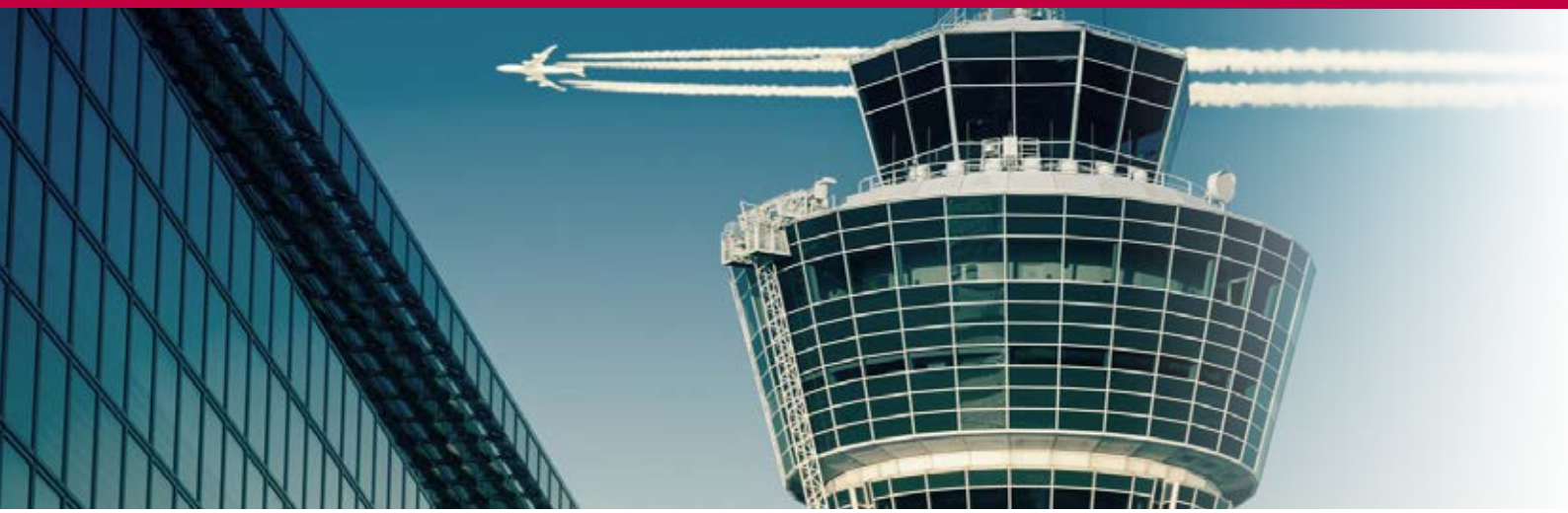
Close Control Units

Refrigeration technology for precision applications

Precision Cooling for Crucial Applications



PRECISION

Precision cooling requires very small tolerances in the temperature and humidity control. High precision is possible only thanks to high sensitivity sensors able to detect even the slightest variations of the parameters, high-speed microprocessors able to reduce the reaction times and an efficient working software developed specifically for the application.

SUPERVISION SYSTEM

Supervision system allows the total remote active control of an installation. In addition it provides the best working program for the energy optimization.

RELIABILITY

Reliability can be obtained with an accurate development of the units, the best components, the self-diagnosis system and the alarm system to anticipate the necessary maintenance interventions.

Lennox is a leading provider of solutions for precision applications and is committed to helping its customers with their projects, providing optimal and sustainable solutions.

New technology trends in the data center market are gradually increasing the heat load per m2, which obviously affects the design of the air conditioning.

Precision Air Conditioning

The importance of energy efficiency calls for the best technology to optimise data centre' efficiency and effectiveness.

The new design of data centers, industries and control rooms implies that servers being used need to be increasingly efficient. Over time the need for thermal loads is increased due to their power. The air conditioning in several rooms is one of the most critical elements of current needs, demanding greater reliability and security in the devices. This means infrastructures need redesigning to comply with increasingly demanding classifications and certifications.

The main elements specify continuous improvement of energy efficiency in order to reduce the most demanding OPEX and not affect CAPEX capital investment.

Lennox guarantees high efficiency and availability of data centre solutions, whatever the complexity of its needs, and provides a high level of knowledge and experience.

ENERGY
EFFICIENCY

CAPEX: CAPITAL INVESTMENT

The computer room is one of the main arteries of a company and requires high level technological solutions, bringing added value, increasing service life and reducing operating expense.

OPEX: OPERATING COSTS

These are the permanent costs (24 hours a day, all year round during 10 years approximately) of a data center. To control them is crucial. Even the smallest saving becomes extremely relevant over time. This justifies the initial investment and the early restoration of the system in order to provide improved efficiency.

PUE:
THE RESULT OF DIVIDING THE TOTAL ELECTRICAL CONSUMPTION OF A DATA CENTRE BY THE CONSUMPTION OF THE IT SYSTEMS ONLY

DPC: includes the consumption of the Uninterruptible Power Supplies (UPSs), generators, air conditioning systems, lighting, monitoring, etc.
The electricity consumption of the IT equipment only includes the consumption of the equipment used for management and storage of the information circulated through the data centre.
The maximum value of the PUE should be 1, where the total electricity consumption of the data centre is equivalent to IT equipment's requirement.

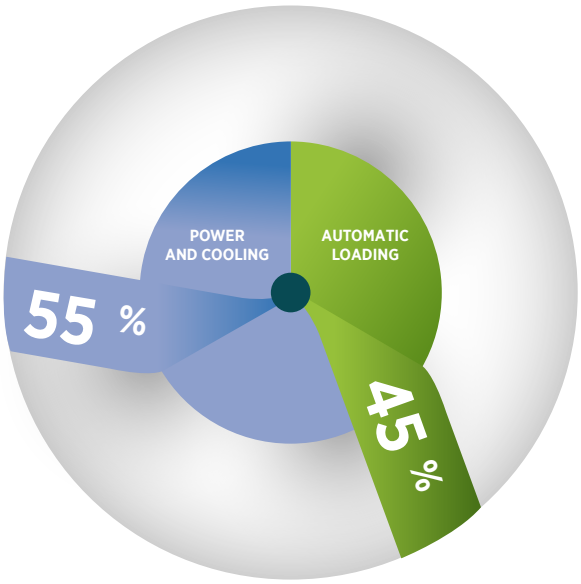
DCIE = 1/PUE x 100

The DCIE (data centre infrastructure efficiency), connected to the PUE, is the percentage of power absorbed by the information technology infrastructure compared to the overall consumption of the data centre. In conventional data centres, values tend to approach 30%. A DCIE of 70% indicates a very high energy efficiency.

Leaders in data centre solutions for high density requirements

Our challenge:
Data centre optimisation

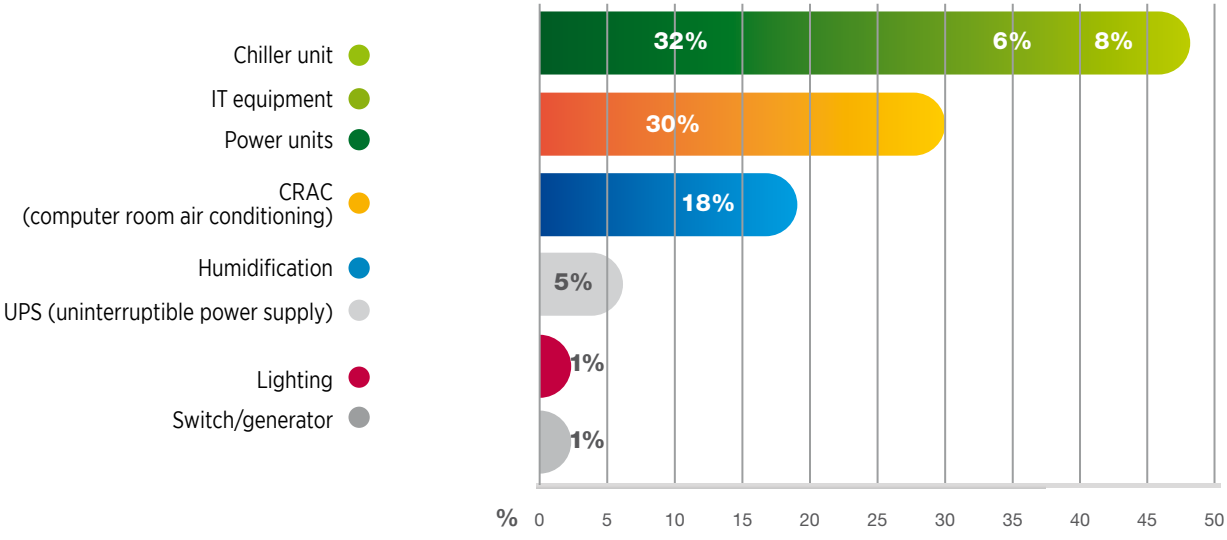
Knowledge of the specific needs of the data centres, and Lennox's involvement in energy efficiency improvement strengthen our standing, providing the maximum technology and efficiency through high, medium and low density solutions.



OPEX REDUCTION

Cooling of the Data Centre is an important part of the total energy consumption

DATA CENTRE ENERGY CONSUMPTION BY MACHINE



TECHNOLOGICAL REVOLUTION IN THE DESIGN OF DATA PROCESSING CENTRES

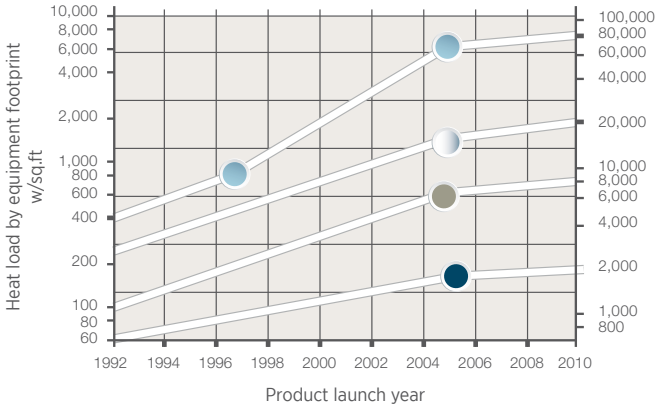
Communication equipment (structures)

Workstations (standalone)

Servers and disk storage systems (1.8-2.2 m high)

Tape storage systems

The greater use of microprocessors, although made up for by improved efficiency, continuously increases the density of power generated. Such growth is so obvious that, in order to represent this phenomenon, a logarithmic scale is needed. (Source: Uptime Institute)

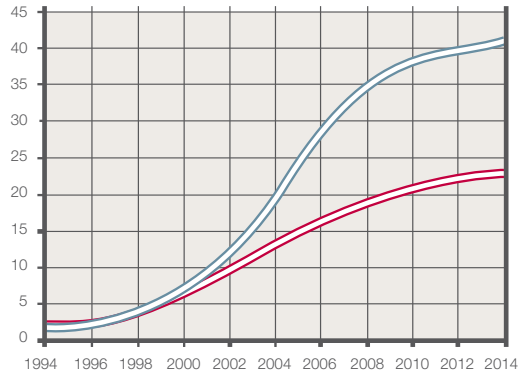


Computer servers - Blade

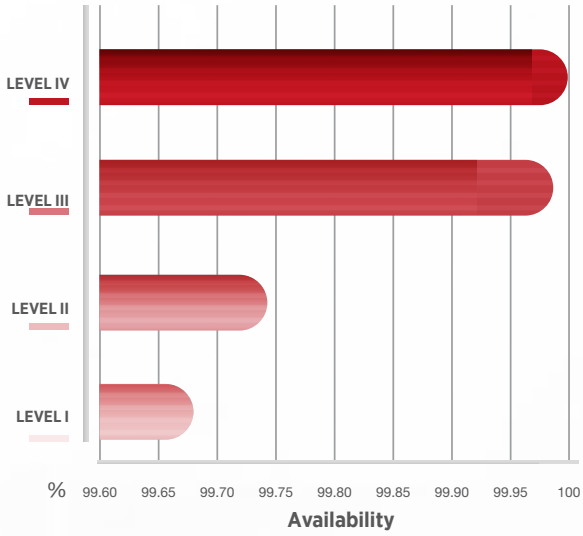
Servers - Control rooms

The gradual greater use of incoming virtualisation and BLADE SERVERS characterised by increased power in limited volumes drives the sharp increase in loads, with the resulting increase in the thermal power per m^2.

Thermal load trends according to ASHRAE



RELIABILITY
GUARANTEE



TIER indicates the level of reliability of a data centre associated with four defined levels of availability:

TIER 1: AVAILABILITY OF 99.671% (28.8 hours of inactivity)

- Installation without redundancy in its infrastructures (electrical distribution, cooling, etc.).
- It is not mandatory to have a UPS or alternative power source in case of an emergency.
- Offline once a year for a specified time for maintenance.

TIER 2: AVAILABILITY OF 99.741% (22.7 hours of inactivity)

- Installation relies on redundancy in minimum infrastructures such as cooling, but not the electrical system.
- Has UPS or alternative power source in case of emergency.
- Has raised floors.
- Some maintenance work can be done with the Centre online.
- Availability of 99.741%.

TIER 3: AVAILABILITY OF 99.982% (1.58 hours of inactivity)

- Relies on redundancy in its infrastructures.
- Has various alternative power and cooling sources in case of emergency.
- The maintenance operations do not require the Centre to be offline at any point.

TIER 4: AVAILABILITY OF 99.995% (0.44 hours of inactivity)

- Implies compliance with all TIER 3 requirements. Withstands unplanned events and emergency situations with no critical impact on the load.
- Preventive, corrective and evolutionary maintenance can be performed without affecting service, even in critical emergency situations.

AIR CONDITIONING SYSTEMS

Lennox solutions are designed to fit with any type of data centre air conditioning

COLD AND HOT AISLES

Maintaining the right temperature inside the data centre is critical.

Most data centre devices take in fresh air through the front and discharge warm air from the back, alternating the orientation of the aisles provides the air flow naturally.

COLD WATER SYSTEMS

Optimisation of hydronic solutions for high-precision air conditioning units guarantees efficiency and ensures the safety and reliability of the systems.

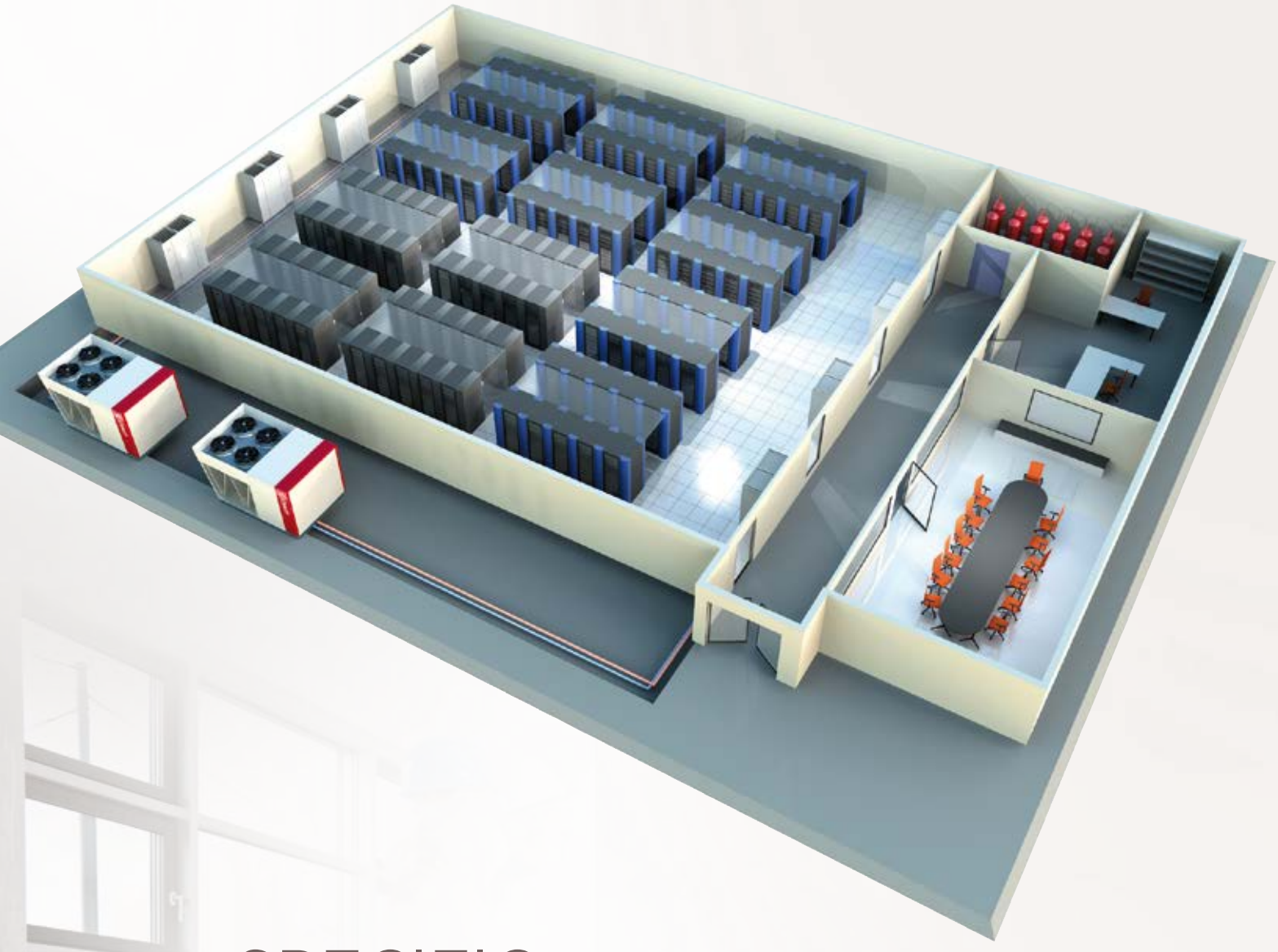
Very high energy efficiency values can be achieved thanks to LENNOX chillers combined with DYNAMIC FREE-COOLING and SET POINT systems.

SPOT COOLING

This is the process whereby hot spots of a data centre are cooled.

OPTIMUM AIR SUPPLY DISTRIBUTION

The optimum distribution of the air flow through the raised floor makes it easier to design cold or hot aisles.



SPECIFIC **PROJECTS** for data centres

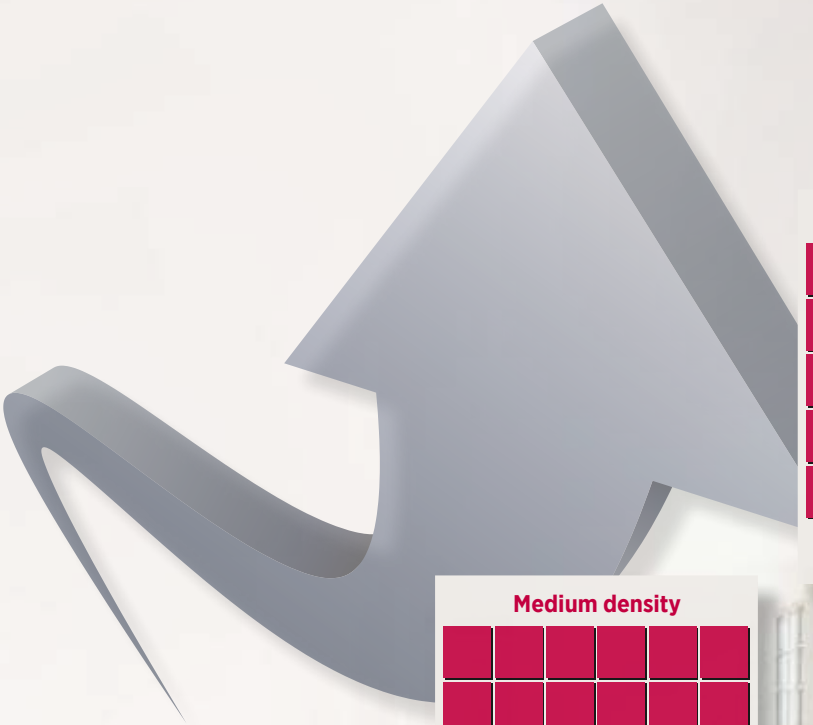
LENNOX PROVIDES COOLING SYSTEM SOLUTIONS ENSURING FLEXIBILITY FOR THE DIFFERING HEAT LOADS OF DATA CENTRES

MODULAR
COOLING

BASED ON THE ACTUAL HEAT LOAD OF DATA CENTRES AND THE WORKING CONDITIONS AT THE TIME

LOAD PER RACK: quantity of the heat dissipated by all of the equipment present in the rack

Classification of IT equipment into 3 groups:
Low Density · Medium Density · High Density



High density

> 25 kW/m2_rack

Medium density

10-20 kW/m2_rack

Low density

< 5 kW/m2_rack

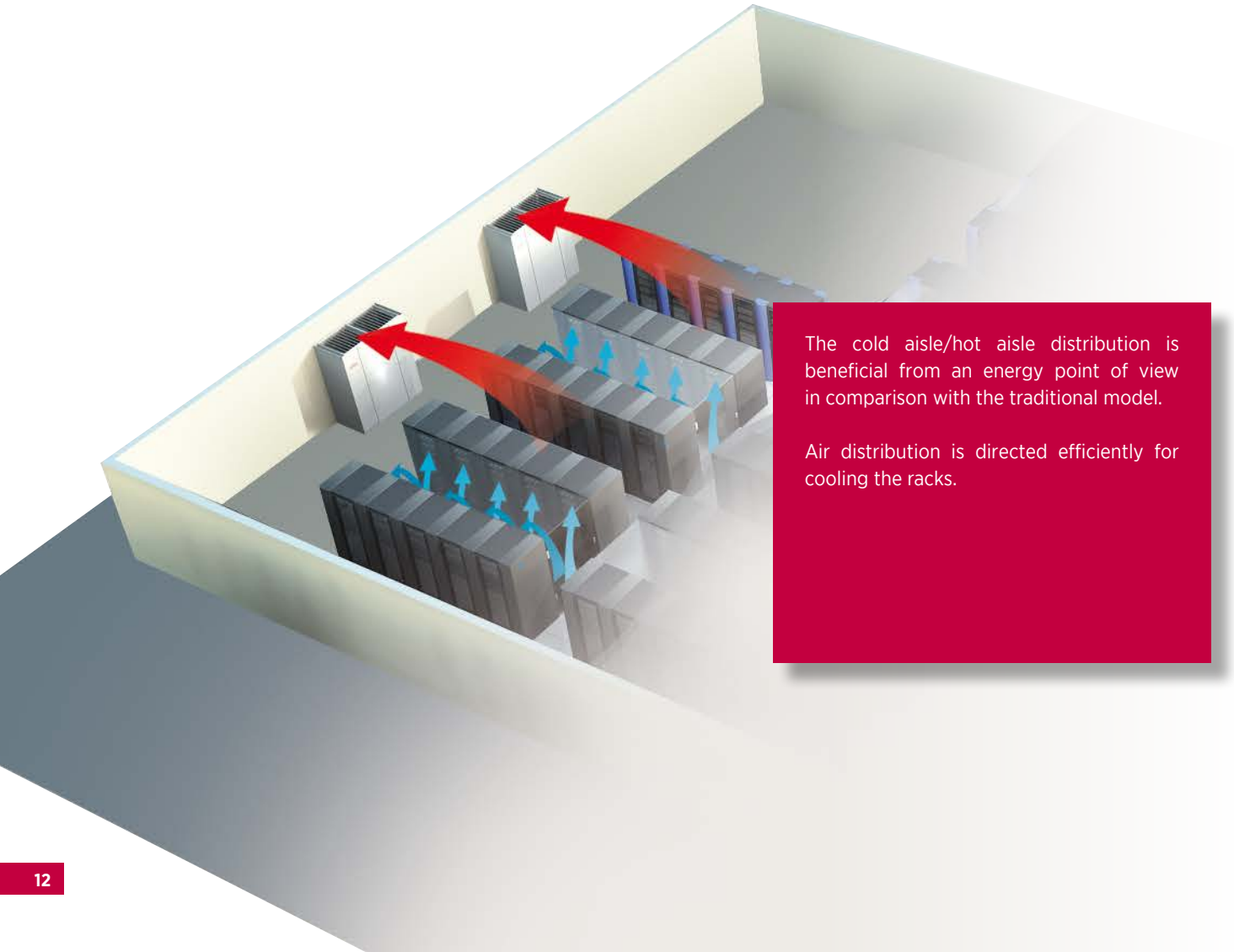
LOW density

< 5 kW/m²

HOT/COLD AISLE

Low density in data centres is based on DIFFERENTIATING hot and cold aisles. Air is distributed through the raised floor, ducts or displacement, directing the cold air where needed. Hot air is directed back to the cooling equipment.

EASY EXPANSION · EASY REITERATION · MINIMUM INVESTMENT · OPTIMUM EFFICIENCY



The cold aisle/hot aisle distribution is beneficial from an energy point of view in comparison with the traditional model.

Air distribution is directed efficiently for cooling the racks.

MEDIUM density

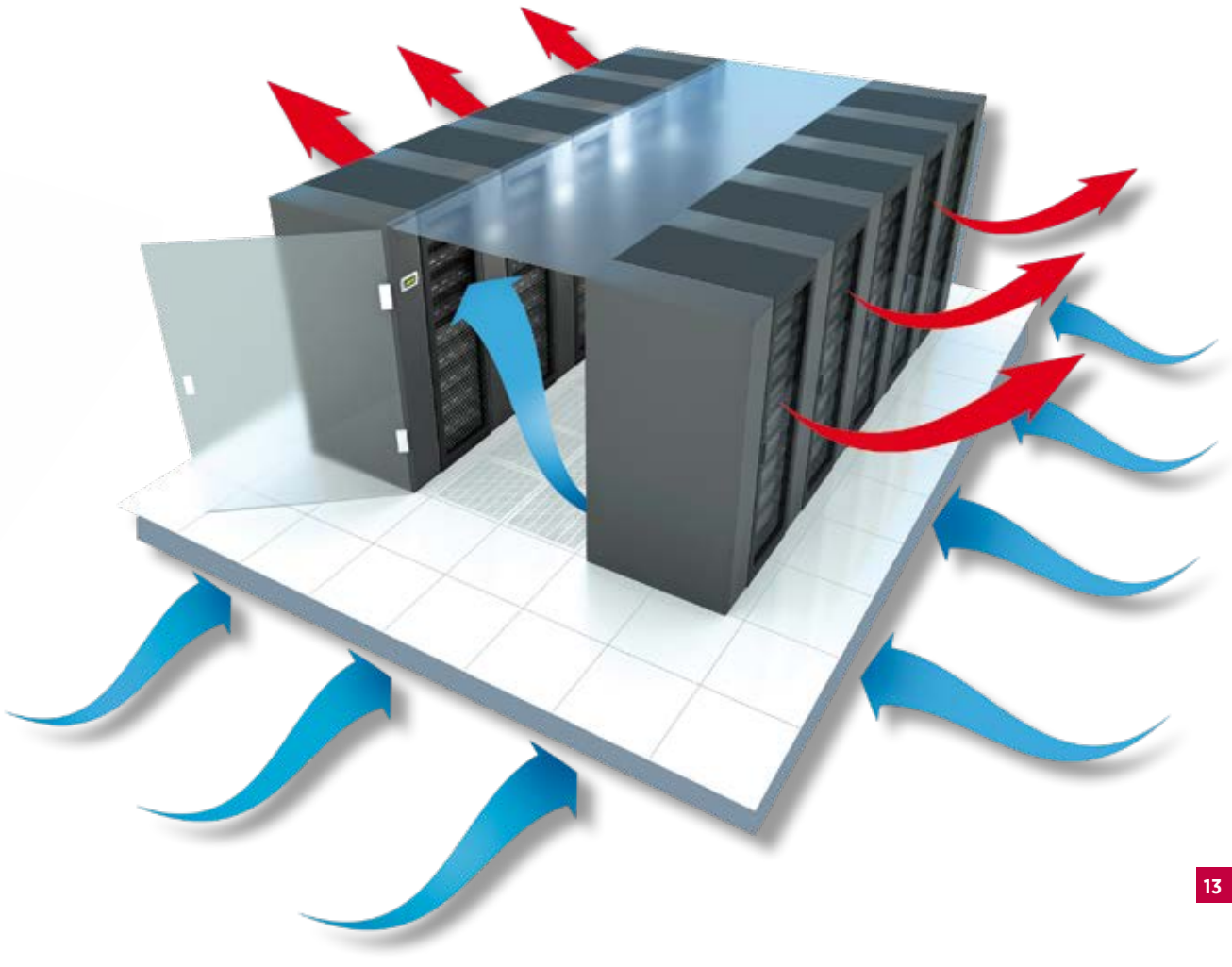
10-20 kW/m^2

PARTITIONING

The most standard design of a Medium-Density data centre is PARTITIONING of hot and cold aisles, preventing the air from mixing. Air is distributed through the raised floor or ducts, isolating this area guarantees the homogeneity of the air in both the hot and cold aisles.

Thanks to the most innovative Lennox technology (Inverter, In-Row, etc.), the cold aisle compartment ensures a constant temperature in the rack air intakes and return the hot air through the room.

The hot aisle compartment is different : the hot air is directly conducted to the air conditioning units. Air is discharged into the room for better inertia before shutdown.



HIGH density

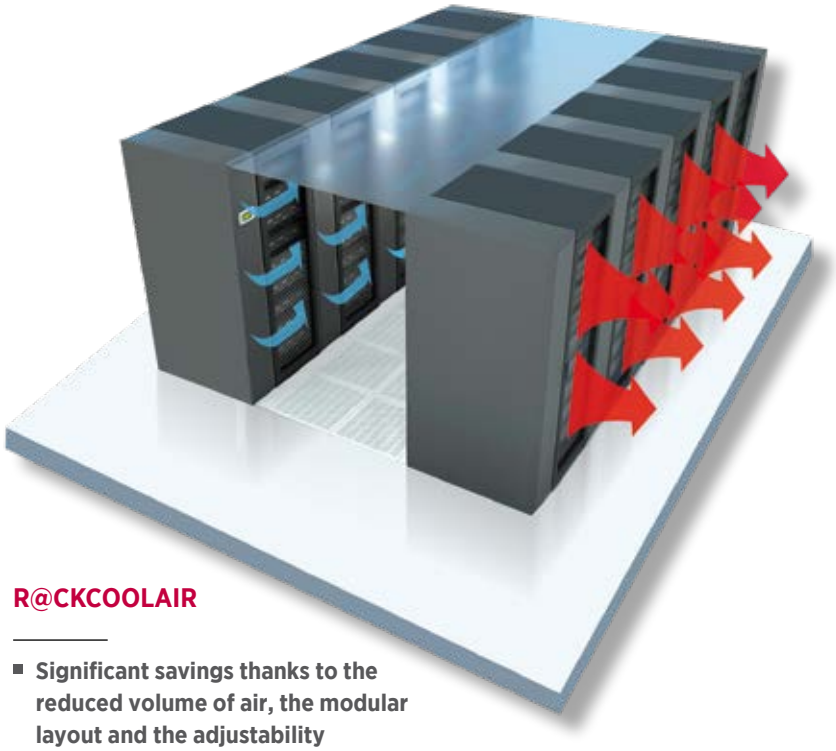
> 25 kW/m²

PARTITIONING

R@CKCOOLAIR

High density in data centres is the need to concentrate the high heat loads dissipated by the racks. This is possible with Lennox cooling systems (R@CKCOOLAIR).

These units save space in data centres and have different configurations, discharging to the cold aisle or directly over the server.



R@CKCOOLAIR

- **Significant savings thanks to the reduced volume of air, the modular layout and the adjustability**
- **Optimum solution for a single rack 100% redundancy available**

A SOLUTION FOR EACH SYSTEM

CRCX: Direct expansion
- EC FANS
- DC INVERTER COMPRESSOR, R-410A
- CAPACITY BETWEEN 20 AND 35 kW

CRCC: Chilled water
- EC FANS
- MODULATING THREE-WAY VALVE
- CAPACITY BETWEEN 20 AND 35 kW

RANGE:

Close Control Units

INNOV@ ENERGY INVERTER

3 to 90 kW 16

INNOV@

6 to 240 kW 18

INNOV@ DFCDR / DSCDR

38 to 330 kW 22

Adiabatic Solutions

DatAdiab

10 to 330 kW 26

Medium and High-Density Units

R@CKCOOLAIR

3 to 74 kW 28

MINI R@CKCOOLAIR

3 to 7.3 kW 32

Telecom Units

@DNOVA

2.5 to 38 kW 34

INNOV@
ENERGY INVERTER
3 to 90 kW
CLOSE CONTROL UNITS

Close control air conditioning units with modulating cooling capacity.

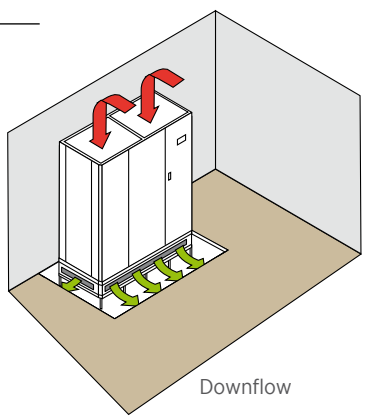
The **e-Drive** technology used in the unit optimises the cooling capacity through fans and compressors, especially in extreme-density environments. Thanks to modulation of the cooling capacity from 25 to 100%, combined with the rapid reaction to load variation [6 Hz/second], energy consumption is reduced compared to traditional technologies, reaching values of up to 45% and promoting the energy efficiency of this unit.

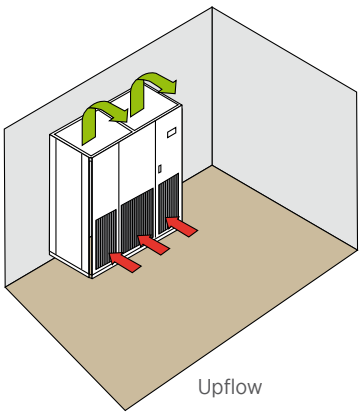
Improved energy efficiency, smaller dimensions and lower noise levels were LENNOX's objectives when developing this product. Units designed to operate 24 hours a day, 365 days a year in cooling.

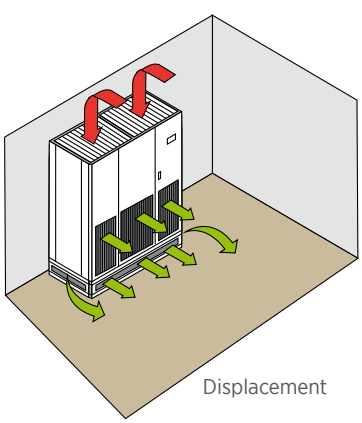
The main components are accessible from the front of the unit with the aim of reducing installation and maintenance costs: switchboard, compressor, fans, humidifiers, electrical resistors, expansion valve and liquid filter, guaranteeing quick, safe servicing.

The **quality of the latest-technology components** makes the Innov@ series an example of maximum efficiency and reliability. Technical specifications, such as electronic expansion valves, radial fans with inverted blades and electronically commutated (EC) DC motors offer energy saving opportunities.

AVAILABLE CONFIGURATIONS


Downflow


Upflow


Displacement

ENERGY INVERTER range
INNOV@ DX Air-condensed and water-condensed

INNOV@ ENERGY INVERTER - R410A		0091	0131	0241	0341	0462	0682	0902
Inlet air 24°C - 50%r.h. Condensing temperature 45°C								
Total cooling capacity	kW	9,3	12,6	25,2	37,1	48,5	75,2	90,3
SHR		0,9	0,9	0,9	0,8	1,0	0,9	0,9
Refrigeration cycle EER		3,7	4	3,7	3,6	3,6	3,7	3,4
Inlet air 30°C - 35%r.h. Condensing temperature 45°C								
Total cooling capacity	kW	9,9	14,2	28,4	39,8	54,4	81,7	98,5
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0
Refrigeration cycle EER		4,0	4,6	4,2	3,9	4,0	4,0	3,7
Air flow rate	m3/h	2150	3700	6800	7280	14150	19420	22500
Total absorbed power	kW	2,7	3,6	7,8	11,5	16,1	23,4	29,7
Total absorbed current	A	4,3	5,6	12,5	18,4	25,7	37,6	47,8
Height	mm	1875	1875	1998	1998	1998	1998	1998
Width	mm	600	900	1010	1280	2030	2510	2510
Depth	mm	600	600	805	805	805	805	805

INNOV@ ENERGY INVERTER - R410A		381	441	501	551	641	701	801	962	1003	1103
Inlet air 24°C - 50%r.h. Condensing temperature 45°C											
Total cooling capacity	kW	40,1	47,4	50,3	58,9	60,3	77,1	80,0	96,6	108,6	133,5
SHR		1,0	0,9	1,0	0,9	1,0	0,9	1,0	0,9	0,9	0,8
Refrigeration cycle EER		4,5	4,2	4,5	4,2	4,3	4,2	4,4	4,6	4,3	4,2
Total absorbed power	kW	10,8	13,0	13,1	16,6	16,2	21,2	21,9	25,4	29,8	36,0
Total absorbed current	A	17,0	20,6	20,9	26,4	25,7	33,6	34,8	42,8	51,9	63,9
Inlet air 30°C - 35%r.h. Condensing temperature 45°C											
Total cooling capacity	kW	46,0	53,0	58,0	67,4	69,2	86,6	91,4	109,4	119,5	143,0
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Refrigeration cycle EER		5,2	4,7	5,2	4,7	4,8	4,7	4,9	5,3	4,7	4,5
Total absorbed power	kW	10,6	13,0	13,1	16,9	16,5	21,5	22,4	25,2	29,8	36,1
Total absorbed current	A	16,7	20,6	20,9	26,9	26,2	34,1	35,7	42,7	52,1	64,0
Air flow rate	m3/h	11700	11700	14300	16200	17500	19900	23700	25300	25300	25300
Height	mm	1998	1998	1998	1998	1998	1998	1998	1998	1998	1998
Width	mm	1270	1270	1760	1760	2020	2020	2500	2500	2500	2500
Depth	mm	890	890	890	890	890	890	890	890	890	890

This efficiency assumes that the units are installed with the remote condenser suggested and an outside air temperature of 35°C
(1) Indoor conditions 24°C/50%.
(2) 1.5 metres high and 2 m in front in free field – downflow units (30 Pa AESP), nominal air flow, compressor speed 50 Hz

AVAILABLE ACCESSORIES

- Dual fluid
- Potential-free contacts for any alarms
- Water leak detection kit
- Flash memory
- Humidification and dehumidification
- Heat input by resistors, water coil or hot gas coil
- Different filtration levels
- Condensation control
- Different communication protocols
- Direct free-cooling
- Low noise level in internal and external unit

CONTROL

The microprocessor control, available in the basic or advanced graphic version, manages all of the functions of the Innov@ series. This control provides the **opportunity to connect up to 8 units together** to create a local network (LAN) that, amongst other things, helps to balance run times automatically using a rotation function. The microprocessor controls are shown on an LCD (basic version) or graphic (advanced version) screen and are compatible with a wide range of protocols.

INNOV@

6 to 240 kW

DX: 6 to 128 kW · CW: 8 to 240 kW

CLOSE CONTROL UNITS

The INNOV@ series is the perfect response to air conditioning needs in technological areas (computer rooms, data centres, control rooms, electronic data processing rooms, the textile industry, meteorological rooms, etc.). Guaranteeing and complying with all environmental protection parameters.

The exclusive design with rounded edges and the excellent response of the Innova@™ series have become the new standard of high quality in the close control air conditioning sector. Range with R-410A refrigerant.

The highest energy efficiency, smallest dimensions and lowest noise levels: units designed to run 24 hours a day, 365 days a year. The energy savings compared to traditional technologies reach up to 45%.

The main components are accessible from the front of the unit with the aim of reducing installation and maintenance costs: switchboard, compressor, fans, humidifiers, electrical resistors, expansion valve and liquid filter. This guarantees quick, safe servicing.

The quality of the latest-technology components makes the Innov@ series an example of maximum efficiency and reliability. Technical specifications, such as electronic expansion valves, radial fans with inverted blades and electronically commutated (EC) DC motors offer energy saving opportunities.

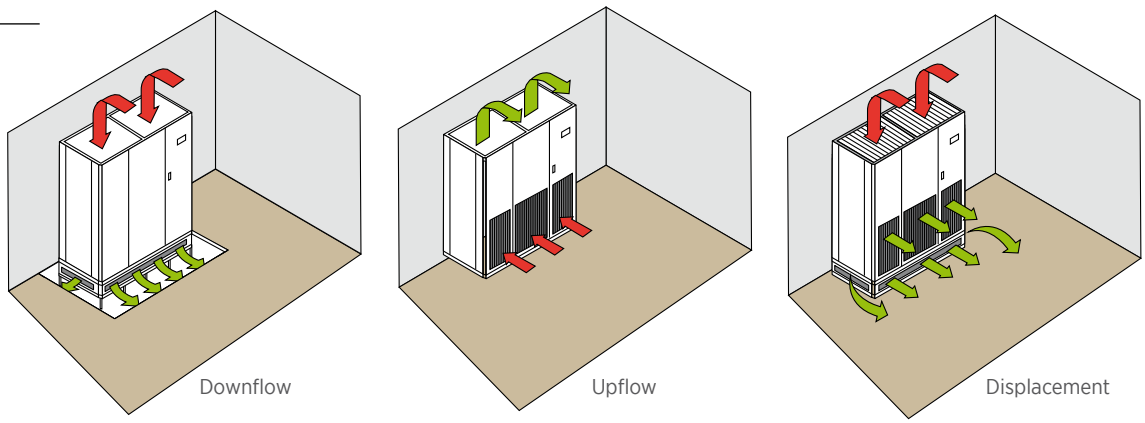
MODELS

- **Centrifugal fan**
- **EC Plug Fan**

OPERATING MODE

- **Air cooled units with remote condenser**
- **Water cooled units**
- **Units with chilled water coil**
- **Dual fluid units: air cooled with remote condenser and chilled water coil or water cooled with remote dry cooler and chilled water coil.** They enable a backup operation with cold water from a chiller unit in normal mode or jump to another mode in the event of incidents or maintenance of the main mode. They can also reach larger capacity ranges in extreme conditions.
- **Water cooled units with remote dry cooler and indirect free-cooling.** Indirect free-cooling is the only air-conditioning solution when the rooms have to be isolated from the outside environment or if a very high level of filtration is required. In this case, the outside air is used to cool water through a dry cooler and sent to the interior unit to refrigerate. A modulating three-way valve manages the cold water through the chilled water coil.

AVAILABLE CONFIGURATIONS



MAIN APPLICATIONS

- Computer rooms
- Data processing centres

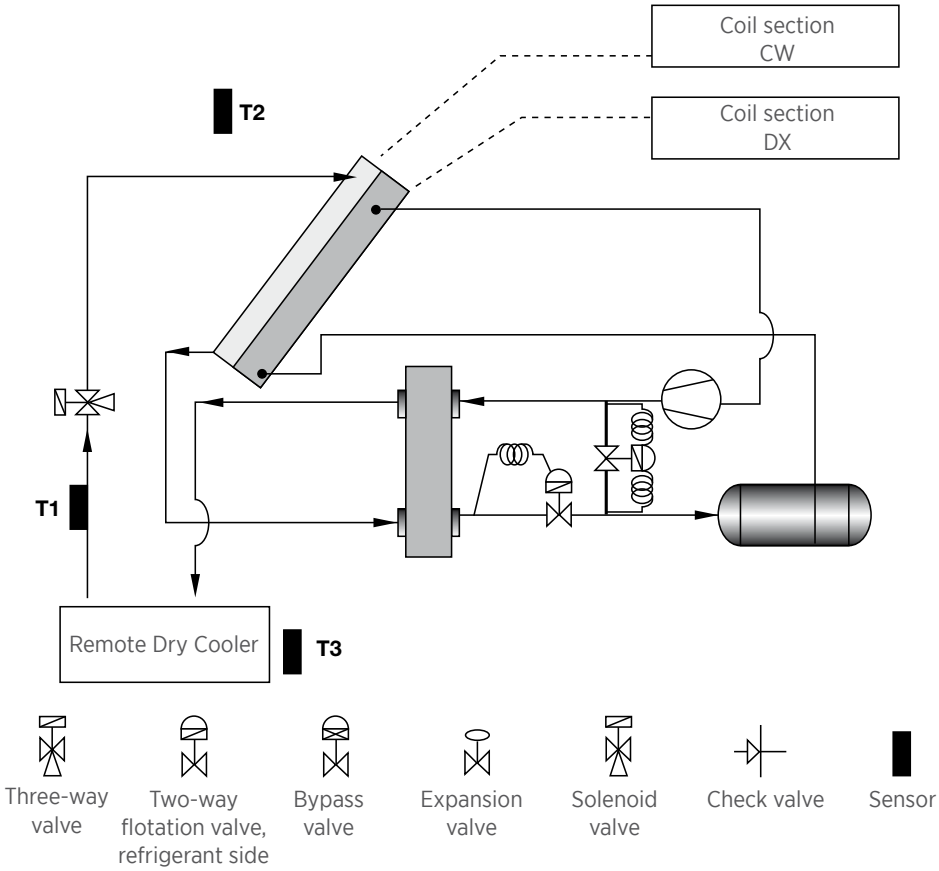
CONTROL

The microprocessor control, available in the basic or advanced graphic version, manages all of the functions of the Innov@ series. This control provides the opportunity to connect up to 8 units together to create a local network (LAN) that, amongst other things, helps to balance run times automatically using a rotation function.

The microprocessor controls are shown on an LCD (basic version) or graphic (advanced version) screen and are compatible with a wide range of protocols.

OPTIONS

- Humidification and dehumidification
- Heat input by resistors, water coil or hot gas coil
- Different filtration levels
- Condensation control
- Different communication protocols
- Direct free-cooling
- Low noise level in internal and external unit



INNOV@

6 to 240 kW

DX: 6 to 128 kW · CW: 8 to 240 kW

CLOSE CONTROL UNITS

DM / INNOV@ DX Air-condensed and water-condensed (direct expansion - Radial fan)

INNOV@ - R410A	DX		0060	0080	0100	0110	0130	0160	0190	0205	0212
Air flow		m³/h	1785	2150	3530	3530	3700	5100	5100	5100	5100
Maximum static pressure available		Pa	776	725	624	624	574	292	292	292	292
Number of radial EC fans			1								
Total cooling capacity	Air-condensed unit(1)	kW	6,6	8	10,4	11,7	13,8	17	19,7	22	22,3
	Water-condensed unit(2)	kW	6,7	8,1	10,5	11,6	13,9	16,6	19,5	21,5	22,7
Sensible heat ratio	Air-condensed unit		0,98	0,98	1	0,98	0,9	0,99	0,95	0,9	0,89
	Water-condensed unit		0,97	0,97	1	0,98	0,9	0,99	0,96	0,91	0,88
Number of scroll compressors/Number of circuits			1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	2 / 2
Height		mm	1875								
Width		mm	600	600	900	900	900	900	900	900	900
Depth		mm	600								
Weight	Air-condensed unit	kg	150	157	195	210	230	245	255	260	264
	Water-condensed unit	kg	165	172	214	231	253	269	280	286	291
Sound pressure level(3)		dB(A)	47	49	52	52	53	55	56	56	56

This efficiency assumes that the units are installed with the remote condenser suggested and an outside air temperature of 35°C
(1) Indoor conditions 24°C/50%.
(2) Indoor conditions 24°C/50% / Water temperature = 7/12°C
(3) 1.5 metres above and 2 from the unit in free field – downflow units (30 Pa AESP), nominal air flow, compressor speed 50 Hz

DM-R / Chilled Water INNOV@ (Radial fan)

INNOV@	CW	0150	0170	0210	0250	0270	0320
Air flow	m³/h	4130	4130	4130	6130	6060	5930
Total cooling capacity(1)	kW	14,6	17	21,2	24,8	27,2	31,7
Sensitive heat ratio	kW	0,90	0,88	0,90	0,84	0,86	0,80
Height	mm	1998					
Width	mm	600	600	600	900	900	900
Depth	mm	600					
Weight	kg	139	143	150	173	180	195
Sound pressure level(2)	dB(A)	59	60	61	62	62	62

(1) Indoor conditions 24°C/50%. Water temperature 7/12°C
(2) 1.5 metres above and 2 from the unit in free field – downflow units (30 Pa AESP), nominal air flow, compressor speed 50 Hz

DM-C / Cold Water INNOV@ (Centrifugal fan)

INNOV@	CW	0080	0110	0140	0160	0200	0230
Air flow	m³/h	1785	2150	3530	3470	5115	4990
Total cooling capacity(1)	kW	6,9	10	12,8	14,5	18	20,8
Sensitive heat ratio	kW	0,87	0,85	0,88	0,87	0,87	0,85
Height	mm	1875					
Width	mm	600	600	900	900	1200	1200
Depth	mm	449					
Weight	kg	125	135	150	160	170	175
Sound pressure level(2)	dB(A)	48	50	51	51	52	52

(1) Indoor conditions 24°C/50%. Water temperature 7/12°C
(2) 1.5 metres above and 2 from the unit in free field – downflow units (30 Pa AESP), nominal air flow, compressor speed 50 Hz

DH / INNOV@ DX Air-condensed and water-condensed (direct expansion - Radial fan)

INNOV@ - R410A		DX	0201	0251	0272	0281	0302	0311	0362	0401	0422
Air flow		m^3/h	6800	6800	12950	7280	12950	7280	12950	12950	12950
Maximum static pressure available		Pa	650	650	686	549	686	549	686	686	686
Number of radial EC fans			1	1	2	1	2	1	2	2	2
Total cooling capacity	Air-condensed unit(1)	kW	22,9	25,4	27,3	30,2	35,3	34,0	38,9	40,9	43,2
	Water-condensed unit(2)	kW	23,4	25,5	28,3	29,9	34,3	32,4	39,7	43,9	44,0
Sensitive heat ratio	Air-condensed unit		0,99	0,97	1,00	0,92	1,00	0,86	0,99	0,98	0,96
	Water-condensed unit		0,97	0,95	1,00	0,92	1,00	0,88	0,99	0,96	0,94
Number of scroll compressors/Number of circuits			1/1	1/1	1/1	1/1	1/1	2/2	2/2	2/2	2/2
Height		mm	1998								
Width		mm	1010	1010	1760	1280	1760	1280	1760	1760	1760
Depth		mm	805	805	805	805	805	805	805	805	805
Weight	Air-condensed unit	kg	375	385	565	394	580	401	590	552	605
	Water-condensed unit	kg	412	723	621	433	638	442	649	611	665
Sound pressure level(3)		dB(A)	55	56	59	58	61	58	62	63	65

INNOV@ - R410A		DX	0452	0532	0592	0602	0692	0762	0852	1002	1204
Air flow		m^3/h	12950	14150	14150	19415	19415	19415	21500	21500	24000
Maximum static pressure available		Pa	686	539	539	667	667	667	245	245	492
Number of radial EC fans			2	2	2	3	3	3	2	2	3
Total cooling capacity	Air-condensed unit(1)	kW	49,4	58,1	63,9	65,3	75,4	84,6	88,1	99,9	126,9
	Water-condensed unit(2)	kW	48,4	56,0	61,5	65,7	73,4	80,3	85,7	97,7	130,7
Sensitive heat ratio	Air-condensed unit		0,91	0,90	0,85	0,89	0,89	0,85	0,93	0,86	0,81
	Water-condensed unit		0,90	0,88	0,85	0,88	0,86	0,84	0,93	0,86	0,80
Number of scroll compressors/Number of circuits			2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	4/2
Height		mm	1998								
Width		mm	1760	2030	2030	2510	2510	2510	2510	2510	3160
Depth		mm	805	805	805	805	805	805	950	950	950
Weight	Air-condensed unit	kg	615	740	905	940	958	979	1001	1013	1390
	Water-condensed unit	kg	676	985	995	1034	1053	1076	1099	1114	1529
Sound pressure level(3)		dB(A)	65	67	67	68	68	68	76	76	79

This efficiency assumes that the units are installed with the remote condenser suggested and an outside air temperature of 35°C
(1) Indoor conditions 24°C/50%.
(2) Indoor conditions 24°C/50%. Water temperature 7/12°C
(3) 1.5 metres above and 2 from the unit in free field – downflow units (30 Pa AESP), nominal air flow, compressor speed 50 Hz

DH / Cold Water INNOV@ (Radial fan)

INNOV@	CW	0300	0380	0450	0550	0650	0750
Air flow	m^3/h	7450	7450	8233	9120	14550	14550
Maximum static pressure available	Pa	609	557	328	305	576	541
Number of radial EC fans		1	1	1	1	2	2
Total cooling capacity(1)	kW	26,2	40,3	47,9	53,5	70,9	81,1
Sensitive heat ratio		0,94	0,8	0,81	0,77	0,83	0,79
Height	mm	1998					
Width	mm	1010	1010	1270	1270	1760	1760
Depth	mm	805					
Weight	kg	310	350	360	395	430	475
Sound pressure level(2)	dB(A)	58	60	62	63	62	62

INNOV@	CW	0890	1090	1200	1500	1800	2100
Air flow	m^3/h	18020	18020	21400	26200	26200	39864
Maximum static pressure available	Pa	271	238	543	124	110	153
Number of radial EC fans		2	2	3	2	2	3
Total cooling capacity(1)	kW	93,3	109,6	125,4	150,6	165,4	232,1
Sensitive heat ratio		0,8	0,76	0,77	0,78	0,75	0,75
Height	mm	1998					
Width	mm	2020	2020	2510	2510	2510	3160
Depth	mm	805	805	805	950	950	950
Weight	kg	470	497	530	720	753	785
Sound pressure level(2)	dB(A)	66	67	65	71	72	74

(1) Indoor conditions 24°C/50%. Water temperature 7/12°C
(2) 1.5 metres above and 2 from the unit in free field – downflow units (30 Pa AESP), nominal air flow, compressor speed 50 Hz

INNOV@ DFCDR

33 to 266 kW

CHILLED WATER DATA CENTRE UNITS WITH FANS IN RAISED ACCESS FLOOR

STANDARD VERSION

EC FAN R · ENERGY SAVING · VARIABLE SPEED · WEB SUPERVISION

DFCDR is the new range of chilled water air conditioners for high-density technological environments.

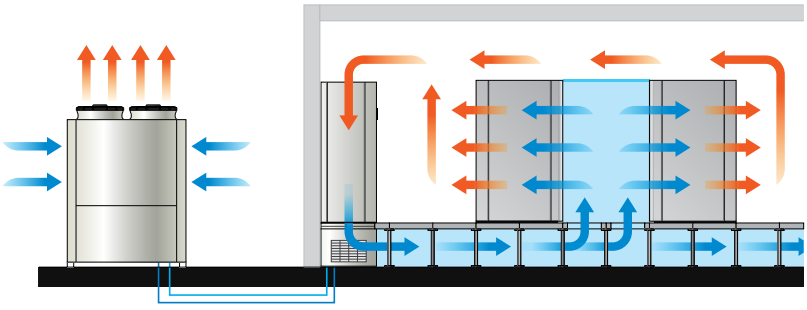
Thorough fluid dynamic analysis has led to each component being designed to minimise the pressure drops of the air flow, the unit's only electrical consumption.

The base module gives the air a larger cross-sectional area, the "E-Wing" profile separates the air flows of each fan and the use of electronic motors enables efficient control of the air flow.

With a reduced ratio between chilled water and air, the possibilities for using indirect free-cooling are increased, with further increase of the system's PUE and reduction of management costs.

HIGH SPECIFIC POWER

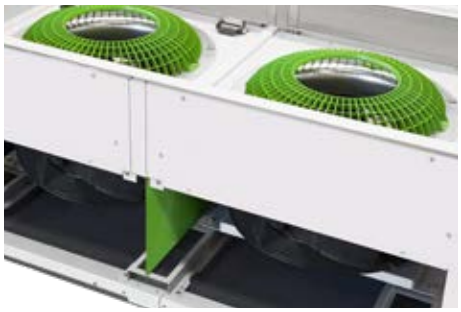
PERFECT FOR FREE-COOLING SYSTEMS



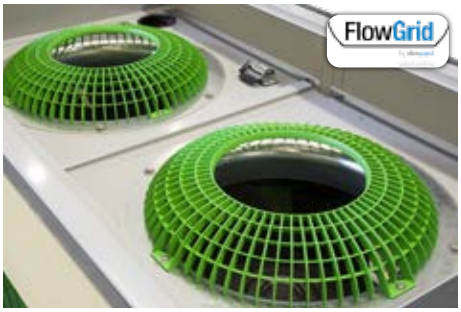
MINIMUM PUE WITH THE "FREE-FAN" SOLUTION

AERODYNAMICS DESIGNED DOWN TO THE LAST DETAIL

"E-WING" DEFLECTOR EC FANS



FLOWGRID® EFFICIENCY AND SILENCE



DFCDR / Cold water with fans under the floor

INNOV@ DFCDR		0450	0550	0650	0750	1500	1800	2000	2100
MAXIMUM POWER - Net cooling capacity(1)	kW	67	74	121	136	179	200	231	266
Air flow	m³/h	14000	14000	26500	26300	39400	39000	51900	51400
Sensitive heat ratio		1							
EER		27	30	23	26	23	25	22	25
Fan power input	kW	2,5	2,5	5,2	5,2	7,8	7,9	10,5	10,5
Absorbed current of fan	A	4,0	4,1	8,3	8,3	12,6	12,6	16,8	16,9
MAXIMUM EFFICIENCY - Net cooling capacity	kW	33	36	58	66	85	90	106	122
Air flow	m³/h	6100	6400	10800	11600	15900	16100	20200	21400
Sensitive heat ratio		1							
EER		100	100	101	99	101	100	100	101
Fan power input	kW	0,33	0,36	0,57	0,67	0,84	0,90	1,06	1,21
Absorbed current of fan	A	0,53	0,58	0,91	1,07	1,35	1,44	1,69	1,94
Dimensions									
Width	mm	1280	1280	1760	1760	2500	2500	3160	3160
Depth	mm	950							
Height without base module	mm	1998							
Height with base module	mm	2548							
Weights									
Weight	kg	866	899	972	1005	1127	1160	1187	1220

(1) Indoor conditions 24°C/50% - Water temperature 16/22°C

INNOV@ DSCDR

57 to 211 kW

CHILLED WATER DATA CENTRE UNITS WITH FANS IN RAISED ACCESS FLOOR

SLIM VERSION

EC FAN R · ENERGY SAVING · VARIABLE SPEED · WEB SUPERVISION

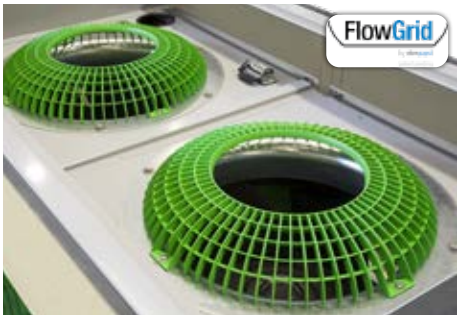
DSCDR is the new range of chilled water air conditioners with reduced footprint for high power density technological environments. Thorough fluid dynamic analysis has been used to ensure extreme care and construction detail in the design, in order to reduce as far as possible pressure drops in the air flow, resulting in lower energy consumption of the fans, the only electrical load in the machine.

The air filter, positioned parallel to the coil, has a more compact frontal surface area, which significantly reduces the air pressure drop as it passes through.

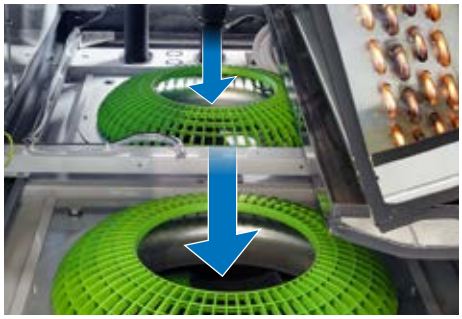
The base module gives the air a wider cross-sectional area, the "E-Wing" profile separates the air flows of each fan and the use of electronic motors enables efficient control of the air flow. Planning of a Data Centre with much lower PUE values of the system are possible thanks to the technical solutions adopted for the **DSCDR**.

OPTIMISED FILTER CROSS-SECTION

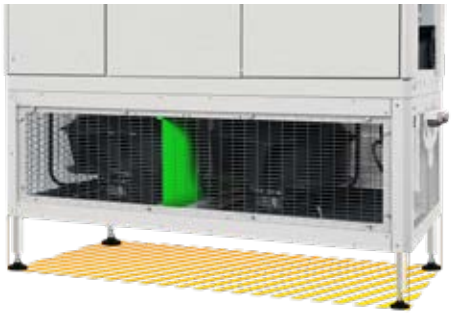
FLOWGRID® EFFICIENCY AND SILENCE



REDUCED CONSUMPTION TOO



REDUCED FOOTPRINT



"E-WING" DEFLECTOR EC FANS

MINIMUM PUE WITH THE "FREE-FAN" SOLUTION

DSCDR / Cold water with fans under the floor - Slim version

INNOV@ DSCDR		0450	0550	0650	0750	1500	1800	2000	2100
MAXIMUM POWER - Net cooling capacity(1)	kW	57	67	93	111	137	165	179	211
Air flow	m³/h	14200	14100	23500	23500	34600	34600	45100	45100
Sensitive heat ratio		1							
EER		27,3	30,6	28,2	30,9	27,4	30,0	27,5	29,3
Fan power input	kW	2,1	2,2	3,3	3,6	5,0	5,5	6,5	7,2
Absorbed current of fan	A	3,4	3,6	5,3	5,8	7,9	8,8	10,4	11,6
Dimensions									
Width	mm	1280	1280	1760	1760	2500	2500	3160	3160
Depth	mm	890							
Height without base module	mm	1998							
Height with base module	mm	2548							
Weights									
Weight	kg	470	500	590	636	970	1038	1141	1230

(1) Indoor conditions 24°C/50% - Water temperature 16/22°C

datAdiab

10 to 330 kW

ADIABATIC COOLING AIR/AIR SOLUTIONS FOR DATA CENTRES

INDIRECT FREE-COOLING

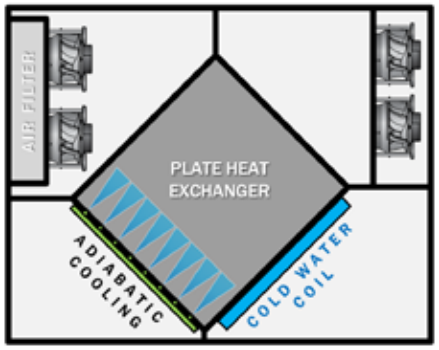
- No mixture between Inside and Outside air;
- Dust and pollutants won't contaminate the server room, therefore no additional filtration is required;
- No impact on latent load;
- Energy consumption reduction.

CHILLED WATER OR DIRECT EXPANSION INTEGRATION

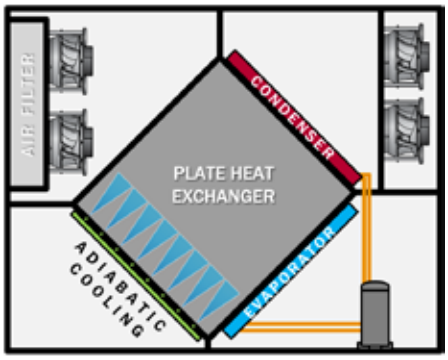
- Two available options, to attend building limitations or constraints:
- Chilled Water coil connected to an external chiller;

Direct Expansion system operated with R410A, with electronic expansion valve and finned evaporator with hydrophilic treatment.

CHILLED WATER



DIRECT EXPANSION



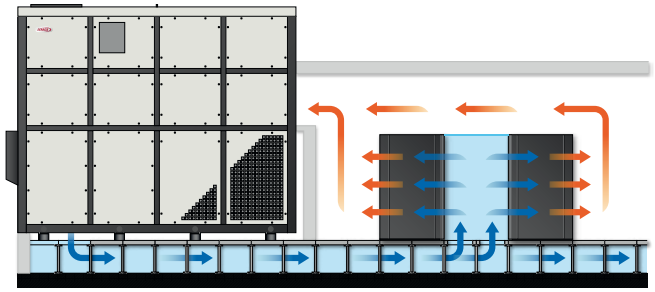
EC PLUG FANS

The EC plug fans on both air flows allows:

- High efficiency rates at partial loads;
- Low noise emissions;
- Fan speed modulation to support thermal load variations;
- Real time consumption available on the onboard display.

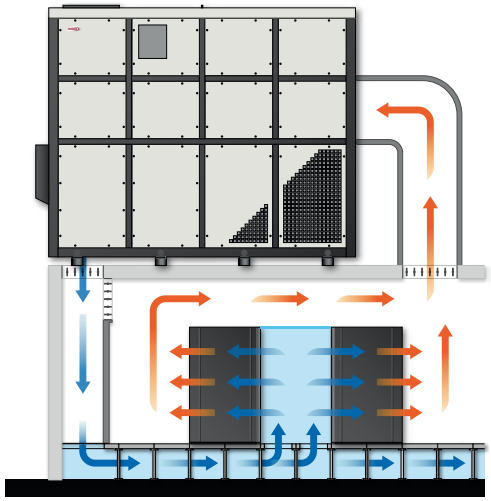
INSTALLATION

ON THE SIDE OF DATA CENTRE



OR

ON THE ROOF OF DATA CENTRE



EVAPORATIVE COOLING ON THE INTAKE AIR STREAM

datAdiab units are equipped with nozzles which atomize water on the outdoor air stream.

The adiabatic effect evaporates the water and cools down the air intake, before it reached the cross-flow heat exchanger. This cooled air stream flows through the heat exchanger and a temperature close to the wet bulb temperature, improving the free-cooling effect.

The adiabatic system adjusts the water spray rate to optimize the saturation efficiency on the air flow.

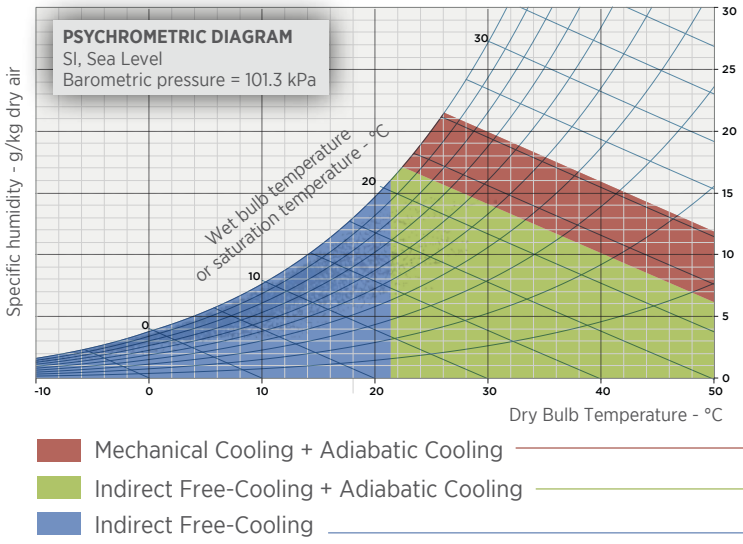
SYSTEM

The electronic pump control modulates the water spray and allows the optimization of the air saturation and the reduction of the Water Usage Effectiveness (WUE) level and energy consumption.

The hydraulic system configuration and the control algorithms ensure the adequate water replenish in the system to avoid high concentration of salts and prevents stagnant water in the drain pan, reducing the proliferation risk of legionella.

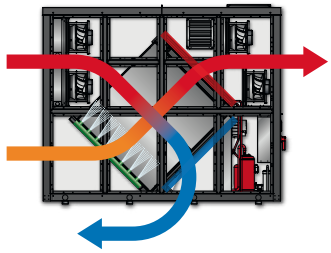
$$WUE = \frac{\text{Annual Water Usage}}{\text{T Equipment Energy}} \quad [\,l\,/\,kWh\,]$$

OPERATING PRINCIPLE
WATER SAVING FUNCTION AND LEGIONELLA-FREE



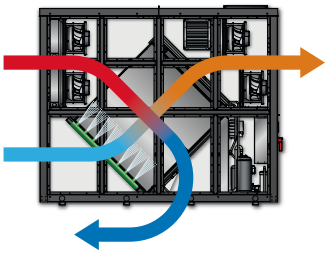
COMBINATION WITH MECHANICAL COOLING

EXT. AIR TEMP. > 23°C (*)



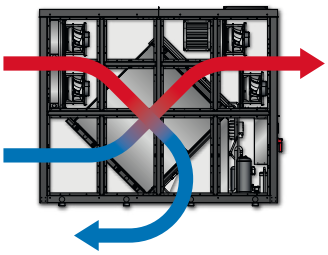
ADIABATIC COOLING

EXT. AIR TEMP. > 21°C



FREE-COOLING

EXT. AIR TEMP. < 21°C



(*) Wet bulb conditions for a 1 MW Data Center (N + 1 redundancy) in Amsterdam @ 36°C - 25%; outlet air T 24°C; Max outlet air T 26°C.

R@CKCOOLAIR

3 to 75 kW

MEDIUM AND HIGH-DENSITY UNITS

The R@CKCOOLAIR series is a cooling solution for rack servers with a small or medium-sized surface area in computer rooms.

They are the perfect solution to extend the existing installation without the need for a raised floor.

The unit is positioned next to the heat source, guaranteeing an efficient and immediate reaction to the variation in dissipation in the servers.

STANDARD

- Flow switch
- Complete accessibility
- High-pressure fans with backward-curved blades
- Hydrophilic treatment on the coil
- Two stainless steel condensate drip trays
- Hydraulic connections from the top or bottom
- Powder-coated sheet steel structure
- Footprint: 300 x 1,200 mm or 600 x 1,200 mm only
- Fully insulated panels
- Two- or three-way water valve, with modulation through 0-10 V signal
- Programmable control with LCD display
- Control of two separate zones (top and bottom of the unit)
- Different air flow configurations
- Flow modulation in accordance with the cooling capacity for greater energy savings
- Internal condensation control for air-condensed units (fan speed control) with automatic dedicated switch
- LAN connection for up to 8 units
- 4 alarms with potential-free contacts

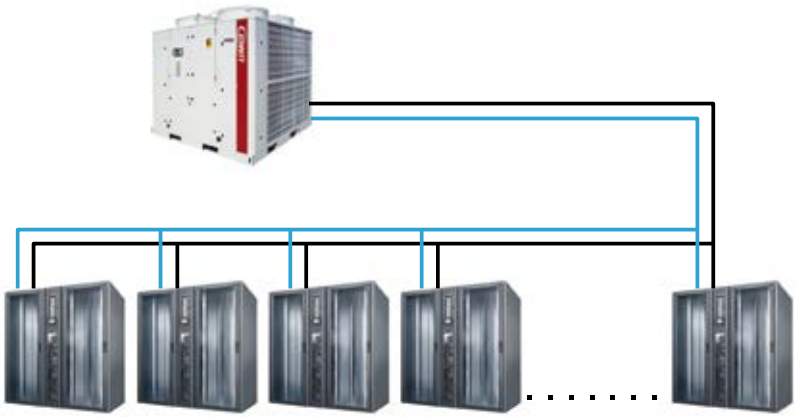
OPTIONS AND ACCESSORIES

- Humidification and dehumidification
- Clogged filter sensors
- Water, leak and smoke sensors
- Additional temperature and humidity sensors
- Condensate water pump
- Flow meter indicating current cooling capacity
- Integral IT rack
- Automatic flow control with display
- Serial cards for protocols: Carel / Modbus / LonWorks / Trend
- PCOWEB hardware: Ethernet card for protocols: BACnet / SNMP
- DATAWEB software: Ethernet card for web connectivity

RHC UNITS

Water-condensed with high-performance coil and modulating valve.

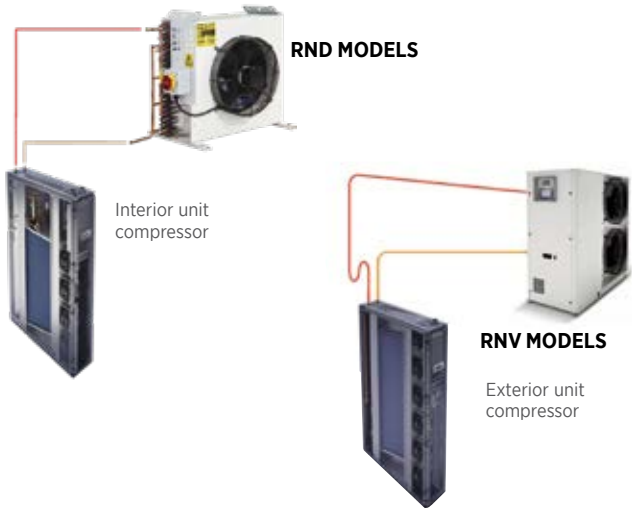
- Greater cooling capacity (W/m²) thanks to a larger heat exchange surface area.
- Precise temperature control (PID control).
- Offers the option to increase the temperature of the return air, therefore increasing the average water temperature (while maintaining a stable cooling capacity). This results in a maximum EER for the chiller and extends the operating range in free-cooling.



RND MOTOR EVAPORATOR / RNV MOTOR CONDENSER UNITS

Both with variable speed compressors
- Precise temperature control (PID control)
- Reduced energy consumption at partial load
- Avoids electrical peaks and mechanical stresses on the compressor in on/off cycles
- Extends the scope of application

This is the solution for small and medium-sized installations where no cold water production system is available or if water is not permitted to pass through the data centre. The distance between the indoor and outdoor units allows simple and economical installation.



VENTILATION

The positioning of the R@CKCOOLAIR unit next to the heat source minimises the ventilation consumption needed to cover the pressure drops of distribution through a raised floor. Using fans with backward-curved blades guarantees maximum flow stability. EC fan option enable to modulate the air volume.

Its integrated microprocessors manage the air flow together with the cold water valve (in RHC units) or the compressor frequency (in RND/RNV units), significantly reducing consumption. Furthermore, it is available with the “automatic air flow control” option, which maintains a constant flow in the event of variable pressure in the system, or the “Delta P control” option for control using the pressure difference in the cold aisle.

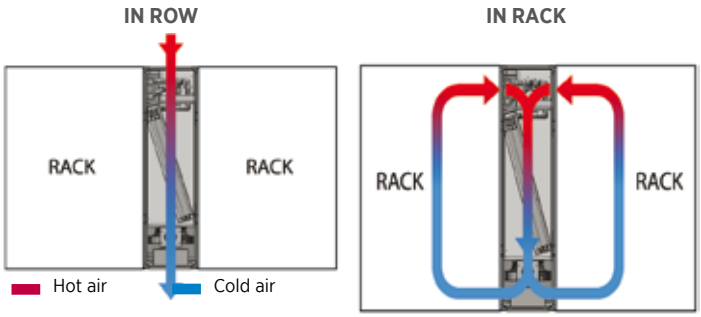
AIR CONFIGURATION

Because no duct system or raised floor is required, RHC units make installation simple.
- Humidification and dehumidification
- Heat input by resistors, water coil or hot gas coil
- Different filtration levels
- Condensation control
- Different communication protocols
- Low noise level

Available in different air configurations to adapt to modern data centres with retrofit systems or extend existing rooms.

IN ROW (horizontal flow)
Perfect for cold/hot aisle applications

IN RACK (left-to-right recirculation)
For applications with individual spot cooling



R@CKCOOLAIR

3 to 75 kW

MEDIUM AND HIGH-DENSITY UNITS

RHC / Interior rack water chiller unit

R@CKCOOLAIR	RHC	0200			0250			0450			0510		
Indoor temperature operating conditions	°C	24 °C	30 °C	35 °C	24 °C	30 °C	35 °C	24 °C	30 °C	35 °C	34 °C	30 °C	35 °C
Indoor relative humidity operating conditions	%	50 %	35 %	26 %	50 %	35 %	26 %	50 %	35 %	26 %	50 %	35 %	26 %
Total cooling capacity	kW	12,7	20,1	26,2	17,6	27,7	35,4	30,4	46,2	59,1	36,1	57	72,8
Sensitive cooling capacity	kW	12,7	20,1	26,2	17,6	27,7	35,4	30,4	46,2	59,1	36,1	57	72,8
Power absorbed by the fan	kW	0,4			0,7			1,2			1,4		
Voltage		230 V/1 Ph/50 Hz						400 V/3 Ph/50 Hz					
Water flow	l/h	2176	3459	4511	3023	4769	6083	5236	7945	10155	6202	9807	12519
Air flow	m^3/h	4000			5300			9000			11000		
Dimensions (Length x Width x Depth)	mm	300 x 2000 x 1200						600 x 2000 x 1200					

RND / DX (direct expansion) Unit inverter compressor evaporator

R@CKCOOLAIR	RND	0100			0260			0400			0450		
Indoor temperature operating conditions	°C	24 °C	30 °C	35 °C	24 °C	30 °C	35 °C	24 °C	30 °C	35 °C	34 °C	30 °C	35 °C
Indoor relative humidity operating conditions	%	50 %	35 %	26 %	50 %	35 %	26 %	50 %	35 %	26 %	50 %	35 %	26 %
Compressor frequency	Hz	30	70	120	30	70	120	30	70	120	30	70	120
Total cooling capacity	kW	2,4	7,2	11,9	5,2	19,6	28,3	8,2	31,3	43,3	14,9	37,1	49,0
Sensitive heat ratio		1											
Absorbed power of the compressor	kW	0,6	1,5	3,4	0,8	4,1	7,3	1,3	7,0	12,5	2,2	6,5	14,9
Absorbed current of the compressor	A	2,8	7,3	16,4	1,3	6,6	11,7	2,1	11,2	20,1	3,6	13,7	23,4
Evaporator air flow	m^3/h	700	1600	2700	2500	4075	5000	4500	7335	9000	4500	7335	9000
Power absorbed by the fan	kW	0,05	0,11	0,2	0,1	0,2	0,6	0,2	0,7	2,0	0,4	0,7	1,2
Voltage		230 V/1 Ph/50 Hz			400 V/3 Ph/50 Hz								
Compressor type		1 x EC motor compressor Dual Rotary						1 x EC motor compressor Scroll					
Dimensions (Length x Width x Depth)	mm	300 x 2000 x 1200			600 x 2000 x 1200			600 x 2000 x 1200					

RNV / DX (direct expansion) Unit remote evaporator-condenser with inverter compressor

R@CKCOOLAIR RNV		0140			0240			0330		
Capacity ratio	%	Min	50%	Max	Min	50%	Max	Min	50%	Max
Inlet air conditions 30 - 35%r.h. Condensing temperature 45°C										
Total cooling capacity	kW	3,7	8,9	13,3	8	17,6	24,6	11,5	24,8	34,6
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,9	0,9
EER of the refrigerant cycle		5,3	5,7	4,6	5,5	4,6	3,2	4,6	4,3	3,1
Inlet air conditions 35 - 30%r.h. Condensing temperature 45°C										
Total cooling capacity	kW	3,7	9,2	14,9	8,8	19,6	28,3	12,7	26,7	38,6
SHR		1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,9
EER of the refrigerant cycle		5,3	5,5	4,8	6,1	5,2	4,2	5,6	4,5	3,8
Evaporator airflow rate	m3/h	1550	2325	3100	2650	3975	5300	2650	3975	5300
Total power input	kW	0,8	1,9	3,4	1,6	4,2	7,6	2,5	6,3	11,1
Total current input	A	3,8	9,0	16,8	3,1	7,9	14,7	4,5	11,4	20,3
Electric power supply	V / - / Hz	230 / 1 / 50								
Dimensions of indoor unit (L x H x D)	mm	300 x 2000 x 1200								
Dimensions of outdoor unit (L x H x D)	mm	1250 x 882 x 460			1565 x 1275 x 605			1965 x 1322 x 950		

MINI R@CKCOOLAIR

MRAC | MTC

3 to 7.3 kW

Smart unit for installation on 19" rack

The MINI R@CKCOOLAIR series is designed for small computer rooms and SER locations.

The positioning inside the server rack guarantees excellent separation of heat/cold/air, ensuring efficiency in high-density applications.

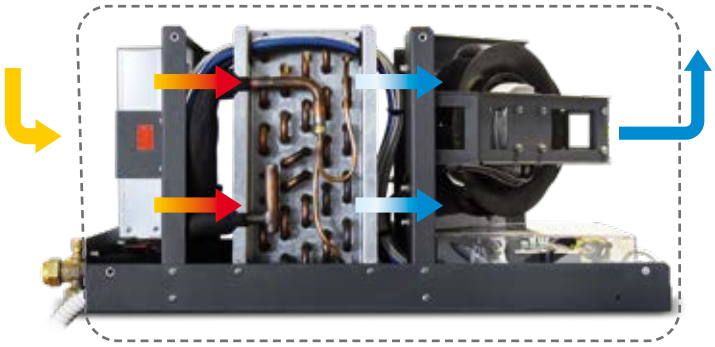
STANDARD SPECIFICATIONS

- Compact cooling only unit (occupies only 7U)
- Designed for installation on 19" rack
- In-rack air flow configuration
- Refrigeration point: where and when needed
- Air flow switch
- High fan pressure with backward-curved blades.
- Coil with efficient hydrophilic coated aluminium fins.
- Drainage tray made from stainless steel AISI 430
- Refrigerant connection from the bottom
- Quick electrical connection system
- Fully insulated panels
- BLDC compressor available for the 7 kW model

INTERIOR UNIT		MRAC 0035	MRAC 0035b	MRAC 0070	MRAC 0070i		
					@ 30Hz	@ 60Hz	@ 90Hz
Total cooling capacity	kW	3,6	4,1	6,8	3,1	5,9	7,3
SHR	-	1,00	1,00	1,00	1,00	1,00	1,00
Evaporator air flow	m^3/h	915	1330	1330	1330		
Fan absorbed power	kW	0,15	0,33	0,33	0,33		
Voltage		230 V/1 Ph/50 Hz	230 V/1 Ph/50 Hz	230 V/1 Ph/50 Hz	230 V/1 Ph/50-60 Hz		
Dimensions (width x height x depth)	mm	485 x 300 x 600	485 x 300 x 600	485 x 300 x 600	485 x 300 x 600		
Weight	kg	26	26	29,5	29,5		

EXTERIOR UNIT		MTC 0035	2 x MTC 0035*	MTC 0070	MTCi 0070i		
					@ 30Hz	@ 60Hz	@ 90Hz
Total absorbed power	kW	1,1	1,1	2,1	0,7	1,3	2,0
Total starting current	A	4,7	4,7	4,2	3,8	7,1	11,3
Compressors/circuits	-/-	1/1	1/1	1/1	1/1		
Lp sound pressure @nominal rpm; Q = 2**	dB(A)	42	42	46	42		
Voltage		230 V/1 Ph/50 Hz	230 V/1 Ph/50 Hz	230 V/1 Ph/50 Hz	230 V/1 Ph/50-60 Hz		
Dimensions (width x height x depth)	mm	700 x 540 x 265	700 x 540 x 265	942 x 735 x 341	1128 x 1121 x 546		
Weight	kg	34	34	71	99		

* 1 motor condenser unit
** 2 m according to standard EN 3744
Indoor conditions 30°C/30% - Outdoor temperature 35°C at 60 Hz



Like all Lennox products, the MRAC complies with current technology standards. MRACs are designed to be installed in any standard server rack, a design in line with rack IT.

They consist of premium quality parts that deliver efficiency and reliability. All of this contributes to the versatility of this unit.

@DNOVA

2.5 to 38 kW

TELECOM UNITS

@DNOVA are units designed for telecommunication applications. Efficient, reliable, precision control equipment.

Designed for indoor or outdoor installation, maintaining temperature management in technological environments with high dissipation of sensitive power.

The THN and THX units are Plug&Play and only require an attachment and an electrical connection.

All of the components are accessible from the front of the units, making maintenance and servicing easier.

AVAILABLE MODELS AND CONFIGURATIONS

- **THN:**
  Compact unit for indoor installation (Upflow/Downflow/Displacement).

- **THX:**
  Compact unit for outdoor installation (Upflow/Downflow depending on the model).

- **THS:**
  Unit for vertical or horizontal installation.

COMPONENTS

The unit's structure is made from thick galvanised sheet metal, and the outer part of aluminium alloy 5005 (THX) or galvanised steel and painted sheet metal RAL 9002 (THN, THS).

Rotary or scroll compressors available in different HFC refrigerants (R410A, R134A, R407C).

@DNOVA (THX, THN) are fitted with fans with backward-curved blades.

Heat exchanger with fins of large front surface area.

Evaporator made with copper pipes extended mechanically over aluminium fins. Hydrophilic treatment to facilitate condensation water drain-off.

Condensate drip tray made from galvanised steel as standard (stainless steel available as an option).

CONTROL

@DNOVA™ units are fitted as standard with basic microprocessors and liquid crystal displays.

AVAILABLE OPTIONS

- Free-cooling management and damper
- Dual feed system
- Potential-free contacts for alarms
- Epoxy coating on the condenser
- Resistor
- Electronic expansion valve
- EU4 filtration + clogged filter sensor
- Condensation control
- Interconnection (Modbus, TCP/IP, Bacnet, etc.)

@DNOVA - R410A	THN	045H	056H	073H	090H	105H	120H	150H	170H	180H	200H	220H	250H
Total cooling capacity(1)	kW	4,3	6	7	10,8	10,6	12,7	14,9	16,3	17,8	20,9	24,8	27,9
Sensitive cooling capacity		4,3	5,4	6,6	10,6	10,6	11,5	14,7	15,4	17,8	20,9	24,8	26,2
Sensitive heat ratio		1	0,9	0,95	0,99	1	0,91	0,99	0,95	1	1	1	0,94
Number of scroll compressors(2)		1r											
Air flow	m^3/h	1450	1450	2100	3020	3020	3020	3800	3800	5500	5500	6500	6500
Sound pressure level	dB(A)	69	69	69	72	72	72	72	72	80	80	81	82
Sound pressure level (10 m outdoors)	dB(A)	41	41	41	44	44	44	44	44	52	52	53	54
Height	mm	1850	1850	1850	1850	1850	1850	1850	1850	2050	2050	2050	2050
Width	mm	800	800	800	1000	1000	1000	1160	1160	1500	1500	1500	1500
Depth	mm	550	550	550	550	550	550	550	550	800	800	800	800

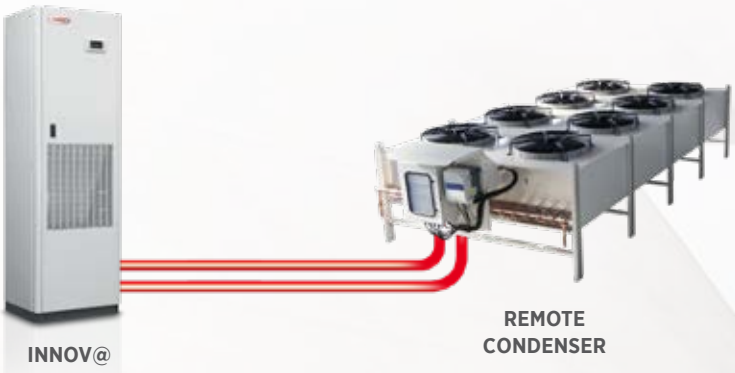
@DNOVA - R410A	THX	045H	056H	073H	0902H	090H	105H	1102H	120H	145H	1302H	230H	290H	320H
Total cooling capacity(1)	kW	4,2	5,9	4,1	8	10	10,8	11,2	12,7	14,4	14,2	23	28,9	37,8
Sensitive cooling capacity		4,2	5,1	6,5	8	9,2	10,7	9,5	11,5	13,2	12,5	23	27,2	37,8
Sensitive heat ratio		1	0,88	0,92	1	0,92	0,99	0,85	0,91	0,92	0,88	1	0,94	1
Number of scroll compressors(2)		1r	1	1	2	1	1	2	1	1	2	2	2	1
Air flow	m^3/h	1450	1450	2150	2800	3020	3020	2800	3020	3020	2800	6500	6500	10000
Sound pressure level	dB(A)	69	70	70	72	71	71	72	71	74	74	82	82	83
Sound pressure level (10 m outdoors)	dB(A)	42	43	43	45	44	44	45	44	46	46	51	51	52
Height	mm	1580	1580	1580	1790	1630	1630	1790	1790	1790	1790	2050	2050	2260
Width	mm	804	804	804	1000	1000	1000	1000	1000	1000	1000	1600	1600	2530
Depth	mm	498	498	498	596	596	596	596	596	596	596	815	815	975

@DNOVA - R410A	THXD	0045H	0056H	0073H	0090H	0105H	0120H	0145H
Total cooling capacity(1)	kW	4,3	5,9	6,6	9,1	10,2	12,6	13,3
Sensitive cooling capacity		4,3	5,3	5,6	7,28	10,2	11,8	12,2
Sensitive heat ratio		1	0,9	0,85	0,8	1	0,94	0,92
Number of scroll compressors(2)		1r	1	1	1	1	1	1
Air flow	m^3/h	1400	1400	1400	1400	3200	3200	3200
Sound pressure level	dB(A)	69	70	70	70	71	71	74
Sound pressure level (10 m outdoors)	dB(A)	41	43	43	43	44	44	46
Height	mm	1040	1040	1040	1040	1040	1040	1040
Width	mm	2145	2145	2145	2275	2275	2275	2275
Depth	mm	730	730	730	730	730	730	730

@DNOVA - R410A	THS	025H	035H	045H	056H	073H	090H	105H	120H	145H	310H	381H
Total cooling capacity(1)	kW	2,9	4,1	4,6	6,3	7,6	9,8	10,5	13,4	15,3	31,2	39,2
Sensitive cooling capacity		2,9	4	4,6	5,6	7,2	9	9,3	12,3	13,1	30,5	34,5
Sensitive heat ratio		1	0,99	1	0,89	0,95	0,92	0,89	0,92	0,86	0,98	0,88
Number of scroll compressors(2)		1r	1r	1r	1	1	1	1	1	1	1	1
Evaporator air flow	m^3/h	950	930	1400	1400	2300	2300	2300	3200	3200	7750	7750
Condenser air flow		2250	2050	3450	3350	3350	5100	5100	5580	5450	9300	16280
Sound pressure level	dB(A)	62	65	65	67	68	65	71	68	70	73	75
Sound pressure level (10 m outdoors)	dB(A)	34	37	37	39	40	37	42	40	42	45	47
INTERIOR UNIT												
Height	mm	350	350	350	350	350	350	350	400	400	685	675
Width	mm	590	590	990	990	990	990	990	1090	1090	1090	1090
Depth	mm	1040	1040	1040	1040	1040	1040	1040	1140	1140	1500	1500
EXTERIOR UNIT												
Height	mm	580	580	630	630	630	630	630	1128	1128	1300	1485
Width	mm	600	600	990	990	990	990	990	1120	1120	1565	1990
Depth	mm	350	350	360	360	360	360	360	578	578	600	950

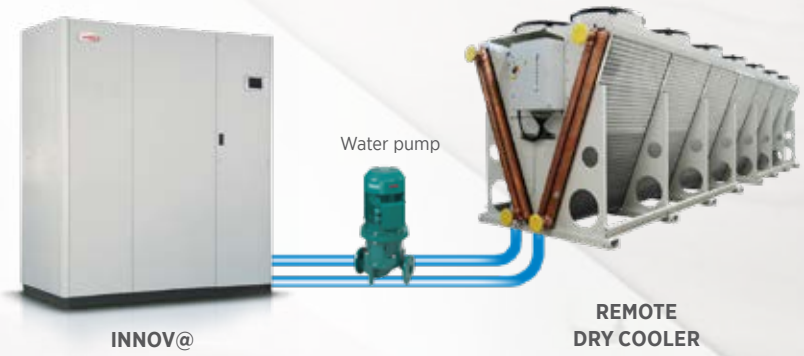
(1) Indoor conditions 27°C/40% / Outdoor conditions 35°C
(2) 1r: Rotary compressor

SYSTEM APPLICATIONS



DIRECT EXPANSION UNITS WITH REMOTE CONDENSER

- Designed to operate with latest refrigerants.
- Room cooling with evaporator coil.
- Heat dissipation through outdoor condenser.



WATER-COOLED DIRECT EXPANSION

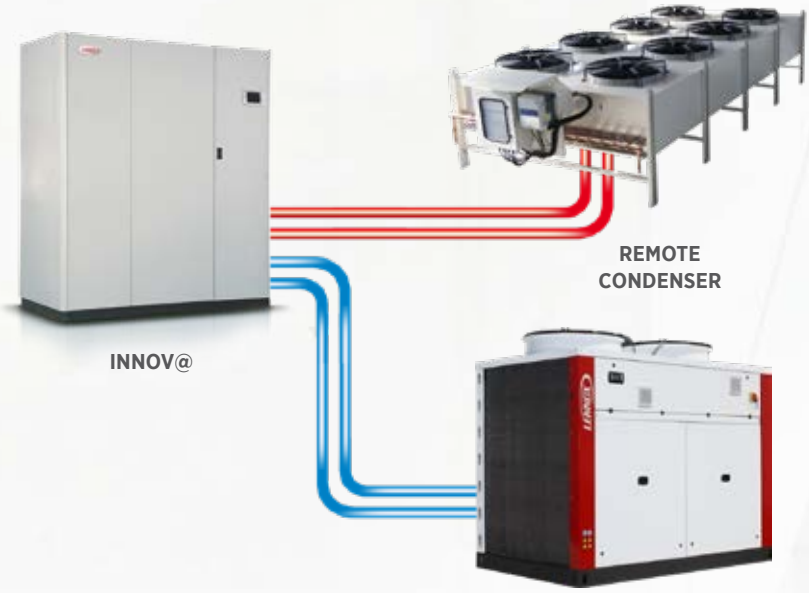
- Designed to operate with latest refrigerants.
- Room cooling with evaporator coil.
- Heat dissipation through outdoor dry-cooler.

CHILLED WATER UNITS

Cooling is done with a chilled water circuit (eComfort, Neosys or AQUA4 unit).

With Neosys units, it is possible to use the built-in free-cooling system, for high energy savings.

Water Refrigerant

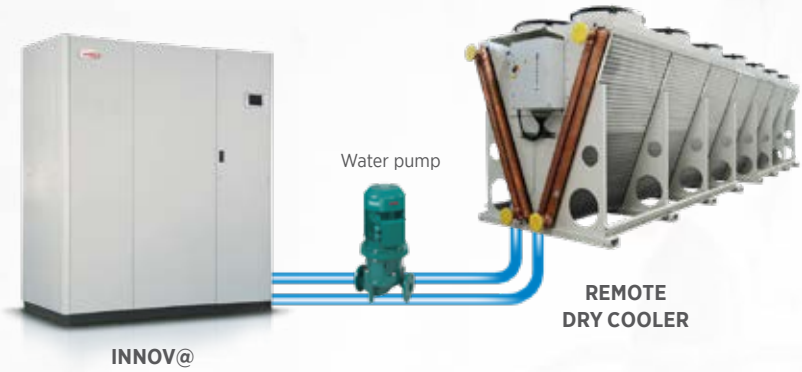


FLUID DUAL COOLING SYSTEM

Unit with a dual cooling system.

Direct expansion* or chilled water system, one to be selected as the main system for operation.

* AIR- or WATER cooled.



INDIRECT FREE-COOLING SYSTEM

Water cooled direct expansion units with dual cooling system and simultaneous work.

Water is chilled by the Dry Cooler (when possible) to obtain free cooling.

DUAL COOLING SYSTEMS

Units with dual chilled water circuits, operating independently and connected to different units for cold production.

With Neosys units, it is possible to use the built-in free-cooling system, for high energy savings.

Water Refrigerant

LENNOX brand of **LENNOX EMEA**

LENNOX EMEA (Europe, Middle East, Africa), a division of Lennox International Incorporated (LII), designs and manufactures heating, air conditioning, air handling and refrigeration equipment.

Our reputation as a leading player in the market is based on simple principles that guide our actions: always listening to you, knowing your business areas and understanding your needs, while ensuring that our employees grow within the group.

Fully aware of the importance of environmental issues, we also support you in the context of regulatory changes and develop solutions that comply with all applicable environmental directives (F-Gas & EcoDesign).

OUR KEY FIGURES

900 people in Europe

European production sites

Quality certification: ISO 9001 - 14001 - OHSAS 18001

1 European training centre

1 HVAC&R European development centre

9 subsidiaries and representative offices

Commercial presence in 46 countries

www.linkedin.com/company/lennox-emea

www.lennoxemea.com/lennox

Belgium: info.be@lennoxemea.com
Poland: info.pl@lennoxemea.com
Germany: info.de@lennoxemea.com
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