OUTDOOR INSTALLATION



### Available range

#### Unit type

PC Heat pump  
(reversible on the refrigerant side)

#### Constructive configurations

VB Base version  
V1 1 damper version  
V2 2 dampers version  
V2 3 dampers version

#### Acoustic setting up

AB Base setting up  
AS Low noise setting up

### Unit description

This series of packaged air conditioners and heat pumps (roof top) satisfies the cooling and heating requirements of medium and large buildings (commercial centres, supermarkets, cinemas, outlets, offices, canteens, restaurants ...)

All the units are suitable for outdoor installation and can be applied to plants realized with various type of air ducts.

Each model is available in various constructive configurations and can be equipped with a large range of accessories in order to fit the different installation requirements.

The region in contact with the treated air, easily accessible, is realized with perfectly washable metal surfaces, externally insulated in order to minimize the thermal losses and to avoid condensate generation both on the internal part and the external part of the structure.

The refrigerant circuit, contained in a compartment protected by the air flow to simplify the maintenance operations, is equipped with scroll compressors mounted on damper supports. Each compressor is placed on an independent refrigerant circuit in order to keep a constant ratio between the sensible cooling power and total cooling power also at partial loads and to guarantee a better treatment of the air besides a greater reliability.

Each refrigerant circuit is equipped with thermostatic expansion valves, reverse cycle valve, axial fans with safety protection grilles, finned coils made of copper pipes and aluminium louvered fins and high and low pressure switches.

All the units can be equipped with variable speed fans control that allows the units to operate with low outdoor temperatures in cooling and high outdoor temperature in heating and permits to reduce noise emissions in such operating conditions.

The low noise acoustic setting up (AS) is obtained, starting from the base setting up (AB), mounting sound jackets on the compressors and the technical compartment is clad with soundproofing material of suitable thickness.

All the units are supplied with an outdoor temperature sensor, already installed on the unit.

All the units are provided with a phase presence and correct sequence controller device.

All the units are accurately built and individually tested in the factory. Only electric, aerulic and hydraulic connections are required for installation.

### Options

#### Air flow position

- upwards / frontal
- downwards

#### Internal fan

- standard
- upsized
- reduced

#### Heating integration

- hot water coil  
(2 or 3 rows with pipes or 3 way valve)
- electrical heater coil  
(standard or upsized)
- condensing gas heating module  
(standard or upsized)

#### Air flow silencers

#### External fans control

- on-off control
- modulating control (condensation / evaporation control)

#### Enthalpic free cooling

#### Air quality control (CO<sub>2</sub>)

#### Special filters

- rigid pockets filters (F6 - F7 - F8 - F9)
- rigid pocket filters with active carbons

#### Filters differential pressure switch

#### Droplets separator

### Accessories

#### Spring vibration dampers

#### External coils protection grilles

#### High and low pressure gauges

#### Remote thermostat

#### Remote control

#### Modbus serial interface on RS485

#### Programmer clock

#### Phase sequence and voltage controller

#### Roof curb

**NOMINAL performances**

PC	Base setting up (AB)	35.1	45.1	55.1	70.2	90.2	110.2	140.2	180.2	220.2	
	Low noise setting up (AS)										
A35A27	Total cooling capacity	35,5	46,3	57,7	71,0	92,3	113	142	184	226	kW
	RST *	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	-
	Power input	10,9	14,0	17,7	22,5	28,8	36,6	46,6	59,5	73,7	kW
	EER	<b>3,26</b>	<b>3,31</b>	<b>3,26</b>	<b>3,16</b>	<b>3,20</b>	<b>3,09</b>	<b>3,05</b>	<b>3,09</b>	<b>3,07</b>	-
	Air flow rate plant side	6200	8100	10000	11000	14500	17000	22500	29000	35000	m <sup>3</sup> /h
	Available static head plant side	200	200	200	200	200	200	200	200	200	Pa
A7A20	Heating capacity	36,7	47,8	59,5	73,9	95,9	118	148	192	236	kW
	Power input	11,2	14,4	18,2	23,0	29,5	37,5	47,7	60,9	75,5	kW
	COP	<b>3,28</b>	<b>3,32</b>	<b>3,27</b>	<b>3,21</b>	<b>3,25</b>	<b>3,15</b>	<b>3,10</b>	<b>3,15</b>	<b>3,13</b>	-
	Air flow rate plant side	6200	8100	10000	11000	14500	17000	22500	29000	35000	m <sup>3</sup> /h
	Available static head plant side	200	200	200	200	200	200	200	200	200	Pa

Data declared according to EN 14511. The values are referred to units without options and accessories operating with 100% return air.

\* RST = ratio between sensible cooling capacity and total cooling capacity.

A35A27 = source : air in 35°C d.b. / plant : air in 27°C d.b. 19°C w.b.

A7A20 = source : air in 7°C d.b. 6°C w.b. / plant : air in 20°C d.b.

**Acoustic performances**

Base setting up (AB)	35.1	45.1	55.1	70.2	90.2	110.2	140.2	180.2	220.2	
Sound power level	84	85	85	87	87	88	90	92	93	dB(A)
Sound pressure level at 1 metre	67	67	68	69	69	70	71	73	74	dB(A)
Sound pressure level at 5 metres	58	58	59	60	61	61	63	65	66	dB(A)
Sound pressure level at 10 metres	53	53	54	55	56	56	58	60	61	dB(A)
Low noise setting up (AS)	35.1	45.1	55.1	70.2	90.2	110.2	140.2	180.2	220.2	
Sound power level	81	82	82	84	84	85	87	89	90	dB(A)
Sound pressure level at 1 metre	64	64	65	66	66	67	68	70	71	dB(A)
Sound pressure level at 5 metres	55	55	56	58	58	59	60	62	63	dB(A)
Sound pressure level at 10 metres	50	50	51	53	53	54	55	57	58	dB(A)

Performances referred to units with VB constructive configuration (base version) operating in cooling mode at NOMINAL conditions A35A27 with STANDARD air flow rate and available static head.

Unit placed in free field on reflecting surface (directional factor equal to 2) with air inlet and outlet connections ducted for 2 metres.

The sound power level is measured according to ISO 3744 standard.

The sound pressure level is calculated according to ISO 3744 and is referred to a distance of 1/5/10 metres from the external surface of the unit.

OPERATING LIMITS	Unit type	Cooling		Heating		
		min	max	min	max	
Outdoor air inlet temperature	PC	10	50	-10	22	°C
Return air inlet temperature	PC	15	37	5	22	°C

TECHNICAL DATA	35.1	45.1	55.1	70.2	90.2	110.2	140.2	180.2	220.2	
Power supply	400 - 3N - 50	400 - 3N - 50	400 - 3N - 50	400 - 3N - 50	400 - 3N - 50	400 - 3N - 50	400 - 3N - 50	400 - 3N - 50	400 - 3N - 50	V-ph-Hz
Compressor type	scroll	scroll	scroll	scroll	scroll	scroll	scroll	scroll	scroll	-
N° compressors / N° refrigerant circuits	1 / 1	1 / 1	1 / 1	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	2 / 2	n°
Plant side heat exchanger type	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	-
Source side heat exchanger type	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	finned coil	-
External fans type	axial	axial	axial	axial	axial	axial	axial	axial	axial	-
N° external fans	2	2	2	4	4	4	4	4	4	n°
Internal fans type	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	centrifugal	-
N° internal fans	2	2	2	2	2	2	2	2	2	n°

HEATING INTEGRATION		35.1	45.1	55.1	70.2	90.2	110.2	140.2	180.2	220.2	
Electrical heater coil	standard	9,0	9,0	9,0	18,0	18,0	18,0	36,0	36,0	36,0	kW
	upsized	18,0	18,0	18,0	31,5	31,5	31,5	63,0	63,0	63,0	kW
Condensing gas heating module	standard	44,8	44,8	44,8	93,4	93,4	93,4	186,8	186,8	186,8	kw
	upsized	54,0	54,0	54,0	145,0	145,0	145,0	290,0	290,0	290,0	kW

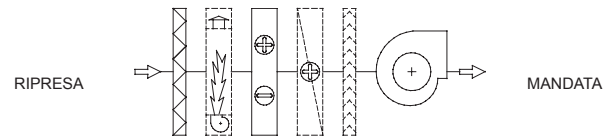
## CONSTRUCTIVE CONFIGURATIONS

Each model can be supplied in different constructive configurations in order to satisfy the application requirements that can be necessary for the plants. The various versions, obtained adding to the base version some modules, are always supplied already assembled, wired and tested in the factory. All the versions can be arranged with standard air flow position (frontal for the models of frame 1 and 2 and upwards for the models of frame 3) or with downwards air flow position. The dotted components are accessories.

### VB - Base version

It only allows to operate with all return air. It contains the standard filtering section and the air-refrigerant exchange coil that allows the heating, cooling and dehumidification processes to be performed.

It is possible to add a further heating section (hot water coil or electrical heater coil) and the droplets separator. Instead of such heating section it is possible to add a gas heating module, placed between the filtering section and the air-refrigerant exchange coil.

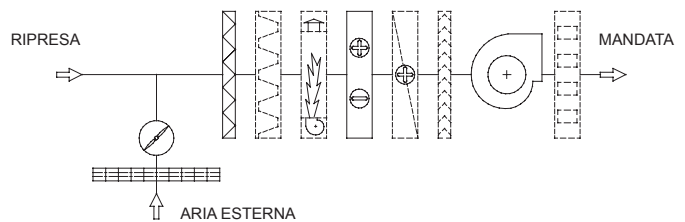


### V1 - 1 damper version

It allows to operate with a percentage of outdoor fresh air, adjustable manually setting the damper placed on the adding module. The outdoor air inlet is equipped with a rain protection cap and a metal safety grille. The expulsion from the conditioned ambient of an air flow rate equal to the outdoor fresh air flow rate must be realized independently from the unit by means of overpressure openings or other extraction devices. In the adding module can be placed various type of special filters in order to complete the standard filtering section.

Also in this version it is possible to add a further heating section (hot water coil or electrical heater coil) and the droplets separator.

Instead of such heating section it is possible to add a gas heating module, placed between the filtering section and the air-refrigerant exchange coil. Downstream the internal fans, air flow silencers can be installed to reduce the noise transmitted to the conditioned ambients through the air ducts (only for the models of frame 1 and 2).



### V2 - 2 dampers version

The presence of two motorized dampers managed by the controller of the unit allows to operate with a minimum percentage of outdoor fresh air (adjustable through the user interface) and to perform thermal free cooling.

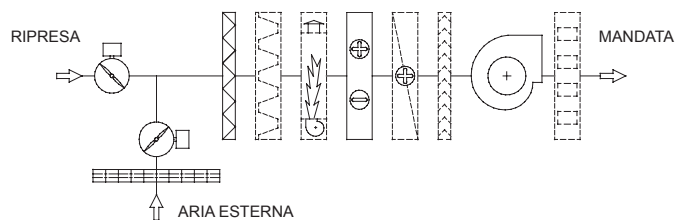
The outdoor air inlet, equipped with a rain protection cap and a metal safety grille, is designed for 100% of the total air flow rate and allows to operate in free cooling with all outdoor air.

The expulsion from the conditioned ambient of an air flow rate equal to the outdoor fresh air flow rate must be realized independently from the unit by means of overpressure openings or other extraction devices.

In the adding module can be placed various type of special filters in order to complete the standard filtering section.

It is possible to add a further heating section (hot water coil or electrical heater coil) and the droplets separator. Instead of such heating section it is possible to add a gas heating module, placed between the filtering section and the air-refrigerant exchange coil.

It is also possible to perform enthalpic free cooling by means of the installation of the humidity sensors. Downstream the internal fans, air flow silencers can be installed to reduce the noise transmitted to the conditioned ambients through the air ducts (only for the models of frame 1 and 2).



### V3 - 3 dampers version

The presence of three motorized dampers managed by the controller of the unit allows to operate with a minimum percentage of outdoor fresh air (adjustable through the user interface), to perform thermal free cooling and to manage the air expulsion.

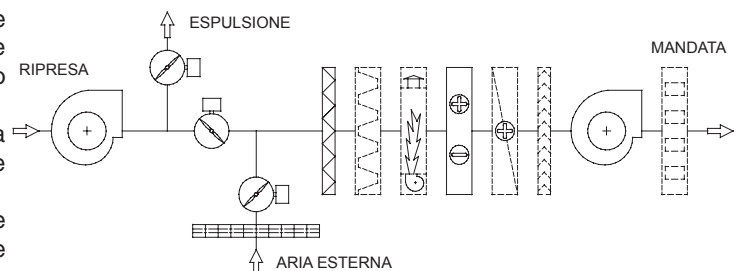
The outdoor air inlet, equipped with a rain protection cap and a metal safety grille, is designed for 100% of the total air flow rate and allows to operate in free cooling with all outdoor air.

The expulsion from the conditioned ambient of an air flow rate equal to the outdoor fresh air flow rate is realized through the return air fan and the expulsion damper placed inside the unit.

In the adding module can be placed various type of special filters in order to complete the standard filtering section.

Also in this version it is possible to add a further heating section (hot water coil or electrical heater coil) and the droplets separator. Instead of such heating section it is possible to add a gas heating module, placed between the filtering section and the air-refrigerant exchange coil. It is also possible to perform enthalpic free cooling by means of the installation of the humidity sensors.

Downstream the internal fans, air flow silencers can be installed to reduce the noise transmitted to the conditioned ambients through the air ducts (only for the models of frame 1 and 2).



## CONTROL SYSTEM

The unit is managed by a microprocessor controller to which, through a board placed inside the electrical panel, all the electrical loads and the control devices are connected. The user interface, accessible removing the protection panel of the electrical board, is realized by a display and two buttons that allow to view and, if necessary, modify all the operating parameters of the unit.

Are available, as accessories, a remote control, that reports all the functionalities of the user interface placed on the unit, or a remote thermostat.

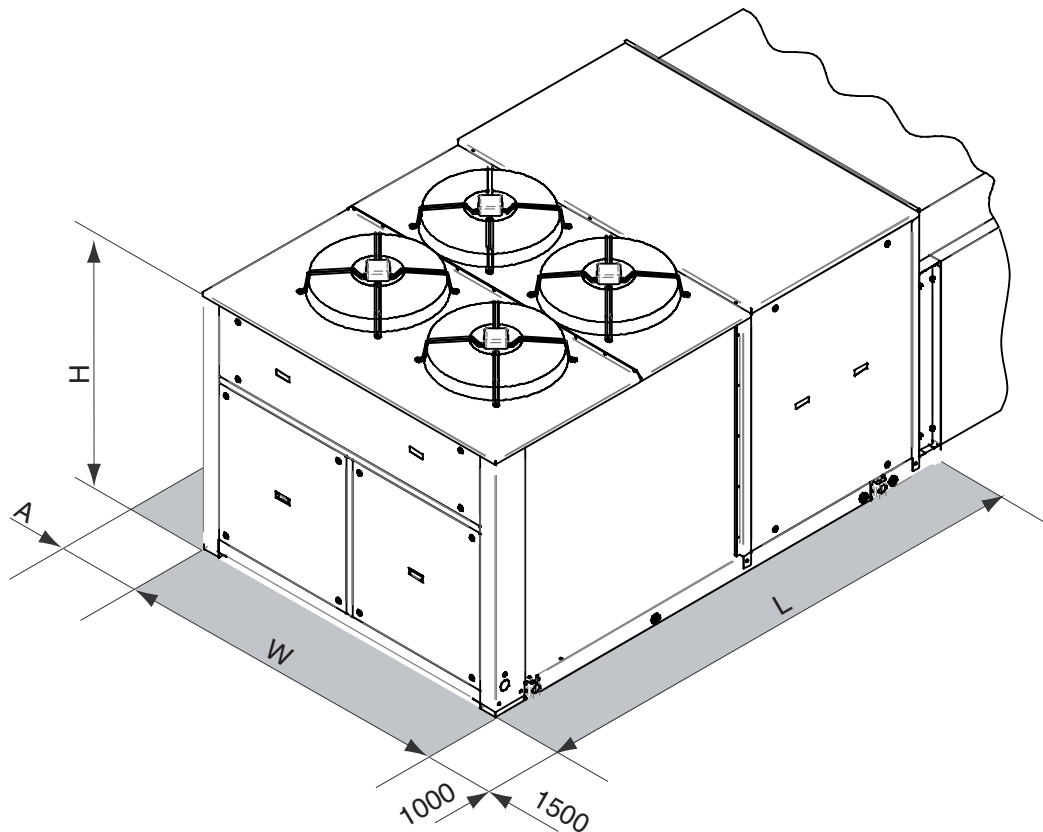
The main functions available are :

- treated air temperature management (through set point adjustment)
- treated air humidity management (only with enthalpic free cooling option)
- treated air quality management (CO<sub>2</sub>)
- thermal or enthalpic (option) free cooling
- external fan management by means of continuous rotational speed control (option)
- internal fan management
- return air fan management

- integrative heating sources management (electrical heater coil, hot water coil, gas heating module)
- defrost cycle management
- dampers management (outdoor air, return air and expulsion air)
- compressor and internal fan operating hours recording
- serial communication through Modbus protocol
- remote on-off
- remote cooling-heating
- active alarms visualization
- general alarm digital output



## DIMENSIONS AND MINIMUM OPERATING AREA



		35.1	45.1	55.1	70.2	90.2	110.2	140.2	180.2	220.2	
L	VB	2900	2900	2900	3100	3100	3100	3900	3900	3900	mm
	VB with gas heating module	3830	3830	3830	4300	4300	4300	5100	5100	5100	mm
	V1 e V2	4000	4000	4000	4200	4200	4200	5000	5000	5000	mm
	V1 e V2 with gas heating module	4930	4930	4930	5400	5400	5400	6200	6200	6200	mm
	V3	4800	4800	4800	5000	5000	5000	6600	6600	6600	mm
	V3 with gas heating module	5730	5730	5730	6200	6200	6200	7800	7800	7800	mm
W		1400	1400	1400	2000	2000	2000	2200	2200	2200	mm
H		1600	1600	1600	1600	1600	1600	2350	2350	2350	mm
A		1000	1000	1000	1500	1500	1500	1500	1500	1500	mm