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SERVICES

INDUSTRY



**Rooftop air conditioning**

**HRT**

**Stand-alone, monobloc and with heat pump**

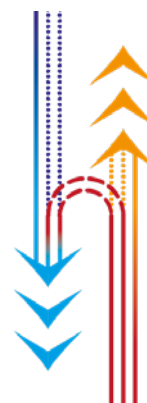


HRT RoofTop is a plug & play air/air monobloc air conditioner, suitable for controlling all climate parameters in medium to heavily crowded environments (cinemas, theatres, shopping malls, etc.) for maximum comfort and energy efficiency. HRT also complies with Regulation (EU) 2016/2281 - ERP 2021 and meets, for Italy, the technical requirements for access to tax deductions for the energy requalification of buildings - Ecobonus, Decree of 6 August 2020 (Annex F), except for size HRT062HO.

## Main advantages

### Rotary or cross-flow heat recovery

The system ensures more favourable outside air intake conditions for the thermodynamic cycle, expanding its field of application and improving energy performance.

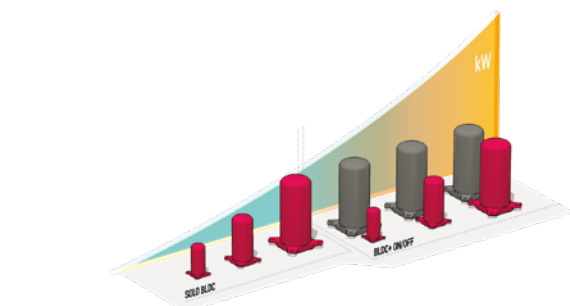


### Outstanding configurability for air delivery and return

The unit has air delivery and return connections on both the base and sides of the machine, to meet all system requirements and ensure maximum configurability.

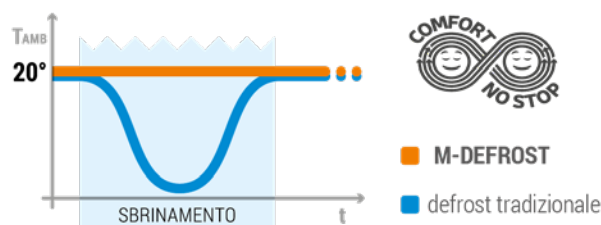
### Jonix system for air purification

On request, the unit can be equipped with the Jonix air purification system which, using Non Thermal Plasma (NTP) technology, reduces the bacterial load of air and makes it completely odourless.



### BLDC and on/off compressors join forces for maximised energy savings

The efficiency of on/off compressors at their rated operating point, integrated with BLDC compressors at partial loads, results in maximised energy efficiency.



### “M-Defrost” system

Innovative defrosting technology using the thermal inertia of the controlled user to reduce system downtime and ensure high levels of comfort.

## Technological components



### Multi-protocol communication interface

HiRef units can be integrated with the customer's external supervision Building Management System (BMS), using the most popular communication protocols, including Modbus RTU, Modbus/IP, BacNet, LonWorks, SNMP.



### Scroll compressors

Scroll compressors include a mobile scroll, driven by the motor, which completes orbital revolutions and a fixed scroll that is coupled to it. The orbital motion creates a series of gas pockets that move from one scroll to the other. When moving closer to the centre of the scroll, where exhaust takes place, the gas is compressed to smaller and smaller volumes until the desired delivery pressure is reached. Scroll technology improves volumetric efficiency and flow continuity, reduces noise and leakage and eliminates harmful volumes and downtime.



### EC Radial Fans

Radial or centrifugal fans are characterised by backward blades. Air is taken in the axial direction, parallel to the rotation axis and delivered radially, perpendicular to the rotation axis. This type of fan does not require an external screw, has a high head and is suitable for use in indoor units where the air is often ducted and recirculated. They are driven by electronically commutated (EC) brushless permanent-magnet (BLDC) synchronous motors. The use of these motors reduces unit consumption, noise and footprint, improves the efficiency and life cycle of the system through accurate control of speed and acceleration, resulting in less heat dissipation. In addition, inrush currents and sparks are eliminated.



### Axial fans

In axial fans air moves in a parallel direction to the rotation axis and allows large air flows to be processed. Thanks to their low head compared to radial fans, they are used on remote condensers and on components with free outlet into the atmosphere, where there are no high pressure drops due, for example, to ducting.



### Inverter driven compressors

Inverter-driven compressors allow compressor rotation speed and efficiency to be controlled, by modulating the frequency and the supply voltage of the motor. They are driven by electronically commutated (EC) brushless permanent-magnet (BLDC) synchronous motors. The use of these motors reduces unit consumption, noise and footprint, improves the efficiency and life cycle of the system through accurate control of speed and acceleration, resulting in less heat dissipation. In addition, inrush currents and sparks are eliminated.



### Modulating hot gas post-heating

Post-heating by modulating hot gas controls the air temperature through the action of an additional coil, powered by the gas delivered by the compressor and partially bypassed by the condenser towards the coil. Unlike the On/Off version, the flow of hot gas is controlled by a diverter valve, which accurately regulates the flow rate required for post-heating. This option is only available for direct expansion units.



### Corrosion resistant material

The HiRef outdoor units are protected by a metal structure resistant to corrosion and weathering. They are also made of galvanised steel sheet, with epoxy-polyester powder coating, oven-polymerised at 180°C, to offer a C3 degree of protection. On request, it is possible to order specific paint finishing treatments or a metalwork structure built entirely in stainless steel, to obtain a higher degree of protection from high impact adverse weather events.



### Rotary heat recovery unit

The rotary heat recovery unit designed for installation on-board the machine, covered with special material, allows both sensible and latent heat to be exchanged from the extraction air flow and temperatures and humidity efficiency levels higher than 80% to be obtained - reducing the workload of the compressor.



### Cross-flow heat recovery unit

The cross-flow recuperator allows heat exchange between the exhaust air and the indoor air, without the flows mixing with each other. This technology makes it possible to exploit highly efficient air-conditioning systems such as Indirect Free-Cooling by air, with which it is possible to condition the indoor environment by means of cold external air, with considerable energy savings compared to traditional direct expansion cycles. In the RoofTop units, the recuperator makes it possible to exploit the heat of the expelled air, in order to pre-treat the fresh air: if the outside air is at a more favourable temperature than the inside air, it is possible to bypass the recuperator by means of the appropriate damper.



### On-board Humidifier

Humidifiers are essential components for maintaining the right level of humidity in the server room and ensuring the proper functioning of the room equipment. Humidifiers with immersed electrodes can be installed in HiRef units, managed by proprietary software which, equipped with a special probe, keeps humidity levels at pre-established values.

## Available versions



OUTDOOR MONOBLOCK



COOLING ONLY



FREE-COOLING



REVERSIBLE HEAT PUMP



AIR/AIR

## Types of system



## Additional benefits

- Direct Free-Cooling function
- Thermodynamic recovery on outlet air
- EC plug fan type delivery fan
- Air quality sensors
- Remote monitoring and control
- RS485 Protocol
- Fan speed modulation based on thermal load (constant  $\Delta t$ ) and air flow demand (constant  $\Delta p$ ).

## Technical table

HRT		022HO	032HO	042HO	052HO	062HO	020HV	030HV	040HV	050HV	062HV
SUMMER WORKING CONDITIONS - DRY BULB TEMPERATURE 27°C - RELATIVE HUMIDITY 47% / OUTDOOR AIR TEMPERATURE 35°C - RELATIVE HUMIDITY 50%											
COOLING CAPACITY	kW	23.7	30	37.8	52.6	56.5	20.5	29	38.4	48.1	59
SENSIBLE COOLING CAPACITY	kW	18.3	23.7	29.6	36.4	42.4	17.6	24.5	30	36.4	44.9
COMPRESSORS ABSORBED POWER	kW	5.68	7.56	10.9	12.3	14.2	5.1	7.6	8.8	11.8	14.7
SHR	-	0.77	0.79	0.78	0.69	0.75	0.86	0.84	0.76	0.69	0.76
EER UNI EN 14511	-	3.51	3.41	3.68	3.4	3.21	3.35	3.25	3.43	3.31	3.23
WINTER WORKING CONDITIONS - DRY BULB TEMPERATURE 20°C - RELATIVE HUMIDITY 50% / OUTDOOR AIR TEMPERATURE 7°C - RELATIVE HUMIDITY 90%											
THERMAL POWER	kW	22.9	30.1	36.6	51	60.5	20	30	37	51.4	57.6
COMPRESSORS ABSORBED POWER	kW	4.25	5.59	7.1	10.3	12.6	4.1	6.1	7.8	11.8	13.1
COP UNI EN 14511	-	4.2	4.18	4.23	3.85	3.73	3.62	3.75	3.62	3.35	3.47
AIR FLOW	m <sup>3</sup> /h	3900	5500	7000	8000	9000	4500	6000	7000	9000	11000

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