

HiRef

Innovators above
the standards

DATA CENTER



Air/Air systems

DataBatic

for Data Centers with adiabatic system

Range: 10-330 kW



The combination of the evaporative cooling system with the air/air cross-flow exchanger of the HDB-DataBatic range extends indirect Free-Cooling for more hours during the year and more climate zones. The reduction, and in some cases cessation, of mechanical operation has two benefits: it reduces operating costs for greater annual energy efficiency (reduced PUE) and reduces deployment costs, thanks to the lower installed power. HDB units can accommodate the “cooling circuit” option, and are entirely factory assembled in a monobloc solution to facilitate installation operations.

Main advantages



Direct expansion or chilled water integration

If external climatic conditions cannot satisfy internal load requirements using only indirect Free-Cooling + Evaporative Cooling, the mechanical cooling system comes into play. There is thus the option of a cooling circuit with BLDC modulating compressors specific for R410A , electronically controlled expansion valve and hydrophilically treated fin evaporator. Alternatively, a chilled water coil can be installed, to be connected to an external chiller.

Evaporative cooling on the air flow from the outside

HDB - DataBatic units are equipped with Evaporative Cooling technology, based on the use of nozzles that spray water onto the air flow coming from outside. Evaporating water cools the air due to an adiabatic effect, the air then passes the cross-flow exchanger at a temperature close to the wet bulb temperature, extending the period of time in which it is possible to exploit the Free-Cooling effect. Finally, the system is of the multistep type in respect of the air flow, in order to optimize saturation efficiency.



Plug type fans with EC motor

EC type ventilation on both air flows offers:

- higher efficiency at partial loads;
- reduced noise emissions;
- precise tracking of thermal load variations.

Fan consumption, in the “hot swappable” configuration, can be displayed in real time on the machine’s display

Water saving function and legionella-free system

Pump adjustment logic, of the electronic and modulating type, makes it possible to optimize air saturation and at the same time Water Usage Effectiveness (WUE) and energy consumption. The particular configuration of the hydraulic circuit and the algorithms used for its management guarantee the necessary replenishment of water in the system to avoid high salt concentrations and prevent water from stagnating in the collection tank, with the risk of the spread of legionellosis.

$$WUE = \frac{\text{Annual Water Usage}}{\text{IT Equipment Energy}} [l/kWh]$$

Indirect Air-Side Free-Cooling

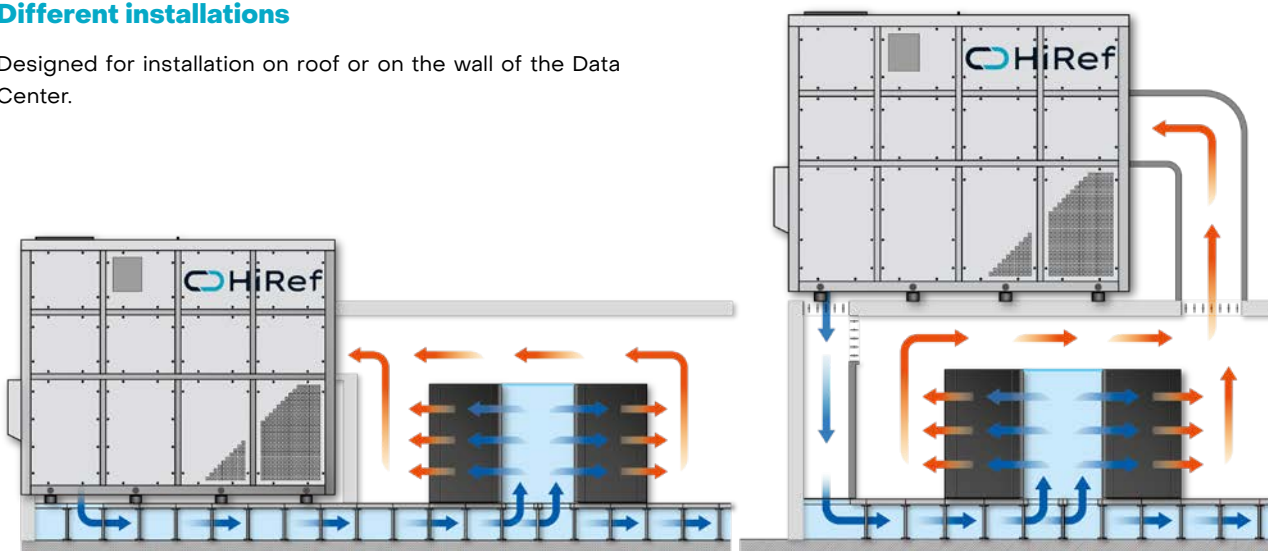
Indirect Air-Side Free-cooling Indirect Free-Cooling, as opposed to direct:

- does not create contamination between the indoor air of the Data Center and outdoor air;
- blocks the entry of dust and pollutants into the Data Center without the need for additional filtering;
- there is no latent load increase.

The result is a clear reduction in energy consumption for system management.

Different installations

Designed for installation on roof or on the wall of the Data Center.



Types of system



Technological components



Adiabatic Cooling

The air is humidified by passing through a series of wet panels placed before the dissipation coils and decreasing its temperature. An increase in the efficiency of the thermodynamic cycle and in the cooling capacity is therefore obtained.



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.



Refrigerant R744 (CO₂)

On some units it is possible to use, as an alternative to the traditional refrigerants, R744, commonly known as CO₂, a natural gas, widely available in nature, non-toxic and above all non-flammable (GWP = 1). In the field of commercial refrigeration it is an already widely used refrigerant, also thanks to its excellent thermodynamic efficiency which makes it suitable for the production of water at temperatures above 80°C.



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.



Fast restart

The fast restart function (on request) allows the unit to restart quickly after a mains power outage. This optional feature is available with dual power to minimise restart times.



Screw compressors

Screw compressors are suitable for handling large volumes of refrigerant and are therefore suitable for use with low density and pressure refrigerants, while still producing a remarkable cooling effect. The internal double screw construction allows work in all conditions with less vibration and greater stability compared to single screw compressors. On request, it is possible to install compressors equipped with inverters - ensuring constant power modulation and high energy efficiency even at partial loads.



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.



Modbus controlled fans

The Modbus protocol, unlike the 0-10V signal, allows to not only control the speed of the fans, but also to capture, monitor and manage considerably more data and alarm information.



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.



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.



Low GWP refrigerant

The Global Warming Potential (GWP) index is a numerical indicator that identifies the environmental impact of a substance. It measures the extent to which a gas contributes to the greenhouse effect, in relation to carbon dioxide (CO₂) whose baseline value is equal to 1. This parameter is used to determine the amount in kilograms of CO₂ corresponding to the environmental impact of the release of a refrigerant gas into the atmosphere. The use of low GWP refrigerants, such as R513A, R454B, R1234ze, CO₂, allows the environmental impact of air conditioning systems to be significantly reduced.



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.



Additional benefits

- Possibility of managing multiple units in parallel in the same system
- High efficiency through-flow heat exchanger with epoxy surface treatment for protection against corrosion (Eurovent certification)
- Ultrasonic humidifier
- Management of overpressure in the air distribution plenum (ΔP Control)
- Side and front access to all components, even when units are operational, to make maintenance easier and avoid system downtime situations
- Labelling developed and assembled in accordance with standard UNI 1886
- Air renewal kit with modulating dampers (Fresh air kit)
- Kit for applications at low outdoor air temperatures (up to -40°C)

Technical table

		0060	0100	0200	0300
AIR FLOW	m³/h	15000	27000	53000	82500
POWER SUPPLY	-	400/3+N/50			
DIMENSIONS [LxHxD]	mm	2750x2650x1180	4200x2650x2250	4700x3600x2250	4700x3600x3100

Data declared with chilled water or direct expansion circuit working in top up cooling mode. | Also available with 60 Hz power supply. | The dimensions shown refer to standard models without accessories and with Free-Cooling and top up cooling execution.



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