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Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70

Казахстан +7(7172)727-132

Киргизия +996(312)96-26-47

<https://hiref.nt-rt.ru> || hfb@nt-rt.ru

SERVICES

INDUSTRY

Outside air unit
HRA
with rotary heat exchanger



HRA is the new range of 100% outside air units with rotary heat exchanger. The components and their internal arrangement were first and foremost designed for **enhanced energy efficiency**: the BLDC modulating compressors, rotary heat exchanger and a system of modulating dampers allow **the highest COPs** (Coefficients of Performance) **and EERs** (Electrical Efficiency Ratios) to be reached under any operating mode. Finally, an **advanced management software** designed and developed by HiRef **guarantees that the required thermal-hygrometric conditions can be maintained in the target environments**. HRA also complies with Regulation (EU) 2016/2281 – ERP 2021 and meets, in Italy, the technical requirements for access to tax deductions for the energy requalification of buildings – Ecobonus, Decree of 6 August 2020 (Annex F).

Main advantages



Smart Defrost System

To enhance occupant comfort, the on-board software manages different frost control methods, selected depending on the type of application.

Thermodynamic recovery

In order to improve refrigeration circuit efficiency, active thermodynamic energy recovery is ensured in the exhaust air flow: in this way, the heat exchanger at source end operates at more favourable condensation and evaporation temperatures both in summer and in winter.



Perfectly balanced airflow

Airflows are measured both at the delivery end and the return end. This ensures that flows are perfectly balanced and maintains a zero pressure difference in the environment.

Enthalpy recovery

The on-board rotary heat exchanger reduces the work of the compressor by recovering thermal energy from the exhaust air flow. Its special material enables the recovery of both sensible and latent heat, resulting in over 80% temperature and humidity efficiency.



Efficiency and precision

Variable speed BLDC compressors and electronic expansion valves enable the unit to continuously modulate capacity and maximum efficiency at part loads, controlling the supply of power with high precision.



Ventilation 2.0

The supply and return fans are of the EC type with brushless permanent magnet motor, second generation integrated electronics and fluid dynamics optimised for installation.

Grater summer-time efficiency

Modulating dampers use some fresh air to increase the air flow rate through the condenser; this reduces compressor consumption and improves the overall performance of the system.

Sonda per la qualità dell'aria

With the VOC/CO₂ probe, HRT monitors the amount of CO₂ and other pollutants in the indoor air and modulates air renewal accordingly. This ensures excellent air quality at all times with the lowest energy expenditure.



Additional benefits

- Refrigerant R410A
- Available versions: cool only or reversible heat pump
- G4 and F7 filtration
- Hot-gas pre-heating heat exchanger
- Electronically commutated EC fans
- Hydrophilic coated coils with wider fin pitch
- Chutes with heating elements for disposal of thawed ice
- Measurement of supply and return airflows
- Pre-cooling or pre-heating water heat exchanger on request

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.



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.



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.



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.



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.

Types of system



AIR/AIR

Technical table

HRA		050	100	150
COOLING A-C 32°C - 60% U.R				
COOLING CAPACITY	kW	66.5	134.9	194.1
TOTAL POWER INPUT	KW	5.28	5.03	5.83
EER	-	5.28	5.03	5.83
COOLING B-C				
EER CYCLE	-	3.1	3.22	3.48
MEC. COOLING CAPACITY	kW	30.9	64.9	87.3
CYCLE ABSORBED POWER	KW	10	20.1	25.1
COOLING D-C 26°C, 50% U.R.				
COOLING CAPACITY	kW	24.6	51.4	67
SENSIBLE COOLING CAPACITY	kW	19.4	39.5	54.2
LATENT COOLING CAPACITY	kW	5.2	12.8	12.8
SUPPLY TEMPERATURE	°C	14.1	13.9	14.9
HEATING A-C -10°C, 90% U.R.				
THERMAL POWER	kW	86.2	173.7	256.5
TOTAL COP	-	8.29	8.43	8.46
HEATING B-C				
MECHANICAL THERMAL POWER	kW	22.6	58.7	65.6
CYCLE ABSORBED POWER	KW	8	15	23.4
COP CYCLE	-	2.82	3.24	2.8
HEATING D-C 20°C, 50% U.R				
THERMAL POWER	kW	15.8	30.7	40.3
SUPPLY TEMPERATURE	°C	29.8	29.5	28.3
AIR FLOW	m³/h	5000	10000	15000
DIMENSIONS [LxHxD]	mm	4400x2030x1650	4620x2570x2065	

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