



# PRECISION AIR CONDITIONING

---

Aermec solutions  
for data centres

---





# AERMEC: TECHNOLOGY YOU CAN TRUST



Aermec, founded in 1961, counts amongst Europe's longest established Air Conditioning suppliers. A true pioneer, with over 50 years of innovative customer focused solutions, Aermec is present on all continents worldwide and with Subsidiaries and Affiliates in France, Germany, Italy, the Netherlands, Poland, Russia, Spain and the UK.

The Aermec Group of companies includes a total of 6 centres of excellence spanning the full air conditioning portfolio,

with a turnover in excess of €305m and over 1600 employees. A total of 8 Group manufacturing locations create the advanced product solutions Aermec offers its clientele.

Aermec is well established in the data centre market, with a multiple year experience and prestigious projects aimed at reducing the overall cost of ownership of modern data centres. This process is achieved by applying state-of-the-art product solutions with a strong focus on integrated design and sophisticated analyses of individual data centre customer requirements, with the aim of achieving a personalised and optimised solution for each and every individual installation site.

Product quality is an Aermec hallmark. Premium components are utilised throughout, each unit exiting the Aermec factories undergoes meticulous testing processes, and numerous certifications including Eurovent, MCS, cUL and AHRI testify to Aermec's attention to detail.

## AERMEC & DATA CENTRES

Aermec's experience in data centre cooling technologies spans many years and countless individual projects in a total of 17 nations. In fact in the last 3 years alone Aermec has installed roughly 1000MW of air conditioning into the data centre market. Aermec's expert professional project approach, combined with system efficiency and reliability, renders Aermec a natural choice in data centre applications.



Aermec's 2MW testing facilities

## 2MW TESTING FACILITIES

Aermec's advanced labs extend to 2MW cooling capacity per single unit in what is probably Europe's largest test facility, which will offer Eurovent certification. Specific labs within Aermec also cater for extreme temperature testing, ventilation and heat exchange measurements, noise level verification and vibration testing.

Aermec furthermore utilizes a simulated data centre installation including both a data hall simulator and an ambient air simulator recreating typical ambient temperature and humidity conditions.



# INDEX

Efficiency and energy saving	6
Technological innovations	8
Focus on	18
P Serie - Precision air conditioners	26
G Serie - Precision air conditioners for large data centres	32
R serie - Precision air conditioners for "in row" installation	36



Customised versions

40

---

Aermec solutions for Data Centres

41

---

The Aermec Solutions

42

# EFFICIENCY AND ENERGY SAVING

## GREEN BUILDING ENGINEERING

The design of environmentally friendly systems (Green Building) is the engineering challenge of recent years. A building can be defined a Green Building if it has been designed, built and managed in a sustainable and efficient way, and certified as such by an independent third party.

**AERMEC** aims to offer a comprehensive range of close control air conditioning units, designed to meet the requirements of environmentally sustainable development:

- **Technical innovation**
- **Ease of use**
- **Flexibility of use**
- **Energy efficiency**
- **Service reliability**

## IMPROVING ENERGY EFFICIENCY AND SUSTAINABILITY

Starting in 2012, **AERMEC** choose to standardise fans with EC technology on the full range of close control air conditioners. This has resulted in energy savings of over 40% compared to the previous generation of fans.



Today **AERMEC** wants to maintain this leadership by choosing to be the first to:

- Provide the full range of close control air conditioners with an advanced microprocessor control system, characterised by features that optimise unit control and system energy saving.
- Install the latest generation of EC fans, entirely controlled via Modbus® protocol, on the full range of close control air conditioners.
- Install electronic expansion valves on the entire range of direct expansion close control air conditioners.
- Make available for brushless DC compressors with inverter control over the entire range of direct expansion close control air conditioners.

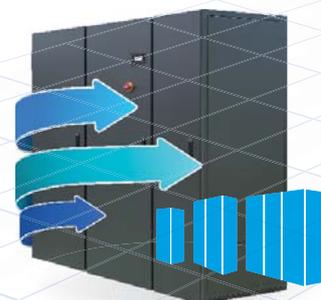
## OPTIMISING INFRASTRUCTURE

The wide range of models and accessories enables optimal configuration of the air conditioning system. The minimum plan dimensions and the possibility of modulating operation for all components allow development of solutions tailored to the actual needs of the infrastructure, as well as ensuring future expansion without high additional costs.

With the introduction of the **POWER VALVE** system, available as an accessory on chilled water units, implementing the water system has been simplified, resulting in construction cost reductions.

The **SMART COOL** system, instead, helps to simplify checks and maintenance operations on direct expansion circuits, by keeping the pressure, temperature and working conditions of the whole cooling cycle under control.

Finally, through the **SMART NET** system, the local network concept is revolutionised, increasing energy savings and safety compared to older systems.



## REDUCING OPERATING COSTS

Through the use of high quality components, close control air conditioning units guarantee high reliability.

Managing and servicing close control air conditioning units has never been easier:

- Easy and intuitive use of the units via a large Full Graphic LCD display.
- Advanced supervision of the direct expansion cooling cycle, with more than 10 different active safety checks to ensure optimal performance, thanks to the **SMART COOL** system.
- Advanced supervision of the water circuit, thanks to the use of the **POWER VALVE** system.
- “Tool-less” maintenance, with all the operation values of fans, cooling circuit, inverter compressors and chilled water water circuits being available on your display.



## ENSURING CERTIFIED QUALITY

To be sure that the equipment used in your own infrastructure complies with the design and applicable regulations, you need a guarantee of the quality of the product and all its construction stages.

**AERMEC** can boast the following certifications:

- **Quality certification UNI EN ISO 9001:2008** regarding the design, manufacture and service of direct expansion air conditioners, chilled water air conditioners and air cooled condensers.
- **CE certification of conformity with European Directives:**
  - Machinery Directive (MD) 2006/42/EC
  - Pressure Equipment Directive (PED) 2014/68/UE (Only Direct Expansion units)
  - Electromagnetic Compatibility Directive (EMC) 2004/130/UE
- **Compliance with the Eco-design Directive 2009/125/EC (ERP - Energy Related Products)** regarding the eco-design of electrical and electromechanical systems.
- **Compliance with IEC 60068/2/57:2013 and IEEE std 693:2005 standards** regarding the design and anti-seismic construction of electrical and electromechanical equipment.
- **EAC Declaration of Conformity of the Eurasec Customs Union (Russia, Kazakhstan and Belarus)** attesting the compliance of products with the Eurasec Customs Union regulations, allowing free trade therein.
- **Registration to the Conformity Assessment Programme for the Kingdom of Saudi Arabia (KSA CAP)** attesting the compliance of products with the regulations of the Kingdom of Saudi Arabia, allowing free trade therein.



# TECHNOLOGICAL INNOVATIONS

## NEW GENERATION ELECTRONIC CONTROL SYSTEM

The units of AERMEC close control air conditioning range feature an advanced electronic control system, conceived and designed to deliver optimum performance and easier access to information.





### INNOVATIVE

Thanks to the control via **Modbus® Master protocol**, all key components of the unit are continuously supervised, with over 50 different variables that ensure the real-time monitoring of all operating cycles.

### SIMPLE

Thanks to the wide **Full Graphic LCD display**, access to all operating parameters is guaranteed in a simple and intuitive way, in addition to icons, progress bars, as well as daily and weekly temperature and humidity charts.

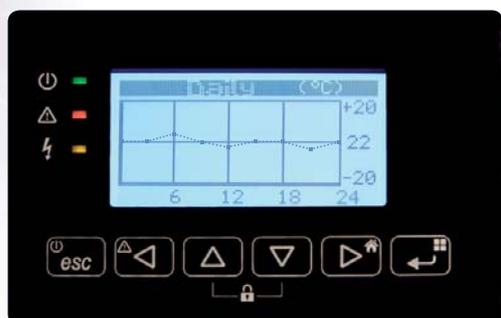


### FLEXIBLE

With **digital inputs and outputs** which, depending on the needs of the system, can be configured with specific features designed to simplify the installation and use of the unit.

### EFFICIENT

With specific features dedicated to **energy savings** and the optimised management of all the unit direct expansion and chilled water operating cycles.



### RELIABLE

Thanks to **predictive safety systems** designed to prevent unwanted shut-down failures, and to an advanced system for recording alarms and hours of operation.

### HIGH CONNECTIVITY

Thanks to the integrated RS485 Modbus® card and BACnet™, LonWorks® and SNMP gateway interfaces, **easily and quickly interfacing** with supervision systems and building management systems (BMS) is possible.

# TECHNOLOGICAL INNOVATIONS

## HIGH PERFORMANCE, LOW POWER CONSUMPTION ELECTRONIC FANS

The units of AERMEC close control air conditioning range are equipped with state-of-the-art electronic fans which allow very high performance levels to be achieved with minimum energy impact.





### INNOVATIVE

Thanks to the control exerted via the Modbus® Master protocol, it is possible to **check all the fan operating values**, ensuring the maintenance of the required working point via real-time feedback.

### SIMPLE

Thanks to the control via the Modbus® Master protocol, checking the fans is simple and intuitive. The fan **self-routing system** facilitates maintenance procedures.

### FLEXIBLE

By modulating the fan speed, **units can be adapted to the actual system needs**. Pressure or constant air flow management allows the supply of the effective quantity of air necessary to the system.

### EFFICIENT

Thanks to the innovative design of the **composite material blade**, a 25% energy saving and a 4-5 dB(A) noise reduction are possible, compared to the previous generation of fans.

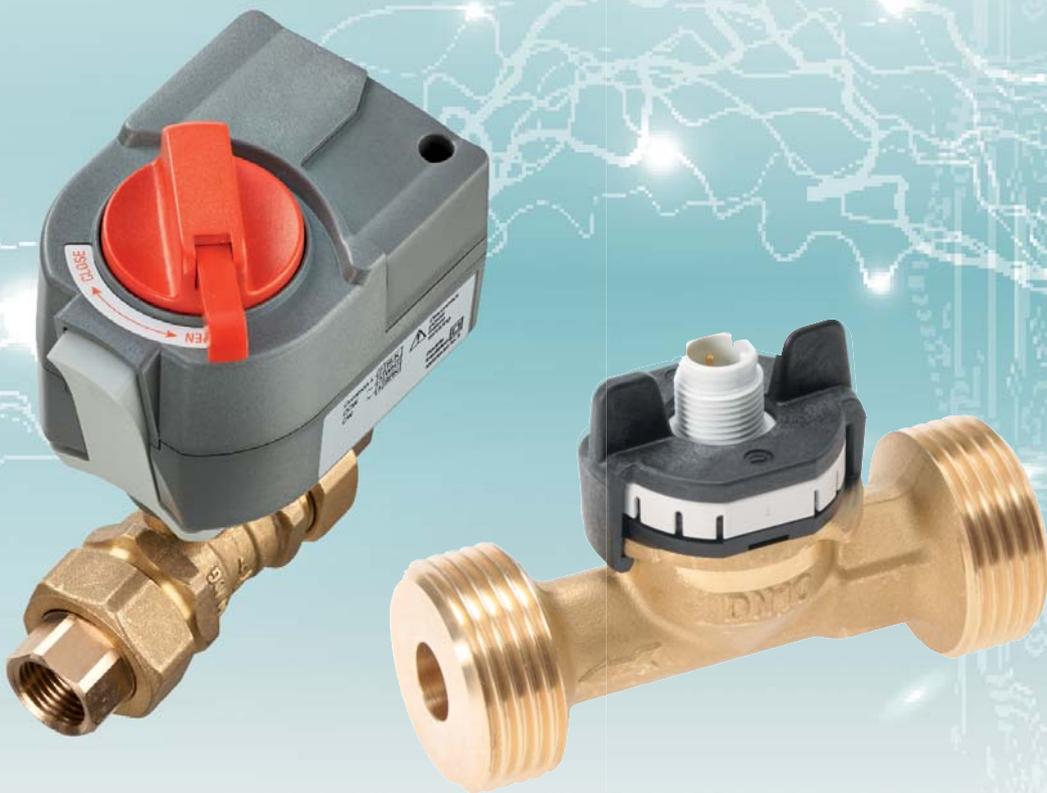
### RELIABLE

Thanks to **high reliability components** and the **independent management** of each fan, a high level of system reliability can be ensured.

# TECHNOLOGICAL INNOVATIONS

## CONTROL VALVE WITH FLOW RATE AND ENERGY ELECTRONIC MONITORING

The chilled water units of the AERMEC close control air conditioning range can be equipped with electronically controlled valves which allow the regulation and continuous monitoring of the water flow rate, inlet and outlet temperatures, and thus cooling capacity.



### INNOVATIVE

Thanks to the **electronic control of the water flow rate and coil inlet and outlet temperatures**, the **POWER VALVE** system allows the monitoring of the cooling circuit performance in real time and the automatic balancing of the water circuit without the involvement of external personnel.

### SIMPLE

Thanks to the **automatic balancing with maximum water flow rate control**, designing, installing and commissioning the system is easy and fast regardless of the water circuit pressure.

### FLEXIBLE

Thanks to the **real-time monitoring of the water circuit performance**, designing how to arrange loads is easy and fast, even in the event of future enlargements of the system.

### EFFICIENT

Thanks to the water circuit automatic balancing, **energy waste** due to water over-flow can be reduced. Performance monitoring allows environmental loads to be controlled, thereby facilitating the identification of imbalances that can affect energy efficiency.

### RELIABLE

Thanks to the electronic control system, water circuit problems that could affect the system service continuity **can be identified in advance**, thus facilitating maintenance and repair work planning.

# TECHNOLOGICAL INNOVATIONS

## ELECTRONIC EXPANSION VALVE

The units of the AERMEC close control air conditioning range are equipped with electronic expansion valves to maximise the performance of direct expansion cooling circuits, especially under partialisation conditions.



### INNOVATIVE

Thanks to an advanced electronic controller, **the entire cooling cycle of a unit** can be controlled by constantly monitoring the operation conditions of all its components.

### SIMPLE

Thanks to an **advanced system of adaptive adjustment**, difficult circuit calibrations are not necessary. The entire cooling cycle control allows the operation to be monitored without the need to use pressure gauges, probes, etc.

### FLEXIBLE

Thanks to the valves wide adjustment range, it is possible to ensure **the best cooling circuit operation** even in the presence of varying thermal loads and under partialisation conditions of the cooling capacity delivered by the circuit.

### EFFICIENT

By optimising working conditions, it is possible **to increase the cooling circuit energy efficiency by more than 40%** compared to a system provided with a mechanical thermostatic expansion valve (TEV).

### RELIABLE

Thanks to **10 different active safety systems**, the cooling circuit locking risk can be reduced by identifying and solving abnormal working conditions in advance.

# TECHNOLOGICAL INNOVATIONS

## DC COMPRESSOR WITH INVERTER REGULATION

The direct expansion units of the AERMEC close control air conditioning range can be equipped with DC compressors with inverter regulation which allow the delivered cooling capacity to be varied, maximising the motor performance and reducing energy consumption.



### INNOVATIVE

Thanks to the brushless DC synchronous motor, a **wide modulation between 20% and 100%** of the delivered cooling capacity is possible.

The **“High Pressure Shell” (HPS) system** allows optimum lubrication of the compressor even at the lowest speed, separating the oil from the refrigerant directly inside the compressor.

### SIMPLE

Thanks to the direct control via the Modbus® Master protocol a **continuous monitoring of the compressor operating conditions** is possible with direct access from the terminal unit, or remotely via connection to supervision systems and building management systems (BMS).

### FLEXIBLE

Thanks to the wide adjustment range, the compressors will automatically adapt to the actual cooling demand, guaranteeing **the optimal supply of cooling capacity** even in the presence of varying thermal loads.

### EFFICIENT

By optimising the working conditions and efficiency of the brushless DC motor, it is possible to **reduce the annual energy consumption** by 35% in partial load.

It is moreover possible to **increase the energy efficiency ratio (EER) by over 25%** compared to a system with a fixed speed compressor.

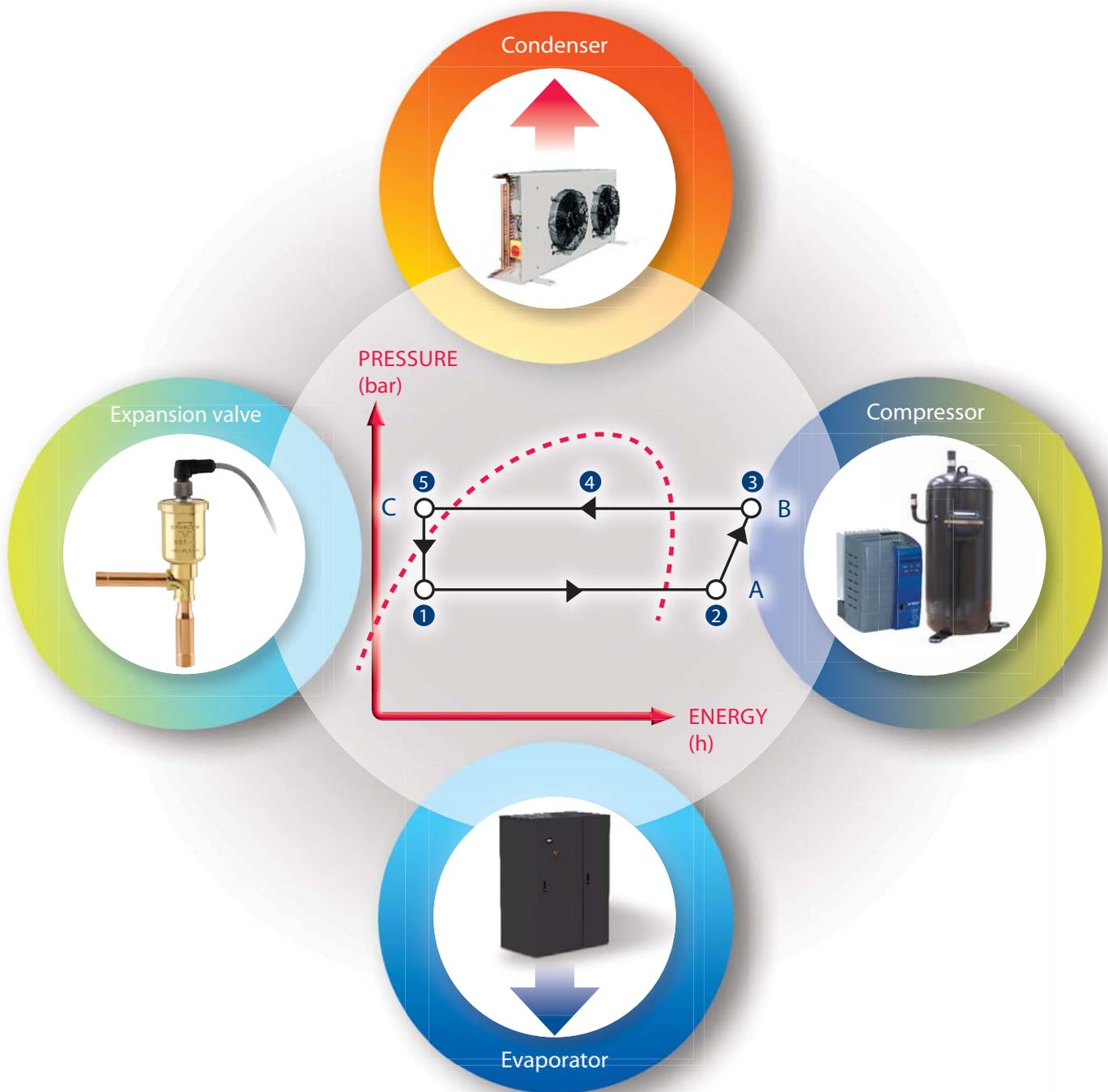
### RELIABLE

Thanks to the inverter control system, the brushless DC motor and the “High Pressure Shell” system, **it is possible to ensure the system high functional efficiency**, minimising the need to service the cooling circuit.

# FOCUS ON

## COOLING CIRCUIT ADVANCED MANAGEMENT SYSTEM

All direct expansion units are equipped with an innovative control system of the cooling circuit, which allows simplified management, easier maintenance and optimized operational safety.



## ACTIVE CONTROL OF OPERATING CONDITIONS

The **SMART COOL** system allows the **display and monitoring of the operating conditions of the whole cooling cycle**, from both the local display and the supervision systems as well as building management systems (BMS).

Using suitable probes and pressure transducers, the following quantities are detected:

- 1) **Evaporation pressure and temperature** of the refrigerant in the evaporator.
- 2) **Refrigerant temperature aspirated** (suction) by the compressor.
- 3) **Temperature of the supply line refrigerant** (discharge) from the compressor.
- 4) **Condensing pressure and temperature** of the refrigerant in the condenser.
- 5) **Temperature of the outgoing liquid refrigerant** from the condenser.

The following values are calculated from these figures:

- A) **Superheat** of the refrigerant (SH).
- B) **De-superheat** of the refrigerant (DSH).
- C) **Subcooling** of the refrigerant (SC).

If a DC inverter compressor is installed, the following values will also be monitored:

- **Actual speed** in hertz (Hz)
- **Electrical power consumption** in amps (A)
- **Power draw** in kilowatt (kW)

## OPERATIONAL SAFETY

The **SMART COOL** system actively manages 10 different safety function, designed to provide high operational safety:

- **Low evaporation pressure** of the circuit (Low Pressure - LP)
- **High condensing pressure** of the circuit (High Pressure - HP)
- **Low operating pressure** of the circuit (LOP)
- **High operating pressure** of the circuit (Maximum Operating Pressure - MOP)
- **Compressor low compression ratio** (LCR)
- **Low superheat** value (LoSH)
- **High superheat** value (HiSH)
- **Low de-superheat** value (LDSH)
- **High de-superheat** value (HDSH)
- **Refrigerant high discharge temperature** (HDT)

## TOOL-LESS SIMPLIFIED MAINTENANCE

The **SMART COOL** system makes it possible to significantly simplify all the installation and maintenance procedures of direct expansion units.

**Using tools to check the conditions of the cooling circuit will be no longer necessary;** technicians will be able to easily access all the operating conditions by simply pressing a button on the display.

Thanks to the ability to interface with the major supervision systems and building management systems (BMS), **monitoring the entire cycle of a unit will be even easier** and quicker.

# FOCUS ON

## THE INTELLIGENT LOCAL NETWORK

The units of the AERMEC close control air conditioning range are equipped with an innovative control system in a local network (LAN) which allows them to be managed and serviced more easily while improving operational safety.



## ACTIVE DISTRIBUTION OF WORKLOAD

The innovative **SMART NET** system allows the concept of local network to be revolutionized. Taking advantage of the modulation capabilities of its components, this system makes it possible to actively share the workload among all the units in the local network.

Compared to the latent redundancy Duty / Stand-by (n+1 or n+n) system, where the backup units were stationary waiting for the onset of a problem, the **SMART NET** system allows **the units connected to the network to be kept always active**.

### DUTY / STAND-BY



On 100%    On 100%    Stand-by

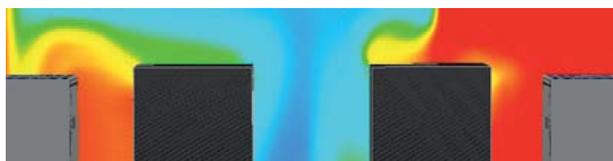
### SMART NET



On 60%    On 60%    On 60%

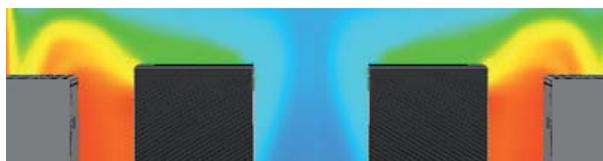
Thanks to a system of **active average of ambient conditions**, the **SMART NET** system allows the units to work in unison to monitor thermo-hygrometric conditions and air pressure, ensuring there are no "hot spots" due to inactive units.

### DUTY / STAND-BY



On 100%    Stand-by

### SMART NET



On 60%    On 60%



## EFFICIENCY AND ENERGY SAVING

Thanks to the distribution of **workload**, system efficiency can be increased by partialising the request to the main components such as fans, compressors, electric batteries and humidifiers.

This partialisation directly translates into an **energy saving of up to 60%** compared to redundant-type networks (n+1 or n+n). Indeed, instead of having active units working at 100% of their performance while one or several machines are stationary, the **SMART NET** system allows the entire group of units to operate at 50 or 60% of their maximum load.

## A SAFE AND RELIABLE NETWORK

The previous generation of latent redundancy systems gave control to a single unit (Master), while the other units were passive (Slaves).

With a view to maximising the safety of the units operating in the network, the **SMART NET** system has been developed with a **MULTIMASTER management logic**. In the **MULTIMASTER system, each unit is able to take control of the local network** even if communication among units is defective (broken or damaged cable), or in the case of shutdown of one of the units.

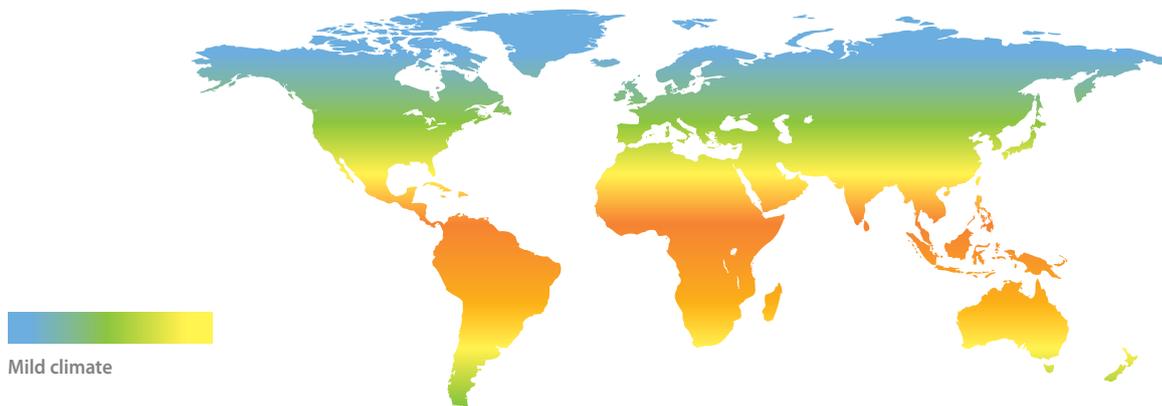
# FOCUS ON

## HIGH ENERGY SAVING AIR CONDITIONING UNIT

Using renewable energy sources is required to reduce the environmental impact of systems. AERMEC has developed innovative FREE COOLING systems able to achieve energy savings of over 50% compared to a conventional air conditioner.

## FREE COOLING FROM RENEWABLE SOURCES

Using **outside air to cool environments** is the primary source of energy savings available in temperate climate areas.



**AERMEC** has therefore decided to invest in the development of **FREE COOLING** close control air conditioning units, able to ensure high energy savings combined with the efficiency and reliability that distinguish this type of product.

## INTELLIGENT ENERGY SAVING

The high number of hours per year in which **FREE COOLING** systems can be used ensures that the air conditioning system energy consumption can be **reduced by over 50%**.

This is reflected in an immediate environmental sustainability increase, thanks to a significant reduction in CO<sub>2</sub> emissions, and the system operating costs.

## FREE COOLING OPERATING HOURS PER YEAR

	Amsterdam	Athens	Belgrade	Berlin	Brussels	Bucharest	Budapest	Copenhagen	Dublin	Helsinki
Number of hours (1)	5,641	4,491	5,105	5,583	5,545	5,503	5,279	5,861	7,161	5,796
Percentage (2)	64%	51%	58%	64%	63%	63%	60%	67%	82%	71%

	Istanbul	London	Madrid	Milan	Moscow	Oslo	Paris	Prague	Reykjavík	Vienna
Number of hours (1)	4,779	5,575	4,643	5,281	6,046	6,202	5,187	5,619	7,743	5,651
Percentage (2)	55%	64%	53%	60%	71%	73%	59%	64%	88%	65%

Notes: (1) Number of hours with temperatures lower than or equal to 18°C. (2) Percentage calculated on a total of 8,760 hours per year.

## INDIRECT FREE COOLING

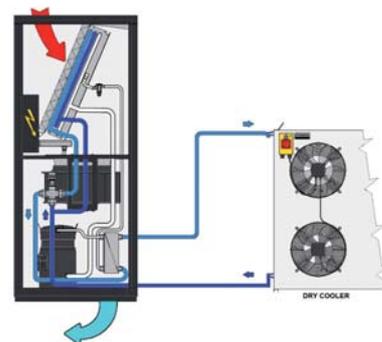
The **indirect FREE COOLING system is characterised by a hybrid unit**, consisting of a primary water circuit and a secondary direct expansion or chilled water circuit. The primary water circuit is connected to a dry cooler that uses outside air - a source of renewable energy - to cool water. The secondary circuit on the other hand exploits the mechanical cooling.

## OPTIMISED OPERATING PROCEDURES

Depending on the outside air temperatures, three possible operating procedures are possible:

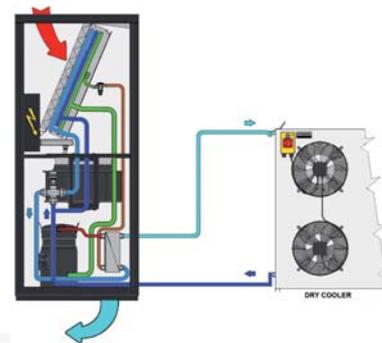
### TOTAL FREE COOLING

The unit completely operates in **FREE COOLING** without triggering mechanical cooling.



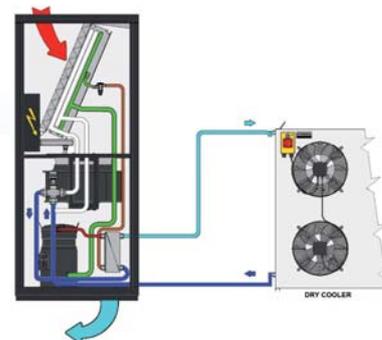
### PARTIAL FREE COOLING

In addition to operating the **FREE COOLING** circuit, mechanical cooling can be triggered for the time strictly necessary to meet the demand for cooling.



### NO FREE COOLING

Regulation is completely entrusted to mechanical cooling, excluding the **FREE COOLING** circuit.



## SELF-ADAPTIVE SET-POINT OF THE DRY COOLER

In order to maximise the efficiency of the **FREE COOLING** system, the unit can handle the regulation of the dry cooler coupled to it directly. **Thanks to the self-adaptive set-point function, the fan speed can be regulated so that the water always has a temperature consistent with the outside air conditions.**

This leads to an **increase in the system efficiency**, allowing you to maximise the performance of both the **FREE COOLING** circuit and the direct expansion circuit, ensuring low condensing temperatures. In addition, the fans of the dry cooler will partially operate even with high temperatures, thereby increasing the energy savings of the system.



# FOCUS ON

## DUAL CIRCUIT SYSTEM

Some critical applications require safety devices that prevent discontinuity of operation due to system problems. AERMEC has developed specific units, named TWO SOURCES, provided with two totally independent cooling sources.



## HIGH OPERATIONAL SAFETY

In an air conditioning system, the main cooling source may be insufficient to guarantee suitable environmental conditions. This may be due to an overload of the system, maintenance, possible seasonal closures or any type of emergency that may arise.

A reduction in the machine cooling capacity can lead to great instability in the system, reducing the ability to control the system thermo-hygrometric conditions, even in the presence of redundancy or **SMART NET** systems.

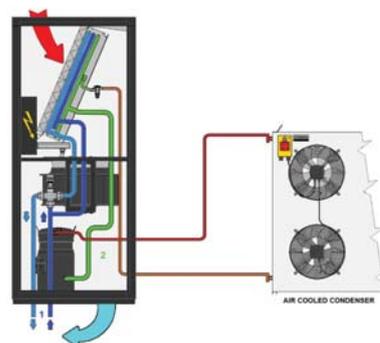
So as to avoid these problems, specific **TWO SOURCES (TS)** units have been developed providing a second source of cooling, complete with its own control valve and totally independent from the primary one.

## A SAFE, FLEXIBLE SYSTEM

The Two Sources system is very flexible and allows three different types of systems:

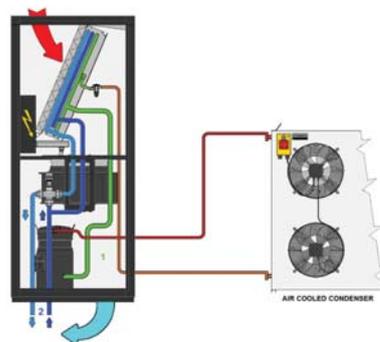
### CHILLED WATER + DIRECT EXPANSION TWO SOURCES

The chilled water primary source of the unit is connected to a building chiller or to District Cooling, whereas the secondary, emergency, and direct expansion one is connected to remote air or in-built water condensers.



### DIRECT EXPANSION + CHILLED WATER TWO SOURCES

The direct expansion primary source of the unit is connected to remote air or in-built water condensers, whereas the secondary, emergency, and water one is connected to a dedicated chiller, to a groundwater/aqueduct water distribution network or to District Cooling.



### CHILLED WATER + CHILLED WATER TWO SOURCES

Both sources of the unit are chilled water coils. The primary one is normally connected to a building chiller or to District Cooling. The emergency source can be connected to a dedicated chiller or a groundwater/aqueduct water distribution network.



# P SERIE PRECISION AIR CONDITIONERS

The P Series precision air conditioners have constructional and operating characteristics suitable for environments where thermal loads of a sensitive nature prevail.



# P SERIE

Although optimised for data centres, the technical characteristics of the P series make these units suitable for various types of special applications, such as metrology laboratories, TV production studios, recording and conservation rooms for musical instruments, museums and archives, control rooms in power stations and railway junctions.

In addition, their application proves ideal for various industrial sectors: optics, electronics, electromedical equipment, production of electrical or electronic equipment, production of musical instruments, etc.

## **P series air conditioners offer:**

- Temperature and humidity close control.
- A high delivered cooling capacity to footprint ratio, which makes it easier to design the environments to be air conditioned.
- Very high values of energy efficiency, which translate into lower CO<sub>2</sub> emissions into the environment, and in particularly low operating costs.
- High flexibility of use, thanks to the wide range of accessories which can be selected.

## **GENERAL FEATURES**

- Very high EER (Energy Efficiency Ratio)
- Limited footprint
- Dark gray RAL 7024 metal structure
- Panels with thermo-acoustic insulation
- Electrical panel complete with control and safety devices
- Control microprocessor with graphic display
- G4-class efficiency air filters with dirty filter alert
- Return air temperature sensor
- Supply air temperature sensor
- Electronic **EC FANS**
- R410A scroll compressors
- Electronic expansion valves with **SMART COOL system**
- Three-way control valves
- Unit shutdown system for the presence of fire
- RS485 Modbus® RTU slave card

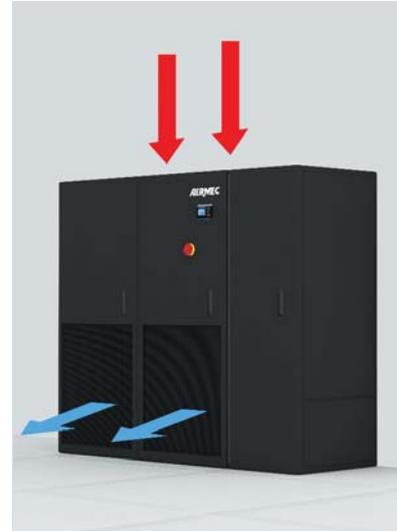
## AIR CONDITIONERS WITH DOWNFLOW AIR SUPPLY



Standard version with top air intake and downflow air supply, with stand for raised floors.



Version with top air intake and front air supply through air distribution plenum with adjustable grilles.



Version with top air intake and front air supply through front panel.

### PXU: Direct expansion air conditioners with downflow air supply and aircooled or watercooled condensers

MODELS		71	141	211	251	301	302	361	422	461	512	662	852	932
<b>Performance</b>														
Total cooling capacity (1)	kW	7,7	14,5	20,8	25,3	31,2	30,6	36,6	42,7	46,9	51,6	67,7	87,3	94,2
Sensible cooling capacity (1)	kW	7,4	12,8	20,8	22,7	30,3	30,1	36,6	42,7	45,3	47,4	64,5	73,2	85,4
EER (2)		3,69	3,36	3,12	3,06	3,13	3,2	3,24	3,22	3,37	3,14	3,25	3,29	3,59
Air flow rate	m <sup>3</sup> /h	2200	3200	7000	7000	8700	8700	14500	14500	14500	14500	17900	17900	20700
Noise level (3)	dB(A)	51	57	62	62	60	60	65	65	65	65	62	62	60
<b>Dimensions and weights</b>														
Width	mm	750	750	860	860	1410	1410	1750	1750	1750	1750	2300	2300	2640
Depth	mm	601	601	880	880	880	880	880	880	880	880	880	880	880
Height	mm	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990
Net weight	kg	180	210	270	270	320	340	440	450	450	500	640	660	860
Free Cooling		o	o	o	o	•	•	o	o	o	o	•	•	o
Two Sources		o	o	•	o	•	•	o	o	o	o	•	•	o

### PWU: Chilled water air conditioners with downflow air supply

MODELS		10	20	30	50	80	110	160	220
<b>Performance</b>									
Total cooling capacity (1)	kW	10,2	18,1	32,4	43,6	67,4	93,4	142,1	186,9
Sensible cooling capacity (1)	kW	9,2	15,5	29,8	38,1	62,5	80,7	122,9	161,3
EER (2)		34,42	29,24	22,83	21,48	24,16	24,02	23,33	24,02
Air flow rate	m <sup>3</sup> /h	2200	3200	7400	8200	15400	17000	26000	34000
Noise level (3)	dB(A)	51	57	63	59	66	62	64	65
<b>Dimensions and weights</b>									
Width	mm	750	750	860	860	1750	1750	2640	3495
Depth	mm	601	601	880	880	880	880	880	880
Height	mm	1990	1990	1990	1990	1990	1990	1990	1990
Net weight	kg	155	160	220	240	340	360	540	700
Free Cooling		o	o	o	•	o	•	•	o
Two Sources		o	o	o	•	o	•	•	o

**Notes:**

- (1) Performance refers to: R410a refrigerant; condensing temperature 45°C; incoming air 24°C-45%Rh; water 7/12°C; external static pressure 30 Pa. The declared performance does not take into account the heat generated by fans, which must be added to the system thermal load.
- (2) EER (Energy Efficiency Ratio) = total cooling capacity / compressors power consumption + fans power consumption (air cooled condensers excluded).
- (3) Sound levels at a 2 m distance, in a free field, as per UNI EN ISO 3744:2010.

## AIR CONDITIONERS WITH UPFLOW AIR SUPPLY



Standard version with front air intake and upflow air supply.



Version with front air intake and supply through air distribution plenum with adjustable grilles.



Version with air intake from the bottom, stand for raised floor, blind front panel and upflow air supply.

### PXO: Direct expansion air conditioners with upflow air supply and aircooled or watercooled condensers

MODELS		71	141	211	251	301	302	361	422	461	512	662	852	932
<b>Performance</b>														
Total cooling capacity (1)	kW	7,8	14,9	21,3	26,8	33,6	30,9	37,8	43,7	48,1	54,2	67,3	90,1	93,3
Sensible cooling capacity (1)	kW	7,6	13,4	21,3	25,6	31,7	30,6	37,8	43,7	47,9	52,8	64,8	77,0	85,0
EER (2)		3,71	3,37	3,15	3,18	3,08	3,2	3,30	3,27	3,43	3,25	3,13	3,33	3,53
Air flow rate	m <sup>3</sup> /h	2200	3200	7000	7000	8700	8700	14500	14500	14500	14500	17900	17900	20700
Noise level (3)	dB(A)	51	57	62	62	60	60	65	65	65	65	62	62	60
<b>Dimensions and weights</b>														
Width	mm	750	750	860	860	1410	1410	1750	1750	1750	1750	2300	2300	2640
Depth	mm	601	601	880	880	880	880	880	880	880	880	880	880	880
Height	mm	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990
Net weight	kg	180	210	270	270	320	340	440	450	450	500	640	660	860
Free Cooling		o	o	o	o	•	•	o	o	o	o	•	•	o
Two Sources		o	o	•	o	•	•	o	o	o	o	•	•	o

### PWO: Chilled water air conditioners with upflow air supply

MODELS		10	20	30	50	80	110	160	220
<b>Performance</b>									
Total cooling capacity (1)	kW	10,0	18,0	32,4	43,6	66,8	80,2	121,9	160,3
Sensible cooling capacity (1)	kW	9,2	15,4	29,8	38,1	62,1	72,0	109,7	144,0
EER (2)		34,42	29,24	22,83	21,48	23,94	24,30	23,62	24,29
Air flow rate	m <sup>3</sup> /h	2200	3200	7400	8200	15400	17000	26000	34000
Noise level (3)	dB(A)	51	57	63	59	66	62	64	65
<b>Dimensions and weights</b>									
Width	mm	750	750	860	860	1750	1750	2640	3495
Depth	mm	601	601	880	880	880	880	880	880
Height	mm	1990	1990	1990	1990	1990	1990	1990	1990
Net weight	kg	155	160	220	240	340	360	540	700
Free Cooling		o	o	o	•	o	•	•	o
Two Sources		o	o	o	•	o	•	•	o

**Notes:**

- (1) Performance refers to: R410a refrigerant; condensing temperature 45°C; incoming air 24°C-45%Rh; water 7/12°C; external static pressure 30 Pa. The declared performance does not take into account the heat generated by fans, which must be added to the system thermal load.
- (2) EER (Energy Efficiency Ratio) = total cooling capacity / compressors power consumption + fans power consumption (air cooled condensers excluded).
- (3) Sound levels at a 2 m distance, in a free field, as per UNI EN ISO 3744:2010.

## AVAILABLE ACCESSORIES

### Direct expansion:

- Brushless DC compressors with inverter regulation
- Power supply line for remote condenser
- Power supply line with speed regulator for remote condenser
- Condensing regulation with 0-10V signal for remote condenser with EC fans
- "LT Kit" for operation with low temperature outside air with remote condenser
- Oversize liquid receiver
- Check valves on the supply and liquid pipes
- Water-cooled condenser
- Water-cooled condenser with a condensing temperature control valve
- "HT Kit" for operation at high condensing temperatures

### Chilled water:

- Two-way control valves
- Inlet and outlet water temperature sensors
- "Power Valve" kit

### Heating:

- Low thermal inertia electric heaters with stage control
- Low thermal inertia electric heaters with modulating control (available on request on selected models only)
- Hot water heating coils with 2- or 3-way control valve (available on request on selected models only)

### Humidification:

- Room humidity probe
- Supply humidity probe
- Immersed electrodes humidifier

### Mechanical and structural:

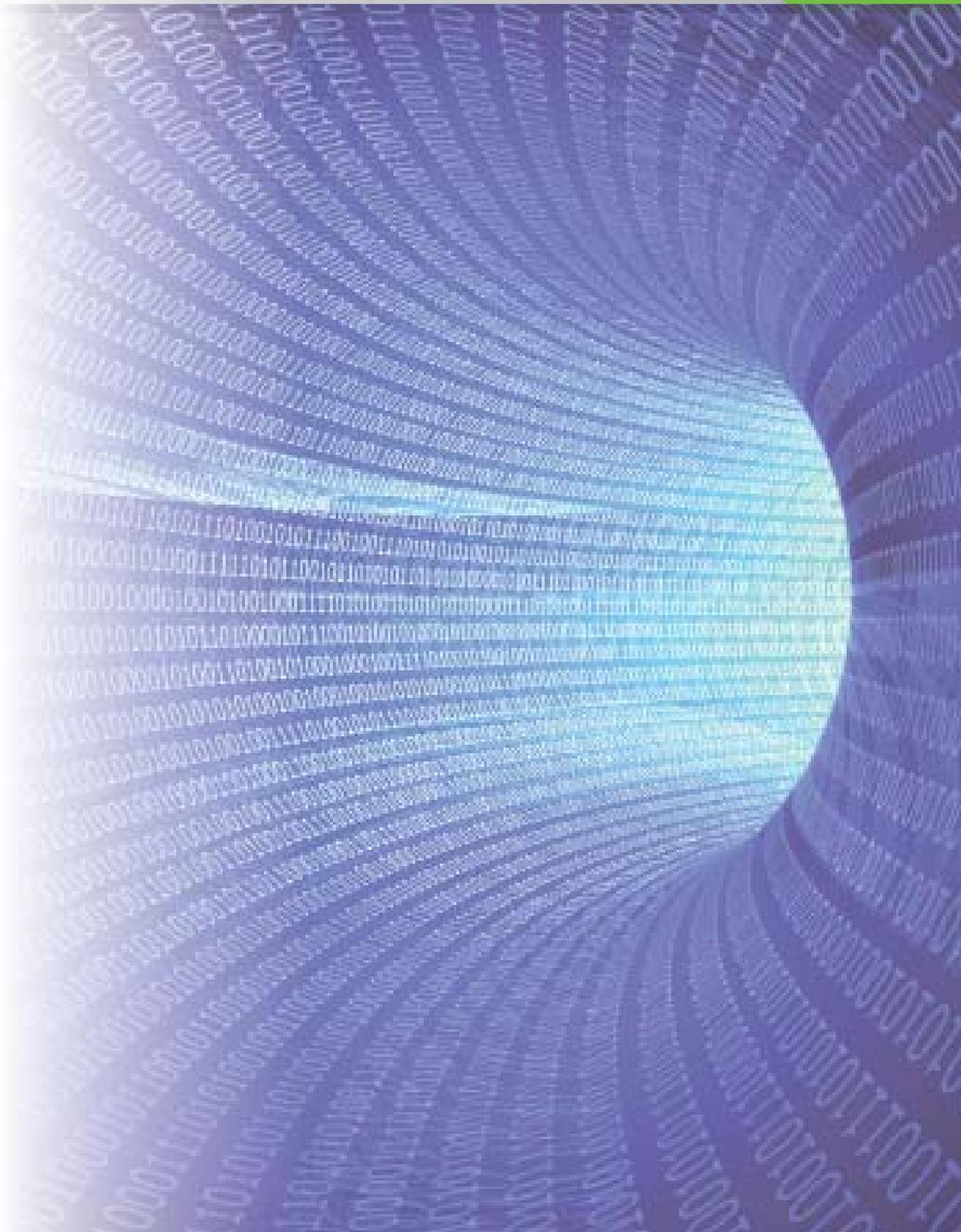
- Condensate drain pump
- Condensate and humidifier drain pump
- Supply overpressure relief damper
- M5 efficiency class intake air filter (EU5)
- Soundproofed duct section on the supply line
- Distribution plenum with adjustable grilles
- Height adjustable stand for installation with raised floor
- Grilled panels for front supply
- Closed panels for air intake from the bottom
- Panels with sandwich counter panelling (available on request on request on selected models only)
- Panels with reinforced acoustic lining (available on request on request on selected models only)

### Electrical:

- Alternative voltages available: 460V/3ph/60Hz - 380V/3ph/60Hz - 230V/3ph/60Hz
- Electrical supply line without neutral
- Automatic transfer switch (ATS), "Basic" version
- Automatic transfer switch (ATS), "Advanced" version

### Regulation:

- Constant air flow control
- Constant pressure control
- Local network set up and connection cable
- User terminal for remote installation
- Flooding detection system



# G SERIE PRECISION AIR CONDITIONERS FOR LARGE DATA CENTRES

G series precision air conditioners have constructional and operating characteristics suitable for meeting the design criteria of the latest generation data centres.



# G SERIE

When designing air conditioning systems for large data centres, the need for electrical cable housing and the enormous air volumes required to cool down the servers have made it essential to increase the height of raised floors up to the current 550/1,000-millimetre level. A large space below the air conditioner for the installation of an adjustable stand has thus created. It was therefore decided to use this large space to house supply fans.

Without increasing the footprint of the machine, and only exploiting space where it is provided, great advantages have been obtained:

- With the same air conditioner footprint, it has been possible to increase the front section of the coil by about 40-50% by reducing the pressure drop on the air side, and thus the fan energy consumption.
- Increasing the size of the air filters installed upstream of the cold coil allows a significant reduction in load losses and replacement frequency for maintenance.
- Increased efficiency of the fans which, installed in the stand, expel treated air horizontally and completely unobstructedly.

## GENERAL FEATURES

- Very high EER (Energy Efficiency Ratio)
- Limited footprint
- Dark gray RAL 7024 metal structure
- Panels with thermo-acoustic insulation
- Electrical panel complete with control and safety devices
- Control microprocessor with graphic display
- G4-class efficiency air filters with dirty filter alert
- Return air temperature sensor
- Supply air temperature sensor
- Electronic **EC FANS**
- R410A scroll compressors
- Electronic expansion valves with **SMART COOL** system
- Two-way control valves
- Unit shutdown system for the presence of fire
- RS485 Modbus® RTU slave card

## AIR CONDITIONERS WITH DOWNFLOW AIR SUPPLY



Standard version for data centre perimeter installation: The height of the raised floor must be at least 550 mm.



Standard version for data centre perimeter installation with raised floor height less than 550 mm. In this case the stand, having a fixed height of 550 mm provided with side closing panels, must be installed above the floor. However, please make sure that the ceiling height allows good air intake.



Version for installation outside the data centre, with no raised floor and rear supply line. In this case the stand, having a fixed height of 550 mm, is provided with side closing panels and rear supply grilles. The installation of a plenum with a rear air intake system is optional, in the absence of a duct system.

**GXU:** Direct expansion air conditioners with downflow air supply and aircooled or watercooled condensers

MODELS		461	612	932
<b>Performance</b>				
Total cooling capacity (1)	kW	43,0	54,9	91,7
Sensible cooling capacity (1)	kW	35,9	42,1	79,4
EER (3)		3,39	2,86	3,60
Total cooling capacity (2)	kW	46,6	58,8	99,6
Sensible cooling capacity (2)	kW	46,6	53,1	99,6
EER (3)		3,67	3,06	3,92
Air flow rate	m <sup>3</sup> /h	9500	10000	19000
Noise level (4)	dB(A)	57	58	59
<b>Dimensions and weights</b>				
Width	mm	1490	1490	2390
Depth	mm	921	921	921
Height	mm	1990	1990	1990
Net weight	kg	630	680	870

**GWU:** Chilled water air conditioners with downflow air supply

MODELS		70	150	230	300
<b>Performance</b>					
Total cooling capacity (1)	kW	47,7	91,7	128,3	183,5
Sensible cooling capacity (1)	kW	42,1	82,6	119,9	165,3
EER (3)		32,89	33,97	35,15	40,8
Total cooling capacity (2)	kW	38,5	74,9	106,7	149,8
Sensible cooling capacity (2)	kW	38,5	74,9	106,7	149,8
EER (3)		27,7	26,98	29,81	34,51
Air flow rate	m <sup>3</sup> /h	9500	19000	28500	38000
Noise level (4)	dB(A)	57	59	61	60
<b>Dimensions and weights</b>					
Width	mm	1320	2220	3120	4020
Depth	mm	921	921	921	921
Height	mm	1990	1990	1990	1990
Net weight	kg	610	750	930	1250

**Notes:**

- (1) Performance refers to: R410a refrigerant; condensing temperature 45°C; incoming air 24°C-45%Rh; water 7/12°C; external static pressure 30 Pa, ventilated plenum, height 1000 mm. The declared performance does not take into account the heat generated by fans, which must be added to the system thermal load.
- (2) Performance refers to: R410a refrigerant; condensing temperature 45°C; incoming air 30°C-30%Rh; water 14/20°C; external static pressure 30 Pa, ventilated plenum, height 1000 mm. The declared performance does not take into account the heat generated by fans, which must be added to the system thermal load.
- (3) EER (Energy Efficiency Ratio) = total cooling capacity / compressors power consumption + fans power consumption (air cooled condensers excluded).
- (4) Sound levels at a 2 m distance, in a free field, as per UNI EN ISO 3744:2010.

## AVAILABLE ACCESSORIES

### Direct expansion:

- Brushless DC compressors with inverter regulation
- Power supply line for remote condenser
- Power supply line with speed regulator for remote condenser
- Condensing regulation with 0-10V signal for remote condenser with EC fans
- "LT Kit" for operation with low temperature outside air with remote condenser
- Oversize liquid receiver
- Check valves on the supply and liquid pipes
- Water-cooled condenser
- Water-cooled condenser with a condensing temperature control valve
- "HT Kit" for operation at high condensing temperatures

### Chilled water:

- Three-way control valves
- Inlet and outlet water temperature sensors
- "Power Valve" kit

### Heating:

- Low thermal inertia electric heaters with stage control
- Low thermal inertia electric heaters with modulating control (available on request on selected models only)
- Hot water heating coils with 2- or 3-way control valve (available on request on selected models only)

### Humidification:

- Room humidity probe
- Supply humidity probe
- Immersed electrodes humidifier

### Mechanical and structural:

- Condensate drain pump
- Condensate and humidifier drain pump
- Supply overpressure relief damper
- M5 efficiency class intake air filter (EU5)
- Front or rear intake plenum
- Ventilated stand with panelling for front or rear supply
- Ventilated stand with panelling for bottom supply (installation on the raised floor)
- Panels with sandwich counter-panelling
- Panels with reinforced acoustic lining

### Electrical:

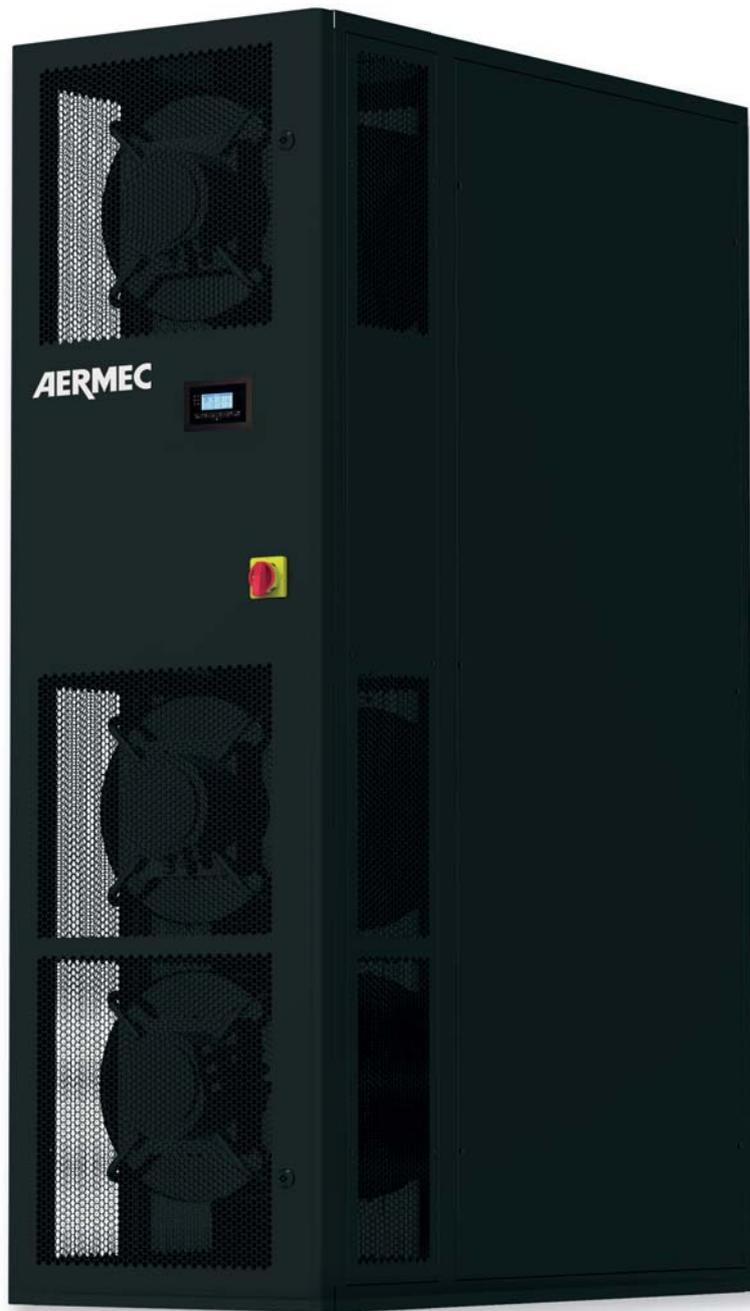
- Alternative voltages available: 460V/3ph/60Hz - 380V/3ph/60Hz - 230V/3ph/60Hz
- Electrical supply line without neutral
- Automatic transfer switch (ATS), "Basic" version
- Automatic transfer switch (ATS), "Advanced" version

### Regulation:

- Constant air flow control
- Constant pressure control
- Local network set up and connection cable
- User terminal for remote installation
- Flooding detection system

# R SERIE PRECISION AIR CONDITIONERS «IN ROW» INSTALLATION

R series precision air conditioners are built and sized in such a way that they can be installed alongside data centre racks.



# R Serie

In air conditioning systems for large data centres, the adoption of the following design concepts has in fact become an established custom:

- The racks containing servers are increasingly positioned according to the Hot Aisle and Cold Aisle layout.
- Air temperatures are allowed to rise up to 30-35°C in the hot aisle and 20-25°C in the cold one, with very low humidity (never above 30%).
- Server performance is increasingly on the rise, while server sizes are increasingly reduced. As a result, many more servers can be installed in a rack, so some of these racks can be eliminated as they are empty. At the same time, heat dissipation increases, thereby requiring more power from air conditioners.

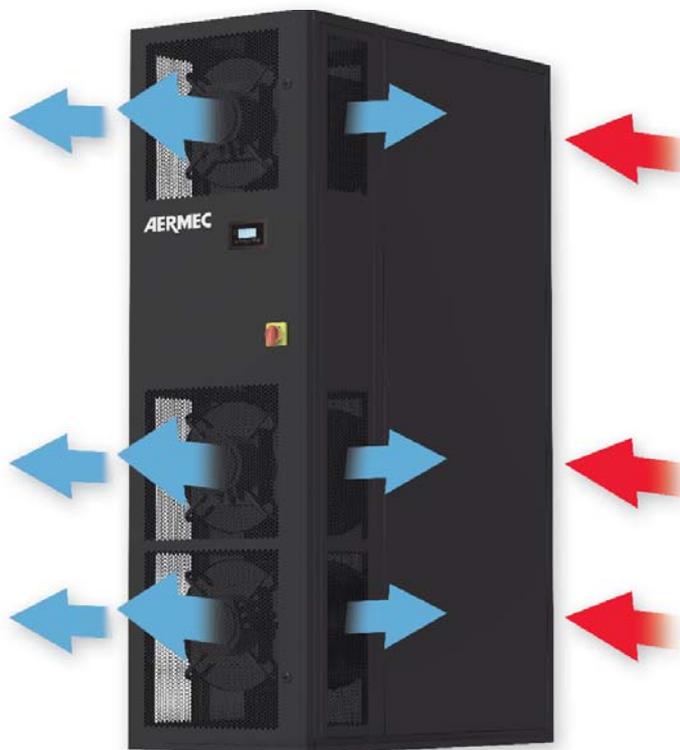
R series air conditioners are designed and built so as to fit into this plant layout perfectly. As a matter of fact:

- They exploit the space left free from racks and allow cold air to be distributed as close as possible to servers, that is, where heat is generated.
- They feature rear intake from the hot aisle and front supply to the cold aisle with a horizontal flow. The horizontal flow reduces internal pressure drop, with a consequent reduction in the power draw of the fan.

## GENERAL FEATURES

- Very high EER (Energy Efficiency Ratio)
- Limited footprint
- Dark gray RAL 7024 metal structure
- Panels with thermo-acoustic insulation
- Front and rear accessibility for easy maintenance
- Cooling, electric and water top/bottom connections
- Electrical panel complete with control and safety devices
- Control microprocessor with graphic display
- G4-class efficiency air filters with dirty filter alert
- Return air temperature sensor
- Supply air temperature sensor
- Electronic **EC FANS**
- Brushless DC compressors with R410A inverter regulation
- Electronic expansion valves with **SMART COOL** system
- Three-way control valves
- Unit shutdown system for the presence of fire
- RS485 Modbus® RTU slave card

## AIR CONDITIONERS WITH HORIZONTAL AIR SUPPLY



Version for "in row" installation with front and side air supply

**RXA:** Direct expansion air conditioners with horizontal supply and aircooled or watercooled condensers

MODELS		231	361
<b>Performance</b>			
Total cooling capacity (1)	kW	20,4	28,2
Sensible cooling capacity (1)	kW	19,7	21,7
EER (2)		3,29	2,95
Air flow rate	m <sup>3</sup> /h	6000	7500
Noise level (3)	dB(A)	56	56
<b>Dimensions and weights</b>			
Width	mm	600	600
Depth	mm	1180	1180
Height	mm	2000	2000
Net weight	kg	215	215
Free Cooling		•	○
Two Sources		•	○

**RXU:** Chilled water air conditioners with horizontal supply

MODELS		40
<b>Performance</b>		
Total cooling capacity (1)	kW	35,4
Sensible cooling capacity (1)	kW	33,5
EER (2)		27,65
Air flow rate	m <sup>3</sup> /h	9000
Noise level (3)	dB(A)	61
<b>Dimensions and weights</b>		
Width	mm	600
Depth	mm	1180
Height	mm	2000
Net weight	kg	190
Two Sources		•

**Notes:**

- (1) Performance refers to: R410a refrigerant; condensing temperature 45°C; incoming air 30°C-30%Rh; water 14/20°C; external static pressure 30 Pa. The declared performance does not take into account the heat generated by fans, which must be added to the system thermal load.
- (2) EER (Energy Efficiency Ratio) = total cooling capacity / compressors power consumption + fans power consumption (air cooled condensers excluded).
- (3) Sound levels at a 2 m distance, in a free field, as per UNI EN ISO 3744:2010.

## AVAILABLE ACCESSORIES

### Direct expansion:

- Power supply line for remote condenser
- Power supply line with speed regulator for remote condenser
- Condensing regulation with 0-10V signal for remote condenser with EC fans
- "LT Kit" for operation with low temperature outside air with remote condenser
- Oversize liquid receiver
- Check valves on the supply and liquid pipes
- Water-cooled condenser
- Water-cooled condenser with a condensing temperature control valve

### Chilled water:

- Two-way control valves
- Inlet and outlet water temperature sensors
- "Power Valve" kit

### Heating:

- Low thermal inertia electric heaters with stage control

### Humidification:

- Room humidity probe
- Supply humidity probe
- Immersed electrodes humidifier

### Mechanical and structural:

- Condensate drain pump
- M5 efficiency class intake air filter (EU5)
- Closed front panel for side supply
- Closed side panels for front supply
- Wheels for handling

### Electrical:

- Alternative voltages available 460V/3ph/60Hz - 380V/3ph/60Hz - 230V/3ph/60Hz
- Electrical supply line without neutral
- Automatic transfer switch (ATS), "Basic" version
- Automatic transfer switch (ATS), "Advanced" version

### Regulation:

- Constant air flow control
- Constant pressure control
- Local network set up and connection cable
- User terminal for remote installation
- Flooding detection system

# CUSTOMISED VERSIONS

The wide range of AERMEC close control air conditioners allows most design and installation requirements to be met. When this is not the case, however, AERMEC is able to put forward alternative solutions to satisfy the most specific needs with in-house know-how.

## CLOSE CONTROL AIR CONDITIONERS FOR CEILING INSTALLATION

This type of unit is designed to be **installed on the ceiling in the premises to be conditioned**. These units are particularly suitable for **small rooms**, where the available space is not enough to install perimeter units.

**Available with direct expansion circuit for remote condensing unit and with chilled water circuit, for cooling capabilities from 5 to 20 kW.**



## CONSOLE CLOSE CONTROL AIR CONDITIONERS

**Designed to have a height of 1250 mm**, this type of unit has been designed for environments where **the operating spaces are not suitable for the installation of normal perimeter units**.

**Available with direct expansion circuit for remote air or in-built water condensers and with chilled water circuit, for cooling capabilities up to 15 kW.**



# AERMEC SOLUTIONS FOR DATA CENTRES



## WATER CHILLERS

Aermec water chillers offer a wide range of cooling capacities to meet the needs of small, medium and large data centres.

Free-cooling technology, equipped with the exclusive Aermec Dynamique Set Point and, for some series, with HWT technology (High Water Temperature) exploits the favourable environmental conditions to supply chilled water without the use of mechanical cooling, maximizing efficiencies and energy savings.

Range of chillers is now available with news series with HFO R1234ze refrigerant which guarantee low GWP.

## REMOTE CONDENSERS AND DRY COOLERS

Aermec direct expansion Precision Air Conditioners find their ideal external cooling source when combined with the extensive range of Aermec remote condensers (for air-cooled solutions) and dry coolers (for water-cooled solutions).

Horizontal and compact V-coil configurations are available, with a multitude of options and accessories for all individual needs.

The dry cooler range with compact V-coil configuration can be equipped also with the adiabatic cooling system. In the Hybrid Dry Coolers, the adiabatic cooling process uses panels with specific aluminium fins, which allow to cool down the air temperature through the water evaporation, so that the free cooling operation mode is extended with significant energy savings.

The highly robust design is ideal for year-round data centre operation.



## UNDERFLOOR UNITS

UFB offers localised “micro-climate” air conditioning support within critical areas in the data hall. Installed within the raised floor and thus creating no intrusion, it supplies fresh underfloor air into the data hall when needed, as determined by an on-board controller; alternatively UFB recirculates the air within the data hall itself. Integrated filters are standard, with an electrical heater as an option. UFB can be easily repositioned within the data hall, occupying the exact dimensions of a single raised floor panel.

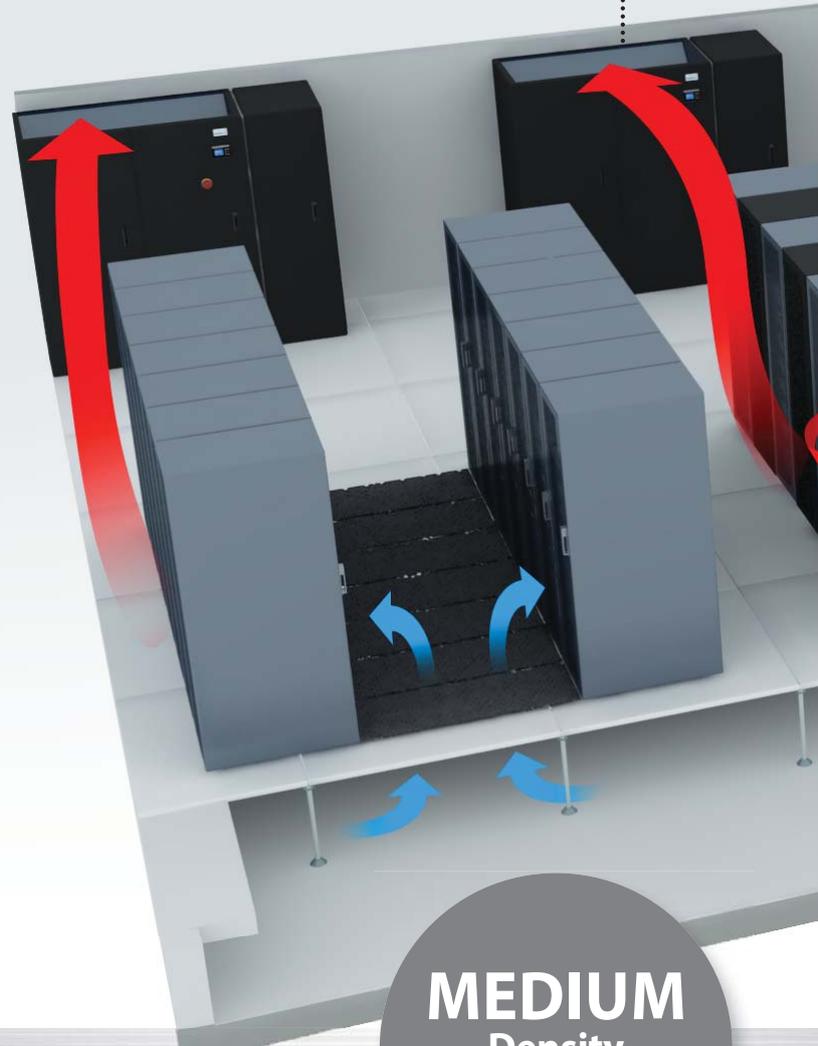


# OUR SOLUTIONS FOR DATA CENTRES

The units of the AERMEC close control air conditioning range have been optimised for use in new generation data centres, offering the highest guarantee of flexibility, efficiency and reliability.

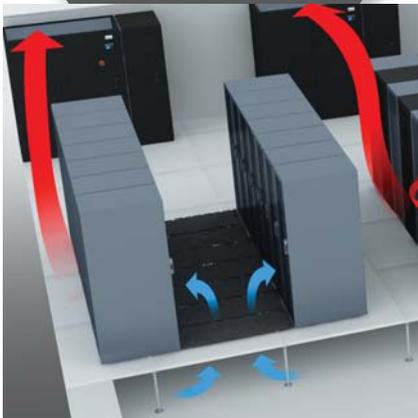
Technological progress has created the need for ever greater exchange of data, thereby exponentially increasing the concentration of electronic equipment in data centres. Infrastructure limits and constantly growing energy costs have thus redefined the design and development standards of data centres, making efficiency and energy saving key concepts underlying the choice of close control air conditioners.

## P Serie



**LOW  
Density**  
< 10 kW/rack

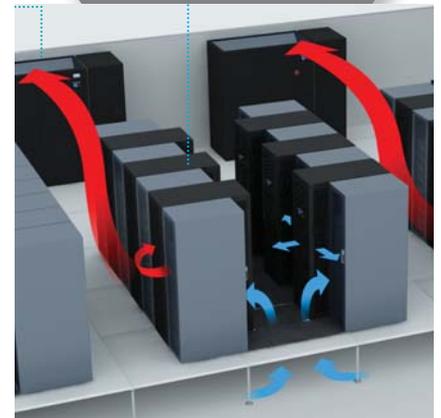
**MEDIUM  
Density**  
10-20 kW/rack



**Low-density data centres are normally configured according to the hot/cold aisle design.**

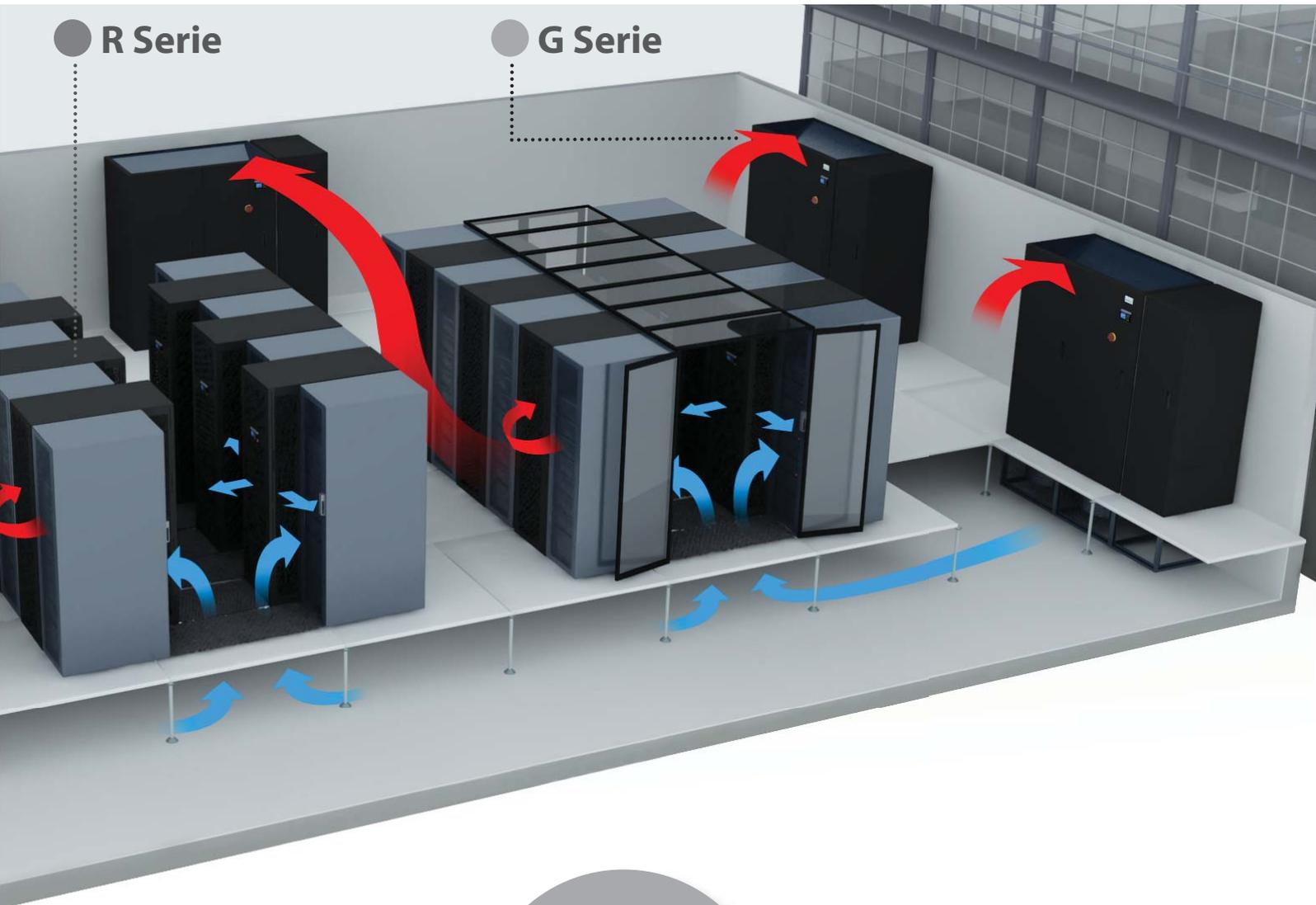
This type of system involves the use of perimetral units which, through a raised floor, convey air into the "cold aisle". The air heated by servers is then collected by "hot aisles".

This solution offers high flexibility, making it easy to enlarge a data centre over time, as well as changing the rack arrangement.



● R Serie

● G Serie



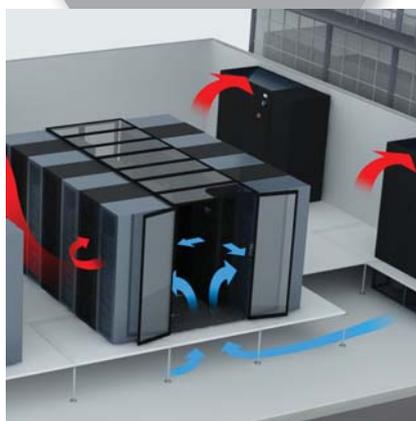
**HIGH  
Density**  
> 20 kW/rack

**Medium-density data centres are normally configured according to the hot/cold aisle design and adding localised "in-row" air conditioning units.**

This type of system involves the use of perimetral units which, through a raised floor, convey air into the "cold aisle". The air heated by racks will then be collected by hot aisles.

"In-row" units allow you to add a localised temperature control, which eliminates "hot-spot" problems.

This solution is optimal both if an existing data centre is expanded, and for the optimisation of loads in newly implemented data centres.



**High-density data centres are normally configured according to the hot/cold aisle partitioning design, with any localised, "in-row" air conditioning units.**

This type of system involves the use of high-efficiency perimetral units, with ventilation being installed in the raised floor. The rack aisles (hot or cold) are partitioned to prevent hot and cold water from being mixed and obtain homogeneous distribution on the servers. "In-row" units allow you to add a localised temperature control, which eliminates "hot-spot" problems.

This solution allows you to optimise air distribution and maximize the system energy efficiency, avoiding energy waste due to mixing hot and cold air in the upper part of the racks.









**Aermec S.p.A.**  
Via Roma, 996  
37040 Bevilacqua (VR) - Italy  
Tel. + 39 0442 633111  
Fax +39 0442 93577  
sales@aermec.com  
www.aermec.com

All specifications are subject to change without prior notice. Although every effort has been made to ensure accuracy, Aermec does not assume responsibility or liability for eventual errors or omissions.

Cod. DPACUY\_02