TECNAIR LV

CLOSE CONTROL AIR CONDITIONERS

Air Conditioners
for Close Control
and Data Centers

Serie P
R410A

EUROVENT CERTIFIED PERFORMANCE
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Techline

TECNAIR LV

CLOSE CONTROL AIR CONDITIONERS

Air Conditioners for Close Control and Data Centers

high energy efficiency and minimum environmental impact

Main characteristics

Tecnair LV's **"P" Series** air conditioners for close control are special machines with design and operating features which clearly differentiate them from standard air conditioning units.

The total cooling capacity coverage of the models with direct expansion - OPA with up-flow air discharge and UPA with down-flow - ranges from 7 up to 90 kW.

The same machines are available in chilled water versions - OPU and UPU - with capacities of up to approximately 200kW.

The **"P" Series** air conditioners offer very high energy efficiency values in all operating conditions which translates into less CO2 emissions and particularly low running costs.

Though optimized for use in data centers and telephone exchanges, they are equally valid in special applications such as measurement laboratories, TV recording studios, musical instrument storage areas, museums, 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. In these applications an integrated system of treatment of the external air may be requested.

GOST certification

ISO 9001
Cert. n° 273

Eurovent performance certification

"Close control" air conditioners are specifically designed for use in enclosed spaces where the continuity of cooling is vitally important to the correct functioning of the electronic equipment contained in that space. In order to guarantee the maximum reliability of the performance of its machines, Tecnair LV has joined the Eurovent test programme (www.eurovent-certification.com), subjecting its air conditioners to the rigorous checks of this institute and obtaining its certification. It should be noted that the test conditions of Eurovent are different from those normally used by manufacturers of air conditioners. For this reason, calculated performance is printed twice in this brochure: first for the test conditions of Tecnair LV and then secondly for Eurovent conditions.

Very high EER values

The **"P" Series** direct expansion air conditioners - models OPA and UPA - enable very high EER *(Energy Efficiency Ratio)* values to be reached.

Very high ratio of cooling capacity to footprint area

This is an important feature in the containment of the space occupied by the cooling machines, thus freeing up more useful space for the positioning of IT equipment. The **"P" Series** air conditioners have been designed to offer the highest sensible cooling capacity with the minimum footprint possible. This advantage is especially important given the progressive increases in capacity required by data centers and other computer applications which need over time the addition of extra air conditioners.

Silent functioning

The design of the machine has not neglected the search for very low sound operation, thanks in particular to:

- the selection of very quiet scroll compressors;
- the application of EC **plug fans** featuring low sound levels at projected conditions which appreciably reduce as the speed diminishes;
- extensive thermo-acoustic insulation of the cabinet shell.

Two fundamental construction types

The **“P” Series** air conditioners are produced in two fundamental construction versions which enable all application requirements to be met, in both data centres and in other special locations:

- direct expansion;
- chilled water.

In general, direct expansion units are more commonly used in buildings of medium/small dimensions, with required capacity not exceeding 400kW. Chilled water units with dedicated cooling groups are generally used above this value.

Different versions for different applications

Also considering their adequacy from an aeraulic and performance level angle, the **“P” Series** direct expansion air conditioners are assembled with various combinations of compressors/airflows, thus determining different SHR *(sensible heat ratio)* of the machine. Models with SHR between 0.9 and 1 are to be chosen for the air conditioning of areas where sensible thermal loads are very prevalent and which do not require (if not minimally) the treatment of latent loads by dehumidification, such as data centers, highly computerized offices, telephone exchanges and more generally special close control uses. Machines with SHR of less than 0.9 are characterized by having (at equal refrigerant circuit) a lower airflow and therefore greater dehumidification. This makes them well adapted to civil or special applications also with high crowd levels and appreciable external airflow. They are appropriate for commercial and service industry areas such as offices, shopping centres, restaurants, libraries and museums.

Construction characteristics

Plug fans with EC motors: minimum energy consumption

The fan section is made up by one or more backward curved, free running impeller, radial fans **(plug fan)** which are particularly silent in operation. Apart from offering very high performance, plug fans also guarantee easy cleaning the blades. These fans are fitted as standard with EC *(electronically commutated)* constant current brushless motors with external rotors and are the latest innovation concerning energy saving in the fan sector.

EC motors are about 25-30% more efficient than normal asynchronous alternating current motors. They also allow continuous speed variation depending on the external sensor signal on the microprocessor control of the machine, without the need for an inverter or other electronic devices. At equal operating conditions, the combination of EC motors and plug fans therefore offers remarkable advantages in many areas: functionality, energy efficiency, low sound level, absence of vibration in operation and soft start *(less current absorbed on starting)*.

Four alternatives for regulation

Tecnair LV provides four different alternatives for the regulation of the airflow of the EC fans depending on the requirements of the installation:

1. Constant fan rotation speed settable by the microprocessor. The available high static pressure is ideal for most applications. The effective air flow is the consequence of the real pressure drop of the aeraulic system of the installation; it can however be calculated through Tecnair LV's computerized selection program.

2. Constant airflow independent of the pressure drop of the filters. An internal sensor guides the microprocessor management system to vary the airflow handled by the fan, depending on the degree of clogging of the filters, in order to maintain a constant airflow. This makes sure that insufficient cooling does not occur due to reduced airflow arising from

dirty filters. Tecnair LV recommends this type of regulation when F7 filters are used, in order to increase their working life.

3. Variable airflow depending on the cooling capacity required by the installation. This is the classic VAV (Variable Air Volume) plant arrangement which responds to increased demand by a proportionate increase in airflow and vice versa. As has been noted, this type of plant offers interesting energy advantages at partial loads, which occur extensively throughout the year, especially at night. The VAV system, which is recommended only for chilled water machines, requires that modulating regulation of the cooling capacity is provided.

4. Airflow as a function of pressure in the raised floor. This regulation alternative is envisaged for plants with raised floors where the air is distributed under the floor itself. The Survey microprocessor management system maintains constant under-floor pressure. In particular, in very large areas subdivided into multiple local zones with partition dampers driven by individual thermostats, constant regulation of the pressure is necessary in order to avoid imbalances in the distribution of the air. In fact, without correct fan speed regulation, the closure of one or more of the dampers could cause an excessive increase in the airflow through the dampers remaining open. A pressure sensor is included to be installed in a representative under-floor point to guide the Survey which, in its turn, regulates the fan speed in order to maintain the designed pressure values.

Plug fans with AC motors

As an alternative to the standard fans with EC motors, other fans can be selected as accessories: always the plug fans type but with traditional AC motors. These fans have two operating speeds and therefore two different airflows and static pressureswhich can be selected through their terminal strip cabling.

Survey Microprocessor

The **“P” Series** air conditioners are equipped with the Survey microprocessor which has been expressly designed to manage the performance of the machines in both data center and civil applications. Survey keeps control of the fundamental functions of the air conditioning: cooling with or without dehumidification, heating, humidification, regulation of the air flow based on the condition of the filters and/or other design requirements. These features mean that Survey operates the machine at a high level of energy efficiency in all working conditions and ensures continuity of service, even in emergency situations, if the machines are equipped with two compressors or the plant has multiple machines. Survey has a wide range of auto-diagnosis functions and can also completely manage all the alarms.

Scroll compressors

Extremely quiet scroll compressors with high energy efficiency have been installed in the direct expansion units. They offer a significant reduction in energy consumption and therefore allow the impact on the environment to be limited. In fact, scroll compressors give higher volumetric performance than alternative ones at equal yield capacity. In addition, the absence of valves eliminates the pressure drop which is characteristic of the alternatives, allowing an increase in energy efficiency in equal conditions. The scroll compressors used in the **"P" Series** air conditioners are selected from the most efficient and reliable models available from highly qualified international constructors.

Single or double refrigerant circuit

The models with **"1"** as the last digit of the numerical part of the identification code have a single circuit and a single compressor. Those with **"2"** as the last digit on the other hand have two completely independent refrigerant circuits and two compressors.

The installation designer can therefore choose to use a single compressor machine or one with two compressors which offers 50% redundancy. The circuits are fitted with all the safety and regulation devices necessary for efficient and reliable operation. The evaporator coil can be single or double circuit depending on the number of compressors.

Electronic expansion valve

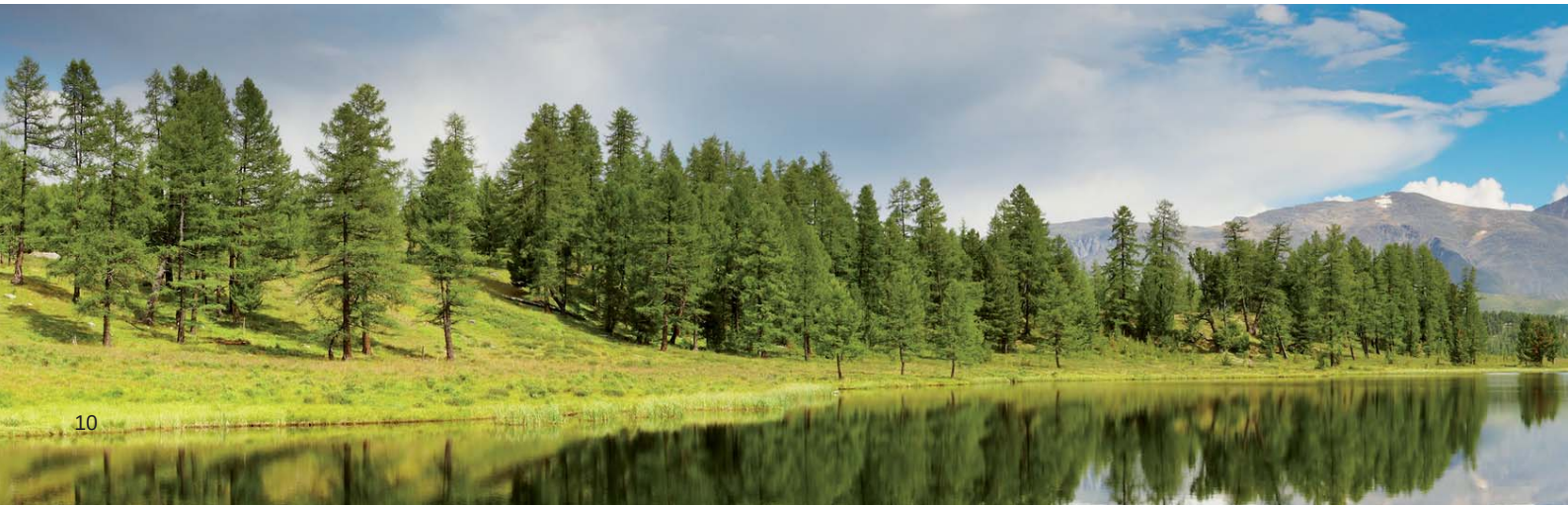
Electronic expansion valves are one of the most recent pieces of equipment to improve the energy efficiency at partial loads of direct expansion machines. These valves are installed at the inlet of the evaporator, substituting the traditional thermostatic expansion ones. This permits much more precise control of the quantity of refrigerant entering the evaporator dependent on the effective requirement of the load, thus guaranteeing good capacity regulation between 100% and 50%.Electronic expansion valves also enable the amount of overheated gas at the outlet of the evaporator to be controlled, thus allowing a significant reducing of the condensation pressure during winter or night-time operation whilst maintaining the evaporation pressure unchanged. Adopting the electronic expansion valve (accessory) guarantees a significant increase in the EER.

Ecological refrigerants

The machines with direct expansion cooling system use the R-410A refrigerant, which does not damage the ozone layer.

Very high efficiency heat exchanger coil

The copper-aluminium coils fitted to direct expansion machines with downward air



discharge can have, as accessory, a hydrophilic surface treatment to the fins in order to prevent any downward condensate drag. This treatment, which penalises the heat exchange of the fins, therefore necessitates an increase in the size of the coils and is required whenever the environment has to be dehumidified. It therefore has to be specified when many operators are present or when there are large volumes of fresh air. In machines with chilled water coils, the hydrophilic treatment is not envisaged as dehumidification is in fact non-existent due to the temperatures of the supply water being always higher in order to exploit the free cooling effect (up to 20°C in data centers with hot pool air distribution), the non-presence of operators, and to the absence of any kind of humidity: this surface treatment, as stated above, reduces the heat exchange and so requires coils with more rows and is therefore totally unfruitful.

The aluminium fins have specialization of the **TURBO/COIL®** profile, perfected in the LU-VE SpA research labs. They produce a predetermined turbulence of the crossing air which therefore increases the coefficient of heat exchange. The copper tubes have the special **TURBO/FIN®** internal helical grooves which centrifuge the liquid refrigerant flow thus optimising the capacity of heat exchange between air and refrigerant.

Refrigerant and oil charge

OPA e UPA mono-block air conditioners with incorporated water condenser (accessory) are supplied complete with refrigerant and oil charge.

OPA e UPA air conditioners for connecting to remote condensers are supplied only with nitrogen pressurized charge and the standard oil charge of the compressor(s). The refrigerant charge and any topping-up of the oil level has to be done by the installer during the installation process.

Hydraulic circuit and regulation valves

The chilled water units are fitted with a fin-pack type heat exchanger coil with several rows, copper tubes and aluminium fins.

The coils have as standard a motorized three-way valve for the floating regulation of the water flow. The coils are designed to give maximum performance in the two regimes typical of chilled water temperatures:

- 15/20 °C, or higher, as required by most data centres, telephone exchanges etc;
- 7/12 °C, mainly for wellness applications in the civil sector.

In both cases, the standard floating regulation allows the progressive modulation of the cooling capacity based on the demand for cooling the environment without any sudden variations which could cause discomfort.

Nevertheless a modulating valve is available as an accessory, installed in place of the floating one when very precise regulation of the cooling capacity is required. It is also very suitable for those cases which involve high rates of fresh air.

If the plant is equipped with variable flow pumps, two-way valves with modulating regulation can be fitted instead of three-way ones.

Local network and remote management

With Survey, it is possible to operate the **“P” Series** air conditioners both by local network with multiple units (up to 12) in one place or by remote management.

In local network applications, one machine is the

slave and the others are master. The slave unit comes into operation in emergency situations or when peak demand exceeds the design values. The slave units are rotated at predetermined intervals (for example every 12 or 24 hours) and switch to the master role to balance the number of working hours of the compressors. In remote applications, the machines can be controlled from remote positions via modem or via supervision software developed by Tecnair LV.

For applications involving remote control of the unit, supervsing systems and interface to Building Management Systems (BMS) the units can be equiped with a RS485 card working with MODBUS RTU protocol.

Further Gateway's are available for interfacing more units (up to 12 units to 1 gateway) to other important Serial Communication Protocols:

- Lonwaorks FTT10
- Bacnet MS/TP or TCP/IP
- TCP/IP Ethernet
- TCP/IP Ethernet with an integrated GSM modem.

Electrical boards

The **"P" Series** air conditioners have electrical boards with complete safety protection in accordance with EU and the principle international regulations. There is a main switch with shutter-block function, in addition to magneto-thermic switches and contactors. There are terminals for switching on and off the machine by remote control, and other free terminals for the remote indication of a cumulative alarm. The machines with compressors have phase sequencers as standard in order to protect the compressors from any damage should the machine start up in the opposite direction from normal. Remote condenser fan speed regulators are also available as accessories.

Large surface-area filters

Adequate air filtration is an especially important requirement in data centers in order to prevent damage to information technology equipment caused by air-dispersed particles which can also carry corrosive substances. But also is civil applications, IAQ (indoor air quality) control is a topic of ever-growing importance.

To satisfy this demand, Tecnair LV equips its **"P" Series** air conditioners as standard with re-generable self-extinguishing class G4 filters. Alternatively, they can be substituted with high efficiency F7 air filters if a more rigorous control of the IAQ is required.

The filters are installed, upstream of the cooling coil, in an inclined position. Their large surface allows lower air crossing speeds and therefore lower energy consumption.

Modern design suitable also for civil environments

The **“P” Series** air conditioners have a modern, functional design which is suitable not only for data centers but also for civil areas. In fact, the anthracite grey colour blends in perfectly with most office and laboratory furnishings as well as information technology equipment. The machine is constructed with a metal frame and aluminium profiles to which are fitted the closing panels and access doors in sheet steel. The latter are hinged to permit easy opening. Doors and panels are thermo-acoustically insulated on the inside by a layer of polyurethane protected by a plastic film for a total thickness of 25mm. Doors and panels have an final external surface treatment of an anthracite (dark grey) PVC film.

The recirculation air intake for upflow (OP) units can be situated in two positions, at the choice of the customer: the standard version has the suction grille on the front, while the special version has a blind front panel and takes air in from the bottom of the unit.

For downflow (UP) units, air is taken from the top of the machine and discharged through the bottom panel or, as an alternative, through grilles in the lower part of the front panel so that the air flows out above the floor.


1
2
3

“Free cooling” air-water: using renewable energy

This system (accessory) uses external air - a source of renewable energy - instead of or in addition to mechanical cooling. Envisaged for the OPA/FC - UPA/FC air conditioners, it consists of a cold water coil integrated with the direct expansion one with a three way modulating valve controlled by microprocessor. Three different operating regimes are therefore possible:

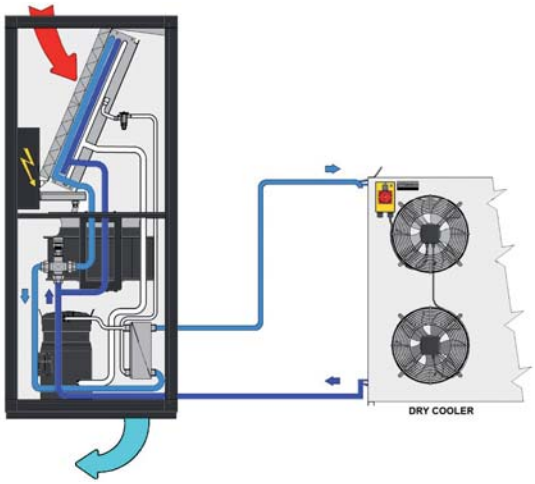
Only free cooling. This occurs when the external air temperature is sufficiently low to bring the water circulating in the coil to a value which fulfils the requirements of cooling in the data center, or more generally, in the area to be acclimatized. This is the maximum energy saving scenario as the compressors are always out of service.

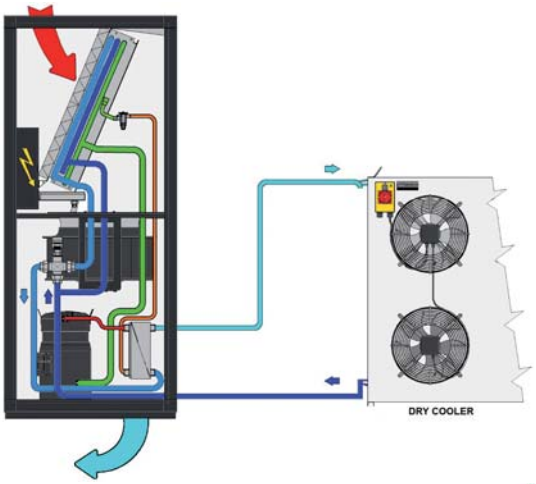
Free cooling + mechanical cooling. If the external air temperature is higher than that necessary to maintain the water cooling at the desired temperature, one or more compressors are switched on for the strategic length of time necessary to reach the desired conditions. This too is an energy saving situation, even if the savings are not as high as the preceding example.

Only mechanical cooling without free cooling. This situation arises when the temperature of the external air is too high to produce sufficient cooling. In this case the compressors function as normal. This operation exploits to the full the high energy efficiency of the refrigerant circuits thanks to the larger size of the coil’s fin pack. So even using only mechanical cooling helps to keep energy consumption down compared to other systems.

The water cooled condensers of the refrigerant circuit are provided with a pressure-switch system to regulate the condensing pressure (accessory).

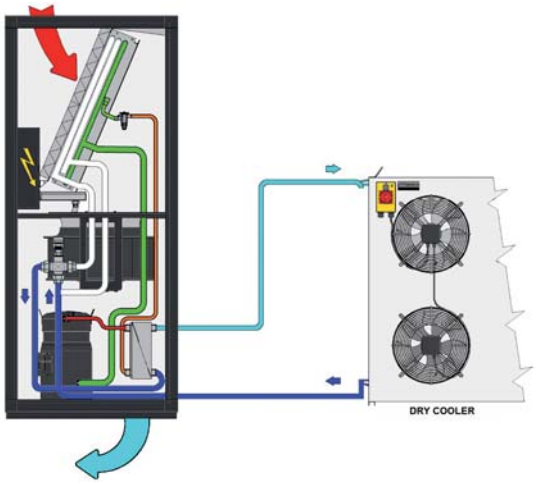
“FREE COOLING SYSTEM”
working mode
“SPRING - AUTUMN”
(Direct Expansion + H2o).





“FREE COOLING SYSTEM”
working mode
“SUMMER”
(Direct Expansion)

“FREE COOLING SYSTEM”
working mode
“WINTER”
(chilled water)



“Two Sources” for the maximum guarantee of continued operation or the use of excess energy from a centralized plant

This system (accessory) 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. It is double the size compared to the standard machine, thus enabling both to reach very high heat exchange efficiency levels.

The “Two Sources” 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.

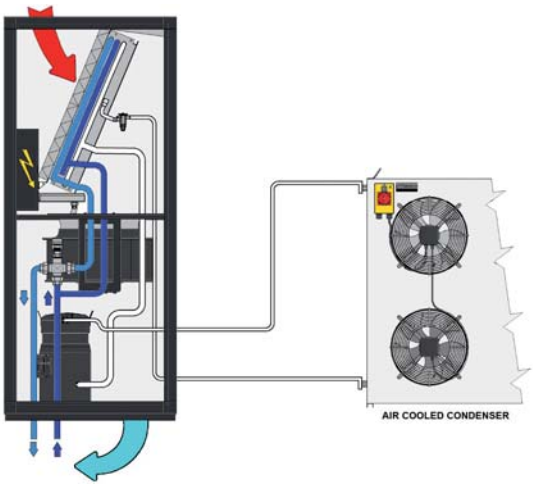
- **OPA/TS, UPA/TS**: in this application the machine has a direct expansion cooling source, with one or two compressors, and another with chilled water.

  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.

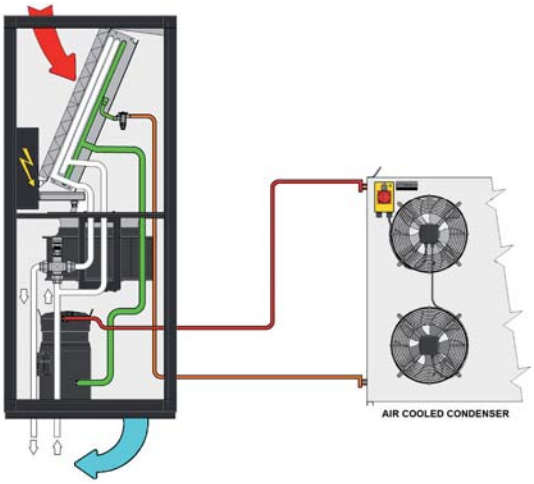
  Alternatively, the primary source can be direct expansion and the emergency one water - groundwater or acqueduct.
- **OPU/TS, UPU/TS:** both cooling sources are chilled water coils.

  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 acqueduct.

“TWO SOURCES SYSTEM”
working mode
“DIRECT EXPANSION”



“TWO SOURCES SYSTEM”
working mode
“CHILLED WATER”



Accessories

Numerous accessories and options are available for the **“P” Series** air conditioners to personalize the installation depending on the requirements of the plant and its design. Divided by function, they include:

Free cooling or two sources

- ❑ Additional Free cooling circuit.
- ❑ Additional Two sources circuit.

Alarms

- ❑ Water alarm (supplied loose).
- ❑ Out-of-range air discharge temperature alarm.
- ❑ Smoke/fire alarm terminals.

Water cooled condensers and pressostatic valves

- ❑ Welded stainless steel water cooled plate condenser.
- ❑ 2 way pressostatic valve (only if the water condenser is selected).

Sound proofing devices

- ❑ Sound damped duct for air suction or discharge.(h=550 mm). Allows a reduction of approx.4 dB(A) of the SPL of the unit.
- ❑ Double layer sound damping panels. Reduces SPL by approx 2 dB(A) in upflow units (OP series), and approx.4 dB(A) in downflow units ((UP series).
- ❑ Double-layer *“sandwich”* thermo-acoustic insulation panels.

Panels and base

- ❑ Blind front panel (OP) and open base for bottom air intake.
- ❑ Front panel with grille in the lower part (UP) and closed base.

Plenum

- ❑ Plenum (h=550 mm) for air discharge or intake with front grille.
- ❑ Plenum (h=550 mm) for air discharge or intake with front and side grilles.

Direct expansion unit cooling capacity regulation

- ❑ Electronic expansion valve.
- ❑ Electronic hot-gas injection system for the regulation of cooling capacity (100-10%).

Heating, reheating and humidification

- ❑ Single-step or double-step low thermal-inertia electrical heating/reheating coil.
- ❑ Immersed-electrode modulating humidifier and dehumidification control.
- ❑ Humidity sensor for the single control of dehumidification.

Boards and sensors

- ❑ Humidity sensor and board for external humidification control not supplied by Tecnair LV.
- ❑ RS 485 communication board.

Dampers

- ❑ Gravity-operated overpressure dampers on the air outlet (OP series).
- ❑ Motorized overpressure dampers on the on the air intake(UP series).

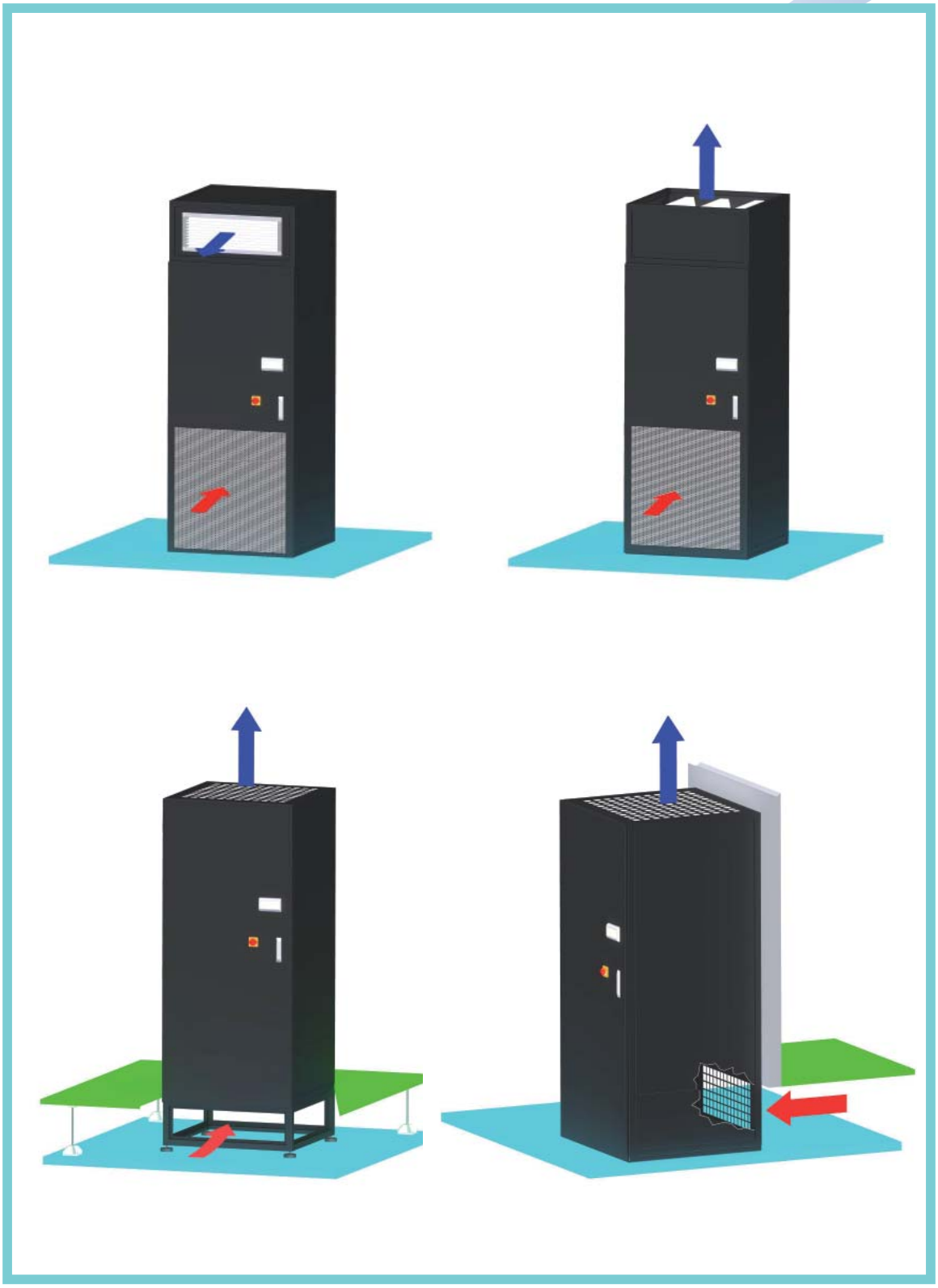
Under bases

- ❑ Adjustable under base (OP only). *(Specify precise height with order).*
- ❑ Adjustable under base with air deflector (UP only). *(Specify precise height with order).*

Fans and filters

- ❑ Electronic EC fans with incorporated inverter for constant rotation speed regulation.
- ❑ Electronic EC fans with incorporated inverter for the regulation of air flow in relation to the required cooling capacity.
- ❑ Electronic EC fans with incorporated inverter for the regulation of constant pressure in the raised floor.
- ❑ Electronic two-speed AC fans.
- ❑ F7 filter to be installed on the air intake as substitute for the standard G4.
- ❑ Monophase condenser-fan rotation speed variator (winter control), maximum power 8 Ampere.

Upflow air supply



Upflow air supply

Performance at TECNAIR LV test conditions

OPA: direct expansion air conditioners with air cooled or water condensers

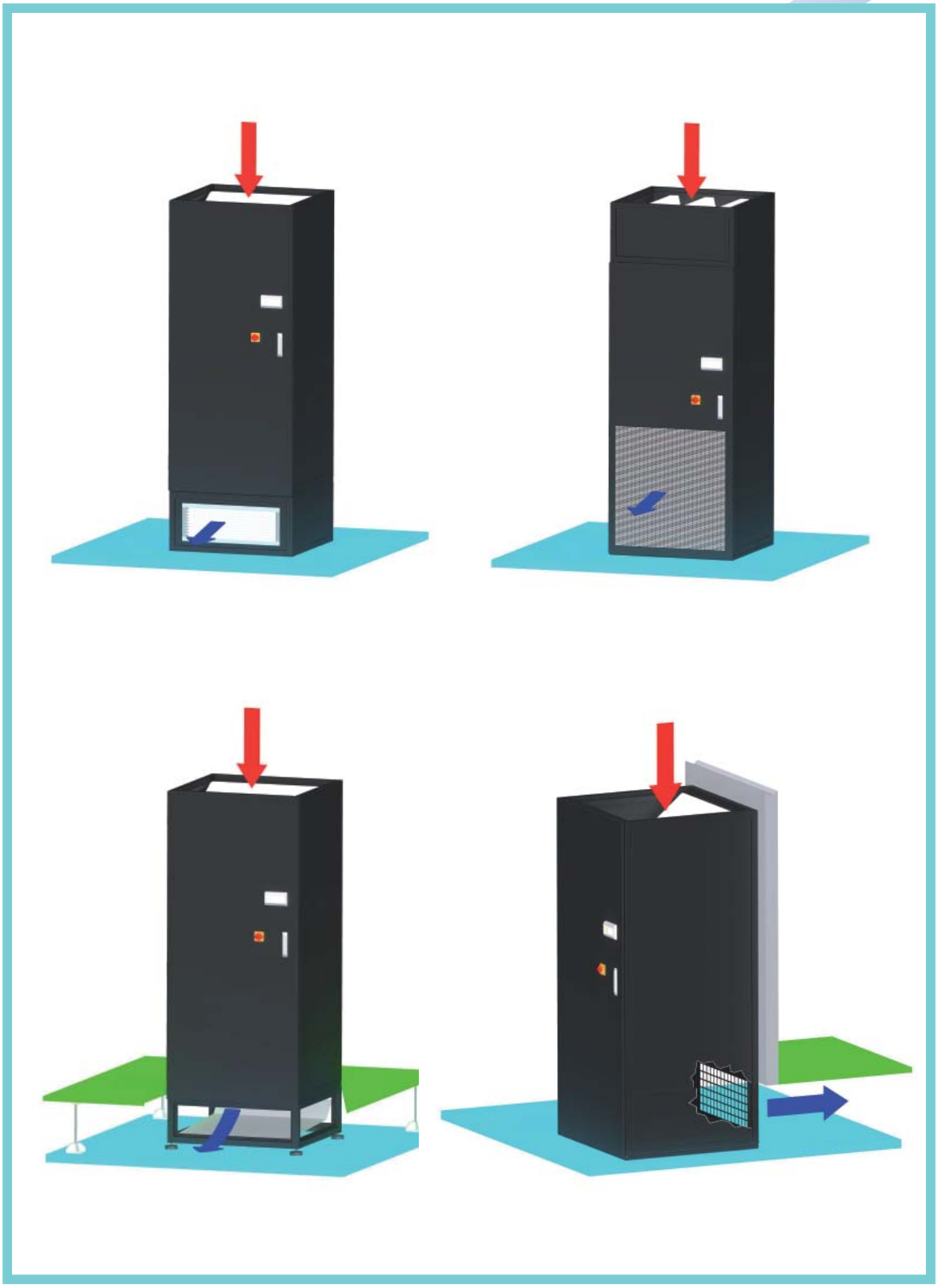
Models	71	111	141	211	251	301	361	461
Performance								
Tot. cooling cap. kW:	7,0	11,4	15,3	21,6	25,6	31,1	38,9	48,1
Sens cooling cap. kW:	6,8	11,1	12,7	20,8	22,6	28,7	36,3	43,9
Airflow m³/h:	2200	3200	3200	7000	7000	8700	14.500	14.500
Condenser Model	ACC 11	ACC 16	ACC 21	ACC 32	ACC 42	ACC 50	ACC 55	ACC 74
EER	3,01	3,11	3,47	3,29	3,13	3,28	3,50	3,52
SPL:dB(A)	49	49	49	56	56	58	63	63
Dimensions & weight								
Lenght mm.	750	750	750	860	860	1.410	1.750	1.750
Depth mm.	630	630	630	880	880	880	880	880
Height mm.	1990	1990	1990	1.990	1.990	1990	1.990	1.990
Net weight kg.	170	170	170	210	270	270	330	400

Models	302	372	422	512	612	662	852	932
Performance								
Tot. cooling cap. kW:	31,4	39,2	43,4	53,1	63,1	70,0	89,8	99,6
Sens cooling cap. kW:	28,7	32,2	42,4	47,4	60,0	63,4	71,3	88,7
Airflow m³/h:	8.700	8.700	14.500	14.500	17.900	17.900	17.900	22.500
Condenser Model	2xACC 25	2xACC 29	2xACC 32	2xACC 42	2xACC 50	2xACC 55	2xACC 61	2xACC 74
EER	3,40	3,14	3,29	3,25	3,32	3,38	3,47	3,64
SPL:dB(A)	58	58	63	63	68	68	68	69
Dimensions & weight								
Lenght mm.	1.410	1.410	1.750	1.750	2.300	2.300	2.300	2.640
Depth mm.	880	880	880	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	990	990	990	1.990
Net weight kg.	300	315	420	440	420	490	315	330

OPU: with chilled water coil

Models	10	20	30	50	80	110	160	220
Performance								
Tot. cooling cap. kW:	11,3	19,6	31,7	39,8	70,9	89,3	152,8	178,8
Sens cooling cap. kW:	9,6	15,9	28,4	34,4	61,2	74,1	122,0	148,7
Airflow m³/h:	2200	3400	7800	8.300	16000	17.000	26.400	34800
SPL:dB(A)	47	49	57	56	59	61	64	82
Dimensions & weight								
Lenght mm.	750	750	860	860	1750	1.750	2.640	3496
Depth mm.	630	630	880	880	880	880	880	880
Height mm.	1990	1990	1990	1990	1990	1.990	1.990	1990
Net weight kg.	155	155	180	250	450	450	650	900

Downflow air supply



Down flow air supply

Performance at TECNAIR LV test conditions

UPA: direct expansion air conditioners with air cooled or water condensers

Models	71	111	141	211	251	301	361	461
Performance								
Tot. cooling cap. kW:	7,0	11,4	15,3	21,6	25,6	31,1	38,9	48,1
Sens cooling cap. kW:	6,8	11,1	12,7	20,8	22,6	28,7	36,3	43,9
Airflow m^3/h:	2200	3200	3200	7000	7000	8700	14.500	14.500
Condenser Model	ACC 11	ACC 16	ACC 21	ACC 32	ACC 42	ACC 50	ACC 55	ACC 74
EER	3,07	3,43	3,58	3,74	3,26	3,39	3,74	3,67
SPL:dB(A)	49	49	49	56	56	58	63	63
Dimensions & weight								
Lenght mm.	750	750	750	860	860	1410	1.750	1.750
Depth mm.	630	630	630	880	880	880	880	880
Height mm.	1990	1990	1990	1.990	1.990	1990	1.990	1.990
Net weight kg.	170	170	170	210	255	270	330	400

Models	302	372	422	512	612	662	852	932
Performance								
Tot. cooling cap. kW:	31,4	39,2	43,4	53,1	63,1	70,0	89,8	99,6
Sens cooling cap. kW:	28,7	32,2	42,4	47,4	60,0	63,4	71,3	88,7
Airflow m^3/h:	8.700	8.700	14.500	14.500	17.900	17.900	17.900	22.500
External static pressure (Pa)	30	30	30	30	30	30	30	30
Condenser Model	2xACC 25	2xACC 29	2xACC 32	2xACC 42	2xACC 50	2xACC 55	2xACC 61	2xACC 74
EER	3,50	3,25	3,46	3,40	3,46	3,46	3,55	3,79
SPL:dB(A)	58	58	63	63	68	68	68	69
Dimensions & weight								
Lenght mm.	1.410	1.410	1.750	1.750	2.300	2.300	2.300	2.640
Depth mm.	880	880	880	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	990	990	990	1.990
Net weight kg.	300	315	420	440	420	470	315	330

UPU: with chilled water coil

Models	10	20	30	50	80	110	160	220
Performance								
Tot. cooling cap. kW:	11,3	19,6	31,7	39,8	70,9	89,3	152,8	178,8
Sens cooling cap. kW:	9,6	15,9	28,4	34,4	61,2	74,1	122,0	148,7
Airflow m^3/h:	2200	3400	7800	8.300	16000	17.000	26.400	34800
SPL:dB(A)	47	49	57	56	59	61	64	82
Dimensions & weight								
Lenght mm.	750	750	860	860	1750	1.750	2.640	3496
Depth mm.	630	630	880	880	880	880	880	880
Height mm.	1990	1990	1990	1990	1990	1.990	1.990	1990
Net weight kg.	155	155	180	250	450	450	650	900

Notes:

The performances are referred to: refrigerant R410; condensing temperature: 45°C; inlet air: 24°C - 45% RH; for chilled water: 7/12°C; The SPL is referred to 2 m distance, 1,5 m height, free field and sound damped discharge mouth. Available static pressure: 30 Pa. EER = Electro Efficiency Ratio = Total cooling capacity / compressors power input + fans power input.
The above performances don't consider the heat generated by the fans which must be added to the thermal load of the system.

Upflow air supply

Performance at EUROVENT test conditions

OPA: direct expansion air conditioners with air cooled or water condensers

Models	71	111	141	211	251	301	361	461
Performance								
Tot. cooling cap. kW:	6,5	10,6	14,1	19,4	23,9	29,0	33,8	44,0
Sens cooling cap. kW:	5,9	9,6	10,9	17,3	19,0	24,6	31,5	37,8
Airflow m³/h:	2.150	3.200	3.200	7.000	7.000	8.700	14.500	14.500
External static pressure (Pa)	50	50	50	50	50	50	50	50
Condenser Model	ACC 11	ACC 16	ACC 21	ACC 32	ACC 42	ACC 50	ACC 55	ACC 74
EER	2,34	2,59	2,75	2,52	2,51	2,55	2,55	2,67
SWL:dB(A)	78	78	78	79	79	79	82	82
Dimensions & weight								
Lenght mm.	750	750	750	860	860	1.410	1.750	1.750
Depth mm.	630	630	630	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	1.990	1.990	1.990	1.990
Net weight kg.	170	170	170	210	270	270	330	400

Models	302	372	422	512	612	662	852	932
Performance								
Tot. cooling cap. kW:	28,4	36,1	39,1	48,9	59,0	64,3	82,5	90,4
Sens cooling cap. kW:	24,3	27,3	36,0	39,7	51,6	53,6	60,7	75,0
Airflow m³/h:	8.700	8.700	14.500	14.500	17.900	17.900	17.900	22.800
External static pressure (Pa)	50	50	50	50	50	50	50	50
Condenser Model	2xACC 25	2xACC 29	2xACC 32	2xACC 42	2xACC 50	2xACC 55	2xACC 61	2xACC 74
EER	2,63	2,53	2,58	2,59	2,65	2,68	2,82	2,82
SWL:dB(A)	79	79	82	82	81	81	81	84
Dimensions & weight								
Lenght mm.	1.410	1.410	1.750	1.750	2.300	2.300	2.300	2.640
Depth mm.	880	880	880	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	990	990	990	1.990
Net weight kg.	300	315	420	440	420	490	315	330

OPU: with chilled water coil

Models	10	20	30	50	80	110	160	220
Performance								
Tot. cooling cap. kW:	11,2	19,4	30,5	38,9	69,0	87,8	150,7	175,4
Sens cooling cap. kW:	8,5	13,8	24,4	29,9	52,8	64,6	106,2	129,1
Airflow m³/h:	2.400	3.500	7.800	8.300	16.000	17.000	26.400	34.000
External static pressure (Pa)	50	50	50	50	50	50	50	50
SWL:dB(A)	82	82	80	78	83	81	84	84
Dimensions & weight								
Lenght mm.	750	750	860	860	1.750	1.750	2.640	3.495
Depth mm.	630	630	880	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	1.990	1.990	1.990	1.990
Net weight kg.	155	155	180	250	450	450	650	900

Down flow air supply

Performance at EUROVENT test conditions

UPA: direct expansion air conditioners with air cooled or water condensers

Models	71	111	141	211	251	301	361	461
Performance								
Tot. cooling cap. kW:	6,5	10,6	14,1	19,4	23,9	29,0	33,9	44,2
Sens cooling cap. kW:	5,9	9,6	10,9	17,3	19,0	24,6	31,6	38,0
Airflow m³/h:	2.150	3.200	3.200	7.000	7.000	8.700	14.500	14.500
External static pressure (Pa)	50	50	50	50	50	50	75	75
Condenser Model	ACC 11	ACC 16	ACC 21	ACC 32	ACC 42	ACC 50	ACC 55	ACC 74
EER	2,34	2,59	2,75	2,52	2,51	2,55	2,59	2,70
SWL:dB(A)	78	78	78	79	79	79	82	82
Dimensions & weight								
Lenght mm.	750	750	750	860	860	1.410	1.750	1.750
Depth mm.	630	630	630	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	1.990	1.990	1.990	1.990
Net weight kg.	170	170	170	210	255	270	330	400

Models	302	372	422	512	612	662	852	932
Performance								
Tot. cooling cap. kW:	28,4	36,2	39,2	49,0	59,3	64,6	82,7	90,5
Sens cooling cap. kW:	24,3	27,4	36,1	39,8	51,8	53,9	60,9	75,2
Airflow m³/h:	8.700	8.700	14.500	14.500	17.900	17.900	17.900	22.800
External static pressure (Pa)	50	75	75	75	75	75	75	75
Condenser Model	2xACC 25	2xACC 29	2xACC 32	2xACC 42	2xACC 50	2xACC 55	2xACC 61	2xACC 74
EER	2,63	2,55	2,61	2,62	2,69	2,71	2,85	2,84
SWL:dB(A)	79	79	82	82	81	81	81	84
Dimensions & weight								
Lenght mm.	1.410	1.410	1.750	1.750	2.300	2.300	2.300	2.640
Depth mm.	880	880	880	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	990	990	990	1.990
Net weight kg.	300	315	420	440	420	470	315	330

UPU: with chilled water coil

Models	10	20	30	50	80	110	160	220
Performance								
Tot. cooling cap. kW:	11,1	19,3	30,6	39,0	69,2	88,0	151,0	175,8
Sens cooling cap. kW:	8,4	13,8	24,5	30,0	53,0	64,9	106,5	129,5
Airflow m³/h:	2.400	3.500	7.800	8.300	16.000	17.000	26.400	34.000
External static pressure (Pa)	20	20	75	75	75	75	75	75
SWL:dB(A)	82	82	80	78	83	81	84	84
Dimensions & weight								
Lenght mm.	750	750	860	860	1.750	1.750	2.640	3.495
Depth mm.	630	630	880	880	880	880	880	880
Height mm.	1.990	1.990	1.990	1.990	1.990	1.990	1.990	1.990
Net weight kg.	155	155	180	250	450	450	650	900

Notes:

The performances are referred to EUROVENT testing conditions. R410 refrigerant ; inlet air: 24°C - 50% RH; external air 35°C. for chilled water: 7/12,5°C. The above performances are net and therefore deduct the heat generated by the fans. Sound Power levels are declared with sound damped discharge mouth.
EER = Electro Efficiency Ratio = Total cooling capacity / Compressors + fans + condensers fans power input.

Air cooled condensers to be matched with Tecnair LV air conditioners

Galvanized steel casing with Epoxy-Polyester powder coating for a maximum resistence to the corrosion Painted in white colour RAL 9003.

Very high efficiency condensing coil.

Very high efficiency single phase directly driven axial fans for continuos external operation.

Life lubrificated and thermally protected motors. Each fan section is separated from the others.

Safety protection grilles on air discharge.

Main switch fitted in a weatherproof box.

Fans speed regulation (winter control) is available as accessory in the indoor unit. The models ACC 74 and ACC 83 are standard equipped with fans speed regulation.

Models	ACC	8	11	16	19	21	25	29
Performance								
Nominal capacity (1)	kW	8,3	10,8	16,5	19,9	21,5	24,8	29,8
Air quantity	m3/h	2.600	2.200	5.200	4.800	4.400	7.800	7.200
Fans number	n.	1	1	2	2	2	3	3
Fans diameter	mm	350	350	350	350	350	350	350
Motor power input	W	180	180	360	360	360	540	540
Absorbed current	Amps	0,85	0,85	1,7	1,7	1,7	1,7	2,5
Sound pressure level (2)	dB(A)	40	40	43	43	43	45	45
Internal circuit volume	dm3	2,0	3,0	3,0	4,0	5,0	4,0	6,0
DIMENSIONS AND WEIGHT								
Lenght (H - V installation)	mm	743	743	1.298	1.298	1.298	1.853	1.853
Depth (H installation)	mm	610	610	610	610	610	610	610
Depth (V installation)	mm	510	510	510	510	510	510	510
Height (H installation)	mm	906	906	906	906	906	906	906
Height (V installation)	mm	578	578	578	578	578	578	578
Weight	kg	20	29	29	33	37	42	48

Models	ACC	32	42	50	55	61	74	83
Performance								
Nominal capacity (1)	kW	32,3	43,1	50,3	56,1	62,0	75,4	84,0
Air quantity	m3/h	6.600	8.800	13.600	12.700	14.900	20.400	19.000
Fans number	n.	3	4	2	2	2	3	3
Fans diameter	mm	350	350	500	500	500	500	500
Motor power input	W	540	720	1.250	1.250	1.160	1.880	1.880
Absorbed current	Amps	2,5	3,4	5,5	5,5	5,5	8,3	8,3
Sound pressure level (2)	dB(A)	45	46	50	50	51	51	51
Internal circuit volume	dm3	6,0	10,0	9,0	12,0	14,0	13,0	17,0
DIMENSIONS AND WEIGHT								
Lenght (H - V installation)	mm	1.853	2.408	1.895	1.895	2.393	2.705	2.705
Depth (H installation)	mm	610	610	905	905	1.110	905	905
Depth (V installation)	mm	510	510	470	470	705	470	470
Height (H instllation)	mm	906	906	1.070	1.070	1.230	1.070	1.070
Height (V installation)	mm	578	578	830	830	1.040	830	830
Weight	kg	54	71	94	102	177	132	144

(1) Nominal capacity at 35°C ambient and 50°C condensing temperature; R410A
(2) Sound pressure level in free field at 10 meters from the unit.

The ACC air cooled condensers are available in the following versions:
ACC/H horizontal installation and vertical air discharge;
ACC/V vertical installation and horizontal air discharge;
ACC/LT for very low temperature; vertical installation and horizontal air discharge.

Available accessories:
ALUPAINT: for better protection of the aluminium fins (suggested in salt atmospheres);
EC FANS: for energy saving (available on models with fan diameter 500 mm).

TECNAIR LV
CLOSE CONTROL AIR CONDITIONERS

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