



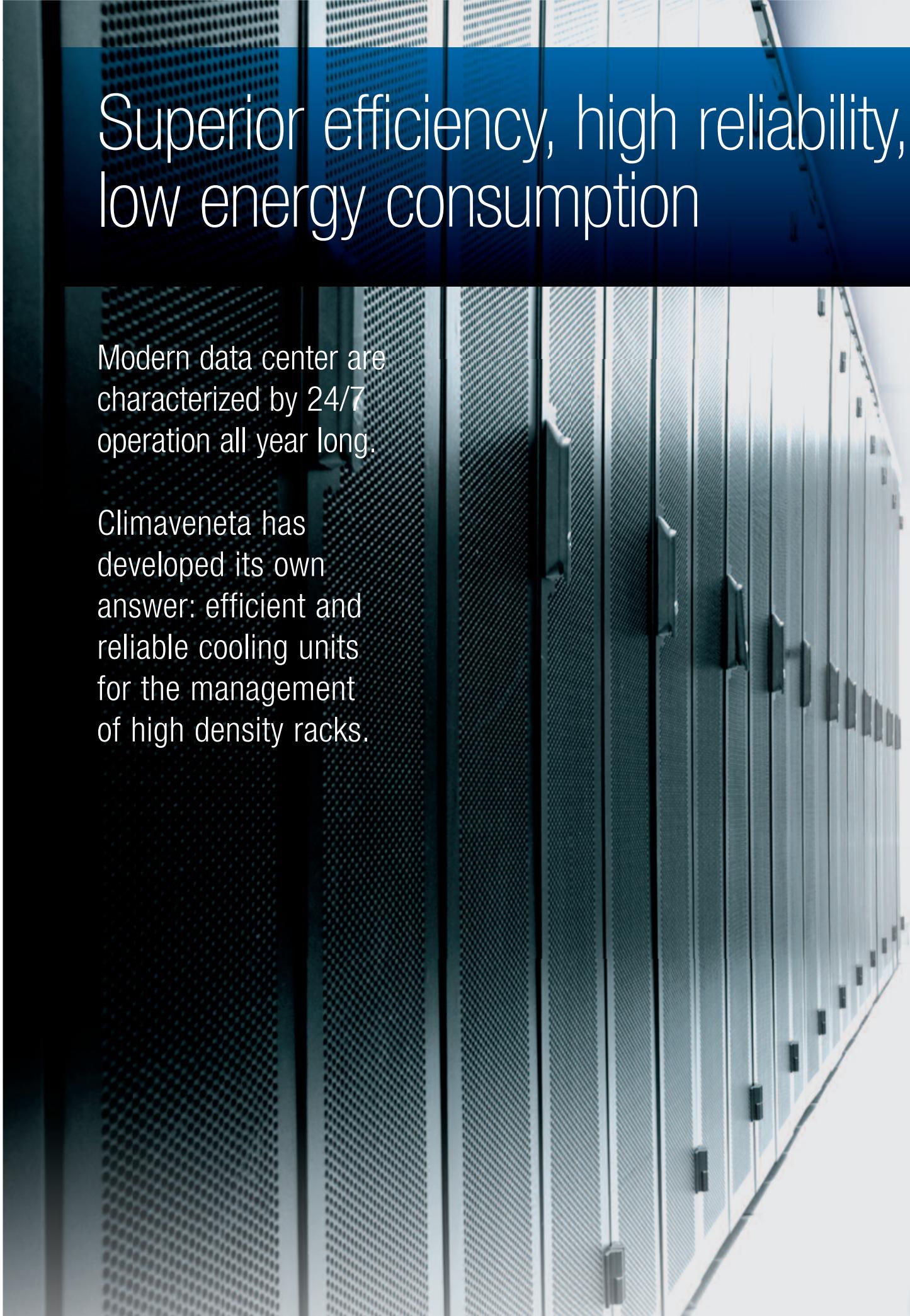
HPAC High Precision Air Conditioning

Rack Cooler

Rack cooling solutions for high density racks management, from 10 to 75 kW



Superior efficiency, high reliability, low energy consumption

A perspective view looking down a long corridor of server racks. The racks are dark grey or black with a fine mesh venting pattern on the front panels. They are arranged in a dense, linear fashion that recedes into the distance.

Modern data centers are characterized by 24/7 operation all year long.

Climaveneta has developed its own answer: efficient and reliable cooling units for the management of high density racks.

HPAC High Precision Air Conditioning

CRC

Rack Cooler

Hot Spot management



CRC unit stands for ideal integration to manage high density servers (blade servers), better known as hot-spots. The advantages are:

- Extra cooling where it is needed
- Direct Expansion systems with Inverter technology or chilled water version available
- Modulating Air flow, thanks to EC high efficiency fans. The fans adapt to the thermal load detected by sensors positioned in the hot and cold aisles
- Perfectly compatible with most of racks and ready for expansion of the cooling system

Scalability and Modularity



The CRC units have been developed to be coupled with modern racks in data centers, allowing:

- More versions available, suitable for 42U and 47U racks
- GREAT SCALABILITY of the cooling system, as the units easily adapt to the real thermal load of the server
- MODULARITY of the cooling system and rapid Upgrade of the Data Center capacity

Active free cooling



The CRC units combine the efficiency of a hydronic system for heat dissipation together with the use of new generation EC fans, allowing EER values over 100. High Density blade servers cooling systems with single or dual circuit allow the use of warm water with a temperature > 15°C. This contributes to improve all those free-cooling systems performances even in places which are normally considered too hot for such efficient systems. In the CRC Dual Circuit version, while the primary circuit (circuit 1) could be water cooled via an external dry cooler in order to maximize the free cooling benefits, the secondary backup circuit (circuit 2) can be easily combined with a Freecooling chiller to obtain best values in terms of REDUNDANCY & EFFICIENCY.

Redundancy and Reliability



Modern data centers have to guarantee an efficient 24/7 operation in order to eliminate the risks of malfunctioning and failure. The total redundancy of the system is therefore of utmost importance for the highest reliability of the data center.

The new Dual Coil version has been developed to guarantee the 100% backup thanks to: double cooling coil and double regulation valve which are completely independent.

The reliability of the system is also increased by the use of automatic switch for dual power supply feed for a CONTINUOUS and REDUNDANT power supply.

Versions

Four versions. Four specific technologies specially designed to ensure superior efficiency and reliability.

CRCX

Direct Expansion Version



Savings up to 30%
compared to traditional systems



CONFIGURATIONS

CRCX-I - Direct Expansion Rack Cooler **IN-ROW**

CRCX-E - Direct Expansion Rack Cooler **ENCLOSURE**

The CRCX unit joins the efficiency of a new Direct Expansion system with the use of the Inverter Technology and the latest brushless DC electric motor. Good performance and high efficiency are the result of the adoption of advanced technologies:

- The Inverter DC technology on the Scroll compressor with the new generation brushless motor
- The electronic thermostatic valve: it allows to improve the inverter compressor performance, and the frigorific cycle optimisation
- New generation EC brushless fans ultralight
- Completely sensible load (SHR=1)
- 'HOT SWAPPABLE' EC fans from the front
- Easy handling due to integrated wheels

CRCC

Chilled water version



25% bigger savings
thanks to the adaptive set
point according to the real thermal load



CONFIGURATIONS

CRCC-I - Chilled Water **IN-ROW**

CRCC-E - Chilled Water **ENCLOSURE**

In the hydronic version the cooling is provided by external chillers and dry coolers, to better use the freecooling system. Good performance and high efficiency are the result of the adoption of advanced technologies:

- New generation EC brushless fans ultralight
- 3 way or 2 way (optional) modulating valves
- Capacity from 16 to 74 kW
- Optimal integration with Climaveneta Freecooling chillers
- 'HOT SWAPPABLE' EC fans from the front
- Easy handling due to integrated wheels

HPAC High Precision Air Conditioning

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Rack Cooler

CRCD

Dual Fluid Version



100% backup
Reliability all year long

CRCF

Free Cooling Version



60% of the year in free cooling mode



CONFIGURATIONS

CRCD-I - Direct Expansion Dual Fluid Rack **IN-ROW**

CRCD-E - Direct Expansion Dual Fluid Rack **ENCLOSURE**

The Dual Fluid Rack Cooler features two separate circuits for the highest redundancy in cooling capacity. Thanks to a system ensuring 100% back-up, the high reliability of the system is always guaranteed, also in emergency situations.

- Inverter DC Scroll compressor featuring last-generation electronic-switching brushless motor
- Electronic expansion valve to ensure superior performance of the inverter compressor and frigorific cycle optimisation
- New generation ultralight fans, with EC brushless motor
- Complete sensible load (SHR=1)
- Easy handling due to integrated wheels
- Hot swappable EC fans from the front



CONFIGURATIONS

CRCF-I - Direct Expansion Rack with indirect free cooling **IN-ROW**

CRCF-E - Direct Expansion Rack with indirect free cooling **ENCLOSURE**

The CRCF Rack Cooler ensures high levels of energy efficiency thanks to the combination of the direct expansion system with the indirect free cooling mode. The CRCF unit works in free cooling mode when the outside temperature allows to use the outdoor air as a source of indirect cooling. The simultaneous operation of the expansion system and the water system contributes to increase the overall efficiency.

- Inverter DC Scroll compressor featuring last-generation electronic-switching brushless motor
- Electronic expansion valve to ensure superior performance of the inverter compressor and frigorific cycle optimisation
- New generation ultralight fans, with EC brushless motor
- Complete sensible load (SHR=1)
- Easy handling due to integrated wheels
- Hot swappable EC fans from the front

Configurations

Modern data centers are characterised by specific requirements: specific room dimensions, redundancy, easy adaptation to preexisting structures. This is why Climaveneta has developed two CRC configurations: In-row and Enclosure.

In-Row



CRCC-I: Chilled Water

CRCX-I: Direct Expansion

CRCD-I: Dual Fluid

CRCF-I: Free Cooling

In the InRow configuration the treated air is suucted in the back of the unit from the hot aisle of the Data Center (35°C), with great advantages in terms of energy efficiency and increased cooling capacity. The air is then cooled and delivered to the cold aisle (18-20°C) - i.e. the front side of the rack.

Features and Benefits

Design

- Back-Up system for power and cooling
- Hot swappable EC fans from the front
- Scalability and modularity
- Data Center extension

Energy Savings

- Cooling only where it is needed
- Optimised management of the system
- Extreme flexibility (applicability to 42U & 47U racks)

Highly efficient Operation

- Reduced space occupancy (0,39 m²)
- Plug & Play connections for a quick and easy installation
- User-friendly Cascade System for electrical panel maintenance
- Humidification System (optional)



HPAC High Precision Air Conditioning

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Enclosure



CRCC-E: Chilled Water

CRCX-E: Direct Expansion

CRCD-E: Dual Fluid

CRCF-E: Free Cooling

In the Enclosure configuration both the servers and the conditioners are coupled on the same structure, avoiding the mixing of indoor and outdoor air and the consequent efficiency reduction. The air is directly treated inside the rack; sucked at 46°C, cooled down to 25- 30°C and then delivered back to the servers. This increases energy saving thanks to the low amount of treated air.

Features and Benefits

Design

- Back-Up system for Power and Cooling
- Hot swappable EC fans from the front
- Scalability and modularity
- Data Center extension

Energy Savings

- Increased energy savings thanks to the low amount of treated air
- Optimised blade management
- Extreme flexibility (applicability to 42U & 47U racks)

Highly efficient Operation

- Reduced space occupancy (1,8 m²)
- Plug & Play connections for a quick and easy installation
- User-friendly Cascade System for electrical panel maintenance
- Humidification System (optional)



Ideal for removing hot spots in stand alone systems

Technological choices

DC Inverter compressor for the CRCX, CRCF and CRCD versions



The inverter driven compressor, through the variable frequency, modulates the power capacity provided, hence enabling to optimize the performances at part load and increasing the overall efficiency of the system in any condition.

Compared to the traditional On/Off compressors the Inverter compressor ensures:

- Quick achievement of the desired temperature thanks to the BOOSTER function
- Starting current & pick removal due to compressor speed and air flow modulation
- Reduced vibrations and low noise levels
- Efficient working performance at partial loads

EC-PUL fans for all indoor units

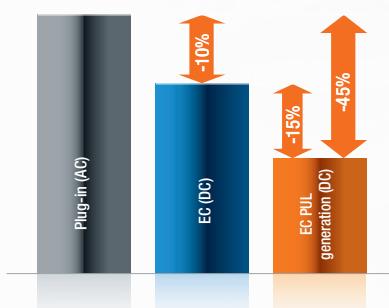


The high efficiency EC brushless fan reduces both noise levels as well as energy consumption, and assures a variable air flow at part loads, optimizing the operating costs of the unit.

Main features:

- Further noise level reduction 4-5 dB
- Further absorbed power reduction by 15%

EC-PUL FANS also for outdoor units



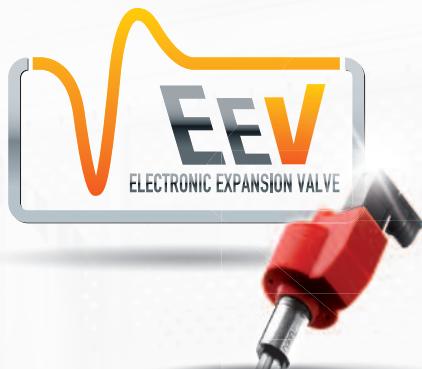
The use of EC brushless technology even on the remote motocondenser (optional) fan assures a further average reduction of noise levels by 10%, together with a strong reduction of energy consumption by 45% compared to traditional condensers with AC technology.

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Electronic Thermostatic Valve



The Direct Expansion CRC units with DC Inverter compressor make use of electronic expansion valve as standard.

These valves have a much wider modulation capacity. It stands out for its quality of control and its capacity to quickly reach and maintain the operating stability of the unit. Joined with the INVERTER compressor technology, the valve ensures a quick fluctuation-free regulation, and therefore a highly accurate adjustment to the swings of load and ambient conditions.

Ecologic Refrigerant



The R-410A represents the most modern and look-ahead choice in refrigerant technology: it clearly contributes to make the ICT GREEN since it complies with environmental friendly policies and provide enhanced cooling efficiency.

The R-410A represents the most efficient long-term solution; it contributes to increase the energy efficiency up to 5-6% compared to the R-407c refrigerant, avoiding air pollution.

Evolution Control



IDM INTEGRATED DYNAMIC MANAGEMENT OF THE TEMPERATURE

The units are provided with a new algorithm called IDM-INTEGRAL DYNAMIC MANAGEMENT, which allows to avoid the stratification of the air temperature inside the rack through the use of 4 integrated and independent sensors (2 for aspiring and 2 for leaving). On the basis of the real load in each single blade, the sensors contribute to improve the ventilation efficiency, working where it is requested. This helps to maximize the energy efficiency. L>IDM guarantees the optimal air temperature and humidity management via a dynamic system able to avoid local condensation thus maintaining SHR = 1-

Technical data

CRCX Direct Expansion Version

CRCX-I + i-HCAT

Model	0051	0071	0121	0151	0251
Power Supply	230V/1N/50Hz*	400V/3N/50Hz*	400V/3N/50Hz*	400V/3N/50Hz*	400V/3N/50Hz*
	max min.				
Total Cooling Capacity	kW 10,63	4,72	16,59	6,78	28,62
Sensible Cooling Capacity	kW 9,61	4,72	15,67	6,78	27,37
Power abs compressor	kW 2,63	0,77	4,56	1,17	7,19
Power abs condensation fan		0,31	0,31	0,6	1,2
Power abs evaporator fan	kW 0,16	0,04	0,304	0,064	0,860
Air flow	m³/h 1500	900	2700	1200	4200
EER		3,43	4,21	3,03	3,7
No. circuits		1	1	1	1
Dimensions					
Indoor unit	HxPxL mm	2100x1000x300	2100x1000x300	2100x1000x300	2100x1000x600
Outdoor unit	HxPxL mm	1240x420x900	1200x550x1450	1700x550x1450	1865x1195x1825

Performances at the following conditions: 35°/27% U.R. and 35°C outdoor temperature

* 60Hz versions available

The data in the table refer to the above power supply

CRCX Direct Expansion Version

CRCX-E + i-HCAT

Model	0051	0071	0121	0151	0251
Power Supply	230V/1N/50Hz*	400V/3N/50Hz*	400V/3N/50Hz*	400V/3N/50Hz*	400V/3N/50Hz*
	max min.				
Total Cooling Capacity	kW 11,84	5,64	18,71	8,19	33,02
Sensible Cooling Capacity	kW 11,84	5,64	18,71	8,19	33,02
Power abs compressor	kW 2,68	0,73	4,65	1,15	7,4
Power abs condensation fan		0,31	0,31	0,6	1,2
Power abs evaporator fan	kW 0,16	0,04	0,3	0,06	0,86
Air flow	m³/h 1500	900	2700	1200	4200
EER		3,8	5,2	3,37	4,52
No. circuits		1	1	1	1
Dimensions					
Indoor unit	HxPxL mm	2100x1200x300	2100x1200x300	2100x1200x300	2100x1200x600
Outdoor unit	HxPxL mm	1240x420x900	1200x550x1450	1700x550x1450	1865x1195x1825

Performances at the following conditions: 46°/16% U.R. and 35°C outdoor air temperature

* 60Hz versions available

The data in the table refer to the above power supply

CRCC Chilled Water Version

CRCC-I

Model	0020	0025	0035	0036	0040	0050	0060	0055
Power Supply			230V/1N/50Hz*			400V/3N/50Hz*		
Total Cooling Capacity	kW 16,14	20,52	24,60	20,95	38,45	46,9	58,2	47,12
Sensible Cooling Capacity	kW 16,14	20,52	24,60	20,95	38,45	46,9	58,2	47,12
Water pressure drops	kPa 30,00	35,00	40,00	70,00	68	38	56	62
Water flow	m³/h 2,77	3,53	4,23	3,60	6,61	8,06	10	8,1
Power abs evaporator fan	kW 0,516	0,688	0,860	0,860	1,73	2,12	2,6	2,64
Air flow	m³/h 2520	3360	4200	4200	8000	8800	12000	10500
No. circuits		1	1	1	2	1	1	1
Dimensions								
Indoor unit	HxPxL mm	2100x1000x300				2100x1000x600		

Performances at the following conditions: 35°/27% U.R. and 10°/15°C water temperature

* 60Hz versions available

The data in the table refer to the above power supply

CRCC Chilled Water Version

CRCC-E

Model	0020	0025	0035	0036	0040	0050	0060	0055
Power Supply			230V/1N/50Hz*			400V/3N/50Hz*		
Total Cooling Capacity	kW 20,44	26,06	31,25	26,79	49,27	60	74,71	60,69
Sensible Cooling Capacity	kW 20,44	26,06	31,25	26,79	49,27	60	74,71	60,69
Water pressure drops	kPa 30,00	40,00	45,00	80,00	75	42	63	69
Water flow	m³/h 2,93	3,74	4,49	3,85	7,07	8,62	10,73	8,71
Power abs evaporator fan	kW 0,52	0,69	0,86	0,86	1,73	2,12	2,6	2,64
Air flow	m³/h 2520	3360	4200	4200	8000	8800	12000	10500
No. circuits		1	1	1	2	1	1	1
Dimensions								
Indoor unit	HxPxL mm	2100x1200x300				2100x1200x600		

Performances at the following conditions: 46°/16% U.R. and 14°/20°C water temperature

* 60Hz versions available

The data in the table refer to the above power supply



CRC Dual Fluid Version

CRC-I + i-HCAT air cooled

CRC-E + i-HCAT air cooled

Model		0051		0071		0051		0071		
Power supply		230V/1N/50Hz*		400V/3N/50Hz*		230V/1N/50Hz*		400V/3N/50Hz*		
Performance (DX)		max (1)	min (1)	max (1)	min (1)	max (2)	min (2)	max (2)	min (2)	
Total Cooling Capacity	kW	10,95	4,55	13,99	6,93	12,7	5,4	16,71	8,41	
Sensible Cooling Capacity	kW	10,24	4,55	13,99	6,93	12,7	5,4	16,71	8,41	
Compressor power abs	kW	2,64	0,77	3,58	1,17	2,71	0,74	3,65	1,15	
Condensing unit's fan power abs	kW	0,31	0,31	0,6	0,6	0,31	0,31	0,6	0,6	
EER		3,35	4,06	2,87	3,76	3,80	4,95	3,38	4,62	
Performance (CW)		Performance (3)		Performance (3)		Performance (4)		Performance (4)		
Total Cooling Capacity	kW	9,53		17,7		12,10		22,6		
Sensible Cooling Capacity	kW	9,53		17,7		12,10		22,6		
Water flow	l/h	1640		3040		1740		3240		
CRC pressure drop	kPa	14,9		45,7		16,3		50,1		
Fans		max	min	max	min	max	min	max	min	
Air flow	m³/h	1500	700	3360	1500	1500	700	3360	1500	
Indoor unit's fan power abs	kW	0,32	0,04	0,69	0,072	0,32	0,04	0,69	0,072	
Dimensions										
Indoor unit	HxPxL	mm	2100x1000x300		2100x1000x300		2100x1200x300		2100x1200x300	
Outdoor unit	HxPxL	mm	1240x420x900		1200x550x1450		1240x420x900		1200x550x1450	

(1) Performances at the following conditions: 35°C/27% U.R., 35°C outdoor air temperature

(2) Performances at the following conditions: 46°C/16% U.R., 35°C outdoor air temperature

(3) Performances at the following conditions: 35°C/27% U.R., 10°/15°C water temperature

(4) Performances at the following conditions: 46°C/16% U.R., 14°/20°C water temperature

* 60Hz versions available

The data in the table refer to the above power supply

CRCF Free Cooling Version

CRCF-I + i-HCFT water cooled

CRCF-E + i-HCFT water cooled

Model		0051		0071		0051		0071		
Power supply		230V/1N/50Hz*		400V/3N/50Hz*		230V/1N/50Hz*		400V/3N/50Hz*		
Performance (DX)		max (1)	min (1)	max (1)	min (1)	max (2)	min (2)	max (2)	min (2)	
Total Cooling Capacity	kW	11,29	4,66	14,67	7,16	12,93	5,51	17,52	8,7	
Sensible Cooling Capacity	kW	10,38	4,66	14,67	7,16	12,93	5,51	17,52	8,7	
Compressor power abs compressor	kW	2,41	0,69	3,08	1,06	2,5	0,64	3,11	1,03	
Condensing unit's fan power abs	kW	0,6	0,6	1,2	1,2	0,6	0,6	1,2	1,2	
EER		3,02	2,68	2,73	2,61	3,38	3,26	3,24	3,21	
Performance (FC)		Performance (3)		Performance (3)		Performance (4)		Performance (4)		
Total Cooling Capacity	kW	9,89		17,7		12,48		22,8		
Sensible Cooling Capacity	kW	9,89		17,7		12,48		22,8		
Water flow	l/h	2370		3070		2670		3570		
CRCF pressure drop	kPa	28,7		46,6		35,9		59,6		
Pump power abs	kW	0,41		0,41		0,41		0,41		
i-HCFT available pressure	kPa	86		92		77		81		
Fans		max	min	max	min	max	min	max	min	
Air flow	m³/h	1500	700	3360	1500	1500	700	3360	1500	
Indoor unit's fan power abs	kW	0,32	0,04	0,69	0,072	0,32	0,04	0,69	0,072	
Dimensions										
Indoor unit	HxPxL	mm	2100x1000x300		2100x1000x300		2100x1200x300		2100x1200x300	
Outdoor unit	HxPxL	mm	1200x550x1450		1700x550x1450		1200x550x1450		1700x550x1450	

(1) Performances at the following conditions: 35°C/27% U.R., 30/35°C condensing water temperature

(2) Performances at the following conditions: 46°C/16% U.R., 30/35°C condensing water temperature

(3) Performances at the following conditions: 35°C/27% U.R., input water FC 10°C

(4) Performances at the following conditions: 46°C/16% U.R., input water FC 14°C

* 60Hz versions available

The data in the table refer to the above power supply



A Group Company of **MITSUBISHI ELECTRIC**

Climaveneta S.p.A.

Via Sarson 57/c
36061 Bassano del Grappa (VI)
Italy
Tel +39 0424 509 500
Fax +39 0424 509 509
info@climaveneta.com
www.climaveneta.com

Subsidiaries

France

www.climaveneta.fr

Spain

www.climaveneta.es

Poland

www.climaveneta.pl

Germany

www.climaveneta.de

Great Britain

www.climaveneta.co.uk

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ae.climaveneta.com

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