



**“C” series**  
**Close control air conditioners**

# “C” series

## Close control air conditioners

### Main features

#### Designed for electronic and comfort applications

“C” series close control air conditioners are available in the following versions:

- “H”: (high air flow), with high airflow compared to the cooling capacity. They are designed for air conditioning of telecommunication offices, computer rooms, high-automated offices, data servers and special “close control” uses.
- “L”: (low air flow), with low air flow compared to the cooling capacity, suitable for application into common business and tertiary environments, such as conference rooms, shopping centres, restaurants, libraries, and museums. Their lower ratio between sensible and total capacity and the consequent very strong air treatment, make their installation in electronic environments acceptable only in case of unmanned rooms with a fresh air flow negligible in comparison to the total one of the units or already dehumidified in a specialised pre-treatment air conditioner.

#### Minimum foot print and front maintenance

Space inside technological rooms is always a precious thing. This is why Tecnair LV's close control air conditioners are specially designed for minimising their dimensions as well as having one of the market's greatest ratios between sensible cooling capacity and base foot print.

All ordinary and extraordinary maintenance activities, barring exclusively the replacement of heat-exchange coils, are executed from the front side of the unit, so allowing installing several units close one each other and not sacrificing precious side space to this purpose.

The hinged front doors make the access to the inside parts easy and quick.



### Silent functioning, energy efficiency and ecological impact

- The scroll compressors of “C” series air conditioners with direct expansion coil are more silent than the alternative ones.
- The scroll compressors have energy consumptions much lower than the others, so limiting the ecological impact.
- The cold coils of the downflow units (UC), both in chilled water and direct expansion executions, have aluminium fins with hydrophylic treatment so to avoid the risk of the air carrying condensation and so to avoid that the coil fills up of water thus reducing the thermal exchange and therefore the air conditioner capacity.
- The use of the ecologic refrigerant HFC R407 contributes to the conservation of the environment (unit with R22 and R134 available on request).
- Thanks to its larger surface, the filter on the coil allows lower crossing speed, which results in lower pressure drop.
- The lower energy consumption of these air conditioners, at the same efficiency, results in a very reduced TEWI (Total equivalent warming impact).



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### Features and performance

#### Microprocessor regulation

The  $\mu$ AC microprocessor allows managing all the typical air-conditioning functions: cooling, heating, humidification, dehumidification, and filtering, very accurately and timely. It assures a regular and optimised functioning as to both performance and consumption; it also provides for alarm management and self-diagnosis.

If you need to install any component requiring analogical control (modulating valve or electronic hot-gas by-pass valve), the pCO microprocessor (optional), with semi-graphic display, shall be installed in lieu of standard  $\mu$ AC. The pCO is also installed as standard microprocessor on special versions such as “Free cooling”, “Two seasons” and “Fresh air” units.

#### Local network management or remote control

Series “C” air conditioners can work in local-network mode, that is, with several units (up to 8) in the same room. A unit slaves all the others, in such way as to intervene in case of a peak load or of an emergency. All master units become slave in turn on a regular basis (e.g. every 12 or 24 hours) in order to equalise the number of running hours.

In remote control mode, up to 64 units can be controlled even from remote positions, via modem, both through a special supervisory program by Tecnair LV and through a Gateway and a Modbus or Bacnet communication protocol, by any BMS.

#### Cooling circuit

The air conditioners with direct expansion coil have a frigorific circuit equipped with: scroll compressor with all necessary protective devices: high pressure (manual reset) and low pressure (automatic reset) switches, thermal expansion valve, dehydrating filter with refrigerant sight glass.

OCA, UCA models for pairing with remote condensers, are already equipped with a pressurisation nitrogen charge. The refrigerant charge, and the oil top-up (if required), shall be made by the installer on site.

OCA and UCA air conditioners in self-contained execution with built-in water-cooled condensers (accessory), are supplied with full refrigerant and oil charge.

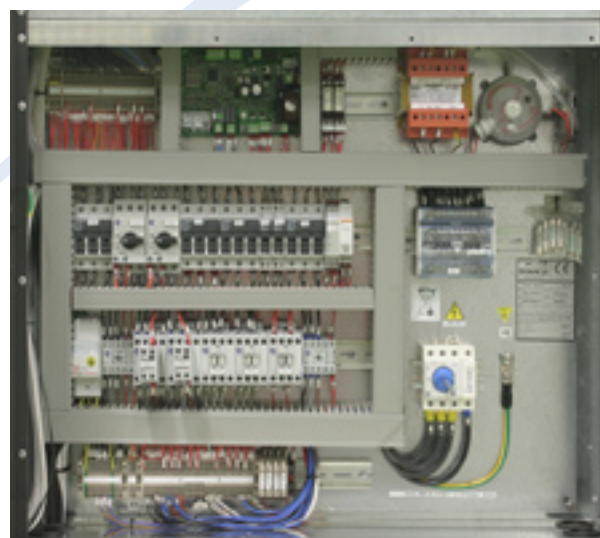
#### Modulating electronic regulation of the cooling capacity (units equipped with frigorific circuit)

An electronically controlled hot gas injection valve (optional) allows obtaining a perfectly modulating regulation from 100 to 50% of the cooling capacity of the frigorific circuit. In case of necessity of a modulating regulation from 100 to 10% with very low tolerance on the room temperature even with a high outdoor air flow, a further electronically controlled valve for refrigerant expansion shall be installed (option).

Both these application requires absolutely the pCO microprocessor (optional) instead of standard  $\mu$ AC.

#### Pressostatic regulation of the cooling capacity (units equipped with frigorific circuit)

A mechanical hot gas injection valve allows obtaining a modulating regulation from 100 to 10% of the cooling capacity of the frigorific circuit. The valve regulation is made on the refrigerant suction pressure and overheating, and therefore the use of the pCO microprocessor (optional) is not mandatory.





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### One or two completely independent compressors

- Sizes 21, 31, 41, 51, 71, 81, 101, 131 and 151 are equipped with one scroll compressor connected with a single cooling circuit.
- Sizes 72, 102, 142, 162, 202, 262 e 302 are equipped with two scroll compressors and two independent cooling circuits, which assure the utmost working safety.

### Hydraulic circuit

Air conditioners with chilled water coil: OCU and UCU, include a finned coil and a three-way throttling motorised valve for water flow regulation. The hydraulic circuit is provided with copper tubes with anti-condensate insulation. The coils are optimised for both water with a temperature of 7/12 and for higher ones such as 12/17.

The standard throttling valve (3 points) allows good modulation of the cooling capacity as a function of the environmental conditions, especially with constant thermal loads, as it responds quite slowly to their quick changes.

### Modulating regulation of the cooling capacity (units equipped with chilled water coil)

On the contrary, if a very precise regulation and high response speed are required, a modulating valve (optional) can be installed in lieu of the throttling one. The installation of this valve is especially suggested in case of functioning with a lot of fresh air. However, the modulating valve needs an analogue signal, not digital, so the installation of the pCO microprocessor (optional) is absolutely required.

### Electric board

All the units are equipped with a complete electric board with main shutter-block switch. Magnetothermic switches, contactors, and all necessary protections are provided as well, as required by the Standards in force.

The electric board of the units equipped with compressors (“A” as third letter of the identification code) has as standard a phase sequencer, which prevents the compressor from getting damaged when counter running.

Also, the board has two clean terminals for remote indication of a cumulative alarm, as well as two terminals for starting up and stopping the unit from remote position.

The electric panel doesn’t include the variator of the revolution number of the fans of the air cooled remote condensers

(winter control). This device is standard included in the CEA and CEA/LN air cooled condensers from Tecnair LV. Anyhow should you decide to match the unit with a condenser from another Manufacturer, the variator can be ordered as accessory.

### Large surface filters

The units are equipped with self-extinguishing class G4 filters. The filters are installed inclined before the cooling coil in order to offer a larger surface and allow lower air crossing speeds, with lower energy consumption.

A 450 mm high duct (accessory) can be installed for holding a F7 class filter, vertically on supply air discharge.

### Design suitable to civil environments

“C” series air conditioners have a nice and functional design, suitable for installation in civil environments. Their structure consists of aluminium profiles and closing panels hinged on them. Both panels and profiles are coated with a dark grey PVC layer (anthracites), thermo-acoustically insulated by a 25 mm-thick polyurethane layer, and further coated with an anti scratch plastic film.

Two versions are available for up flow units (OC): front grille & top air discharge (standard), or blind front panel, suction from the bottom and top discharge (optional).



## Fan section

### Standard fans

The standard fan section is made up by one or more backward curved, free running impeller, radial fans (plug fan) with single speed motors which offer a particularly low noise level as well as a high efficiency. The free running impeller assures a very high efficiency and a easy cleaning of the blades too.

These fans offer a high available static pressure, perfect for most applications. The final air flow comes as a consequence of the real pressure drop of the installation; anyhow it can be calculated through the Tecnaïr LV's selection program.

### Standard fans with auto-transformer

In case of necessity to adjust the air flow during commissioning, or to have the possibility to change it during the use, an auto-transformer (accessory) can be installed to regulate the fan motors revolution number.

### Electronically commutated fans (EC) for a perfect air flow regulation

As accessory, special EC fans (electronically commutated plug fans) can be installed in lieu of the standard ones. In addition to the function of adapting the air flow and the external static pressure to the ones requested by the installation, these fans have the following important characteristics:

- Very high fan shaft motor efficiency: up to 90%. This reduces dramatically the power input and grants a lower noise level.
- Higher available static pressures; very important in case of installation of supply air filter F7 efficiency (accessory). This allows a better use of the filter itself without reducing the air flow: see below: constant air flow regulation.
- Very low start up current: soft start function

The ECs requires a 0 – 10V signal and therefore the pCO microprocessor is mandatory. The following air flow regulation can be requested:

#### 1. Electronic fans for constant air flow regulation:

Thank to a built in measurer, the pCO controls the ECs to guaranty a constant air flow even when the filters become dirty which might cause the air flow to be greatly reduced. This solution is warmly suggested when F7 class filters are installed on supply so not to be subject to changing them too often.

#### 2. Electronic fans for air flow regulation in relationship to cooling capacity:

The pCO controls the ECs to modulate the air flow in relationship to the cooling capacity demanded by the system. It is therefore possible to obtain a significant impact on energy saving and noise level especially with partial thermal loads.

This solution is applicable for units with chilled water coils or direct expansion ones but with modulating control of the cooling capacity.

#### 3. Electronic fans for the regulation of the pressure in the raised floor:

The pCO controls the ECs to maintain a constant pressure in the raised floor.

This regulation is optimal in case of great offices divided in various rooms with distribution of the air in the raised floor through motorised dampers regulated by a local thermostat. In this case the reaching of the temperature desired in a room brings to a closing of the motorised damper in that area which corresponds to a raise in the pressure under the floor. The pressure sensor, supplied loose and to be installed in the raised floor, informs the microprocessor of the increase in pressure corresponding to the total or partial closure of the dampers. The pCO microprocessor therefore controls the air flow indirectly though the pressure control by reducing, or raising, the fan revolution speed, so to keep the pressure as selected from the set point.

This solution is applicable for units with chilled water coils or direct expansion ones but with modulating control of the cooling capacity.

# “C” series

## Close control air conditioners

### Special versions

#### “Water to air free cooling”: using renewable energy sources

OCW.../FC, UCW.../FC air conditioners are equipped with a “Free cooling” system consisting of an additional chilled-water cooling coil integrated in the aluminium fins of the unit’s direct expansion one, with a three-way modulating valve controlled by the microprocessor. As long as the outside conditions allow the water to respond totally or partially to the cooling request, the microprocessor cuts out or minimises the compressors’ intervention, so reducing substantially the energy consumption.

The water cooled condensers of the frigorific circuit are equipped with a pressostatic system for the regulation of the condensing pressure (flooding valves).

The pumps and the expansion tank are not included in Tecnair LV’s supply. Units in “free cooling” version cannot install the option hot water heating coil, but only the electric one, and have as standard the pCO microprocessor.

The system widely uses the outdoor air—a renewable energy source—in lieu of or in addition to the mechanical cooling.

#### “Two seasons”, using excess of energy or for the maximum security of the system.

This system consists of the same chilled-water cooling coil as the “Free cooling”, but fed by the building water chiller. A built in frigorific circuit enters in operation in case of lack of chilled water. The result is the maximum security or a remarkable reduction of both consumption and running costs. This system can also use the direct-expansion coil circuit as primary cooling source and, in case of an emergency, the chilled-water coil connected with the tap water network.

The “Two seasons” version is available for units with direct expansion circuit OCA.../TS, UCA.../TS as well as units with built in water cooled condenser (accessory) and with double chilled water coil OCU.../TS, UCU.../TS: one for district water and the other for tap water or water from a chiller (emergency).

Units in “two seasons” cannot install the option hot water heating coil, but only the electric one, and have as standard the pCO microprocessor.





## Fittings

- Electronic immersed-electrode modulating humidifier and dehumidification control.
- Two row hot water heating/reheating coil with throttling three-way regulating valve.
- One or two steps low thermal inertia heater/reheater.
- Welded plate built in water cooled condensers.
- Pressostatic two-way valves (OCA & UCA with water cooled condenser).
- Single phase variator of the revolution number of the condenser fans (winter control). Max. 8A .
- pCO microprocessor in lieu of the standard  $\mu$ AC.
- Three-way modulating valve, in lieu of the throttling one (units with only pCO only).
- Hot-gas injection electronic valve for a perfectly modulating cooling capacity regulation: 100-50% (units with pCO only).
- Electronic expansion valve, in addition to the hot gas one, for 100-10% regulation.
- Pressostatic hot gas injection valve for cooling capacity regulation: 100-60%.
- Duct hood with F7 filter to be installed on the air discharge (h=450 mm).
- Auto-transformer for the regulation of the air flow/static pressure.
- Electronic EC fan with inverter control for constant air flow regulation.
- Electronic EC fan with inverter control for the regulation of the air flow in relationship to the cooling capacity.
- Electronic EC fan with inverter control to assure constant pressure inside the double floor.
- Filtered connection for fresh air intake: max 200 m<sup>3</sup>/h.
- Air discharge or suction plenum (h=450 mm) with front grille.
- Air discharge or suction plenum (h=450 mm) with front and side grilles.
- Adjustable under base. Specify the height.
- Adjustable under base with air deflector. Specify the height.
- Sound damped hood (h=450 mm) for air discharge or suction. Allows approx. 4 dB (A) reduction of unit SPL.
- Double layer sound damping panels. It allows approx. 2 dB(A) reduction of unit SPL for up flow air discharge models: series OC, and approximately 4 dB(A) reduction for downflow air discharge models: series UC.
- Double skin panels with 25 mm insulation inside.
- Blind front panel (OC) and open base for bottom air intake.
- Gravitational over-pressure dampers (series OC) on the air discharge mouth.
- Motorised over-pressure dampers (series UC) on the air suction mouth.
- Humidity sensor and modulating board for dehumidification control only or remote humidifier control (not supplied by Tecnaïr).
- Clock board for time band control.
- RS 485 communication board.
- Water alarm (supplied loose).
- Out-of-range air active discharge temperature alarm

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### UPFLOW AIR CONDITIONERS

#### TECHNICAL CHARACTERISTICS

OCA: direct expansion with air or water cooled condensers and upflow air discharge								
MODELS	71-H	81-H	101-L	101-H	131-L	131-H	151-L	151-H
Performances								
Total cooling cap.:kW	21.4	23.3	28.3	32.5	38.8	43.3	42.9	47.3
Sens cooling cap.:kW	21.4	21.7	23.9	30.7	33.6	40.5	35.3	42.1
Airflow: m <sup>3</sup> /h	6910	6910	6910	9330	9330	13880	9330	13880
EER with standard fans	3.39	3.38	3.32	3.47	3.34	3.54	3.27	3.45
EER with EC fans	3.64	3.62	3.50	3.68	3.46	3.86	3.38	3.74
SPL: dB(A)	57	57	57	58	58	62	58	63
Dimensions & weight								
Length: mm	860	860	860	1410	1410	1750	1410	1750
Depth: mm	880	880	880	880	880	880	880	880
Height: mm	1990	1990	1990	1990	1990	1990	1990	1990
Net weight: kg	300	315	330	400	420	440	420	470

OCA: direct expansion with air or water cooled condensers and upflow air discharge													
MODELS	72-H	102-L	102-H	142-L	142-H	162-L	162-H	202-L	202-H	262-L	262-H	302-L	302-H
Performances													
Total cooling cap: kW	24.4	27.8	32.4	40.3	44.8	43.6	48.6	56.8	67.4	73.7	78.7	85.4	96.0
Sens cooling cap: kW	22.3	23.8	31.7	34.7	41.4	35.8	43.0	46.0	60.6	57.4	65.6	68.0	82.0
Airflow: m <sup>3</sup> /h	6910	6910	9680	9680	13880	9680	13880	13510	18660	13510	18660	18660	20330
EER with standard fans	3.40	3.24	3.50	3.36	3.54	3.32	3.53	3.32	3.65	3.38	3.38	3.26	3.67
EER with EC fans	3.64	3.41	3.69	3.48	3.89	3.39	3.84	3.43	3.72	3.46	3.50	3.36	3.76
SPL: dB(A)	57	57	58	59	62	59	63	64	67	62	67	68	68
Dimensions & weight													
Length: mm	860	860	1410	1410	1750	1410	1750	1750	2300	1750	2300	2300	2640
Depth: mm	880	880	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	315	330	440	470	490	460	500	520	580	540	620	660	740

OCU: with chilled water coil and upflow air discharge			
MODELS	50	110	160
Performances			
Total cooling cap: kW	43.7	96.1	142.7
Sens cooling cap: kW	37.0	77.9	116.5
Airflow: m <sup>3</sup> /h	9360	18360	27680
SPL: dB(A)	58	62	64
Dimensions & weight			
Length: mm	860	1750	2640
Depth: mm	880	880	890
Height: mm	1990	1990	1990
Net weight: kg	250	450	650

The performances are referred to: refrigerant R407; condensing temperature: 45°C; inlet air: 24°C - 50% RH; water: 7/12°C; available static pressure: 30 Pa  
 EER = Electro Efficiency Ratio = Total cooling capacity / compressors power input + fans power input (air cooled condensers excluded)  
 The SPL is referred to 2 m distance, 1,5 m height, free field and sound damped discharge mouth.  
 The above performances don't consider the heat generated by the fans which must be added to the thermal load of the system.

## DOWNFLOW AIR CONDITIONERS

### TECHNICAL CHARACTERISTICS

UCA: direct expansion with air or water cooled condensers and downflow air discharge								
MODELS	71-H	81-H	101-L	101-H	131-L	131-H	151-L	151-H
Performances								
Total cooling cap.:kW	21.4	23.3	28.3	32.5	38.8	43.7	42.9	47.5
Sens cooling cap.:kW	21.4	21.7	23.9	30.7	33.6	40.7	35.3	45.0
Airflow: m <sup>3</sup> /h	6910	6910	6910	9330	9330	13880	9330	13880
EER with standard fans	3.39	3.38	3.32	3.51	3.34	3.56	3.27	3.46
EER with EC fans	3.64	3.62	3.40	3.62	3.46	3.85	3.38	3.78
SPL: dB(A)	56	56	56	58	58	62	58	62
Dimensions & weight								
Length: mm	860	860	860	1410	1410	1750	1410	1750
Depth: mm	880	880	880	880	880	880	880	880
Height: mm	1990	1990	1990	1990	1990	1990	1990	1990
Net weight: kg	300	315	330	400	420	440	420	470

UCA: direct expansion with air or water cooled condensers and downflow air discharge													
MODELS	72-H	102-L	102-H	142-L	142-H	162-L	162-H	202-L	202-H	262-L	262-H	302-L	302-H
Performances													
Total cooling cap.:kW	24.4	27.8	32.4	40.3	44.0	43.6	48.9	57.6	67.0	73.7	78.7	86.3	96.0
Sens cooling cap.:kW	22.3	23.8	31.7	34.7	44.0	35.8	45.4	48.9	62.9	57.4	67.5	70.4	82.0
Airflow: m <sup>3</sup> /h	6910	6910	9680	9680	13880	9680	13880	13510	18660	13510	18660	18660	20330
EER with standard fans	3.40	3.24	3.50	3.36	3.48	3.32	3.55	3.37	3.63	3.38	3.38	3.29	3.67
EER with EC fans	3.64	3.41	3.69	3.48	3.88	3.43	3.86	3.46	3.77	3.46	3.47	3.37	3.76
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Depth: mm	880	880	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	315	330	440	470	490	460	500	520	580	540	620	660	740

UCU: with chilled water coil and downflow air discharge			
MODELS	50	110	160
Performances			
Total cooling cap.:kW	47.1	103.2	153.1
Sens cooling cap.:kW	39.6	83.2	124.4
Airflow: m <sup>3</sup> /h	9360	18710	28210
SPL: dB(A)	56	59	62
Dimensions & weight			
Length: mm	860	1750	2640
Depth: mm	880	880	890
Height: mm	1990	1990	1990
Net weight: kg	250	450	650

The performances are referred to: refrigerant R407; condensing temperature: 45°C; inlet air: 24°C - 50% RH; water: 7/12°C; available static pressure: 30 Pa

EER = Electro Efficiency Ratio = Total cooling capacity / compressors power input + fans power input (air cooled condensers excluded)

The SPL is referred to 2 m distance, 1,5 m height, free field and sound damped discharge mouth.

The above performances don't consider the heat generated by the fans which must be added to the thermal load of the system.



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