HiRef

CATALOGUE

CCAC
HPDCU
HDC

HiRef

INNOVATORS

above the standards

CCAC

	APPLICATION	SYSTEM TYPE	COOLING CAPACITY	
TRF CW	**CHILLED WATER PERIMETER-MOUNTED UNITS FOR DATA CENTERS**			
	DATA CENTER, INDUSTRIAL	CHILLED WATER	33 - 257 (kW)	PAGE 8
TRF CS	**CHILLED WATER PERIMETER-MOUNTED AIR CONDITIONERS FOR DATA CENTERS WITH UNDERFLOOR FANS**			
	DATA CENTER	CHILLED WATER	58 - 242 (kW)	PAGE 10
TRF CF	**CHILLED WATER PERIMETER-MOUNTED AIR CONDITIONERS FOR DATA CENTERS WITH UNDERFLOOR FANS**			
	DATA CENTER	CHILLED WATER	78 - 374 (kW)	PAGE 12
NRG A	**AIR CONDENSED PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS**			
	DATA CENTER, INDUSTRIAL	AIR-TO-AIR	9 - 147 (kW)	PAGE 14
NRG W/Z	**WATER CONDENSED PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS**			
	DATA CENTER, INDUSTRIAL	AIR-WATER	Mod. W 9 - 112 (kW) Mod. Z 10 - 124 (kW)	PAGE 16
NRG F	**PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS WITH INDIRECT FREE-COOLING**			
	DATA CENTER, INDUSTRIAL	AIR-WATER	11 - 99 (kW)	PAGE 18
NRG D/K/Q	**DUALCOOLING PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS**			
	DATA CENTER, INDUSTRIAL	Mod. D AIR-TO-AIR Mod. Q/K AIR-WATER	Mod. D 12 - 99 (kW) Mod. K 11 - 101 (kW) Mod. Q 13 - 110 (kW)	PAGE 20
TREF DX A	**AIR CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS**			
	DATA CENTER, INDUSTRIAL	AIR-TO-AIR	23 - 135 (kW)	PAGE 24
TREF DX W/Z	**WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS**			
	DATA CENTER, INDUSTRIAL	AIR-WATER	Mod. W 23 - 138 (kW) Mod. Z 27 - 153 (kW)	PAGE 26

Technical data are subject to change without notice. Do not use these data in the design stage.

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	APPLICATION	SYSTEM TYPE	COOLING CAPACITY	
	TREF DX F PERIMETER-MOUNTED UNITS FOR DATA CENTERS WITH INDIRECT FREE-COOLING			
	DATA CENTER INDUSTRIAL	AIR-WATER	21 - 123 (kW)	PAGE 28
	TREF DX D/K/Q DUALCOOLING PERIMETER MOUNTED UNITS FOR DATA CENTERS			
	DATA CENTER INDUSTRIAL	Mod. D AIR-TO-AIR Mod. Q/K AIR-WATER	Mod. D 21 - 124 (kW) Mod. K 21 - 126 (kW) Mod. Q 25 - 143 (kW)	PAGE 30
	JREF CW Radial CHILLED WATER PERIMETER-MOUNTED UNITS FOR DATA CENTERS			
	DATA CENTER INDUSTRIAL	CHILLED WATER	15 - 33 (kW)	PAGE 34
	JREF DX A Radial WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS			
	DATA CENTER INDUSTRIAL	AIR-TO-AIR	6 - 25 (kW)	PAGE 36
	JREF DX W/Z Radial WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS			
	DATA CENTER INDUSTRIAL	AIR-WATER	Mod. W 7 - 24 (kW) Mod. Z 7 - 27 (kW)	PAGE 38
	JREF CW Centrifugal CHILLED WATER PERIMETER-MOUNTED UNITS FOR DATA CENTERS			
	DATA CENTER INDUSTRIAL	CHILLED WATER	7 - 24 (kW)	PAGE 40
	JREF DX A Centrifugal AIR CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS			
	DATA CENTER INDUSTRIAL	AIR-TO-AIR	7 - 24 (kW)	PAGE 42
	JREF DX W/Z Centrifugal WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS			
	DATA CENTER INDUSTRIAL	AIR-WATER	Mod. W 7 - 24 (kW) Mod. Z 7 - 28 (kW)	PAGE 44
	FanWall CHILLED WATER OR DIRECT EXPANSION VERSIONS FOR HIGH DENSITY HYPERSCALE DATA CENTRES			
	DATA CENTER	CHILLED WATER	45 - 460 (kW)	PAGE 46

Technical data are subject to change without notice. Do not use these data in the design stage.

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	APPLICATION	SYSTEM TYPE	COOLING CAPACITY	
	HTI CW CHILLED WATER UNIT FOR MEDIUM/SMALL SERVER ROOMS			
	DATA CENTER INDUSTRIAL	CHILLED WATER	8 - 45 (kW)	PAGE 48

HPDCU

	APPLICATION	SYSTEM TYPE	COOLING CAPACITY	
	HDB AIR-TO-AIR SYSTEM FOR DATA CENTERS WITH ADIABATIC SYSTEM			
	DATA CENTER	CHILLED WATER AIR-TO-AIR	10 - 330 (kW)	PAGE 52

High Density Cooling

	APPLICATION	SYSTEM TYPE	COOLING CAPACITY	
	NRCD/ NRCV DIRECT EXPANSION AIR CONDITIONERS FOR HIGH DENSITY RACKS WITH MODULATING COMPRESSORS			
	DATA CENTER	AIR-TO-AIR	Mod. NRCD 12 - 50 (kW) Mod. NRCW 13 - 37 (kW)	PAGE 56
	HRCC CHILLED WATER AIR CONDITIONING UNITS FOR HIGH POWER DENSITY RACKS			
	DATA CENTER	CHILLED WATER	20 - 57 (kW)	PAGE 58
	MRAC CW/DX MINI RACK COOLER FOR HIGH DENSITY SYSTEMS			
	DATA CENTER	CHILLED WATER AIR-TO-AIR	Mod. MRACK CW 3 - 5 (kW) Mod. MRACK DX 3 - 9 (kW)	PAGE 60

Technical data are subject to change without notice. Do not use these data in the design stage.

HiRef

CCAC

Platform TRF Evolution

Inspired by the best of TREF
Revolutionary design

Efficiency, flexibility, reduced footprint, optimization of internal layout

TRF Evolution is the new HiRef solution for perimeter cabinets. It brings together in a single and revolutionary product the many product ranges already on offer, from chilled-water to direct expansion units. The new range comes with a host of improvements made to the main units for Data Center cooling. Components of the new TRF platform have everything needed to provide the most efficient Data Center cooling solution, ensuring reliability, precise control of thermo-hygrometric conditions and the flexibility to adapt to different working conditions. The depth has been increased to 890 mm and 960 mm, with a finned-coil exchanger 30% larger in the NRG versions and 16% larger in the TRF CW versions. There is a rise in specific capacity (kW/Sq.m) and efficiency, thanks to a next-generation fan that increases performance by 15%. Each HiRef unit is also customizable in the co-design phase with the client or the designer, depending on the specific application, making solutions modular and more efficient on a case-by-case basis.

Flexibility

Efficiency

Optimization
of internal layout

Reduced
footprint

Chilled water

Chilled water units are available in several solutions:

- broad power range: from 40 kW for TRF CW units to 350 kW for TRF CF units;
- air flow: various air flow configurations for the TRF CW models and fan module configurations for the TRF CS and TRF CF units are possible;
- hydronic circuit: the configurations A, B and C have been developed to be able to choose the best solution for the Data Center's actual operating conditions:

Geometry "A"
Designed to work with high water flow rates and ΔT = 5°C. Ideal for existing solutions

Geometry "B"
Designed to work with moderate water flow rates and ΔT= 8°C. Ideal for next-generation Data Centers

Geometry "C"
Designed to work with low water flow rates and ΔT= 12°C. Ideal for the very latest Data Centers

Adjustment

All TRF units are fitted with water valves for adjustments. In addition to the 2-or 3-way modulating valves, pressure-independent regulating valves can be fitted On request. These offer a host of benefits, including reduced commissioning costs, greater accuracy and stability in regulating cooling capacity.

Direct expansion

NRG perimeter-mounted units are the HiRef solution in the TRF Evolution platform for applications with direct expansion units. The use of an inverter-controlled compressor allows NRGs to find a space in low energy consumption solutions with high air conditioning accuracy.
In the various configurations you can choose the most suitable energy source - air or water. With dualcooling complete redundancy is possible thanks to the additional chilled water coil. Finally, with the indirect water freecooling version, energy consumption can be minimized, taking advantage of low room temperatures to chill water without using the compressor.

TRF CW
CHILLED WATER PERIMETER-MOUNTED UNITS FOR DATA CENTERS

TRF CS
CHILLED WATER PERIMETER-MOUNTED CONDITIONERS FOR DATA CENTERS WITH UNDERFLOOR FANS - SLIM EDITION

TRF CF
CHILLED WATER PERIMETER-MOUNTED CONDITIONERS FOR DATA CENTERS WITH UNDERFLOOR FANS

NRG
PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS

Platform ***TRF Evolution***

DATA CENTER | INDUSTRIAL

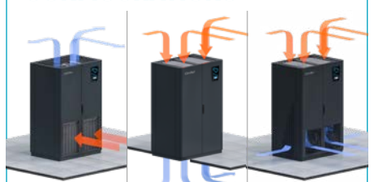
TRF CW

CHILLED WATER PERIMETER MOUNTED UNITS FOR DATA CENTERS

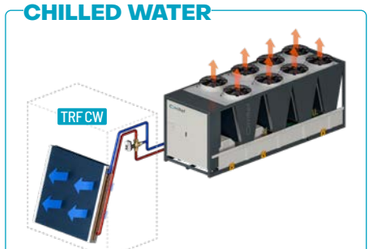
33 – 226 kW

The new chilled water air conditioners of the **TRF CW** series are particularly suitable for IT facilities where temperature and air flow need to be continuously monitored. The components of the **TRF CW** unit offer the most efficient solution for Data Center cooling, ensuring reliability, precise control of thermo-hygrometric conditions and the flexibility to adapt to different working conditions.

AIRFLOW CONFIGURATIONS

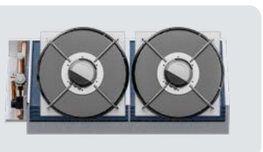


CHILLED WATER



Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components. This makes routine maintenance easier in full compliance with safety standards.



Ventilation adjustment

The most suitable on-board ventilation system can be chosen based on the air distribution logic in the server room, guaranteeing a constant flow of air (airflow control) or a constant available overlap (Δp control); the latter is particularly useful when using a floating floor.

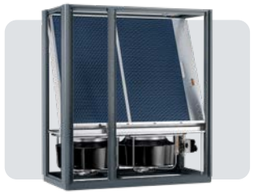
Double circuit

Chilled water units are also available with a double circuit. In this version the supply is via two different hydraulic circuits that can offer the utmost operational continuity if one of the two circuits malfunctions. Each circuit is equipped with a regulating valve.

- Temperature control through heating and post-heating systems using electric heating elements, additional hot water coil or both
- Humidity control through dehumidification and humidification
- Humidifier installed on board the machine
- Fan speed modulation based on the thermal load (constant ΔT)
- Hydraulic connections from the bottom of the unit
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Double panelling only on the front doors or on the whole machine
- Instant reading of water flow rate, water inlet and outlet temperatures, or cooling capacity



Finned pack coil with hydrophilic coating

All models in the **TRF CW** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection and outflow during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Numerous types of valves for accurate adjustment

All units in the **TRF CW** range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system or with servo motor with spring return. Pressure-independent valves can also be fitted on request. All these types of valves ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.

New design: efficiency, flexibility and optimization of internal layout

Internal spaces have been completely redesigned for a better distribution of components. The new internal layout features a larger pack heat exchanger and a state-of-the-art fan for maximum air flow and efficiency. Following a painstaking dynamic fluid study, the filtering surface has also been expanded, now it is distributed over the entire coil to further reduce air pressure drops.

Ventilation EC 2.0

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. The speed, with extended range, is adjusted via the Modbus protocol. Finally, the "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

TRF CW		040	060	070	080	090	100	110	130	150	170	180	210	240
Geometry A		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 20°C Glycol 0%												
Cooling capacity	[kW]	43,7	58,6	68,2	80,2	89,3	102,3	112,9	133,9	145,8	172,9	182,0	215,9	237,5
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		36,4	39,1	35,9	36,5	37,2	39,3	36,4	39,4	32,4	35,3	35,0	37,9	32,1
Geometry B		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 23°C Glycol 0%												
Cooling capacity	[kW]	39,1	55,0	63,4	75,3	82,4	98,1	104,9	125,9	135,6	162,6	169,2	203,0	228,4
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		32,6	36,7	33,4	34,2	34,3	37,7	33,8	37,0	30,1	33,2	32,5	35,6	30,9
Geometry C		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 27°C Glycol 0%												
Cooling capacity	[kW]	33,9	50,1	56,5	67,9	73,8	87,9	91,0	112,3	117,6	145,1	146,8	181,1	210,6
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		28,3	33,4	29,7	30,9	30,8	33,8	29,4	33,0	26,1	29,6	28,2	31,8	28,5
Geometry A		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 15°C Glycol 0%												
Cooling capacity	[kW]	43,3	59,6	67,9	80,8	89,9	104,1	112,3	133,7	148,4	172,7	185,2	219,7	236,3
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,9
EER		36,1	39,7	35,7	36,7	37,5	40,0	36,2	39,3	33,0	35,2	35,6	38,5	31,9
Geometry B		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 18°C Glycol 0%												
Cooling capacity	[kW]	38,8	55,2	63,3	74,8	82,4	98,4	104,8	126,3	135,3	163,1	169,0	203,6	229,5
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		32,3	36,8	33,3	34,0	34,3	37,8	33,8	37,1	30,1	33,3	32,5	35,7	31,0
Geometry C		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 22°C Glycol 0%												
Cooling capacity	[kW]	33,4	49,8	54,4	67,5	73,3	87,6	90,1	111,8	116,3	144,4	145,2	180,3	210,2
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		27,8	33,2	28,6	30,7	30,5	33,7	29,1	32,9	25,8	29,5	27,9	31,6	28,4
Geometry A		Air temp. 24°C Relative humidity 50% - Water temp. In 7°C Out 12°C Glycol 0%												
Cooling capacity	[kW]	38,1	58,0	64,4	80,8	85,3	105,5	103,1	137,2	137,8	177,2	172,0	226,9	257,1
SHR		0,9	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,7
EER		31,8	38,7	33,9	36,7	35,5	40,6	33,3	40,4	30,6	36,2	33,1	39,8	34,7
Rated air flow	m³/h	10700	10700	14500	14500	18000	18000	24000	24000	31000	31000	38700	38700	39000
Total fan absorbed power	[kW]	1,2	1,5	1,9	2,2	2,4	2,6	3,1	3,4	4,5	4,9	5,2	5,7	7,4
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	61	61	67	67	72	72	66	67	71	72	69	70	71
Dimensions Mod. "D" (Downflow) [WxHxD]*	mm	1010x2000x890		1270x2000x890		1760x2000x890		2020x2000x890		2510x2000x890		3160x2000x890		3160x2000x960
Power supply	V/ph/Hz	400/3+N/50												

Also available with 60 Hz power supply

Performance data for Downflow versions

* Units also available in the models "U" (Upflow) and "X" (Displacement), with the exception of size 240.
Height of model "X" (Displacement) 2250 mm

Platform ***TRF Evolution***

DATA CENTER

TRF CS

CHILLED WATER PERIMETER-MOUNTED AIR CONDITIONERS FOR DATA CENTERS WITH UNDERFLOOR FANS - SLIM EDITION

58 - 242 kW

TRF CS is the range of chilled-water air conditioners for high power density computer rooms. The fans of the **TRF CS** units are positioned in separate housing (so-called FREE FAN solution), to increase the overall cooling capacity of the unit, but not to the detriment of the depth, which remains 890 mm. Great care has gone into every detail, in order to minimize air flow pressure drops and energy consumption of the fans, the only electrical load present in the machine.

FREE FAN solution

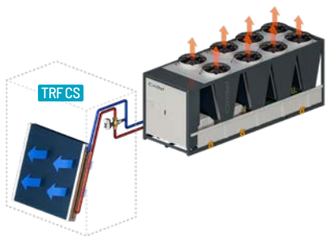
The FREE FAN solution with the fans mounted in separate housing frees up space inside the unit and thus increases the surface area of the coil. This results in both an increase in air flow and cooling capacity and a reduction in air pressure drops.
The FREE FAN solution increases the refrigerating power of the entire range.

- Temperature control through heating and post-heating systems with electric heating elements
- Humidity control through dehumidification and humidification
- Humidifier installed on board the machine
- Fan speed modulation based on the thermal load (constant ΔT)
- Hydraulic connections from the bottom of the unit
- Broad choice of accessories, including plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Double panelling only on the front doors or on the whole machine
- Instant reading of water flow rate, water inlet and outlet temperatures, or cooling capacity

CHILLED WATER



AIRFLOW CONFIGURATIONS

Numerous types of valves for accurate adjustment

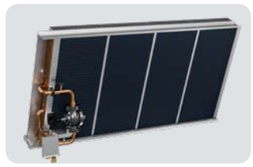
All units in the **TRF CS** range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system or with servo motor with spring return. Pressure-independent valves can also be fitted on request. All these types of valves ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.

Ventilation adjustment

The most suitable on-board ventilation system can be chosen based on the air distribution logic in the server room, guaranteeing a constant flow of air (airflow control) or a constant available overlap (Δp control); the latter is particularly useful when using a floating floor.

Double circuit

Chilled water units are also available with a double circuit. In this version the supply is via two different hydraulic circuits that can offer the utmost operational continuity if one of the two circuits malfunctions. Each circuit is equipped with a regulating valve.



Finned-coil with hydrophilic coating

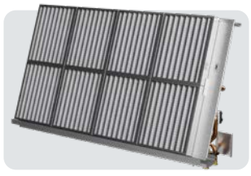
All models in the **TRF CS** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection and outflow during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components. This makes routine maintenance easier in full compliance with safety standards.

Ventilation EC 2.0

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.



Extended filter section

Air filters, located on the entire surface of the coil, maximize the filtering section and minimize the unit's air pressure drops.

TRF CS		045	055	065	075	150	180	200	210
Geometry A		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 20°C Glycol 0%							
Cooling capacity	[kW]	72,9	84,9	110,8	130,2	173,0	199,0	-	-
SHR		1,0	1,0	1,0	1,0	1,0	1,0	-	-
EER		28,0	30,3	33,6	35,2	37,6	38,3	-	-
Geometry B		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 23°C Glycol 0%							
Cooling capacity	[kW]	67,8	79,7	103,0	121,2	157,4	188,9	205,5	241,8
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		26,1	28,5	31,2	32,8	34,2	36,3	28,2	29,5
Geometry C		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 27°C Glycol 0%							
Cooling capacity	[kW]	58,8	70,9	89,3	110,2	136,5	168,5	178,2	220,0
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		22,6	25,3	27,1	29,8	29,7	32,4	24,4	26,8
Geometry A		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 15°C Glycol 0%							
Cooling capacity	[kW]	72,6	84,8	110,2	131,2	172,3	200,6	-	-
SHR		1,0	1,0	1,0	1,0	1,0	1,0	-	-
EER		27,9	30,3	33,4	35,5	37,5	38,6	-	-
Geometry B		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 18°C Glycol 0%							
Cooling capacity	[kW]	66,0	79,9	102,8	121,4	157,2	189,4	205,2	242,4
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		25,4	28,5	31,2	32,8	34,2	36,4	28,1	29,6
Geometry C		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 22°C Glycol 0%							
Cooling capacity	[kW]	58,2	70,6	88,4	109,7	135,1	167,7	176,4	218,9
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		22,4	25,2	26,8	29,6	29,4	32,3	24,2	26,7
Geometry A		Air temp. 24°C Relative humidity 50% - Water temp. In 7°C Out 12°C Glycol 0%							
Cooling capacity	[kW]	68,9	81,8	104,7	131,2	165,3	200,5	-	-
SHR		0,8	0,8	0,8	0,8	0,8	0,8	-	-
EER		26,5	29,2	31,7	35,5	35,9	38,6	-	-
Rated air flow	m³/h	15500	15500	23550	23550	36000	36000	47000	47000
Total fan absorbed power	kW	2,6	2,8	3,3	3,7	4,6	5,2	7,3	8,2
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	69	69	66	67	68	68	69	70
Dimensions (WxHxD)	mm	1270x2000x890		1760x2000x890		2510x2000x890		3160x2000x890	
Minimum dimensions with fan module [WxHxD]	mm	1270x2550x890		1760x2550x890		2510x2550x890		3160x2550x890	
Power supply	V/ph/Hz	400/3+N/50							

Also available with 60 Hz power supply
Minimum height with fan module 2550 mm.

Platform ***TRF Evolution***

DATA CENTER

TRF CF

CHILLED WATER PERIMETER MOUNTED UNITS FOR DATA CENTERS WITH UNDERFLOOR FANS

77 - 373 kW

TRF CF is the range of chilled-water air conditioners for computer rooms with very high power density. As for the TRF CS range, the fans are mounted in separate housing, but in addition units are equipped with two chilled water batteries. With these solutions the cooling capacity is maximized, at the same depth of 960 mm. In-depth fluid dynamic analysis has resulted in the meticulous design of every last constructive detail to minimise air pressure drops and fan power consumption, the only power load in the machine.

FREE FAN solution

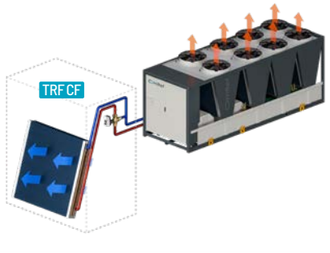
The FREE FAN solution with the fans mounted in separate housing frees up space inside the unit and thus increases the surface area of the coil. This results in both an increase in air flow and cooling capacity and a reduction in air pressure drops.
The FREE FAN solution increases the refrigerating power of the entire range.

- Temperature control through heating and post-heating systems with electric heating elements
- Humidity control through dehumidification and humidification
- Humidifier installed on board the machine
- Fan speed modulation based on the thermal load (constant ΔT)
- Hydraulic connections from the bottom of the unit
- Broad choice of accessories, including plenums for ducting, plenums for direct Free-Cooling

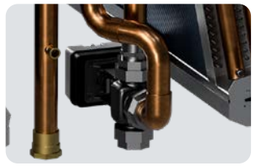
On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Double panelling only on the front doors or on the whole machine
- Instant reading of water flow rate, water inlet and outlet temperatures, or cooling capacity

CHILLED WATER



AIRFLOW CONFIGURATIONS



Numerous types of valves for accurate adjustment

All units in the **TRF CS** range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system or with servo motor with spring return. Pressure-independent valves can also be fitted on request. All these types of valves ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.

Ventilation adjustment

The most suitable on-board ventilation system can be chosen based on the air distribution logic in the server room, guaranteeing a constant flow of air (airflow control) or a constant available overlap (Δp control); the latter is particularly useful when using a floating floor.

Double circuit

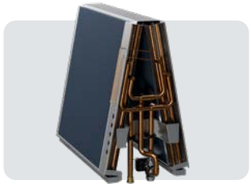
Chilled water units are also available with a double circuit. In this version the supply is via two different hydraulic circuits that can offer the utmost operational continuity if one of the two circuits malfunctions. Each circuit is equipped with a regulating valve.

Finned-coil with hydrophilic coating

All models in the **TRF CF** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection and outflow during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components. This makes routine maintenance easier in full compliance with safety standards.



Double coil

The double coil solution is designed to optimize the internal spaces of the unit, significantly increasing the heat exchange surface and potential refrigerating power.

TRF CF		045	055	065	075	150	180	200	210
Geometry A		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 20°C Glycol 0%							
Cooling capacity	[kW]	91,2	100,5	154,4	173,6	234,2	263,5	308,7	344,3
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		32,6	34,7	26,2	27,6	24,7	26,4	23,9	25,3
Geometry B		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 23°C Glycol 0%							
Cooling capacity	[kW]	85,7	96,6	141,7	163,9	219,5	253,2	283,4	327,9
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		30,6	33,3	24,0	26,0	23,1	25,3	22,0	24,1
Geometry C		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 27°C Glycol 0%							
Cooling capacity	[kW]	77,9	89,9	128,0	153,6	194,2	233,0	256,0	301,2
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		27,8	31,0	21,7	24,4	20,4	23,3	19,8	22,1
Geometry A		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 15°C Glycol 0%							
Cooling capacity	[kW]	91,1	102,4	154,0	176,7	233,7	263,5	308,0	347,3
SHR		1,0	0,9	1,0	0,9	1,0	0,9	1,0	0,9
EER		32,5	35,3	26,1	28,0	24,6	26,4	23,9	25,5
Geometry B		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 18°C Glycol 0%							
Cooling capacity	[kW]	85,9	97,9	141,8	164,6	219,8	254,3	283,7	329,2
SHR		1,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0
EER		30,7	33,8	24,0	26,1	23,1	25,4	22,0	24,2
Geometry C		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 22°C Glycol 0%							
Cooling capacity	[kW]	77,6	90,6	127,2	153,3	193,0	232,5	254,4	300,4
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
EER		27,7	31,2	21,6	24,3	20,3	23,3	19,7	22,1
Geometry A		Air temp. 24°C Relative humidity 50% - Water temp. In 7°C Out 12°C Glycol 0%							
Cooling capacity	[kW]	92,8	111,2	154,5	191,2	234,5	283,6	317,6	373,9
SHR		0,8	0,7	0,8	0,7	0,8	0,7	0,8	0,7
EER		33,1	38,3	26,2	30,3	24,7	28,4	24,6	27,5
Rated air flow	m³/h	16500	16500	29000	29000	44000	44000	58000	58000
Total fan absorbed power	[kW]	2,8	2,9	5,9	6,3	9,5	10,0	12,9	13,6
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	70	70	71	71	73	73	74	75
Dimensions (WxHxD)	mm	1270x2000x960		1760x2000x960		2510x2000x960		3160x2000x960	
Minimum dimensions with fan module [WxHxD]	mm	1270x2550x960		1760x2550x960		2510x2550x960		3160x2550x960	
Power supply	V/ph/Hz	400/3+N/50							

Also available with 60 Hz power supply
Minimum height with fan module 2550 mm.

Ventilation EC 2.0

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Platform ***TRF Evolution***

DATA CENTER | INDUSTRIAL

NRG A

AIR CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS

9 - 147 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- MODULATING HOT GAS POST-HEATING
- INVERTER DRIVEN COMPRESSORS

NRG series perimeter-mounted air conditioning units are designed for high thermal density IT facilities requiring accurate hygrothermal parameter control and continuous operation. The use of inverter-driven compressors, capable of tracking the thermal load with extreme precision, of EC fans (standard), and of electronically controlled lamination valves (standard) also make it possible to achieve high performance with reduced energy consumption, improving the Data Centre's PUE. The strength of the new **NRG** range is the high efficiency (KW/sq.m), obtained thanks to the precise internal design, a frame of just 890 mm in depth, and the careful choice of components.

Versatile and flexible range

The following refrigerating configuration options are available:

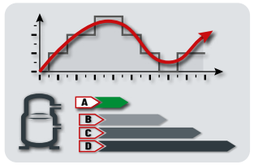
- NRG:**A** Air condensing with remote condenser.
- NRG:**W** Dry-Cooler or water condensing
- NRG:**Z** Mains water condensing (15°C).
- NRG:**F** Water condensing and indirect water free-cooling.
- NRG:**D** Air condensing with remote condenser and Dual Cooling.
- NRG:**K** Dry-Cooler or water condensing and Dual Cooling.
- NRG:**Q** Mains water condensing (15°C) and Dual Cooling.

The **NRG A** units are air-condensed perimeter-mounted units of the **NRG** range; they are widely used for the cooling of Data Centers. The air-condensed solution offers a simple system design, thanks to the absence of auxiliary circuits and pumps; the cooling circuit is managed by the cabinet, and both the indoor unit and the remote condenser are easy to install.

- Refrigerant R410A
- EC Fans
- Scroll inverter and on-off compressors
- Electronic expansion valves
- Advanced programmable microprocessor control with LCD display
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Long distance kits for optimal operation in the case of large distances between indoor and outdoor units
- Low temperature kits for optimal operation in the case of installation in particularly cold environments

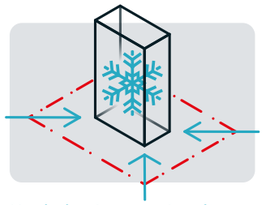


Power modulation

The **NRG A** units adapt quickly to Data Center cooling requests. Thanks to the inverter-controlled compressor, performance can be modulated to up to 25% of the rated value, thus reducing consumption. This ensures continuous operation of the unit even at low loads, without switching cycles on and off.

Aiming at maximised system efficiency

Design choices include, in addition to the use of electronically controlled expansion valves, the management of variable-speed scroll compressors and EC (electronically commutated) fans via Modbus. Thanks to these features it is possible to acquire, manage and adjust operating parameters and therefore thermo-hygrometric values in the server room very accurately, with high levels of energy efficiency.



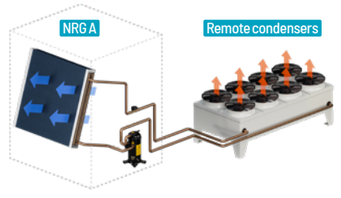
Maximised power density

The internal design and the special arrangement of the components of the TRF Evolution platform, used in the NRG units, have been designed to maximise the exchange surface of the evaporating coil. These characteristics, combined with the use of latest-generation electronic switching EC fans with high air flow rate, have allowed the power density to be increased. The space available in the server room is made the most of and this makes the **NRG A** units suitable for applications with high thermal load density, typical of latest generation Data Centres.

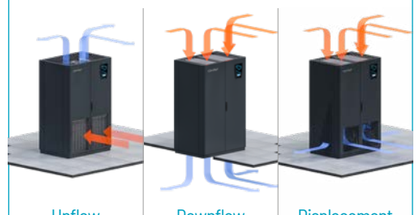
Remote Condensers

All units can be combined with HiRef remote condensers, choosing from different combinations to meet all system needs.
Oversize remote condensers are ideal for warmer environments, where it is necessary to keep the condensing temperature under control, while the compact condensers on the other hand are small in terms of both size and consumption. The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs.

AIR CONDENSED



AIRFLOW CONFIGURATIONS



NRG A		0091	0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962	1003	1103
		Air temperature 35°C Relative humidity 30% Outdoor air temp. 35°C															
Cooling capacity	[kW]	10,8	15,2	25	29,9	39,2	47,5	53,4	59	68,9	72,3	90	96,1	101,2	114,3	130,1	147,2
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		4,2	4,3	4,9	4,8	5,1	4,7	3,9	4,5	4,4	4,6	4,3	4,4	5	4,8	4,7	4
Total absorbed power	[kW]	2,8	3,9	6,4	7,4	9,5	12	15,5	15,4	17,8	18,6	25,1	26,5	26	29,6	33,6	42,3
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C															
Cooling capacity	[kW]	9,9	13,9	22,5	27	35,5	43,2	48,7	53,7	62,8	65,6	81,9	87,3	92	104,1	119	135,7
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,9	4,1	4,4	4,4	4,7	4,3	3,7	4,2	4,1	4,2	4	4,2	4,7	4,4	4,4	3,8
Total absorbed power	[kW]	2,7	3,8	6,3	7,4	9,4	11,8	15,1	15	17,5	18,4	24,5	25,9	25,6	29,3	33,1	41,7
		Air temp. 24°C Relative humidity 50% Outdoor air temp. 35°C															
Cooling capacity	[kW]	9,3	12,3	19,8	23,8	31,3	38,1	44	47,7	56,8	58,2	73,8	77,3	81,4	93,3	109,2	127
SHR		0,9	0,9	1	1	1	1	0,9	1	0,9	1	0,9	1	1	0,9	0,9	0,8
EER		3,7	3,7	4	4	4,2	3,9	3,5	3,9	3,8	3,8	3,7	3,8	4,2	4,1	4,1	3,6
Total absorbed power	[kW]	2,7	3,7	6,2	7,2	9,3	11,6	14,5	14,5	17,2	18	23,8	25,1	25,2	28,6	32,8	41,1
Rated air flow	m³/h	2150	3700	8800	8800	11720	11720	11720	14300	14300	17500	19900	23700	25300	25300	25300	25300
Lp @ Nominal rpm; dist.= 2 m Q=2	dB(A)	50	54	70	70	71	74	74	75	77	77	76	76	76	76	77	77
Dimensions (WxHxD)	mm	600x1875x600	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890				
Dimensions of Displacement version [WxHxD]	mm	600x2125x600	900x2125x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890				
Power supply	V/ph/Hz	400 / 3+N / 50															

Performance data relating to Downflow versions combined with standard HiRef remote condenser.
Also available with 60 Hz power supply
Height of Displacement models 2125 mm for sizes 0091-0131

Platform ***TRF Evolution***

DATA CENTER | INDUSTRIAL

NRG W/Z

WATER CONDENSED PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS

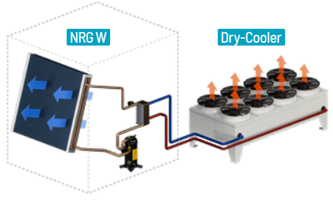
NRG W > 9 – 112 kW

NRG Z > 10 – 124 kW

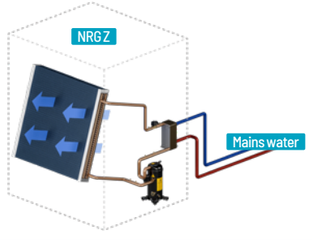
The **NRG W/Z** units are water-condensed perimeter cabinets. The **W series** uses Dry Cooler water, the **Z series** on the other hand uses low temperature mains water or groundwater (15°C). The **NRG** units of these series are monobloc units inside which the entire cooling circuit is concentrated, cooling is via a brazed plate exchanger made from stainless steel AISI 304.

- Refrigerant R410A
- EC Fans
- Scroll inverter and on-off compressors
- Electronic expansion valves
- Advanced programmable microprocessor control with LCD display
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

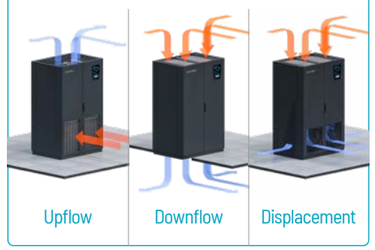
WATER CONDENSED



MAINS WATER CONDENSED

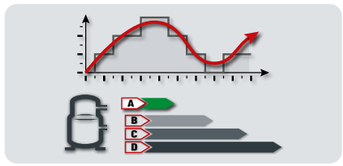


AIRFLOW CONFIGURATIONS



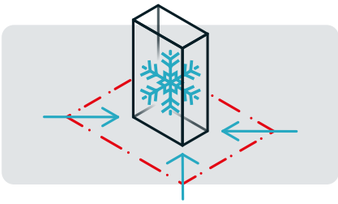
On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Low temperature kits for optimal operation in the case of installation in particularly cold environments



Power modulation

The **NRG AW/Z** units adapt quickly to Data Center cooling requests. Thanks to the inverter-controlled compressor, performance can be modulated to up to 25% of the rated value, thus reducing consumption. This ensures continuous operation of the unit even at low loads, without switching cycles on and off.



Maximised power density

The internal design and the special arrangement of the components of the TRF Evolution platform, used in the NRG units, have been designed to maximise the exchange surface of the evaporating coil. These characteristics, combined with the use of latest-generation electronic switching EC fans with high air flow rate, have allowed the power density to be increased. The space available in the server room is made the most of and this makes the **NRG W/Z** units suitable for applications with high thermal load density, typical of latest generation Data Centres.

Aiming at maximised system efficiency

Design choices include, in addition to the use of electronically controlled expansion valves, the management of variable-speed scroll compressors and EC (electronically commutated) fans via Modbus. Thanks to these features it is possible to acquire, manage and adjust operating parameters and therefore thermo-hygrometric values in the server room very accurately, with high levels of energy efficiency.

NRG W		0091	0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962
		Air temperature 35°C Relative humidity 30% Outdoor air temp. 40-45°C													
Cooling capacity	[kW]	10,3	14,8	26,4	31,3	41,3	47,1	54,6	58,8	67	71,2	88,1	94,8	105,4	112,1
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,6	4,1	6,1	5,8	6,2	5,1	4,6	4,9	4,5	4,9	4,4	4,7	5,8	5,1
Total absorbed power	[kW]	3,1	4	5,6	6,6	8,5	11	13,6	14,1	17,1	17,5	23,8	25	24	28
		Air temp. 30°C Relative humidity 35% Water 40-45°C													
Cooling capacity	[kW]	9,5	13,5	23,6	28,2	36,9	42,4	49,3	52,9	60,5	64,1	79,8	85,6	95	101,5
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,3	3,8	5,3	5,1	5,3	4,6	4,2	4,5	4,1	4,3	4,1	4,3	5,2	4,6
Total absorbed power	[kW]	3	4	5,7	6,7	8,7	11,1	13,5	14,1	17,2	17,6	23,6	24,7	24,2	28,1
		Air temperature 24°C Relative humidity 50% Water 40-45°C													
Cooling capacity	[kW]	8,8	11,9	20,4	24,5	32,2	37,1	44,1	46,3	54,3	56,3	71,3	74,8	82,8	90,1
SHR		0,9	0,9	1	1	1	1	0,9	1	0,9	1	0,9	1	1	0,9
EER		3,2	3,4	4,4	4,4	4,6	4	3,8	3,9	3,6	3,8	3,7	3,8	4,5	4,1
Total absorbed power	[kW]	3	3,9	5,8	6,8	8,8	11,1	13,5	14	17,1	17,6	23,4	24,5	24,4	28,1
Rated air flow	m³/h	2150	3700	8800	8800	11720	11720	11720	14300	14300	17500	19900	23700	25300	25300
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	50	54	70	70	71	74	74	75	77	77	76	76	76	76
Dimensions (WxHxD)	mm	600x1875x600	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Dimensions of Displacement version [WxHxD]	mm	600X2125X600	900X2125X600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Power supply	V/ph/Hz	400 / 3+N / 50													

NRG Z		0091	0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962
		Air temp. 35°C Relative humidity 30% Water 15-30°C													
Cooling capacity	[kW]	11,1	16,5	28,7	34,1	45	51,6	59,8	65	73,5	78,2	96,6	104,2	115,6	124
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		5,1	6,7	10,7	9,9	10,5	8,1	7	7,7	6,7	7,4	6,4	6,9	9,6	8
Total absorbed power	[kW]	2,3	2,8	3,9	4,7	6,1	8,2	10,4	10,7	13,2	13,5	19	20,1	17,9	21,3
		Air temp. 30°C Relative humidity 35% Water 15-30°C													
Cooling capacity	[kW]	10,3	14,9	26	31	40,8	46,6	54,2	58,9	66,8	70,7	88	94,9	105,1	112,4
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		4,8	6	8,9	8,4	8,9	7	6,2	6,8	6	6,5	5,9	6,3	8,3	7,1
Total absorbed power	[kW]	2,3	2,8	4,2	4,9	6,4	8,4	10,5	10,8	13,4	13,7	18,9	20	18,5	21,7
		Air temp. 24°C Relative humidity 50% Water 15-30°C													
Cooling capacity	[kW]	9,7	13,6	22,8	27,1	35,7	41,7	49,9	52,6	61,2	62,9	79,7	84,3	93,4	102,7
SHR		0,9	0,9	1	1	1	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
EER		4,5	5,5	7,2	6,9	7,3	6,1	5,7	6	5,4	5,7	5,4	5,6	7,1	6,4
Total absorbed power	[kW]	2,3	2,9	4,4	5,2	6,7	8,6	10,5	10,9	13,5	13,9	18,8	19,9	19	21,9
Rated air flow	m³/h	2150	3700	8800	8800	11720	11720	11720	14300	14300	17500	19900	23700	25300	25300
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	50	54	70	70	71	74	74	75	77	77	76	76	76	76
Dimensions (WxHxD)	mm	600x1875x600	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Dimensions of Displacement version [WxHxD]	mm	600x1875x600	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Power supply	V/ph/Hz	400 / 3+N / 50													

Performance data for Downflow versions. Also available with 60 Hz power supply.
Height of Displacement models 2125 mm for sizes 0091-0131.

Platform ***TRF Evolution***

DATA CENTER | INDUSTRIAL

NRG F

PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS WITH INDIRECT FREE-COOLING

11 - 99 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

EC RADIAL FANS

MODBUS

MODBUS CONTROLLED FANS

FAST RESTART

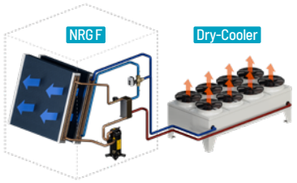
ON-BOARD HUMIDIFIER

INVERTER DRIVEN COMPRESSORS

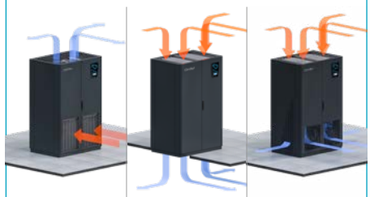
PLATE HEAT EXCHANGERS

NRG F units are water-condensed perimeter-mounted cabinets that are able to exploit the effect of indirect water-based Free-Cooling. The F Series uses Dry Cooler water as both a cooling source for free-cooling and a heat exchange fluid for condensing the cooling circuit. **NRG F** units are "monobloc" units inside which the entire cooling circuit is concentrated. Cooling is via a brazed plate exchanger made of stainless steel AISI 304.

INDIRECT WATER-SIDE FREE-COOLING



AIRFLOW CONFIGURATIONS

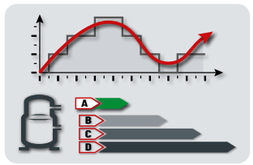


Upflow | Downflow | Displacement

- Refrigerant R410A
- EC Fans
- Scroll inverter and on-off compressors
- Electronic expansion valves
- Advanced programmable microprocessor control with LCD display
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

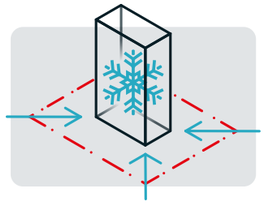
On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation



Power modulation

NRG F units adapt quickly to Data Center cooling requests. Thanks to the inverter-controlled compressor, performance can be modulated to up to 25% of the rated value, thus reducing consumption. This ensures continuous operation of the unit even at low loads, without switching cycles on and off.



Maximised power density

The internal design and the special arrangement of the components of the TRF Evolution platform, used in the **NRG** units, have been designed to maximise the exchange surface of the evaporating coil. These characteristics, combined with the use of latest-generation electronic switching EC fans with high air flow rate, have allowed the power density to be increased. The space available in the server room is made the most of and this makes the **NRG F** units suitable for applications with high thermal load density, typical of latest generation Data Centres.

Aiming at maximised system efficiency

Design choices include, in addition to the use of electronically controlled expansion valves, the management of variable-speed scroll compressors and EC (electronically commutated) fans via Modbus. Thanks to these features it is possible to acquire, manage and adjust operating parameters and therefore thermo-hygrometric values in the server room very accurately, with high levels of energy efficiency.

Maximum energy saving

In periods when the air outside is cooler than the warm air inside the Data Center, the cold water produced by the dry cooler directly feeds the heat exchange coil, which is able to provide a part or all of the required cooling capacity.
Before returning to the dry cooler, the water is reused inside the plate exchanger, serving the compressor. The entire process is regulated by a 3-way valve directly controlled by HiRef software, which maximizes the free-cooling effect and checks the cooling circuit. In this way the work of the compressor is significantly reduced, and shuts down when a state of Free Cooling is fully reached, with a significant reduction in the system's PUE.

NRG F		0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962
		Air temp. 35°C Relative humidity 30% Water 40-47°C / Water 17°C / Glycol 30%												
Cooling capacity	[kW]	13,9	24,3	28,6	36,6	41,6	47,6	54	61,2	63,6	75,8	85,4	93,2	99,2
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,7	5,2	5	5,1	4,3	3,9	4,4	4	4,2	3,7	4,2	4,9	4,3
Free cooling capacity	[kW]	9	23,5	24,9	33,6	35,5	36,6	48,2	49,7	56,6	58,4	77,5	77,5	79,9
SHR Freecooling		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	4,2	5,8	6,8	8,8	11,3	13,8	14,6	17,7	18	23	25,2	23,8	27,8
		Air temp. 30°C Relative humidity 35% Water 40-47°C / Water 12°C / Glycol 30%												
Cooling capacity	[kW]	12,6	21,9	25,7	32,9	37,3	43,1	48,7	55,5	57,8	68,9	77,7	84,2	89,5
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,4	4,6	4,4	4,5	3,8	3,6	4	3,6	3,8	3,4	3,8	4,4	3,9
Free cooling capacity	[kW]	8,8	22,6	24	31,5	34,4	35,3	45,5	48	53,5	56,4	73,2	75,2	77,3
SHR Freecooling		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	4,2	5,9	6,9	8,9	11,3	13,7	14,5	17,7	18	22,8	25	24	27,8
		Air temp. 24°C Relative humidity 50% Water 40-45°C / Water 7°C / Glycol 30%												
Cooling capacity	[kW]	11,4	19,3	22,9	29,3	33,7	39,9	43,7	51	51,8	64,2	69,7	76,2	82,7
SHR		0,9	1	1	1	0,9	0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,9
EER		3,2	4,1	4,1	4,1	3,6	3,4	3,7	3,4	3,5	3,3	3,6	4,1	3,7
Free cooling capacity	[kW]	8,8	22,5	24,6	33,3	36,3	39,3	48	54	56,4	65,8	80,4	80,4	86,8
SHR Freecooling		0,9	1	0,9	0,9	0,9	0,8	0,9	0,8	0,9	0,8	0,8	0,8	0,8
Total absorbed power	[kW]	4	5,8	6,8	8,7	11	13,3	14,1	17,3	17,5	22,1	24,2	23,3	27
Rated air flow	m³/h	3700	8000	8000	10800	10800	10800	14300	14300	16800	16800	23000	23000	23000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	54	70	70	70	74	74	75	77	77	75	76	75	75
Dimensions (WxHxD)	mm	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Dimensions of Displacement version [WxHxD]	mm	900x2125x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Power supply	V/ph/Hz	400 / 3+N / 50												

Performance data for Downflow versions. Also available with 60 Hz power supply.
Height of Displacement models 2125 mm for size 0131.

Platform ***TRF Evolution***

NRG D/K/Q

DATA CENTER **INDUSTRIAL**

DUALCOOLING PERIMETER MOUNTED UNITS FOR DATA CENTRES WITH MODULATING COMPRESSORS

NRG D > 12 - 99 kW

NRG K > 13 - 101 kW

NRG Q > 13 - 110 kW

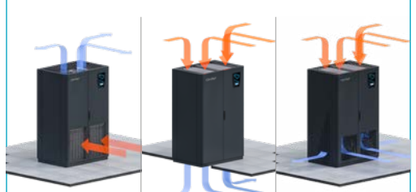
✱ *Only Mod. Q and K*

NRG D/K/Q units are Dual Cooling units. They combine the traditional evaporative coil of the cooling circuit with the cooling effect of chilled water, coming from an outdoor unit such as a chiller. The use of a dual source guarantees the continuity of supply to the system and the best operational solution in all cases, in order to minimize operating costs.

Remote condensers (version D only)

All **NRG D** units can be combined with HiRef remote condensers, choosing from different combinations to meet all system needs. Oversize remote condensers are ideal for warmer environments, where it is necessary to keep the condensing temperature under control, while the compact condensers on the other hand are small in terms of both size and consumption. The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs.

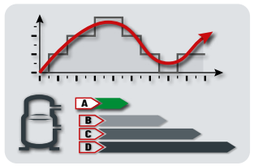
AIRFLOW CONFIGURATIONS



- Refrigerant R410A
- EC Fans
- Scroll inverter and on-off compressors
- Electronic expansion valves
- Advanced programmable microprocessor control with LCD display
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

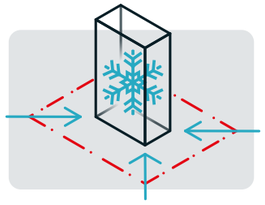
On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Low temperature kits for optimal operation in the case of installation in particularly cold environments
- Long distance kits for optimal operation in the case of large distances between indoor and outdoor units



Power modulation

The **NRG D/K/Q** units adapt quickly to Data Center cooling requests. Thanks to the inverter-controlled compressor, performance can be modulated to up to 25% of the rated value, thus reducing consumption. This ensures continuous operation of the unit even at low loads, without switching cycles on and off.



Maximised power density

The internal design and the special arrangement of the components of the TRF Evolution platform, used in the **NRG** units, have been designed to maximise the exchange surface of the evaporating coil. These characteristics, combined with the use of latest-generation electronic switching EC fans with high air flow rate, have allowed the power density to be increased. The space available in the server room is made the most of and this makes the **NRG D/K/Q** units suitable for applications with high thermal load density, typical of latest generation Data Centres.

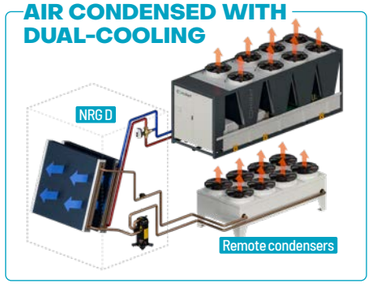
Aiming at maximised system efficiency

Design choices include, in addition to the use of electronically controlled expansion valves, the management of variable-speed scroll compressors and EC (electronically commutated) fans via Modbus. Thanks to these features it is possible to acquire, manage and adjust operating parameters and therefore thermo-hygrometric values in the server room very accurately, with high levels of energy efficiency.

Maximum flexibility

The Dual Cooling units combine the reliability of a dual source with the ease of operation of HiRef cabinets. The on-board control allows you to select the source according to different logics, at your discretion.

AIR CONDENSED WITH DUAL-COOLING



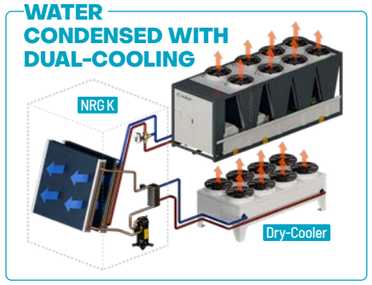
NRG D		0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962
		Air temp. 35°C Relative humidity 30% Outdoor air temp. 35°C / Water 15-20°C												
Cooling capacity	[kW]	14,4	23,5	27,9	36	41	46,1	52,9	61,4	63,3	75,7	85	90,4	98,9
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		4,2	4,6	4,6	4,7	4,1	3,5	4,1	4	4,1	3,7	4	4,3	4,3
Chilled water cooling capacity	[kW]	10,7	31,6	31,6	42,7	42,7	42,7	57,9	57,9	68	68	93,1	93,1	93,1
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	3,9	6,2	7,3	9,2	11,6	14,7	15,2	17,7	18,2	23,1	25,7	25,5	27,9
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C / Water 10-15°C												
Cooling capacity	[kW]	13	21,4	25,3	32,5	37,2	42	48,4	56,2	57,7	69,7	77,5	82,3	90,1
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,9	4,3	4,2	4,3	3,8	3,3	3,9	3,7	3,8	3,5	3,8	4,1	4
Chilled water cooling capacity	[kW]	10,5	31,4	31,4	42,3	42,3	42,3	57,5	57,5	67,5	67,5	92,4	92,4	92,4
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	3,8	6,1	7,2	9,1	11,4	14,3	14,8	17,4	17,9	22,5	25,1	25	27,4
		Air temp. 24°C Relative humidity 50% Outdoor air temp. 35°C / Water 7-12°C												
Cooling capacity	[kW]	11,7	18,8	22,4	28,8	33,4	38,5	43	51,3	51,6	64	69	73,6	82,8
SHR		0,9	1	1	1	0,9	0,9	1	0,9	0,9	0,8	0,9	0,9	0,9
EER		3,6	3,8	3,8	3,9	3,5	3,1	3,5	3,4	3,5	3,3	3,5	3,7	3,7
Chilled water cooling capacity	[kW]	8,2	29,1	29,1	40,8	40,8	40,8	56	56	65,8	65,8	90	90	90
Chilled Water SHR		1	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Total absorbed power	[kW]	3,7	6,1	7,1	8,9	11,2	14	14,4	17,2	17,6	22,1	24,5	24,5	26,9
Rated air flow	m³/h	3700	8000	8000	10800	10800	10800	14300	14300	16800	16800	23000	23000	23000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	54	70	70	70	74	74	75	77	77	75	76	75	75
Dimensions (WxHxD)	mm	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Dimensions of Displacement version [WxHxD]	mm	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Power supply	V/ph/Hz	400 / 3+N / 50												

Performance data relating to Downflow versions combined with standard HiRef remote condenser.
Also available with 60 Hz power supply.
Height of Displacement models 2125 mm for size 0131.

Platform ***TRF Evolution***

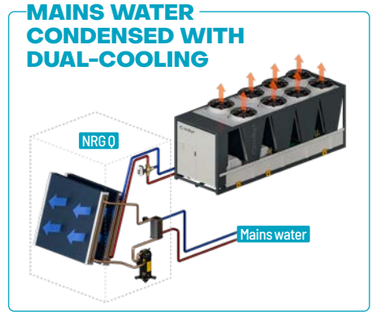
NRG D/K/Q

www.hiref.it



NRG K		0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962
		Air temp. 35°C Relative humidity 30% Water 40-45°C / Water 15-20°C												
Cooling capacity	[kW]	14,1	24,7	29,1	37,2	42,1	48,3	55,1	62,4	64,5	77	87	94,4	100,8
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,9	5,6	5,3	5,4	4,5	4,1	4,7	4,2	4,4	3,9	4,4	5,1	4,5
Chilled water cooling capacity	[kW]	10,7	31,6	31,6	42,7	42,7	42,7	57,9	57,9	68	68	93,1	93,1	93,1
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	4	5,6	6,6	8,5	10,9	13,3	14,1	17,2	17,4	22,3	24,5	23	26,9
		Air temp. 30°C Relative humidity 35% Water 40-45°C / Water 10-15°C												
Cooling capacity	[kW]	12,7	22,2	26,1	33,4	38,1	43,7	49,4	56,3	58,6	69,9	78,8	86	91
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		3,6	4,9	4,7	4,8	4,1	3,8	4,2	3,8	4	3,6	4	4,7	4,1
Chilled water cooling capacity	[kW]	10,5	31,4	31,4	42,3	42,3	42,3	57,5	57,5	67,5	67,5	92,4	92,4	92,4
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	4	5,7	6,7	8,6	10,9	13,3	14,1	17,2	17,4	22,2	24,3	23,2	26,9
		Air temp. 24°C Relative humidity 50% Water 40-45°C / Water 7-12°C												
Cooling capacity	[kW]	11,4	19,3	23	29,4	33,8	40,1	43,6	51,2	52	64,5	69,7	76	83,1
SHR		0,9	1	1	1	0,9	0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,9
EER		3,2	4,2	4,1	4,2	3,6	3,5	3,7	3,4	3,5	3,3	3,6	4,1	3,8
Chilled water cooling capacity	[kW]	8,2	29,1	29,1	40,8	40,8	40,8	56	56	65,8	65,8	90	90	90
Chilled Water SHR		1	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Total absorbed power	[kW]	4	5,8	6,7	8,6	10,9	13,2	14	17,2	17,4	22	24,1	23,2	26,8
Rated air flow	m³/h	3700	8000	8000	10800	10800	10800	14300	14300	16800	16800	23000	23000	23000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	54	70	70	70	74	74	75	77	77	75	76	75	75
Dimensions (WxHxD)	mm	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Dimensions of Displacement version [WxHxD]	mm	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Power supply	V/ph/Hz	400 / 3+N / 50												

Performance data for Downflow versions. Also available with 60 Hz power supply.
Height of Displacement models 2125 mm for size 0131.



NRG Q		0131	0201	0251	0301	0381	0441	0501	0551	0641	0701	0801	0852	0962
		Air temp. 35°C Relative humidity 30% Water 15-30°C / Water 15-20°C												
Cooling capacity	[kW]	15,4	26,9	31,7	40,5	45,7	52,7	60,2	67,7	70,7	83,3	94,9	103,8	110,3
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		6,3	9,5	8,7	8,8	6,8	6,1	7	6,1	6,5	5,6	6,3	8,2	6,9
Chilled water cooling capacity	[kW]	10,7	31,6	31,6	42,7	42,7	42,7	57,9	57,9	68	68	93,1	93,1	93,1
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	2,9	4	4,8	6,2	8,3	10,3	10,9	13,4	13,5	17,7	19,7	17,3	20,5
		Air temp. 30°C Relative humidity 35% Water 15-30°C / Water 10-15°C												
Cooling capacity	[kW]	13,9	24,5	28,8	36,7	41,7	48,2	54,9	61,8	64,3	76,6	86,5	94,1	101,1
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
EER		5,6	8	7,5	7,6	6,1	5,5	6,3	5,5	5,8	5,2	5,8	7,2	6,3
Chilled water cooling capacity	[kW]	10,5	31,4	31,4	42,3	42,3	42,3	57,5	57,5	67,5	67,5	92,4	92,4	92,4
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	2,9	4,2	5	6,4	8,4	10,3	10,9	13,5	13,7	17,5	19,6	17,7	20,7
		Air temp. 24°C Relative humidity 50% Water 15-30°C / Water 7-12°C												
Cooling capacity	[kW]	12,9	21,4	25,6	32,4	38	45,3	49,6	57,6	57,8	71,5	77,8	86,2	94,3
SHR		0,9	1	0,9	1	0,9	0,8	0,9	0,8	0,9	0,8	0,9	0,9	0,8
EER		5,2	6,6	6,4	6,4	5,5	5,2	5,7	5,1	5,2	4,8	5,2	6,5	5,8
Chilled water cooling capacity	[kW]	8,2	29,1	29,1	40,8	40,8	40,8	56	56	65,8	65,8	90	90	90
Chilled Water SHR		1	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Total absorbed power	[kW]	2,9	4,4	5,1	6,6	8,5	10,3	11	13,6	13,8	17,5	19,5	18	20,9
Rated air flow	m³/h	3700	8000	8000	10800	10800	10800	14300	14300	16800	16800	23000	23000	23000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	54	70	70	70	74	74	75	77	77	75	76	75	75
Dimensions (WxHxD)	mm	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Dimensions of Displacement version [WxHxD]	mm	900x1875x600	1010x2000x890		1270x2000x890			1760x2000x890		2020x2000x890		2510x2000x890		
Power supply	V/ph/Hz	400 / 3+N / 50												

Performance data for Downflow versions. Also available with 60 Hz power supply.
Height of Displacement models 2125 mm for size 0131.

DATA CENTER | INDUSTRIAL

TREF DX A

AIR CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS

23 – 135 kW

- LOW GWP REFRIGERANT
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- MODULATING HOT GAS POST-HEATING

The **TREF DX** series perimeter mounted units are direct expansion units with scroll on-off compressors designed to be installed in medium/large-sized premises such as server rooms and labs or for applications where accurate control of thermo-hygrometric parameters and round-the-clock operation are required. The top priority for internal design and for the choice of components is energy efficiency - to optimise the system overall electricity consumption with a positive impact on the Data Center Power Usage Effectiveness (PUE).

Versatile and flexible range

Thanks to different refrigerating configurations available, the **TREF DX** range is suitable for a number of applications in the field of Data Center air conditioning.

TREF A
Air condensing with remote condenser

TREF W
Dry-Cooler or Evaporative tower water condensing

TREF Z
Mains water condensing (15°C)

TREF F
Water condensing and indirect water free-cooling

TREF D
Air condensing with remote condenser and Dual Cooling

TREF K
Dry-Cooler or Evaporative tower water condensing and Dual Cooling

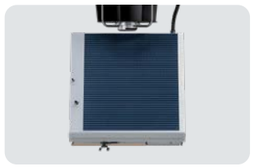
TREF Q
Mains water condensing (15°C) and Dual Cooling

TREF DX A units are air-condensed perimeter-mounted units in the TREF range; they are widely used for the cooling of Data Centers. The air-condensed solution offers a simple system design, thanks to the absence of auxiliary circuits and pumps; the cooling circuit is managed by the cabinet, and both the indoor unit and the remote condenser are easy to install.

- Refrigerant R410A: Also available with R513A and R134a
- EC Fans
- Scroll compressors
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Electronic expansion valves
- Long distance kits for optimal operation in the case of large distances between indoor and outdoor units
- Low temperature kits for optimal operation in the case of installation in particularly cold environments



Safety in the server room

All models in the **TREF DX A** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. All **TREF DX A** units are available with R134a and R513A refrigerants.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

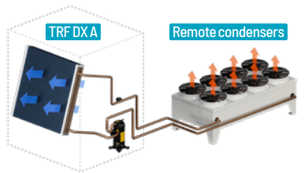
Dual circuit

Double-circuit versions are already available at low power levels. This solution offers maximum unit redundancy and ensures continuity of service, more precise refrigerating power and less absorption for partial Data Center loads.

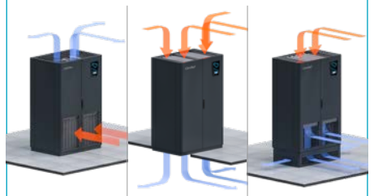
Remote Condensers

All units can be combined with HiRef remote condensers, choosing from different combinations to meet all system needs.
Oversize remote condensers are ideal for warmer environments, where it is necessary to keep the condensing temperature under control, while the compact condensers on the other hand are small in terms of both size and consumption. The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs.

AIR CONDENSED



AIRFLOW CONFIGURATIONS



TREF DX A		0201	0251	0281	0311	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762	0852	1002	1204
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C																	
Cooling capacity	[kW]	25,6	28,7	33	36,4	45,5	30,1	41	44,5	48,6	52,8	62,3	67,5	70,8	81,3	88,3	97,7	106,8	134,7
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		4,1	4,6	4,3	4,6	4,2	4,9	4,8	4,3	4,1	4	4,2	3,9	4	4,2	3,9	4,5	4,2	3,9
Total absorbed power	[kW]	7,3	7,3	8,9	9,3	12,7	8,1	10,4	12,3	14	15,2	17,5	19,8	20,7	22,4	25,6	24,9	28,9	37,5
		Air temp. 24°C Relative humidity 50% Outdoor air temp. 35°C																	
Cooling capacity	[kW]	22,8	26,1	30,2	34,1	41,4	27,4	35,8	39,1	44,1	49	58,3	63,8	65	75,6	83,1	89,6	98,7	126,6
SHR		1	0,9	0,9	0,9	1	1	1	1	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,8
EER		3,8	4,3	4	4,3	3,9	4,5	4,4	3,9	3,8	3,8	4	3,8	3,8	4	3,7	4,2	4	3,7
Total absorbed power	[kW]	7,1	7,2	8,8	9,2	12,5	8,1	10,2	12	13,7	15	17,3	19,6	20,3	22	25,4	24,6	28,2	37,3
Rated air flow	m³/h	6800	6800	7280	7280	12950	12950	12950	12950	12950	12950	14150	14150	19415	19415	19415	21500	21500	24000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	55	56	58	58	63	59	61	62	65	65	67	67	68	68	68	76	76	80
Dimensions (WxHxD)	mm	1010x2000x805		1270x2000x805		1760x2000x805						2020x2000x805		2510x2000x805			2510x2000x950		3160x2000x950
Dimensions of Displacement version [WxHxD]		1010x2250x805		1270x2250x805		1760x2250x805						2020x2250x805		2510x2250x805			2510x2250x950		3160x2250x950
Power supply	V/ph/Hz	400 / 3+N / 50																	

Also available in 60 Hz power supply.
Performance data relating to Downflow versions with R410A refrigerant combined with standard HiRef remote condensers.
Height of Displacement models 2250 mm.

DATA CENTER | INDUSTRIAL

TREF DX W/Z

WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS

TREF DX W > 23 – 138 kW

TREF DX Z > 27 – 153 kW

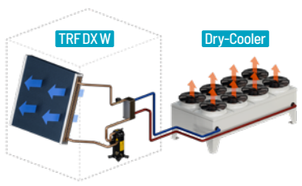
- LOW GWP REFRIGERANT
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- MODULATING HOT GAS POST-HEATING
- PLATE HEAT EXCHANGERS

TREF DX W/Z units are water-condensed perimeter-mounted cabinets. The **W series** uses Dry Cooler water. The **Z series** uses low temperature mains water or groundwater (15°C). The TREF units of this series are "monobloc" units inside which the entire cooling circuit is concentrated. Cooling is via a brazed plate exchanger made of stainless steel AISI 304.

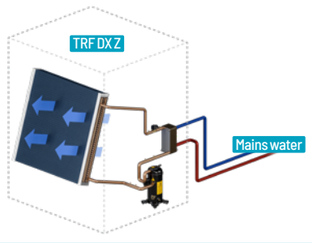
Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

WATER CONDENSED



MAINS WATER CONDENSED



- Refrigerant R410A: Also available with R513A and R134a
- EC Fans
- Scroll compressors
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Low temperature kits for optimal operation in the case of installation in particularly cold environments
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Electronic expansion valves

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

Safety in the server room

All models in the **TREF DX W/ Z** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

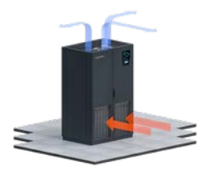
Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. All **TREF DX W/Z** units are available with R134a and R513A refrigerants.

Dual circuit

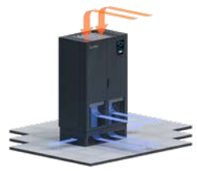
Double-circuit versions are already available at low power levels. This solution offers maximum unit redundancy and ensures continuity of service, more precise refrigerating power and less absorption for partial Data Center loads.

AIRFLOW CONFIGURATIONS



Upflow

Downflow



Displacement

TREF DX W		0201	0251	0281	0311	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762	0852	1002	1204
		Air temp. 30°C Relative humidity 35% Water 40-45°C																	
Cooling capacity	[kW]	26,3	28,2	32,5	34,9	48,5	30,8	39,2	44,4	48,5	52,2	59,4	65,5	71,9	77,6	84,6	93,7	104,8	137,9
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
EER		4,7	4,7	4,6	4,4	4,7	5,3	5	4,6	4,3	4,3	4,2	4,1	4,5	4,2	4	4,7	4,3	4,2
Total absorbed power	[kW]	6,7	7,1	8,3	9,2	12,4	7,8	9,9	11,6	13,2	14,1	16,8	18,6	18,9	21,4	24	23,3	27,4	36
		Air temperature 24°C Relative humidity 50% Water 40-45°C																	
Cooling capacity	[kW]	23,4	25,6	29,6	32,6	43,8	28,1	34,5	39,5	43,6	48	54,9	61,2	65,2	71,9	79	84,7	96,5	128,8
SHR		1	0,9	0,9	0,9	1	1	1	1	0,9	0,9	0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,8
EER		4,2	4,2	4,2	4,1	4,2	4,8	4,4	4,1	3,9	3,9	3,9	3,8	4,1	3,9	3,8	4,3	4	3,9
Total absorbed power	[kW]	6,7	7,2	8,4	9,3	12,4	7,9	9,9	11,6	13,2	14,2	16,8	18,7	19,1	21,4	24	23,1	27,2	36,1
Rated air flow	m³/h	6800	6800	7280	7280	12950	12950	12950	12950	12950	12950	14150	14150	19415	19415	19415	21500	21500	24000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	55	56	58	58	63	59	61	62	65	65	67	67	68	68	68	76	76	80
Dimensions (WxHxD)	mm	1010x2000x805		1270x2000x805		1760x2000x805						2020x2000x805		2510x2000x805			2510x2000x950		3160x 2000x 950
Dimensions of Displacement version [WxHxD]	mm	1010x2250x805		1270x2250x805		1760x2250x805						2020x2250x805		2510x2250x805			2510x2250x950		3160x 2250x 950
Power supply	V/ph/Hz	400 / 3+N / 50																	

TREF DX Z		0201	0251	0281	0311	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762	0852	1002	1204
		Air temp. 30°C Relative humidity 35% Water 15-30°C																	
Cooling capacity	[kW]	29,8	31,6	35	37,4	53,3	35,5	43	49,7	56,4	57,6	66,8	72,5	80,6	87,4	96,5	106,1	118,1	153,1
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0,9
EER		7,2	7,8	7,1	6,7	7,4	8,2	7,4	7,1	6,8	6,9	6,6	6,3	7,2	6,8	6,6	6,9	6,7	6,8
Total absorbed power	[kW]	5,3	5,2	6,3	6,9	9,4	6,4	7,9	9,1	10,4	10,4	12,8	14,1	14,4	16,1	18	18,9	21,1	25,2
		Air temp. 24°C Relative humidity 50% Water 15-30°C																	
Cooling capacity	[kW]	27,3	29,3	32,8	35,3	49,5	30,8	38,2	45	52,4	54,2	62,9	68,4	75,4	82,4	90,8	98,7	110,7	144,1
SHR		0,9	0,9	0,9	0,8	0,9	1	1	0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,9	0,9	0,8	0,8
EER		6,6	7	6,5	6,2	6,7	7,1	6,6	6,4	6,3	6,4	6,1	5,9	6,7	6,4	6,1	6,6	6,3	6,3
Total absorbed power	[kW]	5,3	5,3	6,4	7	9,5	6,5	7,9	9,1	10,4	10,6	13	14,3	14,6	16,2	18,2	18,6	21,2	25,6
Rated air flow	m³/h	6800	6800	7280	7280	12950	12950	12950	12950	12950	12950	14150	14150	19415	19415	19415	21500	21500	24000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	55	56	58	58	63	59	61	62	65	65	67	67	68	68	68	76	76	80
Dimensions (WxHxD)	mm	1010x2000x805		1270x2000x805		1760x2000x805						2020x2000x805		2510x2000x805			2510x2000x950		3160x 2000x 950
Dimensions of Displacement version [WxHxD]	mm	1010x2250x805		1270x2250x805		1760x2250x805						2020x2250x805		2510x2250x805			2510x2250x950		3160x 2250x 950
Power supply	V/ph/Hz	400 / 3+N / 50																	

Also available in 60 Hz power supply. / Performance data relating to Downflow versions with R410A refrigerant. / Height of Displacement models 2250 mm.

DATA CENTER | INDUSTRIAL

TREF DX F

PERIMETER-MOUNTED UNITS FOR DATA CENTERS WITH INDIRECT FREE-COOLING

21 – 123 kW

LOW GWP REFRIGERANT

MULTI-PROTOCOL COMMUNICATION INTERFACE

SCROLL COMPRESSORS

EC RADIAL FANS

MODBUS CONTROLLED FANS

FAST RESTART

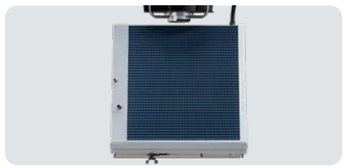
ON-BOARD HUMIDIFIER

PLATE HEAT EXCHANGERS

TREF DX F units are water-condensed perimeter-mounted cabinets that are able to exploit the effect of indirect water-based Free-Cooling. The F Series uses Dry Cooler water as both a cooling source for free-cooling and a heat exchange fluid for condensing the cooling circuit. TREF F units are "monobloc" units inside which the entire cooling circuit is concentrated. Cooling is via a brazed plate exchanger made of stainless steel AISI 304.

Maximum energy saving

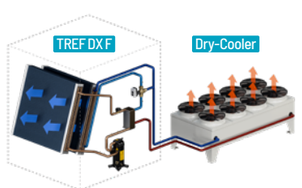
In periods when the air outside is cooler than the warm air inside the Data Center, the cold water produced by the dry cooler directly feeds the heat exchange coil, which is able to provide a part or all of the required cooling capacity.
Before returning to the dry cooler, the water is reused inside the plate exchanger, serving the compressor. The entire process is regulated by a 3-way valve directly controlled by HiRef software, which maximizes the free cooling effect and checks the cooling circuit. In this way the work of the compressor is significantly reduced, and shuts down when a state of Free Cooling is fully reached, with a significant reduction in the system's PUE.



Safety in the server room

All models in the **TREF DX F** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

INDIRECT WATER-SIDE FREE-COOLING



- Refrigerant R410A: Also available with R513A and R134a
- EC Fans
- Scroll compressors
- Advanced control comes as standard
- Temperature control through heating and post-heating systems with electric heating elements
- Humidity control through dehumidification and humidification
- Broad choice of accessories, including base modules and plenums for ducting

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Electronic expansion valves

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. All **TREF DX F**units are available with R134a and R513A refrigerants.

Dual circuit

Double-circuit versions are already available at low power levels. This solution offers maximum unit redundancy and ensures continuity of service, more precise refrigerating power and less absorption for partial Data Center loads.

AIRFLOW CONFIGURATIONS

Upflow | Downflow | Displacement

TREF DX F		0201	0251	0281	0311	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762	0852	1002	1204
		Air temp. 30°C Relative humidity 35% Water 40-47°C / Water 12°C / Glycol 30%																	
Cooling capacity	[kW]	23,3	25,6	30,1	32,8	46,4	27,9	37,9	42	47	51	58,8	64,4	71,1	76,7	83,4	84,4	93,2	123,6
SHR		1	1	1	1	1	1	1	1	1	1	1	0,9	1	1	1	1	1	0,9
EER		4	4	4,1	3,9	4,3	4,6	4,6	4,2	4	4	4	3,8	4,3	4	3,8	4,1	3,8	3,5
Free cooling capacity	[kW]	25	26	31,5	32,7	51,7	40,1	47,8	49,8	51,7	53,6	60,4	62,7	78,3	81,3	84,3	96,5	104	119,1
SHR Freecooling		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	7,1	7,5	8,7	9,6	13,1	8,3	10,5	12,3	14	15	17,6	19,5	20,1	22,6	25,3	24,1	28,3	37,6
		Air temp. 24°C Relative humidity 50% Water 40-45°C / Water 7°C / Glycol 30%																	
Cooling capacity	[kW]	21,1	23,6	28,2	31,1	42,5	25,9	33,7	37,7	43	47,4	55,5	61,2	65,5	71,8	79,4	78,7	87,8	118,3
SHR		0,9	0,9	0,8	0,8	0,9	1	1	0,9	0,9	0,9	0,8	0,8	0,9	0,8	0,8	0,9	0,8	0,8
EER		3,7	3,8	3,9	3,9	4	4,4	4,2	3,9	3,8	3,8	3,9	3,8	4,1	3,9	3,8	4	3,7	3,5
Free-cooling capacity	[kW]	27,1	27,1	32,8	34,7	54,8	42,5	48,1	51,8	54,8	60,8	62,8	66,5	86,2	86,2	91	106,3	112,1	142,9
SHR Freecooling		0,9	0,9	0,9	0,9	0,9	1	1	0,9	0,9	0,8	0,9	0,9	0,9	0,9	0,8	0,8	0,8	0,8
Total absorbed power	[kW]	6,8	7,3	8,4	9,3	12,7	8,2	10,2	11,9	13,6	14,5	17,1	18,9	19,6	21,9	24,5	23,3	27,3	36,5
Rated air flow	m³/h	6800	6800	7280	7280	12950	12950	12950	12950	12950	12950	14150	14150	19415	19415	19415	21500	21500	24000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	56	57	59	59	64	60	62	63	66	66	68	68	69	69	69	77	77	81
Dimensions (WxHxD)	mm	1010x2000x805		1270x2000x805		1760x2000x805						2020x2000x805		2510x2000x805			2510x2000x950		3160x 2000x 950
Dimensions of Displacement version [WxHxD]	mm	1010x2250x805		1270x2250x805		1760x2250x805						2020x2250x805		2510x2250x805			2510x2250x950		3160x 2250x 950
Power supply	V/ph/Hz	400 / 3+N / 50																	

Also available in 60 Hz power supply. / Performance data relating to Downflow versions with R410A refrigerant. / Height of Displacement models 2250 mm

DATA CENTER | INDUSTRIAL

TREF DX D/K/Q

DUALCOOLING PERIMETER MOUNTED UNITS FOR DATA CENTERS

TREF DX D > 21 – 124 kW

TREF DX K > 21 – 126 kW

TREF DX Q > 25 – 143 kW

- LOW GWP REFRIGERANT
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- PLATE HEAT EXCHANGERS *

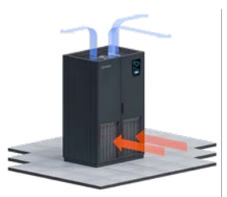
* Only Mod. Q and K

TREF DX D/K/Q units are Dual Cooling units. They combine the traditional evaporative coil of the cooling circuit with the cooling effect of chilled water coming from an outdoor unit such as a chiller. The use of a dual source guarantees the continuity of supply to the system and the best operational solution in all cases, in order to minimize operating costs.

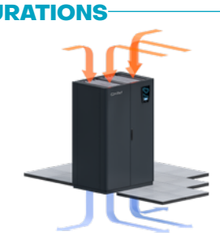
Remote Condensers

All **TREF DX D** units can be combined with HiRef remote condensers, choosing from different combinations to meet all system needs.
Oversize remote condensers are ideal for warmer environments, where it is necessary to keep the condensing temperature under control, while the compact condensers on the other hand are small in terms of both size and consumption. The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs.

AIRFLOW CONFIGURATIONS



Upflow



Downflow

Displacement

- Refrigerant R410A: Also available with R513A and R134a
- EC Fans
- Scroll compressors
- Advanced control comes as standard
- Temperature control through heating and post-heating systems with electric heating elements
- Humidity control through dehumidification and humidification
- Broad choice of accessories, including base modules and plenums for ducting

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Electronic expansion valves
- Low temperature kits for optimal operation in the case of installation in particularly cold environments
- Long distance kits for optimal operation in the event of large distances between indoor and outdoor units*

Safety in the server room

All models in the **TREF D/K/Q** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Maximum flexibility

The Dual Cooling units combine the reliability of a dual source with the ease of operation of HiRef cabinets. On-board controls allow you to select the source according to different logics, at your discretion.

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. All **TREF DX D/K/Q** units are available with R134a and R513A refrigerants.

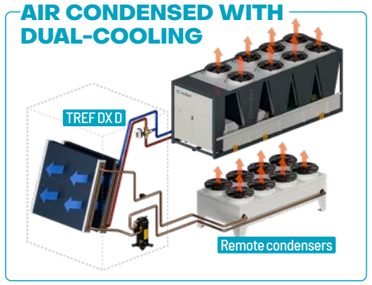
Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

Dual circuit

Double-circuit versions are already available at low power levels. This solution offers maximum unit redundancy and ensures continuity of service, more precise refrigerating power and less absorption for partial Data Center loads.

AIR CONDENSED WITH DUAL-COOLING

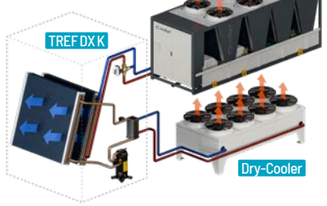


TREF DX D		0201	0251	0281	0311	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762	0852	1002	1204
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C / Water 10-15°C																	
Cooling capacity	[kW]	23,1	25,8	29,8	33,2	46,3	27,8	37,5	41,1	46,5	49,9	58,9	63,6	69,6	76,9	82,6	85,8	93,2	124,3
SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0,9
EER		3,8	4,2	3,9	4	4,3	4,5	4,5	3,9	3,9	3,8	4	3,7	4	4	3,7	4,3	3,8	3,6
Chilled water cooling capacity	[kW]	29,9	29,9	36,3	36,3	61,5	61,5	61,5	61,5	61,5	61,5	67	67	90,6	90,6	90,6	115,1	115,1	128,3
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	7,3	7,3	8,9	9,5	13	8,4	10,6	12,8	14,2	15,5	17,6	20	21	22,6	25,8	23,5	28,3	37,4
		Air temp. 24°C Relative humidity 50% Outdoor air temp. 35°C / Water 7-12°C																	
Cooling capacity	[kW]	20,7	23,8	27,5	31	42,3	25,6	33,4	36,6	42	46,3	54,9	60	63,3	71,4	77,4	79,2	86,8	117,3
SHR		0,9	0,9	0,9	0,8	0,9	1	1	1	0,9	0,9	0,8	0,8	0,9	0,9	0,8	0,9	0,8	0,8
EER		3,5	3,9	3,7	3,8	4	4,2	4,1	3,5	3,6	3,6	3,7	3,5	3,7	3,8	3,5	4	3,6	3,4
Chilled water cooling capacity	[kW]	23,2	23,2	23,5	23,5	48,1	48,1	48,1	48,1	48,1	48,1	45	45	67,8	67,8	67,8	86,1	86,1	109,2
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0,9	0,9	0,9
Total absorbed power	[kW]	7,1	7,3	8,8	9,4	12,8	8,3	10,4	12,5	13,9	15,2	17,4	19,8	20,6	22,3	25,5	23,1	27,6	36,9
Rated air flow	m³/h	6800	6800	7280	7280	12950	12950	12950	12950	12950	12950	14150	14150	19415	19415	19415	21500	21500	24000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	56	57	59	59	64	60	62	63	66	66	68	68	69	69	69	77	77	81
Dimensions (WxHxD)	mm	1010x2000x805		1270x2000x805		1760x2000x805						2020x2000x805		2510x2000x805			2510x2000x950		3160x 2000x 950
Dimensions of Displacement version [WxHxD]	mm	1010x2250x805		1270x2250x805		1760x2250x805						2020x2250x805		2510x2250x805			2510x2250x950		3160x 2250x 950
Power supply	V/ph/Hz	400 / 3+N / 50																	

Also available in 60 Hz power supply.
Performance data relating to Downflow versions with R410A refrigerant combined with standard HiRef remote condensers.
Height of Displacement models 2250 mm.

TREF DX D/K/Q

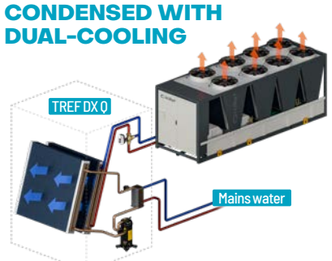
WATER CONDENSED WITH DUAL-COOLING



TREF DX K		0201	0251	0281	0311	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762	0852	1002	1204
		Air temp. 30°C Relative humidity 35% Water 40-45°C / Water 10-15°C																	
Cooling capacity	[kW]	23,9	26	30,6	33,5	47,1	28,8	38,5	43,1	47,7	51,8	60,2	65,9	72,1	77,8	85,4	85,8	95,1	126,4
SHR		1	1	1	1	1	1	1	1	1	1	1	0,9	1	1	1	1	1	0,9
EER		4,3	4,3	4,3	4,2	4,5	4,9	4,9	4,5	4,2	4,3	4,2	4,1	4,5	4,2	4,1	4,3	4	3,8
Chilled water cooling capacity	[kW]	29,9	29,9	36,3	36,3	61,5	61,5	61,5	61,5	61,5	61,5	67	67	90,6	90,6	90,6	115,1	115,1	128,3
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	0,9	1	1	1	1	1	0,9
Total absorbed power	[kW]	6,8	7,3	8,4	9,3	12,6	8,1	10,1	11,8	13,5	14,4	17	18,8	19,4	21,8	24,4	23,3	27,4	36,2
		Air temp. 24°C Relative humidity 50% Water 40-45°C / Water 7-12°C																	
Cooling capacity	[kW]	21,2	23,7	28,3	31,3	42,4	26	33,9	38	43	47,7	55,7	61,5	65,3	72,1	79,8	79,1	88,3	118,9
SHR		0,9	0,9	0,8	0,8	0,9	1	1	0,9	0,9	0,9	0,8	0,8	0,9	0,8	0,8	0,9	0,8	0,8
EER		3,8	3,9	4	3,9	4,1	4,4	4,3	4	3,8	3,9	3,9	3,8	4,1	3,9	3,8	4	3,7	3,6
Chilled water cooling capacity	[kW]	23,2	23,2	23,5	23,5	48,1	48,1	48,1	48,1	48,1	48,1	45	45	67,8	67,8	67,8	86,1	86,1	109,2
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0,9	0,9	0,9
Total absorbed power	[kW]	6,8	7,3	8,4	9,3	12,7	8,1	10,1	11,8	13,5	14,4	17	18,8	19,5	21,8	24,4	23,1	27,1	36,3
Rated air flow	m³/h	6800	6800	7280	7280	12950	12950	12950	12950	12950	12950	14150	14150	19415	19415	19415	21500	21500	24000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	56	57	59	59	64	60	62	63	66	66	68	68	69	69	69	77	77	81
Dimensions (WxHxD)	mm	1010x2000x805		1270x2000x805		1760x2000x805						2020x2000x805		2510x2000x805			2510x2000x950		3160x 2000x 950
Dimensions of Displacement version [WxHxD]	mm	1010x2250x805		1270x2250x805		1760x2250x805						2020x2250x805		2510x2250x805			2510x2250x950		3160x 2250x 950
Power supply	V/ph/Hz	400 / 3+N / 50																	

Also available in 60 Hz power supply.
Performance data for Downflow versions.
Height of Displacement models 2250 mm.

MAINS WATER CONDENSED WITH DUAL-COOLING



TREF DX Q		0201	0251	0281	0311	0401	0272	0302	0362	0422	0452	0532	0592	0602	0692	0762	0852	1002	1204
		Air temp. 30°C Relative humidity 35% Water 15-30°C / Water 10-15°C																	
Cooling capacity	[kW]	27,2	28,7	34,1	37,4	52,3	34,9	44,6	49,4	54,4	57,9	67,1	73,6	79,3	87	95,6	95,2	105,4	143,3
SHR		1	1	0,9	0,9	1	1	1	1	1	1	0,9	0,9	1	1	0,9	1	0,9	0,9
EER		6,6	6,9	6,8	6,6	7,2	8,1	7,7	7,1	6,6	7	6,6	6,4	7,1	6,8	6,5	6,3	6	6,3
Chilled water cooling capacity	[kW]	29,9	29,9	36,3	36,3	61,5	61,5	61,5	61,5	61,5	61,5	67	67	90,6	90,6	90,6	115,1	115,1	128,3
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total absorbed power	[kW]	5,3	5,4	6,3	7	9,5	6,5	8	9,2	10,5	10,6	12,9	14,2	14,7	16,3	18,3	18,5	21,1	25,7
		Air temp. 24°C Relative humidity 50% Water 15-30°C / Water 7-12°C																	
Cooling capacity	[kW]	24,9	26,9	31,9	35	48,6	30,6	39,5	45,1	50,6	54,1	63,2	68,8	74,1	81,9	90,2	89	98,7	136,2
SHR		0,8	0,8	0,8	0,8	0,8	1	0,9	0,9	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,7
EER		6	6,3	6,2	6,1	6,6	7	6,8	6,4	6,1	6,4	6,1	5,9	6,5	6,3	6	6	5,6	5,9
Chilled water cooling capacity	[kW]	23,2	23,2	23,5	23,5	48,1	48,1	48,1	48,1	48,1	48,1	45	45	67,8	67,8	67,8	86,1	86,1	109,2
Chilled Water SHR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0,9	0,9	0,9
Total absorbed power	[kW]	5,3	5,4	6,4	7	9,6	6,6	8	9,2	10,5	10,7	13	14,3	14,9	16,5	18,4	18,3	21,1	25,8
Rated air flow	m³/h	6800	6800	7280	7280	12950	12950	12950	12950	12950	12950	14150	14150	19415	19415	19415	21500	21500	24000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	56	57	59	59	64	60	62	63	66	66	68	68	69	69	69	77	77	81
Dimensions (WxHxD)	mm	1010x2000x805		1270x2000x805		1760x2000x805						2020x2000x805		2510x2000x805			2510x2000x950		3160x 2000x 950
Dimensions of Displacement version [WxHxD]	mm	1010x2250x805		1270x2250x805		1760x2250x805						2020x2250x805		2510x2250x805			2510x2250x950		3160x 2250x 950
Power supply	V/ph/Hz	400 / 3+N / 50																	

Also available in 60 Hz power supply.
Performance data relating to Downflow versions with R410A refrigerant.
Height of Displacement models 2250 mm.

DATA CENTER INDUSTRIAL

JREF CW
Radial

CHILLED WATER PERIMETER-MOUNTED UNITS FOR DATA CENTERS

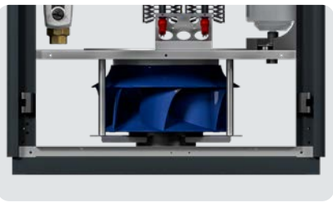
15 – 33 kW

- MULTI-PROTOCOL COMMUNICATION INTERFACE
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- DOUBLE CIRCUIT

The **JREF CW Radial** series perimeter mounted units are chilled water units with EC radial fans for small-sized premises such as server rooms and labs or for applications where accurate control of thermo-hygrometric parameters and round-the-clock operation are required. In-depth CFD (computational fluid dynamics) analysis has allowed for the meticulous design of every last constructive detail to minimise air pressure drops and, therefore, fan power consumption. Air through-flow sections have been expanded to make installation and maintenance operations faster and easier.

Extended filter section

Air filters, located on the entire surface of the coil, maximize the filtering section and minimize the unit's air pressure drops.



Ventilation adjustment

The most suitable on-board ventilation system can be chosen based on the air distribution logic in the server room, guaranteeing a constant flow of air (airflow control) or a constant available overlap (Δp control); the latter is particularly useful when using a floating floor.

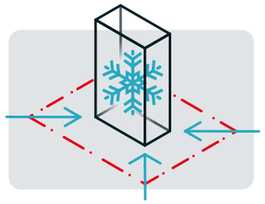
AIRFLOW CONFIGURATIONS

Upflow | Downflow | Displacement

- Temperature control through heating and post-heating systems using electric heating elements, additional hot water coil, or both
- Humidity control through dehumidification and humidification
- Humidifier installed on board the machine
- Fan speed modulation based on the thermal load (constant ΔT)
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Instant reading of water flow rate, water inlet and outlet temperatures, or cooling capacity

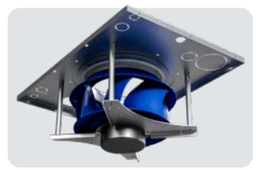


High power density

The reduced footprint and high efficiency offer higher cooling capacity. In this way the space dedicated to the units in the Data Center is minimized, making the most of available spaces.

Double circuit

Chilled water units are also available with a double circuit. In this version the supply is via two different hydraulic circuits that can offer the utmost operational continuity if one of the two circuits malfunctions. Each circuit is equipped with a regulating valve.



Ventilation EC

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Finned pack coil with hydrophilic coating

All models in the **JREF CW Radial** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection and outflow during the dehumidification process, preventing any dripping on the inside and outside of the unit.

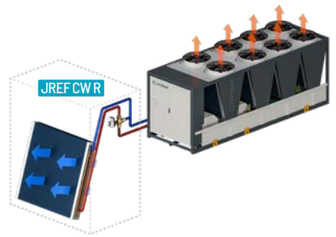
Numerous types of valves for accurate adjustment

All units in the **JREF CW Radial** range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system or with servo motor with spring return. Pressure-independent valves can also be fitted on request. All these types of valves ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components. This makes routine maintenance easier in full compliance with safety standards.

CHILLED WATER



JREF CW Radial		0150	0170	0210	0250	0270	0320
		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 20°C Glycol 0%					
Cooling capacity	[kW]	17,8	20,3	22	27,6	31,5	32,9
SHR		1	1	1	1	1	1
EER		22,3	25,4	24,4	23	26,3	29,9
		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 15°C Glycol 0%					
Cooling capacity	[kW]	17,7	20,2	21,9	27,4	31,4	32,9
SHR		1	1	1	1	1	1
EER		22,1	25,3	24,3	22,8	26,2	29,9
		Air temp. 24°C Relative humidity 50% - Water temp. In 7°C Out 12°C Glycol 0%					
Cooling capacity	[kW]	14,6	17	21,2	24,8	27,2	31,7
SHR		0,9	0,9	0,8	0,8	0,9	0,8
EER		18,3	21,3	23,6	20,7	22,7	28,8
Rated air flow	m³/h	4130	4130	4130	6130	6060	5930
Total fan absorbed power	[kW]	0,8	0,8	0,9	1,2	1,2	1,1
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	59	60	61	62	62	62
Dimensions (WxHxD)	mm	600x2000x600			900x2000x600		
Dimensions of Displacement version [WxHxD]	mm	600x2100x600			900x2100x600		
Power supply	V/ph/Hz	400/3+N/50					

Performance data for Downflow versions.
Also available in 60 Hz power supply.
Height of Displacement models 2100 mm.

DATA CENTER | INDUSTRIAL

JREF DX A
Radial

WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS

6 – 25 kW

- LOW GWP REFRIGERANT
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- MODULATING HOT GAS POST-HEATING

The **JREF DX Radials** series perimeter mounted units are direct expansion units with EC radial fans designed to be installed in small-sized premises such as server rooms and labs or for applications where accurate control of thermo-hygrometric parameters and round-the-clock operation are required. The top priority for internal design and for the choice of components is energy efficiency - to optimise the system overall electricity consumption with a positive impact on the Data Center Power Usage Effectiveness (PUE).

Versatile and flexible range

It is available with different cooling configurations:

JREF A Air condensed units with remote condenser

JREF Z Mains water condensed units (15°C) with on board plate condenser.

JREF W Dry-Cooler water condensed units (15°C) with on board plate condenser.

JREF DX A Radial

The **JREF DX A Radial** units are air-condensed perimeter-mounted units in the JREF range; they are widely used for the cooling of Data Centers. The air-condensed solution offers a simple system design, thanks to the absence of auxiliary circuits and pumps; the cooling circuit is managed by the cabinet, and both the indoor unit and the remote condenser are easy to install.

AIRFLOW CONFIGURATIONS

Upflow | Downflow | Displacement

- Refrigerant R410A: Also available with R513A and R134a
- EC Fans
- Scroll compressors
- Temperature control through heating and post-heating systems, with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

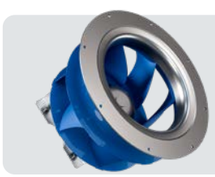
- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Electronic expansion valves
- Long distance kits for optimal operation in the case of large distances between indoor and outdoor units
- Low temperature kits for optimal operation in the case of installation in particularly cold environments

Safety in the server room

All models in the **JREF DX A Radial** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. **JREF DX A Radial** units are available with R134a and R513A refrigerants.



Ventilation EC

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

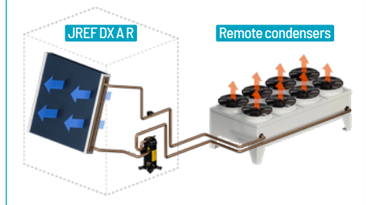
Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

Remote Condensers

All units can be combined with HiRef remote condensers, choosing from different combinations to meet all system needs.
Oversize remote condensers are ideal for warmer environments, where it is necessary to keep the condensing temperature under control, while the compact condensers on the other hand are small in terms of both size and consumption. The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs.

AIR CONDENSED



JREF DX A Radial		0060	0080	0100	0110	0130	0160	0190	0205	0212
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C								
Cooling capacity	[kW]	7,1	9,4	12,1	13,4	15,2	18,9	22,1	24,7	24,9
SHR		1	1	1	1	1	1	1	1	1
EER		3,7	5,1	4,3	4,3	3,6	4,2	4,2	4,4	4,1
Total absorbed power	[kW]	1,9	1,8	2,8	3,1	4,2	4,5	5,3	5,6	6,1
		Air temp. 24°C Relative humidity 50% Outdoor air temp. 35°C								
Cooling capacity	[kW]	6,5	8,6	10,8	11,9	13,8	16,7	19,7	22,6	22,8
SHR		1	0,9	1	1	0,9	1	0,9	0,9	0,9
EER		3,5	4,8	3,9	3,9	3,4	3,8	3,8	4,1	3,8
Total absorbed power	[kW]	2	2	3	3,3	4,5	5,2	6	6,3	6,8
Rated air flow	m³/h	1785	2150	3530	3530	3700	5100	5100	5100	5100
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	49	50	53	53	54	55	56	56	56
Dimensions (WxHxD)	mm	600x1875x600					900x1875x600			
Dimensions of Displacement version [WxHxD]		600x2125x600					900x2125x600			
Power supply	V/ph/Hz	400 / 3+N / 50								

Also available in 60 Hz power supply.
Performance data relating to Downflow versions with R410A refrigerant combined with standard HiRef remote condensers.
Height of Displacement models 2125 mm.

DATA CENTER INDUSTRIAL

JREF DX W/Z
Radial

WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS

JREF DX W > 7 – 24 kW

JREF DX Z > 7 – 27 kW

LOW GWP REFRIGERANT · MULTI-PROTOCOL COMMUNICATION INTERFACE · SCROLL COMPRESSORS · EC RADIAL FANS · MODBUS CONTROLLED FANS · FAST RESTART · ON-BOARD HUMIDIFIER · MODULATING HOT GAS POST-HEATING · PLATE HEAT EXCHANGERS

JREF W/Z Radial units are water-condensed perimeter-mounted cabinets. The W series uses Dry Cooler water. The Z series uses low temperature mains water or groundwater (15°C). The JREF units of this series are "monobloc" units inside which the entire cooling circuit is concentrated. Cooling is via a brazed plate exchanger made of stainless steel AISI 304.

All W units can be combined with HiRef Dry Coolers.

- Refrigerant R410A: Also available with R513A and R134a
- EC Fans
- Scroll compressors
- Temperature control through heating and post-heating systems, with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Low temperature kits for optimal operation in the case of installation in particularly cold environments
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

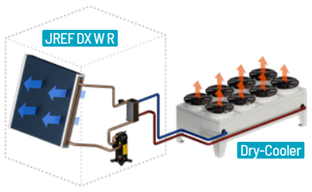
On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Electronic expansion valves

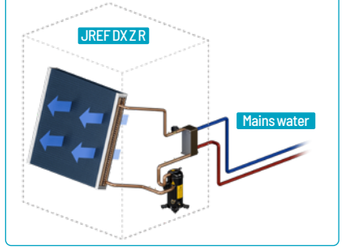
AIRFLOW CONFIGURATIONS

Upflow · Downflow · Displacement

WATER CONDENSED

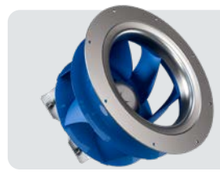


MAINS WATER CONDENSED



Safety in the server room

All models in the **JREF W/Z Radial** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.



Ventilation EC

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. All **JREF W/Z Radial** units are available with R134a and R513A refrigerants.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

JREF DX W Radial		0060	0080	0100	0110	0130	0160	0190	0205	0212
		Air temp. 30°C Relative humidity 35% Water 40-45°C								
Cooling capacity	[kW]	7,3	8,8	11,8	13,2	15,1	18,7	21,5	23,1	24,2
SHR		1	1	1	1	1	1	1	1	1
EER		4,1	4,2	4	4	3,5	4,2	3,9	3,5	3,7
Total absorbed power	[kW]	1,9	2,3	3,2	3,5	4,7	5,3	6,4	7,5	7,4
		Air temperature 24°C Relative humidity 50% Water 40-45°C								
Cooling capacity	[kW]	6,6	8	10,5	11,5	13,6	16,3	18,9	20,8	22
SHR		1	1	1	1	0,9	1	1	0,9	0,9
EER		3,8	3,8	3,5	3,5	3,2	3,7	3,5	3,2	3,3
Total absorbed power	[kW]	1,9	2,3	3,2	3,5	4,7	5,3	6,3	7,4	7,4
Rated air flow	m³/h	1785	2150	3530	3530	3700	5100	5100	5100	5100
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	49	50	53	53	54	55	56	56	56
Dimensions (WxHxD)	mm	600x1875x600					900x1875x600			
Dimensions of Displacement version [WxHxD]		600x2125x600					900x2125x600			
Power supply	V/ph/Hz	400 / 3+N / 50								

JREF DX Z Radial units		0060	0080	0100	0110	0130	0160	0190	0205	0212
		Air temp. 30°C Relative humidity 35% Water 15-30°C								
Cooling capacity	[kW]	7,9	9,9	12,9	14,3	16,9	21,2	24,3	25,9	26,5
SHR		1	1	1	1	1	1	1	1	1
EER		6,4	6,6	5,7	5,6	5,4	6,4	6	5,3	5,1
Total absorbed power	[kW]	1,3	1,7	2,5	2,9	3,5	4,2	4,9	5,7	6
		Air temp. 24°C Relative humidity 50% Water 15-30°C								
Cooling capacity	[kW]	7,3	9,1	11,7	12,8	15,7	19,1	22,2	24,1	24,5
SHR		0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9
EER		6	6,1	5,2	5	5	5,8	5,5	5	4,7
Total absorbed power	[kW]	1,3	1,7	2,5	2,8	3,5	4,1	4,8	5,7	6
Rated air flow	m³/h	1785	2150	3530	3530	3700	5100	5100	5100	5100
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	49	50	53	53	54	55	56	56	56
Dimensions (WxHxD)	mm	600x1875x600					900x1875x600			
Dimensions of Displacement version [WxHxD]		600x2125x600					900x2125x600			
Power supply	V/ph/Hz	400 / 3+N / 50								

Also available in 60 Hz power supply.
Performance data relating to Downflow versions with R410A refrigerant.
Height of Displacement models 2125 mm.

DATA CENTER INDUSTRIAL

JREF CW
Centrifugal

CHILLED WATER PERIMETER MOUNTED UNITS FOR DATA CENTRES

7 – 24 kW

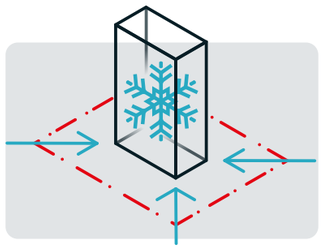
MULTI-PROTOCOL COMMUNICATION INTERFACE

FAST RESTART

ON-BOARD HUMIDIFIER

CENTRIFUGAL FANS

The **JREF CW Centrifugal** series perimeter mounted units are chilled water units with AC centrifugal fans for small-sized premises such as server rooms and labs or for applications where accurate control of thermo-hygrometric parameters and round-the-clock operation are required. The internal design and the choice of components are primarily aimed at ensuring a compact design to make unit installation as easy as possible.



High power density

The reduced footprint and high efficiency offer higher cooling capacity. In this way the space dedicated to the units in the Data Center is minimized, making the most of available spaces.

Double circuit

Chilled water units are also available with a double circuit. In this version the supply is via two different hydraulic circuits that can offer the utmost operational continuity if one of the two circuits malfunctions. Each circuit is equipped with a regulating valve.

- Temperature control through heating and post-heating systems, using electric heating elements, additional hot water coil, or both
- Humidity control through dehumidification and humidification
- Fan speed modulation based on the thermal load (constant ΔT)
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Instant reading of water flow rate, water inlet and outlet temperatures, or cooling capacity

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components. This makes routine maintenance easier in full compliance with safety standards.

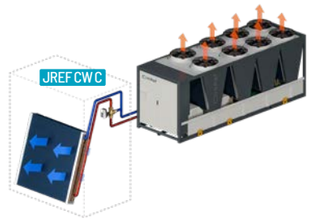
Finned pack coil with hydrophilic coating

All models in the **JREF CW Centrifugal** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection and outflow during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Numerous types of valves for accurate adjustment

All units in the **JREF CW Centrifugal** range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system or with servo motor with spring return. Pressure-independent valves can also be fitted on request. All these types of valves ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.

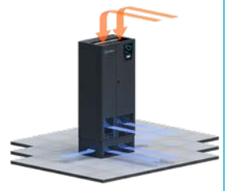
CHILLED WATER



AIRFLOW CONFIGURATIONS

Upflow

Downflow



Displacement

JREF CW Centrifugal		0080	0110	0140	0160	0200	0230
		Air temp. 35°C Relative humidity 30% - Water temp. In 15°C Out 20°C Glycol 0%					
Cooling capacity	[kW]	8,9	10,7	15,4	17,1	20,9	23,8
SHR		0,9	1	1	1	1	1
EER		44,5	35,7	25,7	28,5	29,9	34
		Air temp. 30°C Relative humidity 35% - Water temp. In 10°C Out 15°C Glycol 0%					
Cooling capacity	[kW]	8,8	10,7	15,3	17	20,7	23,7
SHR		0,9	1	1	1	1	1
EER		44	35,7	25,5	28,3	29,6	33,9
		Air temp. 24°C Relative humidity 50% - Water temp. In 7°C Out 12°C Glycol 0%					
Cooling capacity	[kW]	6,9	10	12,8	14,5	18	20,8
SHR		0,9	0,9	0,9	0,9	0,9	0,9
EER		34,5	33,3	21,3	24,2	25,7	29,7
Rated air flow	m³/h	1785	2150	3530	3470	5115	4990
Total fan absorbed power	[kW]	0,2	0,3	0,6	0,6	0,7	0,7
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	48	50	51	51	52	52
Dimensions (WxHxD)	mm	600x1875x449		900x1875x449		1200x1875x449	
Dimensions of Displacement version [WxHxD]	mm	600x2125x449		900x2125x449		1200x2125x449	
Power supply	V/ph/Hz	400/3+N/50					

Performance data for Downflow versions.
Also available in 60 Hz power supply.
Height of Displacement models 2125 mm.

DATA CENTER INDUSTRIAL

JREF DX A
Centrifugal

AIR CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS

7 – 24 kW

LOW GWP REFRIGERANT
MULTI-PROTOCOL COMMUNICATION INTERFACE
SCROLL COMPRESSORS
FAST RESTART
ON-BOARD HUMIDIFIER
CENTRIFUGAL FANS
MODULATING HOT GAS POST-HEATING

The **JREF DX Centrifugal** units are direct expansion units with centrifugal AC fans designed to be installed in small-sized premises such as server rooms and labs or for applications where accurate control of thermo-hygrometric parameters and round-the-clock operation are required. The internal design and the choice of components are primarily aimed at ensuring a compact design to make unit installation as flexible as possible.

JREF DX A

JREF DX A Centrifugal units are air-condensed perimeter-mounted units in the JREF range; they are widely used for the cooling of Data Centers. The air-condensed solution offers simple system design, thanks to the absence of auxiliary circuits and pumps; the cooling circuit is managed by the cabinet, and both the indoor unit and the remote condenser are easy to install.

Versatile and flexible range

The JREF DX range is available with different refrigeration configurations.

JREF A
Air condensing with remote condenser.

JREF Z
Dry-Cooler or Evaporative tower water condensing

JREF W
Mains water condensing (15°C)

- Refrigerant R410A. Also available with R513A and R134a
- Scroll compressors
- Temperature control through heating and post-heating systems, ith electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Electronic expansion valves
- Long distance kits for optimal operation in the event of large distances between indoor and outdoor units
- Low temperature kits for optimal operation in the case of installation in particularly cold environments

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

Safety in the server room

All models in the **JREF DX A Centrifugal** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. All **JREF DX A Centrifugal** units are available with R134a and R513A refrigerants.

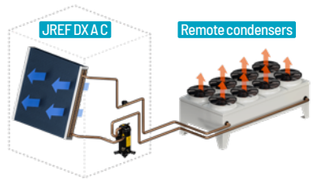
Remote Condensers

All units can be combined with HiRef remote condensers, choosing from different combinations to meet all system needs.
Oversize remote condensers are ideal for warmer environments, where it is necessary to keep the condensing temperature under control, while the compact condensers on the other hand are small in terms of both size and consumption.
The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs.

AIRFLOW CONFIGURATIONS

Upflow | Downflow | Displacement

AIR CONDENSED



JREF DX A Centrifugal		0060	0080	0100	0110	0130	0160	0190	0205
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C							
Cooling capacity	[kW]	7,2	9,4	12,4	13,7	16	18,3	21,9	24,4
SHR		1	1	1	1	1	1	1	1
EER		3,7	5,2	4,4	4,4	3,8	4,1	4,1	4,4
Total absorbed power	[kW]	2,2	2,1	3,4	3,7	4,8	5,2	6	6,2
		Air temp. 24°C Relative humidity 50% Outdoor air temp. 35°C							
Cooling capacity	[kW]	6,5	8,6	11,2	12,3	14,6	16,2	19,7	22,6
SHR		1	0,9	1	0,9	0,9	1	0,9	0,9
EER		3,5	4,8	4,1	4	3,5	3,7	3,8	4,1
Total absorbed power	[kW]	2,1	2,1	3,3	3,6	4,7	5	5,8	6,2
Rated air flow	m³/h	1785	2150	3690	3530	3470	5115	4990	4990
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	46	48	48	49	51	52	53	53
Dimensions (WxHxD)	mm	600x1875x449		900x1875x449			1200x1875x449		
Dimensions of Displacement version [WxHxD]		600x2125x449		900x2125x449			1200x2125x449		
Power supply	V/ph/Hz	400 / 3+N / 50							

Performance data for Downflow versions. / Also available in 60 Hz power supply. / Height of Displacement models 2125 mm.

DATA CENTER | INDUSTRIAL

JREF DX W/Z
Centrifugal

WATER CONDENSED PERIMETER-MOUNTED UNITS FOR DATA CENTERS

JREF DX W > 7 – 24 kW

JREF DX Z > 7 – 28 kW

- LOW GWP REFRIGERANT
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- SCROLL COMPRESSORS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- PLATE HEAT EXCHANGERS
- CENTRIFUGAL FANS
- MODULATING HOT GAS POST-HEATING

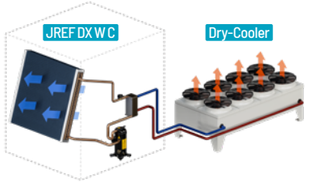
JREF W/Z Centrifugal units are water-condensed perimeter-mounted cabinets. The **W series** uses Dry Cooler water. The **Z series** uses low temperature mains water or groundwater (15°C). The JREF units of this series are "monobloc" units inside which the entire cooling circuit is concentrated. Cooling is via a brazed plate exchanger made of stainless steel AISI 304.

All W units can be combined with HiRef Dry Coolers.

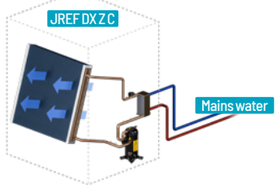
AIRFLOW CONFIGURATIONS

Upflow | Downflow | Displacement

WATER CONDENSED



MAINS WATER CONDENSED



- Refrigerant R410A: Also available with R513A and R134a
- Scroll compressors
- Temperature control through heating and post-heating systems with electric heating elements, hot water and hot gas
- Humidity control through dehumidification and humidification
- Low temperature kits for optimal operation in the case of installation in particularly cold environments
- Broad choice of accessories including basic modules, plenums for ducting, plenums for direct Free-Cooling

On request

- Air filter class G3 supplied as standard. Air Filters G4, M5, F7
- Double power supply with automatic switch
- Electronic expansion valves

Efficiency

The performance, reliability and efficiency of HiRef units are guaranteed by using the best quality components and by cleverly designed internal and external layouts.

Safety in the server room

All models in the **JREF W/Z Centrifugal** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

Green

HiRef is constantly committed to the search for refrigerants that have an increasingly reduced environmental impact. The use of ASHRAE Class A1 refrigerants, non-toxic and non-flammable, is essential for the "close control" application. All **JREF W/Z Centrifugal** units are available with R134a and R513A refrigerants.

JREF DX W Centrifugal		0060	0080	0100	0110	0130	0160	0190	0205
		Air temp. 30°C Relative humidity 35% Water 40-45°C							
Cooling capacity	[kW]	7,4	9	12,3	13,6	16,3	18,4	22	23,7
SHR		1	1	1	1	1	1	1	1
EER		4,3	4,4	4,3	4,3	4	4,4	4,3	4
Total absorbed power	[kW]	2	2,3	3,4	3,7	4,6	4,8	5,7	6,7
		Air temperature 24°C Relative humidity 50% Water 40-45°C							
Cooling capacity	[kW]	6,7	8,1	11	12,1	14,9	16,3	19,8	21,8
SHR		1	1	1	1	0,9	1	0,9	0,9
EER		3,9	3,9	3,8	3,8	3,7	3,9	3,9	3,6
Total absorbed power	[kW]	1,9	2,4	3,4	3,7	4,6	4,8	5,7	6,7
Rated air flow	m³/h	1785	2150	3530	3530	3470	5115	4990	4990
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	46	48	48	49	51	52	53	53
Dimensions (WxHxD)	mm	600x1875x449		900x1875x449			1200x1875x449		
Dimensions of Displacement version [WxHxD]	mm	600x2125x449		900x2125x449			1200x2125x449		
Power supply	V/ph/Hz	400 / 3+N / 50							

JREF DX Z Centrifugal		0060	0080	0100	0110	0130	0160	0190	0205
		Air temp. 30°C Relative humidity 35% Water 15-30°C							
Cooling capacity	[kW]	8	10,1	13,5	15,5	18,3	21,4	25,5	27,7
SHR		1	1	1	1	1	1	1	1
EER		6,8	7,1	6,6	6,5	6,2	6,9	6,9	6,3
Total absorbed power	[kW]	1,4	1,7	2,6	2,9	3,5	3,7	4,4	5
		Air temp. 24°C Relative humidity 50% Water 15-30°C							
Cooling capacity	[kW]	7,4	9,3	12,4	14	17,1	19,5	23,7	25,8
SHR		0,9	0,9	0,9	0,9	0,8	0,9	0,9	0,8
EER		6,3	6,5	6	5,8	5,8	6,3	6,4	5,9
Total absorbed power	[kW]	1,4	1,7	2,6	3	3,5	3,7	4,4	5
Rated air flow	m³/h	1785	2150	3530	3530	3470	5115	4990	4990
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	46	48	48	49	51	52	53	53
Dimensions (WxHxD)	mm	600x1875x449		900x1875x449			1200x1875x449		
Dimensions of Displacement version [WxHxD]		600x2125x449		900x2125x449			1200x2125x449		
Power supply	V/ph/Hz	400 / 3+N / 50							

Also available in 60 Hz power supply. / Performance data for Downflow versions. / Height of Displacement models 2125 mm.

DATA CENTER

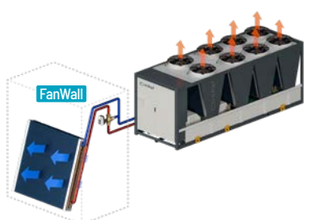
FanWall

CHILLED WATER OR DIRECT EXPANSION VERSIONS FOR HIGH DENSITY HYPERSCALE DATA CENTRES

45 - 460 kW

Our chilled water **FanWall HBCV** series air conditioners are designed for technological environments where a compact footprint is a requirement - without any impact on these units' cooling output capacity. In-depth CFD (computational fluid dynamics) analysis has allowed for the meticulous design of every last constructive detail to minimise air pressure drops and, therefore, fan power consumption. In addition, the large surface of the finned pack exchanger minimises the approach temperatures between inlet air and outlet water, maximising system efficiency.

CHILLED WATER



Ventilation EC 2.0

EC PLUG fans, standard on the entire range, make it possible to vary the air flow according to the thermal load. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Maximum possible redundancy

To ensure system operation continuity, the **FanWall HBCV** range makes it possible to have a fully redundant refrigeration circuit: a double coil and double water adjustment valve allow the server room to be cooled even when either circuit fails.

- Stainless steel condensate drain pan
- Fan speed modulation based on the thermal load (constant ΔT)
- Fan speed modulation based on air flow requirements (constant Δp).
- Humidify/de-humidify feature
- Post-heating systems:
  - with electrical heating elements
  - with hot water coil

On request

- Double power supply with automatic switch
- Instantaneous reading of the supplied cooling capacity

Finned pack coil with hydrophilic coating

All models in the **FanWall HBCV** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection and outflow during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Blown finned coil

According to a specific design choice, this finned coil is installed downstream of the fans to ensure a more even distribution of the delivery air to the racks, minimising turbulence in the air flow.

Numerous types of valves for accurate adjustment

All units in the **FanWall HBCV** range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system or with servo motor with spring return. Pressure-independent valves can also be fitted on request. All these types of valves ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.

Ventilation adjustment

The most suitable on-board ventilation system can be chosen based on the air distribution logic in the server room, guaranteeing a constant flow of air (air flow control) or a constant available overlap (Δp control); the latter is particularly useful when using a floating floor.

Easier scheduled maintenance

The unit has been designed with the utmost care to grant front (air inlet side) access to internal components even with the units running. This makes routine maintenance easier in full compliance with safety standards.

FanWall		051	121	171	102	242	342
		1 MODULE			2 MODULES		
Geometry B		Inlet air 30 °C - 35% r.h.; Water temperature 10-18 °C					
Total cooling capacity	[kW]	48.5	118.2	173.4	97	236.4	346.8
SHR	-	1.0	1.0	1.0	1.0	1.0	1.0
Refrigeration cycle EER	-	69.3	62.2	59.8	69.3	62.2	59.8
Geometry B		Inlet air 35 °C - 25% r.h.; Water temperature 10-18 °C					
Total cooling capacity	[kW]	63.7	157.1	230.3	127.4	314.2	460.6
SHR	-	1.0	1.0	1.0	1.0	1.0	1.0
Refrigeration cycle EER	-	91.0	82.7	79.4	91.0	82.7	79.4
Geometry C		Inlet air 30 °C - 35% r.h.; Water temperature 10-22 °C					
Total cooling capacity	[kW]	44.9	110.2	164.4	89.8	220.4	328.8
SHR	-	1.0	1.0	1.0	1.0	1.0	1.0
Refrigeration cycle EER	-	64.1	58.0	56.7	64.1	58.0	56.7
Geometry C		Inlet air 35 °C - 25% r.h.; Water temperature 10-22 °C					
Total cooling capacity	[kW]	60.6	148.9	219.8	121.2	297.8	439.6
SHR	-	1.0	1.0	1.0	1.0	1.0	1.0
Refrigeration cycle EER	-	86.6	78.4	75.8	86.6	78.4	75.8
Air flow rate	m³/h	8700	21200	31100	17400	42400	62200
Total absorbed power	[kW]	0.7	1.9	2.9	1.4	3.8	5.8
Dimensions (WxHxD)	mm	1500x1475x1300	2950x1475x1300	4000x1475x1300	1500x2950x1300	2950x2950x1300	4000x2950x1300

* The dimensions shown refer to standard models but can be customised according to application requirements
Performance data relating to chilled water versions.
Also available in 60 Hz power supply.

DATA CENTER INDUSTRIAL

HTI CW

CHILLED WATER UNITS FOR MEDIUM/SMALL SERVER ROOMS

8 - 45 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

EC RADIAL FANS

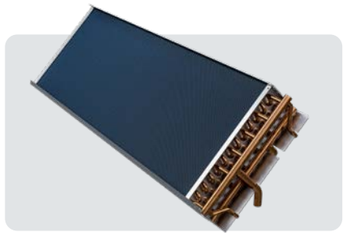
MODBUS CONTROLLED FANS

HTI CW units are split-type air conditioners intended for small and medium-sized Data Centers. Designed for ceiling or wall mounting, they are suitable for air conditioning of control centres with limited internal space or space entirely taken up by technological equipment. Thanks to the rational layout of components and wide range of available accessories, these units are easy to install and suitable for different shelter configurations.

- Temperature control through heating and post-heating systems with electric heating elements
- Humidity control through dehumidification and humidification with external humidifier
- Fan speed modulation based on the thermal load (constant ΔT)
- Version available with dual power supply for emergencies: 230/400V network and 24/48VDC backup supply
- Epoxy powder painted structural metalwork supplied as standard

On request

- Air filter class G3 supplied as standard. Air Filters G4
- Instant water inlet/outlet temperature reading function



Finned pack exchanger with hydrophilic coating.

All models in the **HTI CW** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.

Ventilation EC

EC PLUG fans, standard on the entire range, make it possible to vary the air flow according to the thermal load. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Maximised Redundancy

In case of mains power + uninterruptible power supply in direct current (DUAL), the (optional) Free Cooling mode ensures correct internal thermal conditions, even in the event of blackouts. This ensures the continuity of service of the system.

Maximised energy saving with direct free-cooling

The units can, on request, be equipped with a direct Free Cooling module. This system, which can also be installed inside an already operational unit, reduces the work of the chiller units in generating chilled water (partial Free-Cooling), and in a state of complete Free-Cooling can be switched off. This naturally has an important effect on the system's PUE.

Simple & fast installation

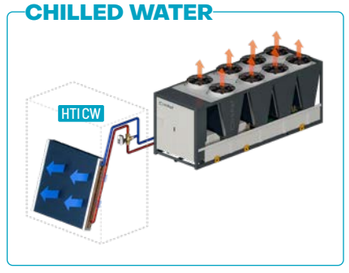
The units can be installed, as needed, on the ceiling or on the wall. Thanks to the use of EC PLUG fans, air conditioners in the **HTI CW** series guarantee optimal air distribution, efficiency, energy savings, reliability and compactness, whatever the configuration chosen.

Easier scheduled maintenance

The unit has been painstakingly designed to ensure frontal access to components. This aspect, combined with the complete extractibility of filters and Free-Cooling damper (if present), greatly facilitates routine maintenance operations.

Numerous types of valves for accurate adjustment

All units in the **HTI CW** range have as standard regulating valves fitted with 0-10V servo motor, selectable in 2-way execution, with variable or 3-way flow system. It is also possible to mount a servo motor with spring return and pressure-independent valves on request. All these types of valves ensure the utmost adjustment accuracy while maintaining the system's hydronic balance.



HTI CW		073	105	120	145	310	380
		Air temp. 35°C Relative humidity 30% / Water temp. In 15°C Out 20°C Glycol 0%					
Cooling capacity	[kW]	7,9	8,4	11,3	12,4	35,6	41,8
SHR		1	1	1	1	1	1
EER		46,2	42,2	45,2	41,4	30,7	33,7
		Air temp. 30°C Relative humidity 35% Water temp. In 10°C Out 15°C Glycol 0%					
Cooling capacity	[kW]	7,9	8,5	11,5	12,5	36,3	41,8
SHR		0,9	0,9	1	0,9	1	0,9
EER		46,6	42,6	46,0	41,8	31,3	33,7
		Air temp. 27°C Relative humidity 40% / Water temp. In 7°C Out 12°C Glycol 0%					
Cooling capacity	[kW]	8,9	10,1	13,1	14,6	38,4	45,4
SHR		0,8	0,8	0,8	0,8	0,9	0,9
EER		52,3	50,3	52,6	48,6	33,1	36,6
Rated air flow	m^3/h	1300	1300	1950	1950	7000	7000
Total fan absorbed power	[kW]	0,2	0,2	0,3	0,3	1,2	1,2
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	53	55	54	56	66	66
Dimensions (WxHxD)	mm	1050x358x936		1150x408x1026		1500x685x1096	
Power supply	V/ph/Hz	230 / 1 / 50				400 / 3+ N / 50	

Also available with 60 Hz power supply.
Unit for ceiling installation only for sizes 0310-0381.

HiRef

HPDCU

DATA CENTER

HDB

AIR/AIR SYSTEMS FOR DATA CENTERS WITH ADIABATIC SYSTEM

10 - 330 kW

- ADIABATIC COOLING
- LOW GWP REFRIGERANT
- MULTI-PROTOCOL COMMUNICATION INTERFACE
- REFRIGERANT R744(CO_2)
- SCROLL COMPRESSORS
- SCREW COMPRESSORS
- EC RADIAL FANS
- MODBUS CONTROLLED FANS
- INVERTER DRIVEN COMPRESSORS
- FAST RESTART
- ON-BOARD HUMIDIFIER
- CORROSION RESISTANT MATERIAL
- CROSS-FLOW HEAT RECOVERY UNIT

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.

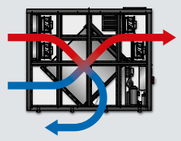
The reduction, and in some cases cessation, of mechanical operation has two benefits: it reduces operating costs for greater annual energy efficiency (reduced PUE) and reduces deployment costs, thanks to the lower installed power.

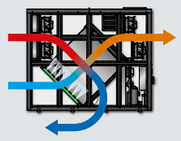
HDB units can accommodate the "cooling circuit" option, and are entirely factory assembled in a monobloc solution to facilitate installation operations.

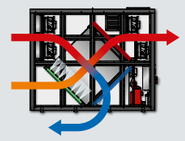
Direct expansion or chilled water integration

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.


Outside air T < 21°C


Outside air T > 21°C


Outside air T > 23°C *

* Wet bulb condition for a 1 MW Data Center (Redundancy N + 1) in Amsterdam at 36°C -25%; Delivery air T 24°C; Max T of air delivery 26°C

- 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)
- 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
- Panelling developed and assembled in accordance with standard UNI 1886

On request

- Air renewal kit with modulating dampers (Fresh air kit)
- Ultrasonic humidifier
- Kit for applications at low outdoor air temperatures (up to -40°C)

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.

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.

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.

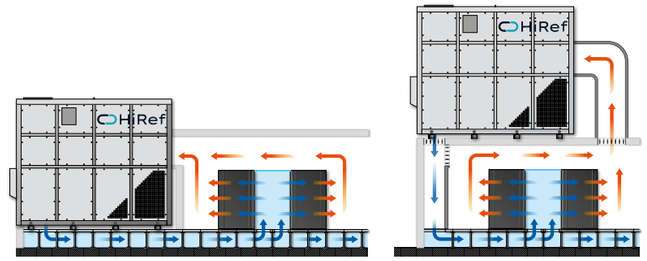
The result is a clear reduction in energy consumption for system management.

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.

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

DESIGNED FOR INSTALLATION ON ROOF OR ON THE WALL OF THE DATA CENTER



Example of use for a 1 MW Data Center (Redundancy N+1) in Amsterdam at 36°C - 25%; Air temp. 24°C; Max air temp. in 26°C

HDB		HDB0060	HDB100	HDB0200	HDB0300
Frame	-	F1	F2	F3	F4
Dimensions (WxHxD)	mm	2750 x 2650 x 1180	4200 X 2650 X 2250	4700 x 3600 x 2250	4700 x 3600 x 3100
Cooling capacity	[kW]	10 - 60	60 - 100	100 - 200	200 - 330
Air flow rate	m³/h	up to 15.000	up to 27.000	up to 53.000	up to 82.500

Also available with 60 Hz power supply.
Performance data relating to the operating mode of the chilled water circuit or direct expansion in integration.
Dimensions relating to base unit without accessories with Free-Cooling version and integration.

HiRef

HIGH DENSITY COOLING

DATA CENTER

NRCD/NRCV

DIRECT EXPANSION AIR CONDITIONERS FOR HIGH DENSITY RACKS WITH MODULATING COMPRESSORS

NRCD > 12 – 50 kW

NRCV > 13 – 37 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

EC RADIAL FANS

MODBUS CONTROLLED FANS

SCROLL COMPRESSORS

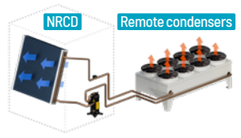
INVERTER DRIVEN COMPRESSORS

HOT SWAPPABLE FANS

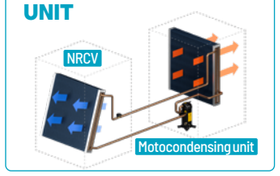
ON-BOARD HUMIDIFIER

The rack coolers in the **NRC** range are an ideal solution for the cooling of small-to-medium size Data Center racks where precision control of hygrothermal parameters is required 24/7. They are particularly suitable for small installations where a chiller cannot be installed or where water in the Data Center is not allowed. Internal design and component selection focus on the achievement of very high energy efficiency levels to minimise running costs of the entire system. **NRCD** units have an external remote condenser, which guarantees efficiency and reliability. **NRCV** units on the other hand have a motocondensing unit with external compressor, for a compact and silent solution.

AIR CONDENSED



AIR CONDENSED WITH MOTOCONDENSING UNIT



- Refrigerant R410A
- EC Fans
- Twin rotary and scroll inverter compressors
- Electronic expansion valves
- Advanced programmable microprocessor control with LCD display
- Humidity control through dehumidification

On request

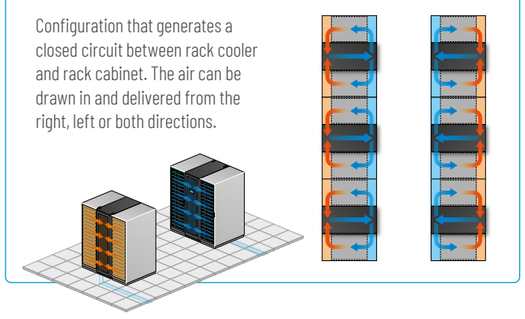
- Air filter class G3 supplied as standard. Air Filters G4, M5
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Low temperature kits for optimal operation in the case of installation in particularly cold environments

In-rack or in-row configuration

Depending on how rack cooling is done - by creating hot and cold aisles in the Data Center via compartmentalisation and localised cooling - the **NRC** range comes in two different configurations:

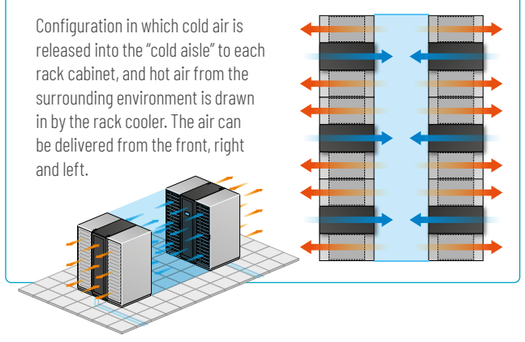
IN RACK

Configuration that generates a closed circuit between rack cooler and rack cabinet. The air can be drawn in and delivered from the right, left or both directions.



IN ROW

Configuration in which cold air is released into the "cold aisle" to each rack cabinet, and hot air from the surrounding environment is drawn in by the rack cooler. The air can be delivered from the front, right and left.

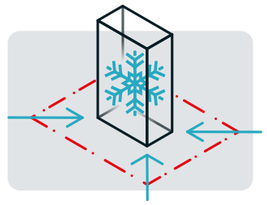


Hot swappable fans

In order to minimize machine shutdown, a failed fan can be replaced without turning off the unit, thanks to the use of the protective basket and connectors for the power and control section. Fan replacement thus becomes a routine maintenance operation.

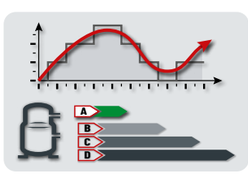
Safety in the server room

All models in the **NRCD/NRCV** range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.



High power density

The internal design and the special component layout allows for an evaporating coil with an extensive heat exchange surface area. The unit footprint is still small, ensuring optimal use of space in the server room.



Power modulation

The units adapt quickly to the Data Center's cooling requests. Thanks to the inverter-controlled compressor, performance can be modulated to up to 25% of the rated value, thus reducing consumption. This ensures continuous operation of the unit even at low loads, without switching cycles on and off.

Ventilation EC

EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Sliding control panel

For 300 mm wide structures, the electrical panel is designed to take up as little space as possible without interfering with air distribution over the whole working height of the unit. A "sliding drawer" structure has been used, making access possible during commissioning and extraordinary maintenance operations. This configuration also prevents tangling of the wiring.

NRCD		0100	0200	0300	0260	0400	0450
		Air temperature 35°C Relative humidity 30% Outdoor air temp. 35°C					
Cooling capacity	[kW]	13,1	23,6	31,6	28,6	45,5	50,1
SHR		1	0,9	0,9	1	1	1
EER		4	3,1	2,7	3,8	3,8	3,3
Total absorbed power	[kW]	3,5	8,4	12,7	8,2	13,4	16,6
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C					
Cooling capacity	[kW]	12,4	21,8	29,4	26,1	41,3	46,2
SHR		1	0,9	0,8	1	1	1
EER		3,9	2,9	2,5	3,5	3,6	3,2
Total absorbed power	[kW]	3,4	8,2	12,4	8,1	13,1	16,1
Rated air flow	m³/h	2700	4000	4250	5000	9000	9000
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	64	66	67	60	73	73
Dimensions (WxHxD)	mm	300x2000x1200			600x2000x1200		
Power supply	V/ph/Hz	230/1/50	400/3+N/50				

NRCV		0140	0240	0330
		Air temperature 35°C Relative humidity 30% Outdoor air temp. 35°C		
Cooling capacity	[kW]	15,2	28,2	37,4
SHR		1	1	0,8
EER		5,2	4	3,9
Total absorbed power	[kW]	3,7	8,4	12,3
		Air temp. 30°C Relative humidity 35% Outdoor air temp. 35°C		
Cooling capacity	[kW]	13,3	24,6	34,6
SHR		1	1	0,9
EER		4,1	3,2	3,1
Total absorbed power	[kW]	4	9,1	13,2
Rated air flow	m³/h	3100	5300	5300
Rated air flow rate for outdoor unit	m³/h	6400	9300	16300
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	62	63	63
Lp @ Nominal rpm ; dist.= 10 m Q=2 outdoor unit	dB(A)	46	46	46
Dimensions (WxHxD)	mm	300x2000x1200		
Outdoor unit dimensions [WxHxD]	mm	1250x460x882	1565x605x1275	1965x950x1322
Power supply	V/ph/Hz	230/1/50		
Power supply for outdoor unit	V/ph/Hz	230/1/50	400/3+N/50	

Also available with 60 Hz power supply.
Performance data relating to units combined with standard HiRef remote condensers (NRCD).
Total absorbed power relating to indoor unit and motocondensing unit (NRCV).

DATA CENTER

HRCC

CHILLED WATER AIR CONDITIONING UNITS FOR HIGH POWER DENSITY RACKS

20 - 57 kW

MULTI-PROTOCOL COMMUNICATION INTERFACE

EC RADIAL FANS

MODBUS CONTROLLED FANS

HOT SWAPPABLE FANS

ON-BOARD HUMIDIFIER

HRCC units are chilled water cooler racks. They offer an ideal solution for the cooling of Data Center racks where precision control of hygrothermal parameters is required 24/7. They are particularly suitable for integration into chilled water systems with Free-Cooling chillers, given the possibility of making these air conditioners work even with higher water temperatures than the usual 7/12°C or 10/15°C values. The internal design and the choice of components are aimed at obtaining high levels of energy efficiency and guaranteeing service continuity, the second being a key requirement in this type of application with high/very high power density.

- Advanced programmable microprocessor control with LCD display
- Humidity control through dehumidification
- Fan speed modulation based on the thermal load (constant ΔT)

On request

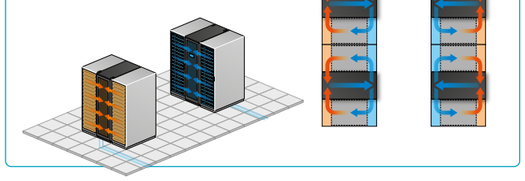
- Air filter class G3 supplied as standard. Air Filters G4, M5
- Double power supply with automatic switch
- Constant flow (airflow control) or constant available overpressure (Δp control) ventilation modulation
- Instant reading of water flow rate, water inlet and outlet temperatures, or cooling capacity

In-rack or in-row configuration

Depending on how rack cooling is done - by creating hot and cold aisles in the Data Center or via compartmentalisation and localised cooling - the **HRCC** range comes in two different configurations:

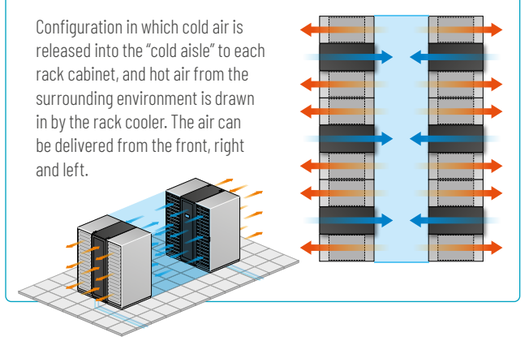
IN RACK

Configuration that generates a closed circuit between rack cooler and rack cabinet. The air can be drawn in and delivered from the right, left or both directions.



IN ROW

Configuration in which cold air is released into the "cold aisle" to each rack cabinet, and hot air from the surrounding environment is drawn in by the rack cooler. The air can be delivered from the front, right and left.



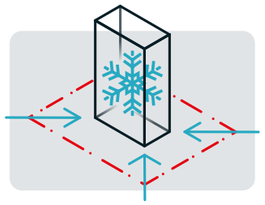
EC PLUG fans, standard throughout the range, are adjustable using different logics: flow rate, overpressure, constant ΔP and ΔT. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function allows for fan operation even in the event of microprocessor malfunctions.

Hot swappable fans

In order to minimize machine shutdown, a failed fan can be replaced without turning off the unit, thanks to the use of the protective basket and connectors for the power and control section. Fan replacement thus becomes a routine maintenance operation.

Safety in the server room

All models in the range feature heat exchange coils with hydrophilic coating. This special coating - together with adequate adjustment of air through-flow speeds - helps condensate collection during the dehumidification process, preventing any dripping on the inside and outside of the unit.



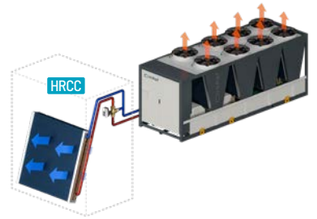
High power density

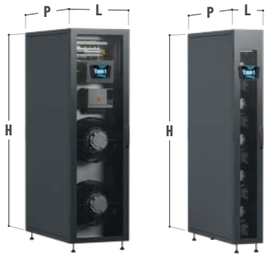
The internal design and the special component layout allows one or two finned-coil exchangers to be used with an extensive heat exchange surface area. The unit footprint is still small, ensuring optimal use of space in the server room.

Sliding control panel

For 300 mm wide structures, the electrical panel is designed to take up as little space as possible without interfering with air distribution over the whole working height of the unit. To achieve this, without affecting accessibility during the initial start-up and unscheduled maintenance operations, a sliding drawer version has been created. This configuration also prevents tangling of the wiring.

CHILLED WATER





HRCC		0200	0250	0450	0510
		Air temp. 35°C Relative humidity 30% Water temp. In 15°C Out 20°C Glycol 0%			
Cooling capacity	[kW]	20,2	27,8	46,4	57,2
SHR		1,0	1,0	1,0	1,0
EER		43,9	38,6	31,1	37,4
		Air temp. 30°C Relative humidity 35% Water temp. In 10°C Out 15°C Glycol 0%			
Cooling capacity	[kW]	20,1	27,7	46,2	57,0
SHR		1,0	1,0	1,0	1,0
EER		43,7	38,5	31,0	37,3
Rated air flow	m³/h	4000	5300	9000	11000
Total fan absorbed power	[kW]	0,5	0,7	1,5	1,5
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	62	65	70	67
Dimensions (WxHxD)	mm	300x2000x1200		600x2000x1200	
Power supply	V/ph/Hz	230/1/50		400/3+N/50	

Also available with 60 Hz power supply.

DATA CENTER

MRAC CW/DX

MINI RACK COOLER FOR HIGH DENSITY SYSTEMS

MRAC CW > 3 – 5 kW

MRAC DX > 3 – 9 kW

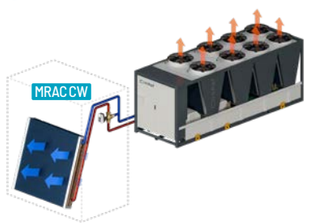
MULTI-PROTOCOL COMMUNICATION INTERFACE

EC RADIAL FANS

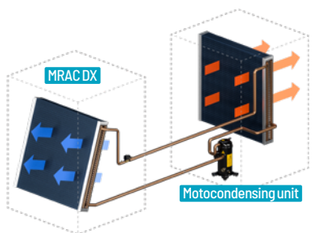
INVERTER DRIVEN COMPRESSORS

The units in the **MRAC** family offer an ideal solution for cooling 19" racks, which require precise internal temperature control and 24/7 operation. In split execution, with R410A refrigerant external condensing unit, the range extends from 3.6 to 7.9 kW. The **CW version**, with chilled water, reaches 4.5 kW. The **MRAC** unit is controlled by a dedicated software, developed within HiRef, allowing a LAN connection for up to 8 units and interfacing with an automatic door-opening system in the event of an alarm.

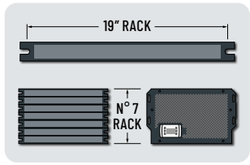
CHILLED WATER



AIR CONDENSED WITH MOTOCONDENSING UNIT



- Refrigerant R410A
- Coil with highly efficient hydrophilic fin and aluminum frame
- A version is available for low outdoor air temperatures
- Compressor with brushless inverter technology available for 7 kW version
- Condensate drain pan made from stainless steel AISI 430
- Electrical and rapid control connections
- Completely insulated panelling
- Air filter type G3

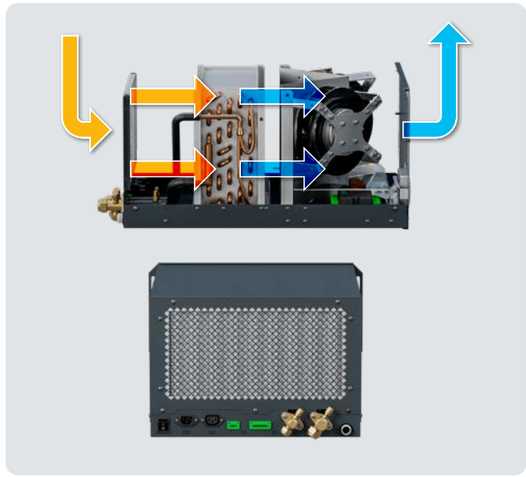


Compactness

MRAC has been designed to be hidden inside the rack cabinet and take up as little space as possible. Installable in any rack cabinet with 19" racks, it occupies the height of just 7 racks, taking up very little space in the Data Center.

Ventilation EC

EC PLUG fans, standard on the entire range, make it possible to vary the air flow according to the thermal load. Their accurate adjustment allows an efficient use of power for ventilation and a consequent reduction of the system's PUE. Extended range speed adjustment is carried out via Modbus protocol. The "emergency speed" function enables the fan to move even if the microprocessor is switched off.

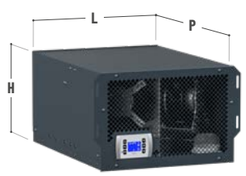


Maximum MRAC redundancy with the version having two external motocondensing units

The **MRAC** unit with dual external motocondensing unit is available on request. This solution provides redundancy and ensures continuity of service even in the event of failure of one of the two units.

MRAC DX		035	035B	070	070 (Inverter)
		Air temp. 35°C Relative humidity 30% Outdoor air 35°C			
Cooling capacity	[kW]	4	3,6	4,7	9,4
SHR		1	1	1,1	0,9
EER		3,7	3,3	4,1	2,7
Total absorbed power	[kW]	1,3	1,4	1,5	4,1
		Air temp. 30°C Relative humidity 35% Outdoor air 35°C			
Cooling capacity	[kW]	3,7	3,2	4	8,8
SHR		1	1	1	0,8
EER		3,6	3,2	3,9	2,6
Total absorbed power	[kW]	1,2	1,4	1,4	4
Rated air flow	m³/h	915	1330	1330	1330
Rated air flow rate for outdoor unit	m³/h	1600	1600	1600	5100
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	62	66	66	66
Lp @ Nominal rpm ; dist.= 10 m Q=2 outdoor unit	dB(A)	46	46	46	46
Dimensions (WxHxD)	mm	300x2000x1200			
Outdoor unit dimensions [WxHxD]	mm	776x540x320			1305x648x495
Power supply	V/ph/Hz	230/1/50			
Power supply for outdoor unit	V/ph/Hz	230/1/50			

MRAC CW		035	070
		Air temp. 35°C Relative humidity 30% / Water temp. In 15°C Out 20°C Glycol 0%	
Cooling capacity	[kW]	3,5	4,5
SHR		1,0	1,0
EER		17,5	22,5
		Air temp. 30°C Relative humidity 35% / Water temp. In 10°C Out 15°C Glycol 0%	
Cooling capacity	[kW]	3,4	4,5
SHR		1,0	1,0
EER		17,0	22,5
Rated air flow	m³/h	915	915
Total fan absorbed power	[kW]	0,2	0,2
Lp @ Nominal rpm ; dist.= 2 m Q=2	dB(A)	61	61
Dimensions (WxHxD)	mm	485x300x600	
Power supply	V/ph/Hz	230/1/50	



Also available with 60 Hz power supply.
Performance data for size 035B relating to operation with only one motocondensing unit (MRAC DX).
Total absorbed power relating to indoor unit and motocondensing unit (MRAC DX).

REMOTE CONDENSERS

The **HiRef remote condensers** are outdoor units that can be combined with air-condensed indoor units such as cabinets in the A-D series and NRCD rackcoolers. HiRef offers a wide range of condensers, suitable for working with refrigerants R410A, R134a, R454B, R407C. The condensers, used with dual-circuit units, are available with a single cooling circuit for maximum reliability and redundancy of the system or with a double cooling circuit, to reduce installation spaces and costs. The models have an aluminum alloy and galvanized sheet frame, ideal for ensuring high corrosion resistance, protection of copper pipes and solidity. The galvanized sheet external panels have an anti-corrosion and anti-UV radiation polyester coating.

- Power supply 230V single phase or 400V three phase
- Power supply from HiRef indoor unit (standard) or stand alone (on request)

Silent operation

The remote condensers are also available in low noise emission versions, ideal in areas where a high level of acoustic comfort must be maintained.

Finned coil

The finned-coil heat exchangers are made with copper tubes and, depending on the model, wavy or corrugated aluminium fins. The standard spacing between the fins is 1.8 - 2 - 2.1 mm, depending on the model, offering high heat exchange efficiency without affecting the ease of routine cleaning.

Customization

The units can be customized on request to meet the customer's design needs. Among the various options:

- special treatment for the finned-coil exchanger, including epoxy treatment, offering good resistance to corrosive environments, or copper fins for installation in marine environments;
- increased fin spacing to reduce soiling and facilitate cleaning in sandy environments;
- special ductable condensers for installation in closed places.

Versatility

As an alternative to vertical installation with horizontal air flow, as standard, horizontal installation with upward air flow is possible, with the use of a leg kit that can be ordered separately.

Efficiency

Depending on the model, the units mount axial fans with diameters of 350 – 450 – 500 – 630 mm. The fans, with 4 or 6 poles, can be adjusted using a speed regulator from the indoor unit or mounted on the machine.
The units are also available with high efficiency EC fans for low operating consumption and reliable control of the condensing temperature thanks to electronic speed regulation.

DRY COOLER

HiRef Dry Coolers are outdoor units that can be combined with water-condensed indoor units such as cabinets in the W - F - K series. HiRef offers a wide range of Dry Coolers suitable for working with a water-glycol mixture up to 60%. They are made with frame in aluminium alloy and galvanized sheet steel that ensures corrosion resistance, copper pipe protection and solidity. The external panels are made of galvanized sheet metal finished with corrosion- and UV-resistant polyester paint.

- Power supply 230V single phase or 400V three phase
- Power supply from HiRef indoor unit (standard) or stand alone (on request)

Finned coil

The finned-coil heat exchangers are made with copper tubes and, depending on the model, wavy or corrugated aluminium fins. The standard spacing between the fins is 2 mm, offering high heat exchange efficiency without affecting the ease of routine cleaning.

Customization

The units can be customized on request to meet the customer's design needs. Among the various options:

- special treatment for the finned-coil exchanger, including epoxy treatment, offering good resistance to corrosive environments, or copper fins for installation in marine environments;
- increased fin spacing to reduce soiling and facilitate cleaning in sandy environments;

Versatility

As an alternative to vertical installation with horizontal air flow, as standard, horizontal installation with upward air flow is possible, with the use of a leg kit that can be ordered separately.

Silent operation

The Dry Coolers are also available in low noise emission versions, ideal in areas where a high level of acoustic comfort must be maintained.

Efficiency

Depending on the model, the units mount axial fans with diameters of 350 – 500 – 630 - 800 mm. The fans, with 6 or 8 poles, can be adjusted using a speed regulator from the indoor unit or mounted on the machine.
The units are also available with high efficiency EC fans for low operating consumption and reliable control of the condensing temperature thanks to electronic speed regulation.

HiRef

INNOVATORS

above the standards

CATALOGUE

CCAC / HPDCU / HDC

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