

PRECISION AIR CONDITIONING



The Aermec solutions
for Data Centres



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Technical characteristics

MICROPROCESSOR TECHNOLOGY

AERMEC units are fitted with advanced microprocessors which are designed to provide complete control of all the fundamental functions of Precision Air Conditioning.



The microprocessor has a FULL GRAPHICS interface, with interactive icons and progress bars to make the controller user-friendly even for those who are not familiar with air conditioning equipment in either Data Centres or comfort cooling.

The microprocessors can also:

- Guarantee enhanced operating continuity thanks to the self-diagnostic function and complete management of alarms.
- Manage in an integrated manner the operation of the EEV valve and the DC INVERTER with verification of the envelope of the compressors.
- Present active graphic displays of temperature and humidity, daily and weekly and permit the user a high degree of supervision of the general operation of the plant.
- Guarantee integration with supervision systems and BMS through the RS485 MODBUS RTU serial communication card.

The following examples illustrate some of the functions visualized on the display of the microprocessor:



New generation of electronic fans

The ever-growing necessity to save energy has made the use of high-performance EC Plug Fans indispensable in reducing plant costs.



The fans installed in AERMEC Precision Air Conditioning are fitted with BRUSHLESS EC (Electronically Commutated) MOTORS and a composite-material impeller to maximize performance.

Important advantages obtained as a result include:

- Power drawn by the fans is reduced by over 25% compared to fans using traditional AC technology.
- Power drawn by the fans is reduced by about 15% compared to the previous generation of EC fans.
- Noise levels are reduced by over 5 dB(A) at partial loads.
- Risk to the plant is reduced as the mechanical parts are subjected to less use.

Thanks to integration with the microprocessor, the EC fans can be controlled to:

- Reduce rotation speed and therefore air quantity as the cooling capacity requirement decreases, thus making possible a 50% energy saving, operating at partial loads, compared to a constant velocity system.
- Maintain constant air quantity controlled in real time by differential pressure sensors, optimal control if F7 filters are installed.
- Maintain constant air pressure in the raised floor or in the compartmented areas in order to optimize air distribution avoiding hot spots and to guarantee maximum modularity of the plant.

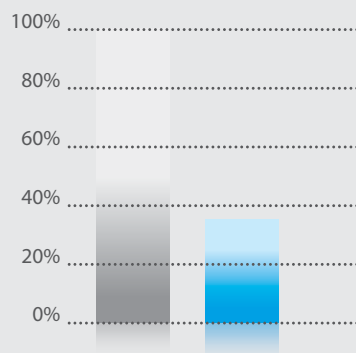
PLANT NO. 1

1 x PWU 160 with constant velocity configuration
 Total air quantity: 26400 m³/h (fan speed 84%)
 Cooling capacity: 145,4 kW (at nominal conditions)
 Annual average cooling capacity required: 100 kW
 EER average: 18,25
 Energy consumption of fans: 5,48 kW/h
 Annual energy consumption of fans: 48.004,8 kW
 Annual energy cost: 5.616,56 € (0,1170 € per kW/h)
 Annual environmental impact: 36 t CO₂ (0,75 kg CO₂/kW electricity)

PLANT NO. 2

1 x PWU 160 with air quantity reduced depending on cooling capacity requirements
 Total air quantity: Varying between 16500 and 26400 m³/h depending on the required cooling capacity
 Cooling capacity: 145,4 kW (at nominal conditions)
 Annual average cooling capacity required: 100 kW
 EER average: 53,20
 Average energy consumption of fans: 1,88 kW
 Average annual energy consumption of fans: 16.468,8 kW
 Annual energy cost: 1.926,85 € (0,1170 € per kW/h)
 Annual environmental impact: 12,3 t CO₂ (0,75 kg CO₂/kW electricity)

■ Annual energy consumption of fans PLANT 1
 ■ Annual energy consumption of fans PLANT 2



TOTAL SAVING: -65,6% (-3.689,71 €)

23,6 tonnes of CO₂ not released into the atmosphere

Technical characteristics

ADVANCED LOCAL NETWORK

Thanks to constant efforts in the research and development of control processes, AERMEC has implemented the innovative AERNET management system for the units in a local network (LAN). Unlike normal n+1 or n+n networks, which are however still available, AERNET can maintain all the units in the network active at the same time.



Thanks to a powerful control algorithm designed to maximise the advantages of the local network, AERNET permits:

- Optimal and uniform distribution of the air and cooling capacity in the zones without units in standby state which could create hot spots.
- Average energy savings of over 60% due to the modulation of components at partial load (EC fans, DC inverter, etc.).
- Management of the AVERAGE READINGS of the temperature and humidity sensors fitted in the units, guaranteeing the best management of conditions in the areas.
- Management of the AVERAGE READINGS of the pressure sensors fitted in the units, guaranteeing optimal air distribution in the areas.

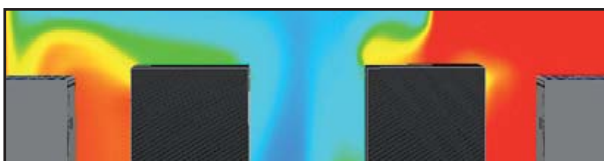
DUTY / STAND-BY



On 100%

On 100%

Stand-by



On 100%

Stand-by

AERNET



On 60%

On 60%

On 60%



On 60%

On 60%

EEV ELECTRONIC EXPANSION VALVE

An advanced control system is necessary to maximize the performance of direct expansion cooling circuits, especially in partialized conditions. The EEV electronic expansion valves guarantee excellent control of the cooling cycle through the direct regulation of the main functional values. EEV electronic expansion valve is available as a accessory only for the models with A version.



Thanks to integration with the microprocessor, the EEV electronic valves make it possible to:

- Save energy, over the course of a year, by up to 25%, optimizing the performance of the cooling circuit compared to a traditional TEV thermostatic expansion valve.
- Visualize on the display the operating conditions of the cooling circuit in a simple and immediate way.
- Manage the lowest possible value of overheating for the cooling circuit, maximizing the heat transfer of the evaporating coil.
- Allow the condensing temperature, in winter or at night, to drop to 35°C with a great reduction in the compression ratio of the cooling circuit and therefore also of the power draw.

PLANT NO. 1

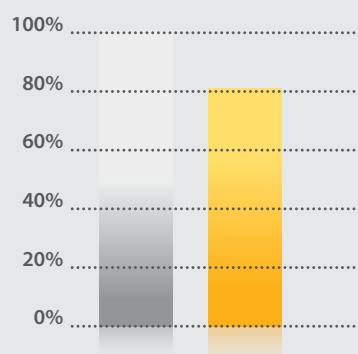
PXO 211 with standard TEV thermostatic expansion valve
 Total air quantity: 7000 m³/h at constant velocity
 Cooling capacity: 21,5 kW (at nominal conditions)
 EER: 3,26
 Energy consumption of the fans: 1,23 kW
 Energy consumption of the compressor: 5,38 kW

PLANT NO. 2

PXO 211 with EEV electronic expansion valve
 Total air quantity: 7000 m³/h at constant velocity
 Cooling capacity: 24,5 kW (condensing temperature 35°C)
 EER: 4,42
 Energy consumption of the fans: 1,23 kW
 Energy consumption of the compressor: 4,31 kW

■ Annual energy consumption of fans PLANT 1

■ Annual energy consumption of fans PLANT 2



TOTAL SAVING: -19,8%

Further characteristics:



Very high EER (Energy Efficiency Ratio)



Limited footprint



Very quiet operation



Dark grey metal structure



Class 1 fire-resistant thermo-acoustic insulation panels



Scroll compressors for R410A



2- or 3-way modulating valves to regulate cooling capacity of units with chilled water coils



Electrical panel equipped with all regulation and safety devices; there is a phase sequencer for direct expansion units



Large-surface G4 efficiency air filters fitted before the cooling coil

Quality guaranteed by:



Quality Certificate ISO 9001:2000.



CE Certification of the product: all AERMEC Precision Air Conditioning are in compliance with CE Directives.

Main accessories

BRUSHLESS DC COMPRESSORS WITH INVERTER TECHNOLOGY

Adapting cooling capacity to the real requirements of the plant is one of the principal conditions of guaranteeing the flexibility required by the most advanced systems.

AERMEC has adopted BRUSHLESS DC INVERTER technology in order to obtain this. Like the EC fans, also the compressors are fitted with BRUSHLESS motors driven by a special inverter designed to maximize the performance of the motor, especially at partial loads, control of which is integrated in the microprocessor.



Thanks to the innovative BRUSHLESS DC technology, AERMEC Precision Air Conditioning can:

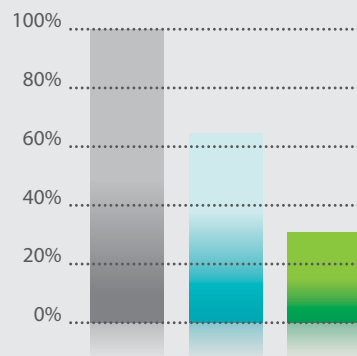
- Maintain the thermo-hygrometric conditions of the controlled areas at a constant level, guaranteeing that the set-point is respected even under partial loads.
- Modulate the cooling capacity of the units between 20% and 100% of maximum capacity.
- Reduce the annual energy consumption of the unit by over 70% (in partial load conditions).
- Obtain an increase in energy efficiency (EER), since the power drawn by a BRUSHLESS DC compressor driven by inverter reduces in proportion to the decrease in cooling capacity supplied (unlike other control systems which do not reduce the number of revolutions of the compressor).
- Increase the safety of the plant thanks to the innovative design of the compressors which guarantees perfect return of oil even at minimum speeds.
- Reduce noise levels.

PXO 211 with 7 hp DC INVERTER

Total air quantity: 7000 m³/h at constant velocity
 MAXIMUM cooling capacity: 22.0 kW (at nominal conditions)
 MEDIUM cooling capacity: 15.8 kW (at nominal conditions)
 MINIMUM cooling capacity: 7.4 kW (at nominal conditions)

EER at MAXIMUM velocity: 3,27
 EER at MEDIUM velocity: **3,40**
 EER at MINIMUM velocity: **2,58**
 Energy consumption of the fans: 1,23 kW
 Energy consumption of the compressor at MAXIMUM velocity: 5,5 kW
 Energy consumption of the compressor at MEDIUM velocity: **3,42 kW**
 Energy consumption of the compressor at MINIMUM velocity: **1,64 kW**

■ Consumption at MAXIMUM velocity
 ■ Consumption at MEDIUM velocity
 ■ Consumption at MINIMUM velocity



Saving at MEDIUM velocity: -37,8%
Saving at MINIMUM velocity: -70,2%

Free Cooling



THE USE OF RENEWABLE ENERGY

The interest of the market in sources of renewable energy has led to the development of systems with low environmental impact using the FREE COOLING function.

This system uses external air - a source of renewable energy – to cool the water in the Free Cooling circuit through an external dry cooler.

The Free Cooling circuit works instead of or in addition to direct expansion mechanical cooling.

Three different operating regimes are therefore possible:

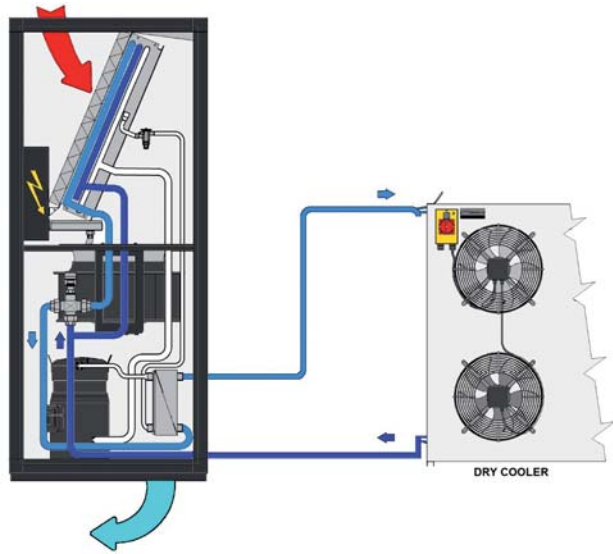
- **TOTAL FREE COOLING:** when the external air temperature is sufficiently low to bring the water to a value which fulfils the cooling requirements, the Free Cooling circuit functions without the intervention of mechanical cooling. This is the maximum energy-saving scenario as the compressors are never in service.
- **PARTIAL FREE COOLING:** when the external air temperature is insufficient to maintain the water at the desired temperature, in addition to the Free Cooling circuit function, mechanical cooling can intervene for the period strictly necessary to meet the cooling requirements. This too is an energy saving situation, even if the savings are not as high as the preceding example.
- **NO FREE COOLING:** when the temperature of the external air is too high for the water temperature to be sufficient to meet the cooling requirements, operation is completely given over to mechanical cooling, cutting out the Free Cooling circuit. Thanks to the head pressure control valve of the water-cooled condenser which allows regulation of the condensing temperature to 35°C, reducing the power draw of the compressor, it is still possible to obtain a reduction of energy consumption compared to a normal direct expansion system.

The Free Cooling systems are fitted as standard with:

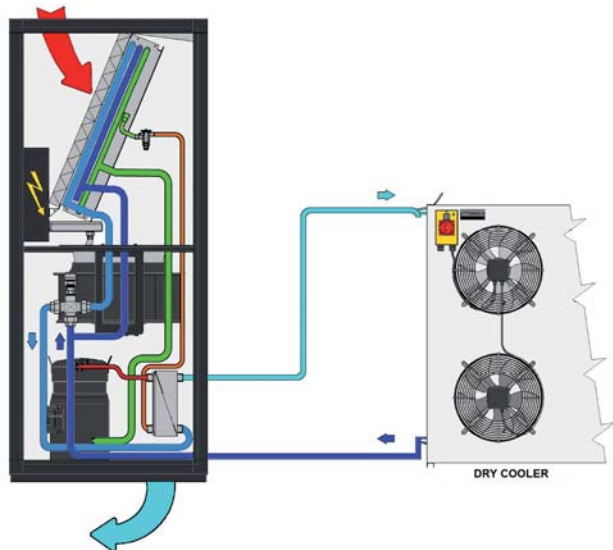
- An innovative control algorithm integrated into the microprocessor permits energy savings of over 50% to be made compared to a normal direct expansion unit.
- An AUTOADAPTIVE SETPOINT function which in addition enables the regulation of the dry cooler fans serving the unit to obtain always the best set-point of the water temperature as the external temperature changes. This regulation also permits the energy saving to be increased by making the fans function at partial load for most of the time.
- An EEV electronic valve.
- A head pressure control valve of the water-cooled condenser which enables the water temperature to be regulated to 35°C, reducing the power draw of the compressor.
- A hot-gas injection, pressure-actuated regulating valve to prevent the simultaneous functioning of the two cooling sources from freezing the condensate.

TOTAL FREE COOLING

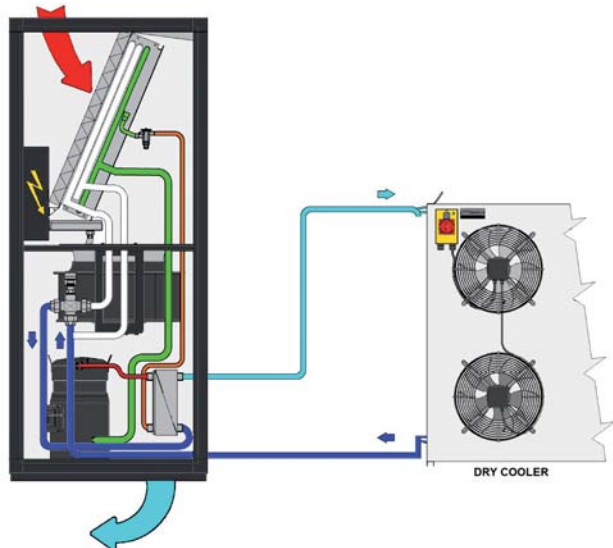
"WINTER" operation (100% Free Cooling)

**PARTIAL FREE COOLING**

"SPRING-AUTUMN" operation
(Free Cooling + Direct expansion)

**NO FREE COOLING**

"SUMMER" operation (100% Direct expansion)



Twin source

GUARANTEED CONTINUITY OF OPERATION

The criticality of some types of plant, such as Data Centres, requires safety measures that prevent interruption of operation due to equipment problems.

The "Twin Source" system guarantees continuity of the cooling function if, for whatever reason, the primary source is not available: overload, maintenance, night-time/seasonal stoppage or for any type of emergency.

This system envisages the installation inside the machine of a second cooling source, complete with its own regulation and totally independent of the primary one. Only the aluminium fin pack is common to the two sources, thus enabling both to reach very high heat transfer efficiency levels.

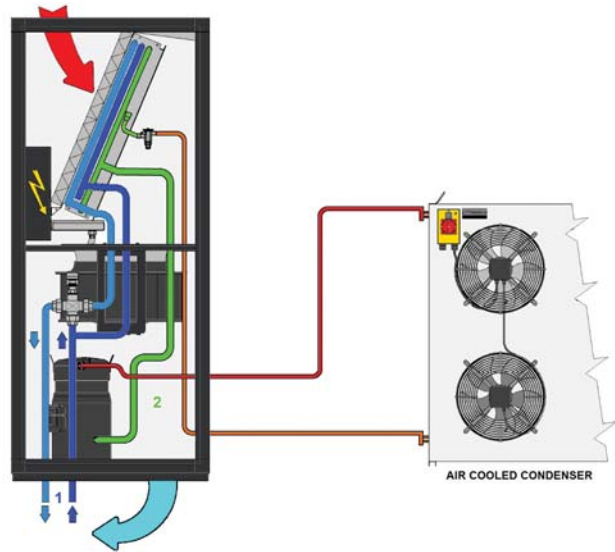
The Twin Source system is extremely flexible and, depending on the sources chosen, permits various applications:

- **DX/TS:** in this application, the air conditioner has a direct expansion cooling source, with one or two compressors, and another with chilled water. The primary source is normally the chilled water one connected to the refrigeration plant of the building or to the district cooling system, and the emergency one is the direct expansion connected in its turn to a remote air-cooled or a built-in water-cooled condensers. Alternatively, the primary source can be direct expansion and the emergency one water-groundwater or aqueduct.
- **CW/TS:** in this application both cooling sources are chilled water coils. The primary source is normally connected to the refrigeration plant of the building or to the district cooling system. The emergency source can be connected to a dedicated water chiller or to water-groundwater or aqueduct.

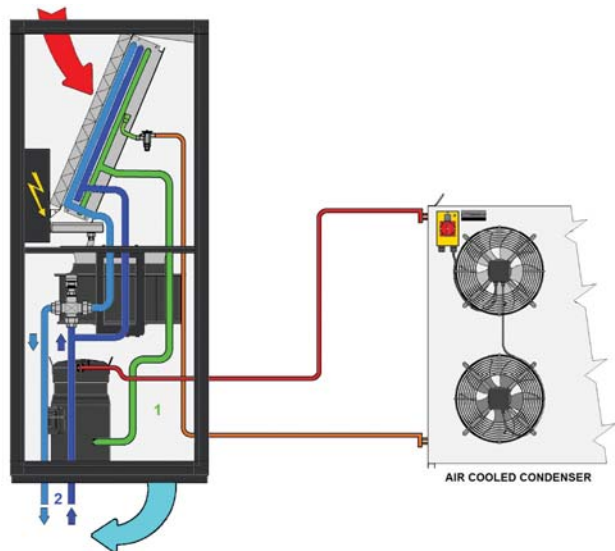


TWIN SOURCE DX

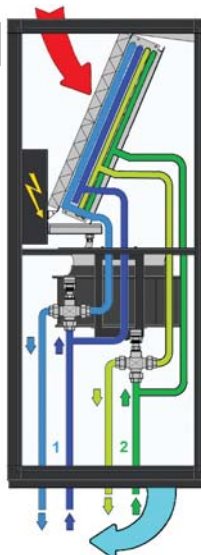
1. Primary circuit operation:
Chilled water
2. Secondary circuit operation:
Direct expansion

**TWIN SOURCE DX**

1. Primary circuit operation:
Direct expansion
2. Secondary circuit operation:
Chilled water

**TWIN SOURCE CW**

1. Primary circuit operation:
Chilled water
2. Secondary circuit operation:
Chilled water/groundwater/aqueduct



P Series - Precision Air Conditioning

Perimetral installation

APPLICATION

AERMEC Precision Air Conditioning in the P Series consist of a family of units which are significantly different from normal climate control equipment due to their construction and operation characteristics. Though optimized for use in data centres and telephone exchanges, they are equally valid in special applications such as metrology laboratories, TV recording studios, musical instrument storage areas, control rooms for electricity power stations and railway junctions and other areas in general where there are prevalent sensible thermal loads and crowding is negligible. Their application is also ideal in widely varied industrial sectors: optics, electronics, electro-medical equipment, electronic equipment production, musical instrument production etc.

GENERAL CHARACTERISTICS

The P series offer:

- Rigorous control of room temperature and humidity.
- A very high ratio of cooling capacity to footprint area, which facilitates the designing of the areas to be climate controlled.
- Very high levels of energy efficiency, which translates into less CO₂ emitted into the environment and very contained running costs.
- Very flexible application thanks to the wide range of accessories which can be selected.

CONFIGURATIONS AVAILABLE



Direct expansion

Cooling capacity from 7 to 95 kW

PXO: upflow air supply

PXU: downflow air supply



Chilled water

Cooling capacity from 10 to 187 kW

PWO: upflow air supply

PWU: downflow air supply



ACCESSORIES

Direct expansion

- DC brushless compressors with inverter control
- Electric power supply line for remote condenser
- Electric power supply line with speed adjustment for remote condenser
- Condenser adjustment with 0-10V signal for remote condenser with EC fans
- "LT Kit" for external air low temperature functioning with remote condenser
- Increased liquid receiver
- Non-return valves on the flow and liquid lines
- Water condenser
- Water condenser with valve for adjusting the condensation temperature
- "HT Kit" for functioning with high condensation temperatures

Chilled water

- Two ways modulating valves
- Inlet and outlet water temperature probes
- "Power Valve" Kit

Heating

- Low thermal inertia electric batteries with differentiated stages regulation
- Low thermal inertia electric batteries with modulating regulation (available on request on some models only)
- Water heating batteries with 2 or 3 ways modulating valve (available on request on some models only)

Humidification

- Room humidity probe
- Flow humidity probe
- Immersed electrode humidifier

Mechanicals and structural

- Condensation drain pump
- Condensation and humidifier drain pump
- Flow overpressure dampers
- M5 (EU5) efficiency air filter on air supply
- Soundproofed duct piece on flow
- Flow plenum with adjustable grills.
- Height adjustable support for raised floor installation
- Grilled panels for front flow
- Closed panels for downwards air intake
- Panels with "sandwich" counter-panels (available on request on some models only)
- Panels with increased soundproof upholstery (available on request on some models only)

Electrical

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

Adjustment

- Constant flow rate ventilation adjustment
- Constant pressure ventilation adjustment
- Local area network configuration and cable
- User terminal for remote installation
- Flooding detection system

Note: For further information, refer to the selection program.

P Series - Precision Air Conditioning Perimetral installation

UPFLOW AIR SUPPLY



Standard version with front air intake and upflow air supply.



Frontal air intake and front air supply with distribution plenum and grille.



Suction from below with plinth for raised floors, closed front panel and upflow air supply.

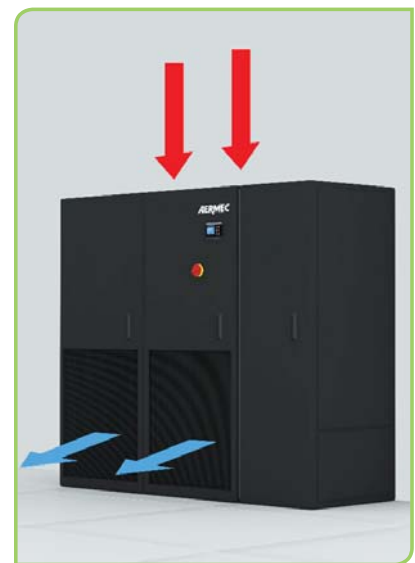
DOWNLOAD AIR SUPPLY



Standard version with suction from above and downflow air supply, with plinth for raised floors.



Suction from above and frontal air supply with distribution plenum and grille.



Suction from above and frontal air supply with grilled front panel.

Technical data - PXO, PXU, PWO and PWU

PXO : direct expansion precision air conditioning with air-cooled or water-cooled condensers and upflow air supply

Sizes		71	111	141	211	251	301	302	361	372	422	461	491	512	612	662	852	932	
Total cooling capacity	(1) kW	7,7	11,1	14,5	20,8	25,3	31,2	30,6	36,6	38,8	42,7	46,9	52,3	51,6	63,2	67,7	87,3	94,2	
Sensitive cooling capacity	(1) kW	7,4	11,1	12,8	20,8	22,7	30,3	30,1	36,6	33,6	42,7	45,3	52,3	47,4	62,6	64,5	73,2	85,4	
EER	(2)	3,69	3,26	3,36	3,12	3,06	3,13	3,2	3,24	3,22	3,22	3,37	3,47	3,14	3,21	3,17	3,29	3,59	
Fans	type	Plug fan EC																	
Air flow rate	m ³ /h	2200	3200	3200	7000	7000	8700	8700	14500	8700	14500	14500	17900	14500	17900	17900	17900	20700	
Sound data																			
Sound Pressure	(3) dB(A)	51	57	57	62	62	60	60	65	65	65	65	62	65	62	62	62	60	

PWO : upwards airflow - with chilled water

Sizes		10	20	30	50	80	110	160	220
Total cooling capacity	(1) kW	10,0	18,1	32,4	43,6	67,4	93,4	142,1	186,4
Sensitive 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
Fans	type	Plug fan EC							
Air flow rate	m ³ /h	2200	3200	7400	8200	15400	17000	26000	34000
Sound data									
Sound Pressure	(3) dB(A)	51	57	63	59	66	62	64	65

PXU : downwards airflow - direct expansion with air or water condensation

Sizes		71	111	141	211	251	301	302	361	372	422	461	491	512	612	662	852	932	
Total cooling capacity	(1) kW	7,7	11,1	14,5	20,8	25,3	31,2	30,6	36,6	38,8	42,7	46,9	52,3	51,6	63,2	67,7	87,3	94,2	
Sensitive cooling capacity	(1) kW	7,4	11,1	12,8	20,8	22,7	30,3	30,1	36,6	33,6	42,7	45,3	52,3	47,4	62,6	64,5	73,2	85,4	
EER	(2)	3,69	3,25	3,36	3,12	3,06	3,13	3,2	3,24	3,03	3,22	3,37	3,47	3,14	3,17	3,25	3,29	3,59	
Fans	type	Plug fan EC																	
Air flow rate	m ³ /h	2200	3200	3200	7000	7000	8700	8700	14500	8700	14500	14500	17900	14500	17900	17900	17900	20700	
Sound data																			
Sound Pressure	(3) dB(A)	51	57	57	62	62	60	60	65	60	65	65	62	65	62	62	62	60	

PWU : downwards airflow - with chilled water

Sizes		10	20	30	50	80	110	160	220
Total cooling capacity	(1) kW	10,2	18,1	32,4	43,6	67,4	93,4	142,1	186,9
Sensitive 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
Fans	type	Plug fan EC							
Air flow rate	m ³ /h	2200	3200	7400	8200	15400	17000	26000	34000
Sound data									
Sound Pressure	(3) dB(A)	51	57	63	59	66	62	64	65

(1) Cooling: condensation temperature 45°C; input air 24°C-45%; water 7/12°C; external static pressure: 30Pa.

Stated performances do not take into account the heat generated by the fans which must be added to the heat load of the system.

(2) EER: Energy Efficiency Ratio; total cooling capacity / input power to the compressors + the power of fans (excluding air condensers)

(3) Sound pressure: stated data 2m away, in free field according to UNI EN ISO 3744:2010

Dimensions

Mod. PXO - PXU		71	111	141	211	251	301	302	361	372	422	461	491	512	612	662	852	932
Height	mm	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990	1990
Width	mm	750	750	750	860	860	1410	1410	1750	1410	1750	1750	2300	1750	2300	2300	2300	2640
Depth	mm	600	600	600	880	880	880	880	880	880	880	880	880	880	880	880	880	880
Weight	kg	180	200	210	270	270	320	340	440	350	450	450	540	500	640	640	660	860
Mod. PWO - PWU		10	20	30	50	80	110	160	220									
Height	mm	1990	1990	1990	1990	1990	1990	1990	1990									
Width	mm	750	750	860	860	1750	1750	2640	3495									
Depth	mm	600	600	880	880	880	880	880	880									
Weight	kg	155	160	220	240	340	360	540	700									

G Series - Precision Air Conditioning

Perimetral installation

APPLICATION

AERMEC Precision Air Conditioning in the G Series consist of a family of units specially designed to exploit the plant characteristics of the latest generation of large Data Centres.

In the design of air conditioning equipment for large Data Centres, the necessities of cable housing and for the distribution of the enormous quantities of air required to cool the servers have made it necessary to raise the height of the raised floor to now reach the current 600-800 millimetres. This creates an ample space below the air conditioning destined to the installation of the plinth. This large space under the raised floor was therefore considered as the housing for the discharge fans. The Precision Air Conditioning are supplied in two separate sections: the under-base containing the discharge fans to be installed under the floating floor, and the treatment unit with the exchanger coil, filters and the electrical panel.

This large space under the raised floor is used to house the supply air fans. The Precision Air Conditioners are therefore supplied in two separate sections:

- The treatment unit with enlarged heat exchanger coil, filters and electrical panel.
- The plinth containing the supply air fans, to be installed under the raised floor. The plinth with the fans is supplied to match the height indicated in the order from the customer. The two sections, shipped separately, are easy to install on-site as they require only electrical connection of the two junction boxes in the air conditioner and the plinth.

Without increasing the footprint area but only using the available space, the following important advantages are gained:

- At equal footprint area of the air conditioner, the heat exchanger coil can be sized using also the internal space left free by the fans. The frontal section of the coil can thus be increased by about 40-50%, reducing the air side pressure drop and therefore the energy consumption of the fans.
- The increased size of the air filters, installed before the cold water coil, allows for a significant reduction in pressure drop and their less frequent replacement for maintenance.
- An increase in the energy efficiency of the fans which, installed in the plinth, expel air horizontally and completely free of obstacles.

CONFIGURATIONS AVAILABLE



Direct expansion

Cooling capacity from 43 to 172 kW

GXU: downflow air supply



Chilled water

Cooling capacity from 48 to 184 kW

GWU: downflow air supply



ACCESSORIES

Direct expansion

- Brushless DC compressors with inverter adjustment
- Power supply line for remote condenser
- Power supply line for remote condenser speed adjuster
- Condenser adjustment with 0-10V signal remote condenser with EC fans
- "Kit LT" for operating with low outside air temperature with the remote condenser
- Oversized liquid receiver tank
- Non-return valves on the delivery and liquid lines
- Water condenser
- Water condenser with condensing temperature adjustment valve
- "Kit HT" for operating with high condensation temperatures

Cooled water

- Modulating 3-way valves
- Water temperature probes on inlet & outlet
- "Power valve" kit

Heating

- Electrical coils with low thermal inertia and adjustment over differential stages
- Electrical coils with low thermal inertia and modulating adjustment (available on request only for certain models)
- Water-based heating coils with 2 or 3 way modulating (available on request only for certain models)

Humidification

- Ambient humidity probe
- Delivery humidity probe
- Immersed electrode humidifier

Mechanicals and structural

- Condensate discharge pump
- Condensate discharge and humidifier pump
- Overpressure gate valves on delivery
- Air filter on intake, efficiency M5 (EU5)
- Intake plenum
- Ventilated plenum with panelling for front or rear delivery
- Ventilated plenum with panelling for bottom delivery (installation above raised flooring)
- Panels with counter-panelling, "sandwich" type
- Panels with over-sized acoustic finishing

Electrical

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

Regulation

- Ventilation adjustment at constant capacity
- Ventilation adjustment at constant pressure
- Setting and cable for local network connection
- User terminal for remote installation
- Flooding detection system

Note: For further information, refer to the selection program.

G Series - Precision Air Conditioning Perimetral installation

UPFLOW AIR SUPPLY



Standard version for perimetral installation inside the Data Centre: the height of the raised floor must be minimum 550 mm.



Version for perimetral installation inside the Data Centre with raised floor height less than 550 mm. In this case, the plinth with fixed height of 550 mm is supplied with lateral closure panels and must be installed above the floor. It is essential to check that the height of the ceiling is sufficient to ensure good air suction.



Version for installation outside the Data Centre, without raised floor, rear air supply. In this case the plinth (fixed height 550 mm) is supplied with side closure panels and rear supply air grilles. Installation of the plenum with rear re-intake system is optional, if there is no ductwork.

Technical data - GXU and GWU

GXU : direct expansion precision air conditioning with air-cooled or water-cooled condensers and downflow air supply

Sizes			461	612	932	1232*	1342*	1732*
Total cooling capacity	(1)	kW	43,0	54,9	91,7	123,3	138,8	171,5
Sensible cooling capacity	(1)	kW	35,9	42,1	79,4	98,0	127,6	143,4
EER	(3)		3,39	3,08	2,84	3,60	3,43	3,36
Total cooling capacity	(2)	kW	46,6	58,8	99,6	130,3	153,6	186,4
Sensible cooling capacity	(2)	kW	46,6	53,1	99,6	124,9	153,6	186,4
EER	(3)		3,67	3,06	3,92	3,39	3,78	3,66
Fans		type	Plug-fan EC					
Air flow rate		m ³ /h	9500	10000	19000	24000	37500	37500
Sound Data								
Sound pressure	(4)	dB(A)	57	58	59	64	65	65

GWU : downwards air delivery - cooled water

Tailles			70	150	230	300
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	44,7
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
Fans		type	Plug-fan EC			
Air flow rate		m ³ /h	9500	19000	28500	38000
Sound Data						
Sound pressure	(4)	dB(A)	57	59	61	60

(1) Cooling: condensing temperature 45°C incoming air 24°C-45%; incoming air 24°C-45%; water 7/12°C; static external pressure: 30Pa; plenum ventilated, height 1000 mm. The stated performance levels do not take into account the heat generated by the fans, that should be added to the thermal impact of the installation.

(2) Cooling: condensing temperature 45°C incoming air 30°C-30%; incoming air 12°C-40%; water 14/20°C; static external pressure: 30Pa; plenum ventilated, height 1000 mm. The stated performance levels do not take into account the heat generated by the fans, that should be added to the thermal impact of the installation.

(3) EER: Energy Efficiency Ratio; total cooling capacity / input power from compressors + fans (air condensers excluded).

(4) Sound pressure declared data at a distance of 2m in a free field in accordance with UNI EN ISO 3744:2010

(*) Sizes available only on request

Dimensions GXU and GWU

Mod. GXU		461	612	932	1232	1342	1732
Length	mm	1490	1490	2390	2390	3290	3290
Depth	mm	921	921	921	921	921	921
Height	mm	1990	1990	1990	1990	1990	1990
Net weight	kg	630	680	870	940	1160	1250

Mod. GWU		70	150	230	300
Length	mm	1320	2220	3120	4020
Depth	mm	921	921	921	921
Height	mm	1990	1990	1990	1990
Net weight	kg	610	750	930	1250

R Series - Precision Air Conditioning IN-ROW installation

APPLICATION

AERMEC Precision Air Conditioning in the R Series consist of a family of units specially designed and constructed to have the same dimensions as the racks. In the design of air conditioning plant for large Data Centres, the reduction of energy consumption is of ever increasing importance. For this reason the following concepts have become consolidated international standard practice:

- The racks containing the servers are more often positioned according to the "hot corridor aisle" and "cold corridor/aisle" layout.
- The working air temperatures are now allowed to go up to 30-35°C in the hot corridor and 20 -25°C in the cold one, with very low humidity (never above 30%). Consequently, also the water temperature is allowed to rise up to 20-28°C, using the Free Cooling system to the best effect.
- Server capacities keep going up while their dimensions keep going down. This means that more servers can be installed in a rack so that some of these racks, remaining empty, can be removed. At the same time the heat dissipated rises and more capacity is

required from air conditioners.

- The servers work day and night albeit with a night time reduction of their capacity. It is therefore essential for the air conditioning installation to have an efficient modulating cooling capacity control and to be designed for minimum energy consumption and minimum environmental impact.

In order to satisfy these requirements, the R Series have been designed and constructed to have the same dimensions as the racks, with rear suction from the hot corridor and front supply into the cold one, with the following advantages:

- Use of the space freed up in the racks and therefore cold air is distributed as close as possible to the server i.e. where the heat is generated.
- Horizontal air suction and also horizontal air supply: the air flow therefore does not change direction inside the machine, so avoiding the relative pressure drops and with an important consequent reduction of the power draw of the fans.
- Front and rear accessibility for easier maintenance.
- Cooling, hydraulic and electrical connections from above or from below.

CONFIGURATIONS AVAILABLE



Direct expansion

Cooling capacity from 20 to 36 kW

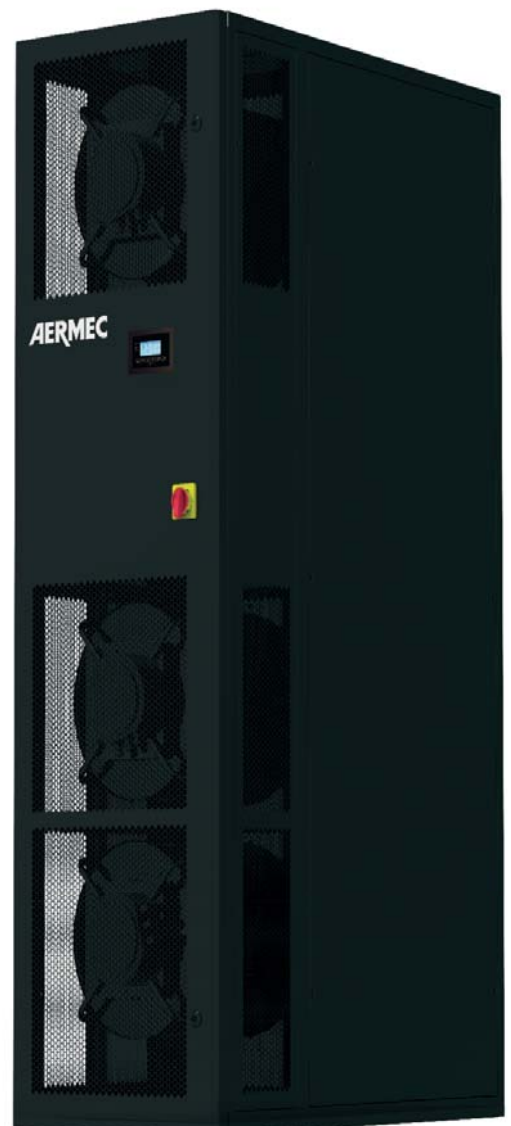
RXA: Horizontal air supply



Chilled water coil

Cooling capacity 32 kW

RXU: Horizontal air supply



ACCESSORIES

Direct expansion

- Power supply line for remote condenser
- Power supply line for remote condenser speed adjuster
- Condenser adjustment with 0-10V signal remote condenser with EC fans
- "Kit LT" for operating with low outside air temperature with the remote condenser
- Oversized liquid receiver tank
- Non-return valves on the delivery and liquid lines
- Water condenser
- Water condenser with condensing temperature adjustment valve

Chilled water

- Modulating 2-way valves
- Water temperature probes on inlet & outlet
- "Power valve" kit

Heating

- Electrical coils with low thermal inertia and adjustment over differential stages

Humidification

- Ambient humidity probe
- Delivery humidity probe
- Immersed electrode humidifier

Mechanicals and structural

- Condensate discharge pump
- Air filter on intake, efficiency M5 (EU5)
- Closed front panel for side delivery
- Closed side panels for front delivery
- Handling wheels

Electrical

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

Regulation

- Ventilation adjustment at constant capacity
- Ventilation adjustment at constant pressure
- Setting and cable for local network connection
- User terminal for remote installation
- Flooding detection system

Note: For further information, refer to the selection program.

R Series - Precision Air Conditioning IN-ROW installation

HORIZONTAL SUPPLY



Version for in-row installation with front and lateral air supply.

Technical data - RXA and RXU

RXA : direct expansion precision air conditioning with air-cooled or water-cooled condensers and horizontal air supply

Sizes			231	361
Total cooling capacity	(1)	kW	20,3	36,2
Sensible cooling capacity	(1)	kW	20,3	35,6
EER	(2)		3,28	3,65
Fans		type	Plug-fan EC	
Air flow rate		m ³ /h	6000	7500
Sound Data				
Sound pressure	(3)	dB(A)	56	56

RXU : horizontal air delivery - cooled water

Sizes			40
Total cooling capacity	(1)	kW	31,9
Sensible cooling capacity	(1)	kW	31,9
EER	(2)		26,79
Fans		type	Plug-fan EC
Air flow rate		m ³ /h	9000
Sound Data			
Sound pressure	(3)	dB(A)	61

(1) Cooling: condensing temperature 45°C incoming air 24°C-45%; incoming air 24°C-45%; water 7/12°C; static external pressure: 30Pa.

The stated performance levels do not take into account the heat generated by the fans, that should be added to the thermal impact of the installation.

(2) EER: Energy Efficiency Ratio; total cooling capacity / input power from compressors + fans (air condensers excluded).

(3) Sound pressure declared data at a distance of 2m in a free field in accordance with UNI EN ISO 3744:2010

Dimensions RXA and RXU

Mod. RXA		231	361
Height	mm	2000	2000
Width	mm	600	600
Depth	mm	1180	1180
Weight	kg	215	215

Mod. RXU		40
Height	mm	2000
Width	mm	600
Depth	mm	1180
Weight	kg	190

(1) Cooling: condensing temperature 45°C incoming air 24°C-45%; incoming air 24°C-45%; water 7/12°C; static external pressure: 30Pa.

The stated performance levels do not take into account the heat generated by the fans, that should be added to the thermal impact of the installation.

(2) EER: Energy Efficiency Ratio; total cooling capacity / input power from compressors + fans (air condensers excluded).

(3) Sound pressure declared data at a distance of 2m in a free field in accordance with UNI EN ISO 3744:2010

Achieving high efficiency Data Centres

Energy efficiency: terminology

Evolving technology has created the necessity for ever greater exchange of data, increasing exponentially the concentration of electronic equipment inside Data Centres. Infrastructure limits and constantly increasing energy costs have therefore redefined the standards of design and development of Data Centres, making efficiency and energy saving the key concepts for the choice of Precision Air Conditioning.

In order to better define the abstract concepts, four main indexes have been created:

CAPEX – Index of initial investment

CAPEX (CAPital EXpenditure), is the money used to buy fixed assets of an operational nature i.e. investment in capital assets. CAPEX is found on the cash flow statement and is obtained from the difference of the gross values of the materials capitalized (noted as “Investment in Plant, Property, and Equipment”) in a given year and the preceding one.



OPEX – Index of operating costs

OpEx (Operating EXpenditure) is the cost necessary for running a product, business or a system. The selection of an air conditioning plant with a high degree of efficiency and sustainability - which can optimize its own operation to suit the real requirements of the system thus maximising its efficiency and decreasing its CO₂ emissions to a minimum – enables very high OPEX index levels to be achieved.



PUE – Index of energy efficiency

PUE (Power Usage Effectiveness) is a measure of how efficiently a computer Data Centre uses its electrical energy. It is a parameter which explains how much electrical energy is used by IT equipment compared to other auxiliary services such as air conditioning, lighting or UPS losses. PUE is the ratio of total power used by the Data Centre facility (PT) to the power used only by IT equipment (PIT). A PUE value approaching 1 indicates an optimal level of efficiency. An air conditioning plant with reduced energy consumption and, where possible, advanced energy saving systems such as Free Cooling, dramatically reduces the PUE index.



DCiE – Index of IT equipment efficiency

DCiE (Data Centre Infrastructure Efficiency) is the inverse of PUE. It is the percentage value derived by dividing information technology equipment power by total facility power. As with PUE, an increase in DCiE is directly related to the efficiency of the air conditioning plant.



Energy efficiency: how it is achieved

The absolute reliability of AERMEC air conditioners is guaranteed by design processes using computerized thermodynamic modelling, tests carried out in advanced R&D laboratories, the use of latest-generation materials and components, advanced production techniques in a modern facility and a certified Quality System which conforms to ISO 9001 standards.

Thanks to originality, design and attention to the requirements of the market, new solutions for application problems can be found by using AERMEC units in order to:

Optimized infrastructure

The wide range of models and their combined accessories makes it possible to design modular air conditioning plant capable of being fully integrated into the Data Centre. The minimum footprint area of the units and the modulating operation features of the components enables solutions to be tailor-made to fulfil the effective requirements of the infrastructure, as well as guaranteeing the possibility of future expansion without high added costs and increasing the CAPEX index of the Data Centre.



Reduce operating costs

A fundamental requirement for an increase in the OPEX index of every Data Centre is the guarantee of continuous service and therefore the total reliability of the infrastructure. The combination of our investment in Research and Development, together with the highly reliable main components of the units and the simplified manufacturing processes, make AERMEC Air Precision Conditioners the perfect choice for new-generation Data Centres.



Improve energy efficiency and sustainability

The constant increase in the amount of electrical power used as a result of the growth of the digital world, has made it necessary to improve the energy efficiency of the plant, in addition to reducing its impact on the environment. The ever-increasing use of renewable energy sources and low energy consumption components make AERMEC units the most competitive choice for Data Centres in particular. The Free Cooling units, EC technology components and software specially designed to reduce power draw together enable savings of over 50% to be made compared to the previous generation of Data Centres.



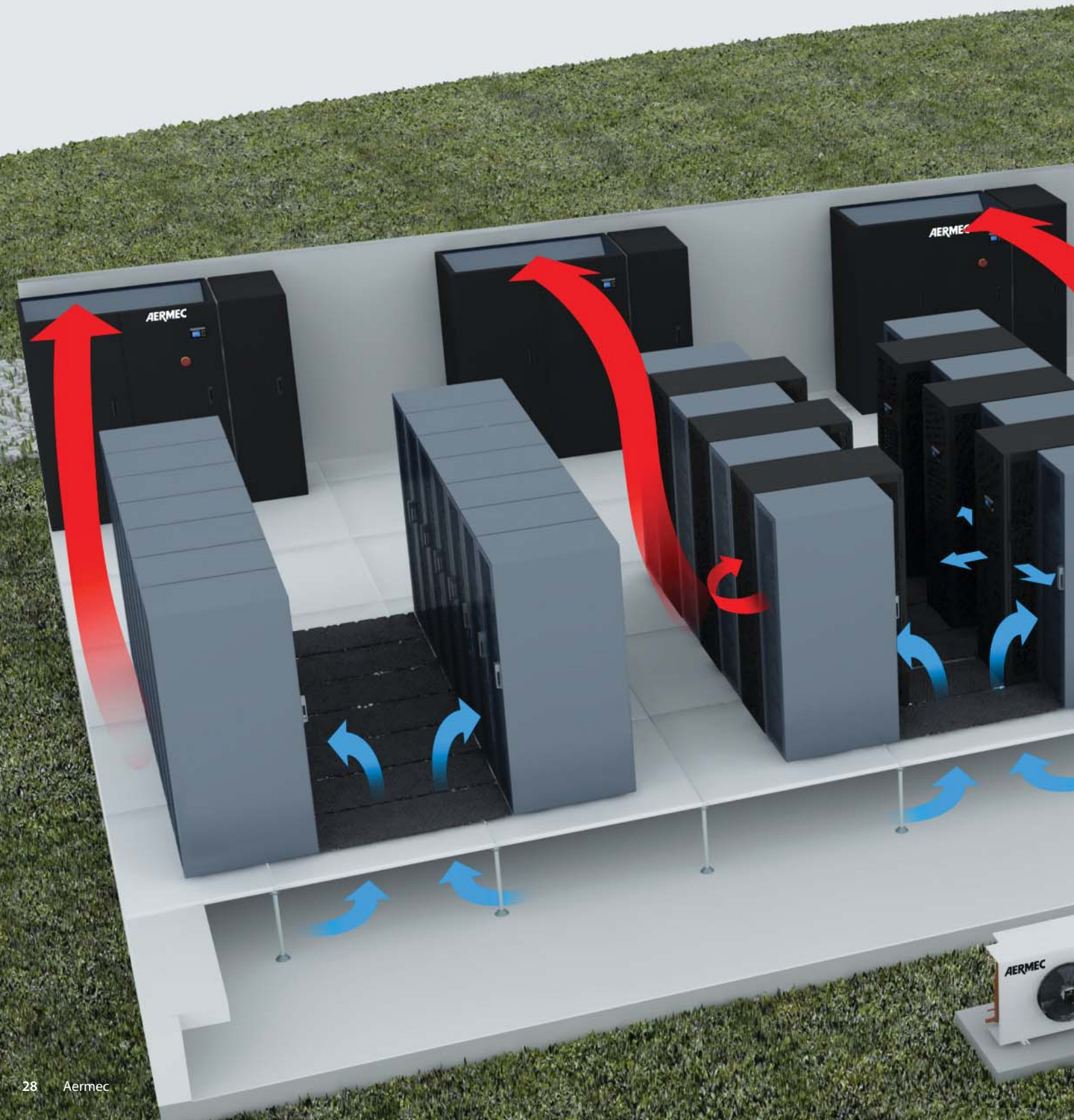
Obtain the best results with guaranteed performance

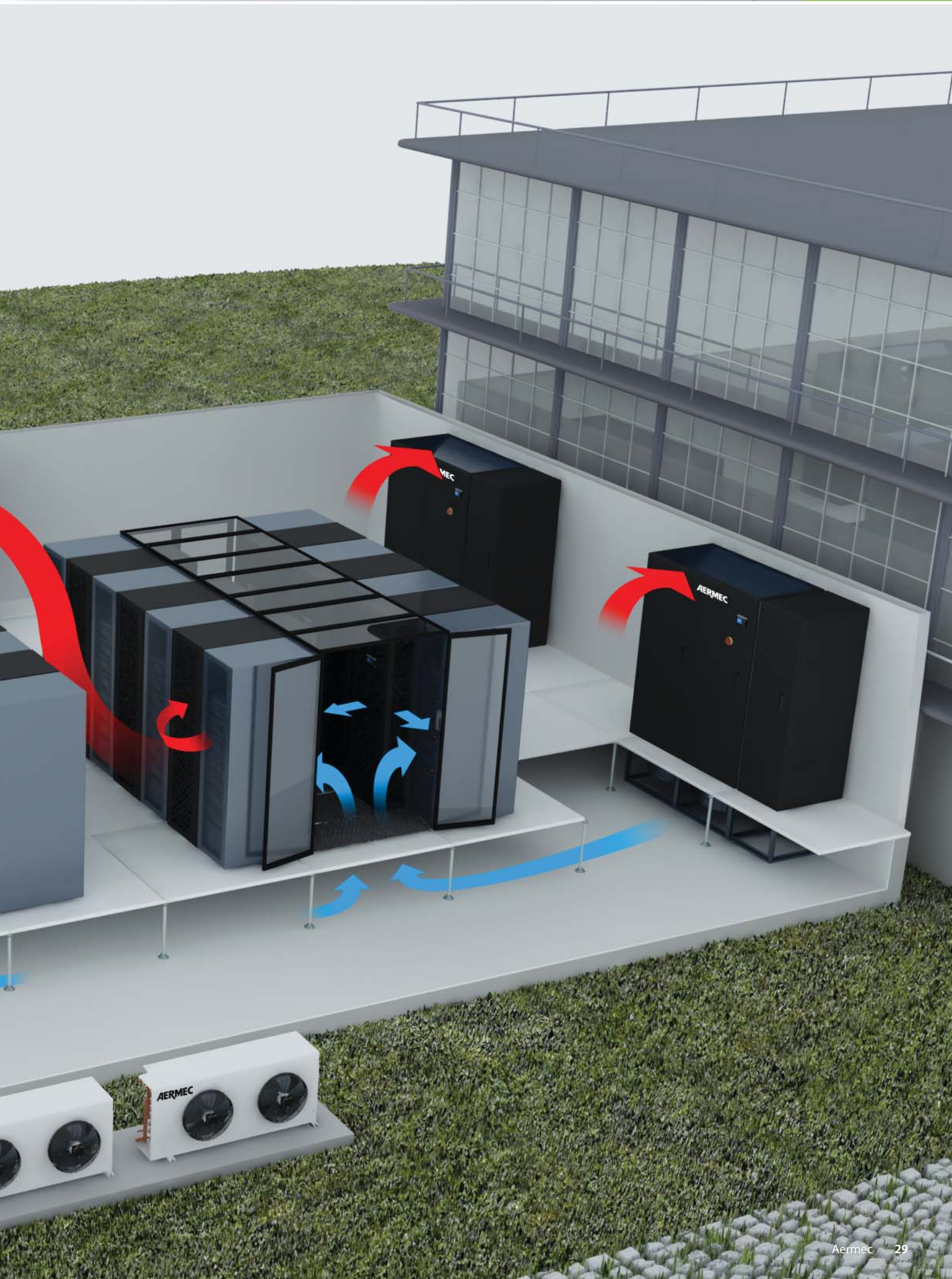
The first step in obtaining the best possible result with the minimum capital investment is the reassurance that the performance of the equipment used in the infrastructure conforms to the project. AERMEC is therefore proud to present its qualifications in this area:

Quality Certification ISO 9001:2000 Vision
CE Product Certification
GOST Certification
EUROVENT Certification



The Aermec solutions for Data Centres





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