

RTX 09-16

Roof-Top for applications in medium crowd

Cooling capacity 50 ÷ 135 kW
Heating capacity 49 ÷ 141 kW

- For medium crowding applications
- Upgraded thermodynamic heat recovery
- Handling section with plug fan coupled with BRUSHLESS EC motors
- Free-cooling / enthalpic free-cooling / photocatalytic system option



DESCRIPTION

Independent Roof-top type air cooled air conditioner, for treatment, filtration and renewal of the air, based on the chosen configuration. RTX 09-16 units are designed for medium crowding applications, like shopping malls, shops, offices, production areas being designed for operation with 30% external and expelled air (version MB3). The unit based on the version and selected accessories allows the management of the free-cooling operation, and can be equipped with a recuperator to recover the energy contained in the exhaust air allowing higher performances and efficiencies.

VERSIONS

- F Cooling only
- H Heat pump.

FEATURES

Refrigerant circuit

functioning with R410A refrigerant, consisting of scroll compressors in "uneven" tandem configuration (except for sizes 09, 10 and 14) to ensure maximum energy savings at partial loads and better adaptability to system demands, providing only the energy actually needed. The compressors are equipped with electric resistances on the guards and thermal protection on the exhaust. The compressor compartment is isolated from the air flow.

Ventilation

The air treatment cross-section ventilation, which represents the highest expense in terms of machine operating costs, is entrusted to the plug fans with EC brushless motors which enable high performance, easy flow rate adjustment, compactness, low noise, versatility and easy maintenance. Furthermore, a special adaptive logic allows you to adjust the air flow rate to actual system demand with further advantages in terms of consumption reduction.

Axial fans

The axial fans, located in the condensing section of the unit, are the helical type, statically and dynamically balanced, protected electrically and mechanically by grids. Electronic condensation control is optional in F

versions and condensation and evaporation during winter functioning in H versions. The fans are also available with electronically controlled (EC) permanent magnet synchronous motor.

Exchangers

The internal and external heat exchangers are finned pack direct expansion, made with copper pipes arranged in staggered rows and mechanically expanded to better adhere to the collar of the louvers. The louvers are made of aluminium with a special corrugated surfaces, suitably spaced to ensure maximum heat exchange yield.

Air filtration

Entrusted to a filter with 55% Coarse efficiency (according to EN ISO 16890) on the fresh air flow. Also available: compact filter with ePM1 50% efficiency or ePM1 80% efficiency (according to EN ISO 16890) and electronic filter on fresh air flow. Positioning upstream of the components to be protected to ensure low pressure drops, having a large surface. Air quality control systems are also available (VOC and CO2 probe).

Cleaning system with photocatalytic lamp

The Photocatalytic Oxidation technology generates natural oxidising ions capable of attracting and destroying the pollutants present in the air and on surfaces, by means of the combined action of UV rays with a catalyst structure composed of a four-metal alloy, mainly consisting of TiO₂ (titanium dioxide).

Thermoregulation

Electronic controller able to manage the different functioning modes, ensuring maximum energy savings in all conditions of use by means of special software. Interfaces to connect to remote supervision and control systems available as options. The electrical panel complete with all devices is easily accessible.

The free-cooling/heating and defrosting logics are particularly sophisticated. As soon as the external conditions allow it, the unit is able to automatically activate the free-cooling or free-heating mode, which cools or heats the served room, while keeping the compressors off and introducing suitably treated external air. This mode significantly reduces both energy consumption and wear of the compressors. These func-

tions are also used when the external air energy content is not enough

CONFIGURATIONS

MB1: Single ventilating cross-section for recovery air.

Recovery air only configuration where no fresh air is required. The useful flow and recovery static pressure is provided by the flow ventilating cross-section.

MB2: Single ventilating cross-section for recovery and external air.

Recovery and external air configuration. The useful flow and recovery static pressure is provided by the flow ventilating cross-section. The presence of the recirculation damper (optional) allows for total free-cooling (100% external air). If there are no extraction systems, the room will be in overpressure.

MB3: double ventilating cross-section (flow and return) for recovery air, external air and exhaust air, thermodynamic recovery.

Recovery, external and exhaust air configuration. The flow ventilating cross-section provides the useful flow static pressure while the recovery ventilating cross-section provides the useful recovery static pressure. The double flow and recovery ventilating cross-section allows for total freecooling (100% external air) without the need for a dedicated extraction system. The room overpressure or depression can be obtained by unbalancing the flow rates.

to cool or heat the room. In this case, the thermal cooling capacity is integrated by the compressors.

Thermodynamic recovery is performed by conveying expelled air on the external heat exchanger.

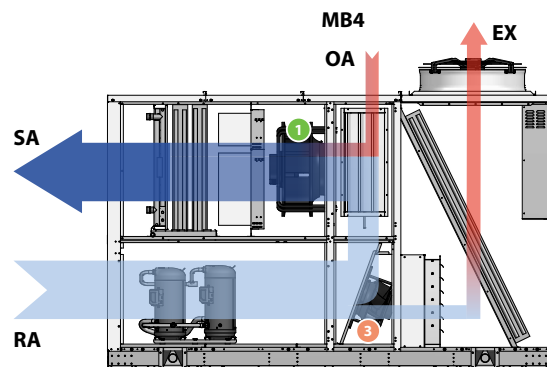
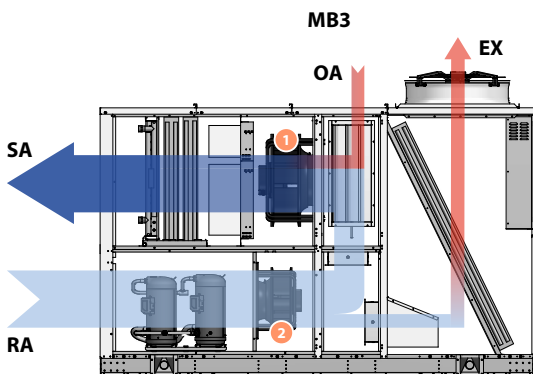
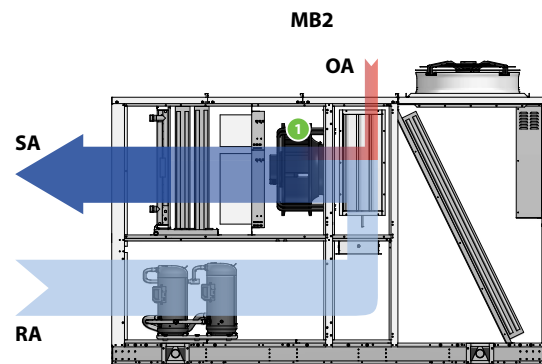
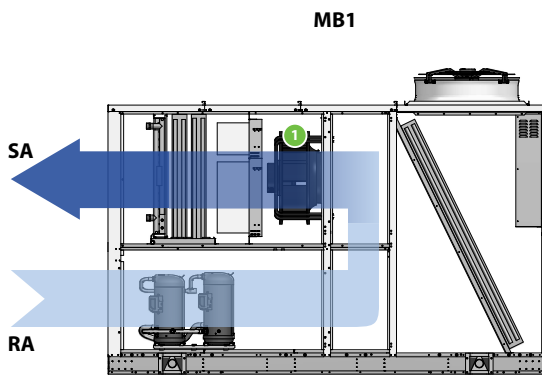
MB4: double ventilating cross-section (flow and expulsion) for recovery air, external air and exhaust air, thermodynamic recovery.

Recovery, external and exhaust air configuration. The flow ventilating cross-section provides the flow and recovery useful static pressure. The exhaust ventilating cross-section only controls the air flow rate to be expelled, with consequent reduction of the installed ventilation power. The double flow and exhaust ventilating cross-section allows for partial free-cooling.

As for the MB3 version, it has the thermodynamic recovery function.

Advantages of thermodynamic recovery (MB3 - MB4 version):

- Energy recovery from the exhaust air flow that would otherwise be lost
- No further components are introduced and, therefore, there are no additional pressure drops
- Cooling circuit functioning with heat sources at more advantageous temperatures
- Reduction of defrosting cycles
- Increase in thermal and cooling efficiency
- Efficiency increase (EER/COP)



SA supply air
RA fresh air
OA fresh air
EX Exhaust air

- 1 Delivery fan
- 2 Return fan
- 3 Expulsion fan

MBT: DOUBLE VENTILATING CROSS-SECTION (FLOW AND EXPULSION) FOR RECOVERY AIR, EXTERNAL AIR AND EXHAUST AIR, UPGRADED THERMODYNAMIC RECOVERY.

Recovery, external and exhaust air configuration. The flow ventilating cross-section provides the flow and recovery useful static pressure. The exhaust ventilating cross-section only controls the air flow rate to be expelled, with consequent reduction of the installed ventilation power.

The double flow and exhaust ventilating cross-section allows for partial free-cooling.

The MBT configuration allows for the upgraded thermodynamic recovery on the exhaust air by fully exploiting the energy content still present in it. The exhaust flow rate, controlled by the dedicated exhaust fan,

is conveyed to the innovative finned pack recovery coil, integrated in the cooling circuit of the unit.

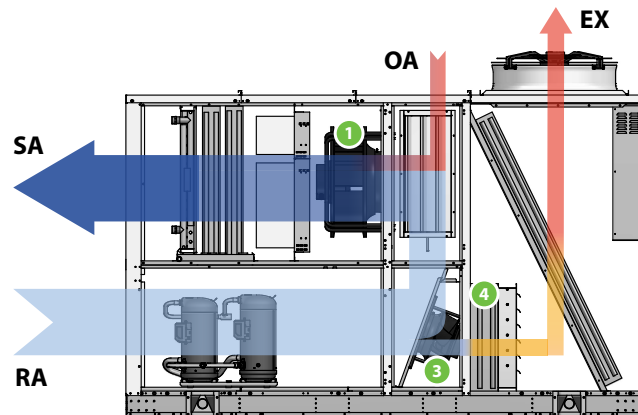
The coil, perfectly hit by the air flow, recovers the energy still present in the exhaust flow and transfer it to the cooling circuit, increasing the treatment coil performance without increasing the input power of the compressors.

In summer functioning, the coil makes it possible to increase the liquid subcooling, while in winter functioning, the coil takes on part of the evaporation by operating the cooling circuit at more advantageous temperatures.

Advantages of upgraded thermodynamic recovery (MBT version):

- High heat exchange efficiency thanks to the dedicated recovery coil
- Further increase in unit cooling and heating capacity
- Further increase in unit efficiency (EER/COP)

- Reduced additional air side pressure drops (expelled air side only)
- The unit remains compact
- In heating functioning, the defrost cycles are further reduced due to the increase in evaporation temperature. The result is an increase in efficiency and greater room comfort.
- Compared to traditional passive recuperators, in heating functioning it allows for exhaust air recovery even with low temperature difference between external and indoor air (mild winters)
- Compared to traditional passive recuperators, in cooling functioning it allows for exhaust air recovery even with low temperature difference between external and indoor air (continental and temperate climate)
- The presence of the dedicated coil determines the recovery efficiency that can be used in the energy certification calculations.



- SA** supply air
- RA** fresh air
- OA** fresh air
- EX** Exhaust air

- 1 Delivery fan
- 2 Return fan
- 3 Expulsion fan
- 4 Dedicated thermodynamic recovery coil

ACCESSORIES

- AXEC:** Axial fans with EC motors with speed control function according to the pressure of condensation and evaporation.
- AXECP:** EC axial fans with available useful static pressure.
- BAC:** Interface card BACnet MS/TP pConet.
- BE:** Electric heating coil 2 stages.
- BEM:** Modulating electric heating coil.
- BIP:** Interface card Ethernet-pCOWeb (BACNET IP)
- BPGC:** After heating coil with hot gas.
- BW:** 2-rows-heating coil with hot water.
- BWV2V:** 2 -rows -heating coil with hot water, with 2-way modulating valve.
- BWV3V:** 2-rows heating coil with hot water, with 3-way modulating valve.
- CA:** Waterproof covers on external air intake.
- CF:** Flue, only on unit with gas burner module.
- CUR:** Humidification control (humidity probe in recovery, limit humidity probe in supply, contact ON/OFF and modulating analog output).
- DCPR:** AC fans with pressure switch device of speed control function of the pressure of condensation and evaporation.
- DP:** Dehumidification control (humidity probe in recovery) and of after-heating (if present).
- FCT:** Partial Temperature Free-Cooling for MB2, MB4 versions.
- FT7:** F7 efficiency pocket filters positioned on the supply air flow.
- FT9:** Pocket filters F9 efficiency placed on the flow of supply air.
- FTE:** Electronic filters placed on the flow of supply air.
- FTH:** Enthalpy free-cooling.
- GP:** External coil protection grid.
- Gx:** Heating module with gas burner.
- LFX:** Device with photocatalytic effect.
- LW:** Interface card LonWorks.
- MAN:** High and low pressure gauges.
- MSSM:** Flow silencer module, only for rear flow.

- MSSR:** Recovery silencer module, only for rear air recovery.
- PRT1:** Wall/recessed (up to 50 m) remote control panel.
- PRT2:** Wall/recessed (up to 200 m) remote control panel.
- PSFT:** Differential pressure switch signalling dirty filters.
- PSTEP:** Adjusting constant flow, step flow in function of the modulation of the cooling circuit.
- RF:** Smoke detector.
- RFC:** Smoke detector and damper management.
- RS:** Serial card BMS RS485.
- SCM:** Modulating servo-controls (standard on MB3 model or if temperature or enthalpic free-cooling is present).
- SCMRM:** Modulating Servo-control with spring return.
- SCO2:** Probe CO2 (not available on MB1 fittings).
- STA:** Room temperature probe
- SUA:** Room humidity probe.
- SVOC:** Probe VOC (not available on MB1 fittings).
- UP:** Manufacturer of immersed electrodes supplied and steam ramp installed.
- VT:** Antivibration mounts.

PERFORMANCE SPECIFICATIONS

MB1

Size		09	10	11	12	13	14	15	16
Configuration: MB1									
Cooling performances (1)									
Cooling capacity	kW	50,00	60,10	68,60	81,00	93,40	103,50	114,00	125,30
Sensible cooling capacity	kW	40,10	46,10	52,70	63,20	70,90	81,80	89,30	97,10
Compressors absorbed power	kW	11,90	14,40	18,80	17,90	23,10	25,60	30,50	35,50
EER compressors		4,20	4,17	3,65	4,53	4,04	4,04	3,74	3,53
Heating performances (2)									
Heating capacity	kW	49,40	61,10	69,30	80,60	93,70	102,20	113,70	126,60
Compressors absorbed power	kW	9,80	12,20	15,50	15,70	20,60	21,00	24,40	28,40
Compressor COP		5,04	5,01	4,47	5,13	4,55	4,87	4,66	4,46

(1) Ambient air 27°C d.b./19°C w.b.; External air 35°C/24°C w.b.; Functioning with 30% of external and expelled air.

(2) Ambient air 20°C D.B./15°C W.B.; Outside air 7°C D.B./6°C W.B. (EN14511); Operation with 30% outside and expelled air.

MB2

Size		09	10	11	12	13	14	15	16
Configuration: MB2									
Cooling performances (1)									
Cooling capacity	kW	52,90	63,30	72,30	85,30	98,40	108,80	120,10	131,60
Sensible cooling capacity	kW	42,70	48,80	55,90	67,10	75,00	86,70	94,80	102,80
Compressors absorbed power	kW	12,10	14,60	19,00	18,10	23,30	25,90	30,90	35,90
EER compressors		4,37	4,34	3,81	4,71	4,22	4,20	3,89	3,67
Heating performances (2)									
Heating capacity	kW	50,50	61,90	70,60	82,20	94,90	103,60	115,30	128,10
Compressors absorbed power	kW	9,00	11,20	14,10	14,30	18,90	19,20	22,50	26,00
Compressor COP		5,61	5,53	5,01	5,75	5,02	5,40	5,12	4,93

(1) Ambient air 27°C d.b./19°C w.b.; External air 35°C/24°C w.b.; Functioning with 30% of external and expelled air.

(2) Ambient air 20°C D.B./15°C W.B.; Outside air 7°C D.B./6°C W.B. (EN14511); Operation with 30% outside and expelled air.

MB3

Size		09	10	11	12	13	14	15	16
Configuration: MB3									
Cooling performances (1)									
Cooling capacity	kW	53,40	63,70	73,10	86,10	99,30	110,00	121,30	133,30
Sensible cooling capacity	kW	43,00	48,90	56,20	67,40	75,30	87,00	95,10	103,20
Compressors absorbed power	kW	11,80	14,20	18,50	17,70	22,80	25,10	30,10	34,80
EER compressors		4,53	4,49	3,95	4,86	4,36	4,38	4,03	3,83
Heating performances (2)									
Heating capacity	kW	52,10	64,10	74,10	85,00	98,60	107,80	120,60	134,30
Compressors absorbed power	kW	9,20	11,40	14,40	14,60	19,10	19,40	22,90	26,70
Compressor COP		5,66	5,62	5,15	5,82	5,16	5,56	5,27	5,03

(1) Ambient air 27°C d.b./19°C w.b.; External air 35°C/24°C w.b.; Functioning with 30% of external and expelled air.

(2) Ambient air 20°C D.B./15°C W.B.; Outside air 7°C D.B./6°C W.B. (EN14511); Operation with 30% outside and expelled air.

MB4

Size		09	10	11	12	13	14	15	16
Configuration: MB4									
Cooling performances (1)									
Cooling capacity	kW	53,40	63,70	73,10	86,10	99,30	110,00	121,30	133,30
Sensible cooling capacity	kW	43,00	48,90	56,20	67,40	75,30	87,00	95,10	103,20
Compressors absorbed power	kW	11,80	14,20	18,50	17,70	22,80	25,10	30,10	34,80
EER compressors		4,53	4,49	3,95	4,86	4,36	4,38	4,03	3,83
Heating performances (2)									
Heating capacity	kW	52,10	64,10	74,10	85,00	98,60	107,80	120,60	134,30
Compressors absorbed power	kW	9,20	11,40	14,40	14,60	19,10	19,40	22,90	26,70
Compressor COP		5,66	5,62	5,15	5,82	5,16	5,56	5,27	5,03

(1) Ambient air 27°C d.b./19°C w.b.; External air 35°C/24°C w.b.; Functioning with 30% of external and expelled air.

(2) Ambient air 20°C D.B./15°C W.B.; Outside air 7°C D.B./6°C W.B. (EN14511); Operation with 30% outside and expelled air.

MBT

Size		09	10	11	12	13	14	15	16
Configuration: MBT									
Cooling performances (1)									
Cooling capacity	kW	57,10	67,80	78,00	90,50	103,70	116,90	128,80	140,60
Sensible cooling capacity	kW	46,60	53,00	61,20	71,90	79,70	94,00	102,60	110,60
Compressors absorbed power	kW	11,80	14,20	18,50	17,70	22,80	25,10	30,10	34,80
EER compressors		4,84	4,77	4,22	5,11	4,55	4,66	4,28	4,04
Heating performances (2)									
Heating capacity	kW	55,40	68,00	78,30	90,10	103,60	114,40	127,50	141,40
Compressors absorbed power	kW	9,20	11,40	14,40	14,60	19,10	19,40	22,90	26,70
Compressor COP		6,02	5,96	5,44	6,17	5,42	5,90	5,57	5,30
Recovery efficiency	%	84%	92%	87%	90%	85%	85%	82%	78%

(1) Ambient air 27°C d.b./19°C w.b.; External air 35°C/24°C w.b.; Functioning with 30% of external and expelled air.
(2) Ambient air 20°C D.B./15°C W.B.; Outside air 7°C D.B./6°C W.B. (EN14511); Operation with 30% outside and expelled air.

ENERGY INDEX

Size			09	10	11	12	13	14	15	16
Energy index										
SEER	H	W/W	4,24	3,94	3,76	3,92	3,89	4,22	4,10	4,05
η_{sc}	H	%	166.6%	154.5%	147.2%	153.9%	152.7%	165.7%	161.1%	159.1%
Pdesignh	H	kW	29	34	38	46	52	57	62	71
SCOP	H		3,59	3,50	3,30	3,27	3,22	3,47	3,41	3,38
η_{sh}	H	%	140.5%	137.0%	128.8%	127.7%	126.0%	135.9%	133.5%	132.3%

GENERAL TECHNICAL DATA

Size			09	10	11	12	13	14	15	16
Power supply										
Power supply	H		400V~3 50Hz	400V~3 50Hz	400V~3 50Hz	400V~3 50Hz	400V~3 50Hz	400V~3 50Hz	400V~3 50Hz	400V~3 50Hz
Compressor										
Type	H	type	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Number	H	no.	2	2	2	2	2	2	2	2
Circuits	H	no.	1	1	1	1	1	1	1	1
Refrigerant	H	type	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Partialisation step	H	no.	2	2	3	3	3	2	3	3

FANS**External fans**

Size			09	10	11	12	13	14	15	16
Configuration: MB1, MB2, MB3, MB4, MBT										
External fans										
Type	H	type	Assiali AC	Assiali AC	Assiali AC	Assiali AC	Assiali AC	Assiali AC	Assiali AC	Assiali AC
Number	H	no.	2	2	2	2	2	2	2	2

Internal fans MB1-MB2-MB3-MB4-MBT

Size			09	10	11	12	13	14	15	16
Configuration: MB1, MB2, MB3, MB4, MBT										
Internal fans										
Nominal air flow rate	H	m ³ /h	9500	11000	13000	15000	17000	20000	22000	24000
Minimum air flow rate	H	m ³ /h	6650	7700	9100	10850	12600	14000	15400	16800
Maximum air flow rate	H	m ³ /h	9500	11000	13000	15500	18000	20000	22000	24000

Internal recovery fans

Size			09	10	11	12	13	14	15	16
Configuration: MB3										
Recovery										
Type	H	type	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC
Number	H	no.	1	1	1	2	2	2	2	2

Expulsion fan MB4-MBT

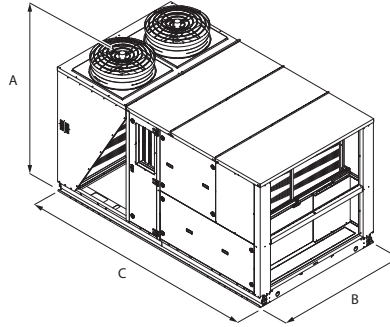
Size			09	10	11	12	13	14	15	16
Configuration: MBT										
Exhaust										
Type	H	type	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC
Number	H	no.	1	1	1	2	2	2	2	2

Internal flow fans

Size			09	10	11	12	13	14	15	16
Configuration: MB1, MB2, MB3, MB4, MBT										
Delivery										
Type	H	type	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC	RAD EC
Number	H	no.	1	1	1	2	2	2	2	2
Maximum useful head (1)	H	Pa	770	510	445	555	740	640	525	675
High static pressure (EN14511) (1)	H	Pa	200	200	200	200	250	250	250	300

(1) At the nominal/maximum flow rate with a new, clean air filter.

DIMENSIONS



Size			09	10	11	12	13	14	15	16
Dimensions and weights										
A	H	mm	2061	2061	2061	2373	2373	2440	2440	2440
B	H	mm	1900	1900	1900	2100	2100	2200	2200	2200
C	H	mm	3400	3400	3400	3400	3400	4000	4000	4000

Aermec reserves the right to make any modifications deemed necessary.
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