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K Series Modular air conditioners

- *With direct expansion coil*
- *With chilled water coil*



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- *With chilled water coil*

Designed for precision and comfort applications

K Series modular 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 central offices, computer centres, high-automated offices, 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, restaurants, libraries, and museums.

Their modularity allows coping with increasing cooling demand by installing additional units beside the original ones.

Silent functioning, energy efficiency, and ecological impact

- The scroll compressors of K series air conditioners with direct expansion coil are more silent than the alternative ones; they are contained as well into an acoustically insulated compartment, outside the air flow, which improves its working soundlessness still further.
- The scroll compressors have energy consumptions much lower than the other compressors, so limiting the ecological impact.
- Both the chilled-water and direct-expansion cooling coils

of the units with downflow air discharge (UK) are equipped with hydrophilic aluminium fins, which eliminate any possible condensate entrainment in the airflow and avoid the lower part of the coil from getting full of water, so reducing the heat exchange and therefore the capacity delivered by the air conditioners.

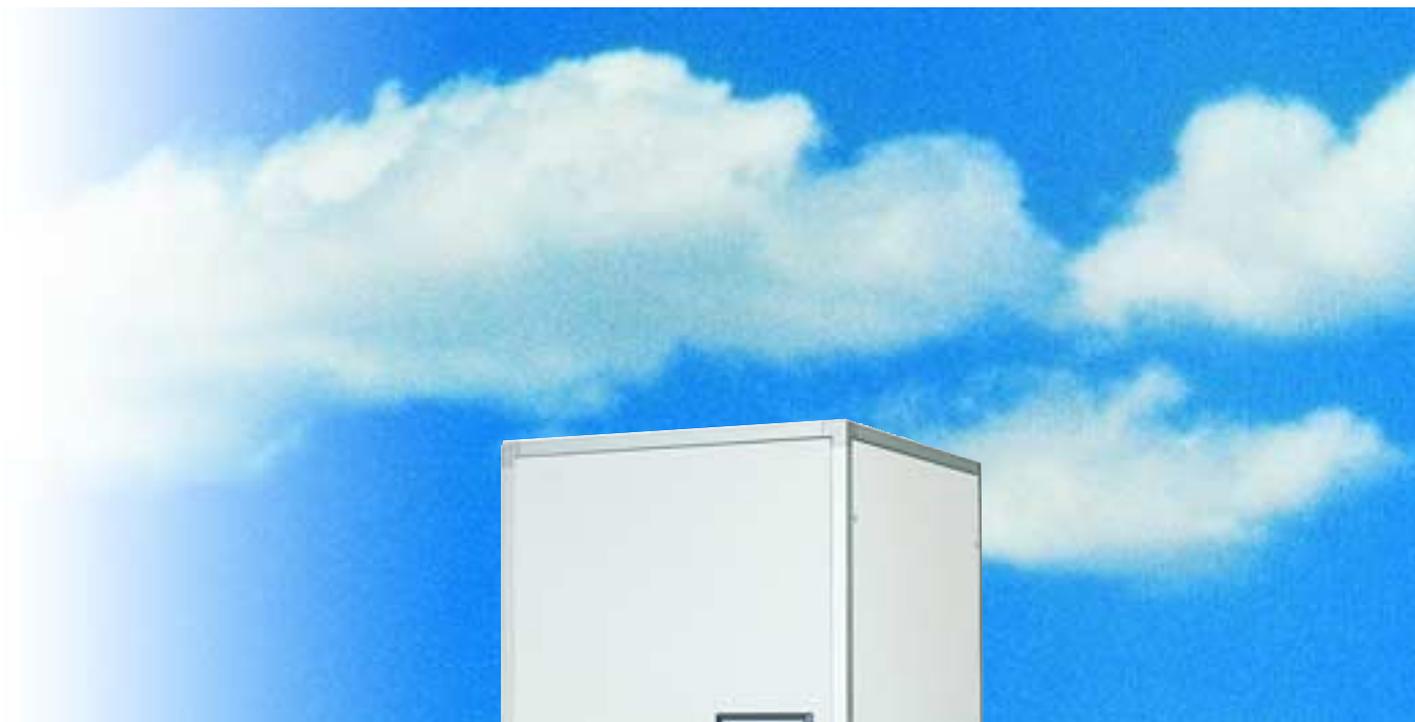
- The use of the ecologic refrigerant HFC R407C contributes to the conservation of the environment (unit with R 22 available on request)
- The high aerodynamic efficiency of the units with downflow air discharge is due, for the units equipped with direct expansion circuit, to the fan which is positioned centrally, instead of in the base, with a downflow duct that partially recovers the dynamic pressure, improves the system effect, and involves lower fan energy consumption.
- 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).

Minimum foot print and front maintenance

Space inside technological rooms is always a precious thing. This is why Tecnaire LB's modular air conditioners are specially designed for minimising their footprint.

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.



Features and performance

Microprocessor regulation

The μ 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 pCO² microprocessor (optional) shall be installed in lieu of standard μ AC.

Local network management or remote control

Series K air conditioners can work in local-network mode, that is, with several units (up to 6) 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 Tecnaire LB 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. OKA UKA models for pairing with remote condensers, and OKE UKE models for pairing with remote

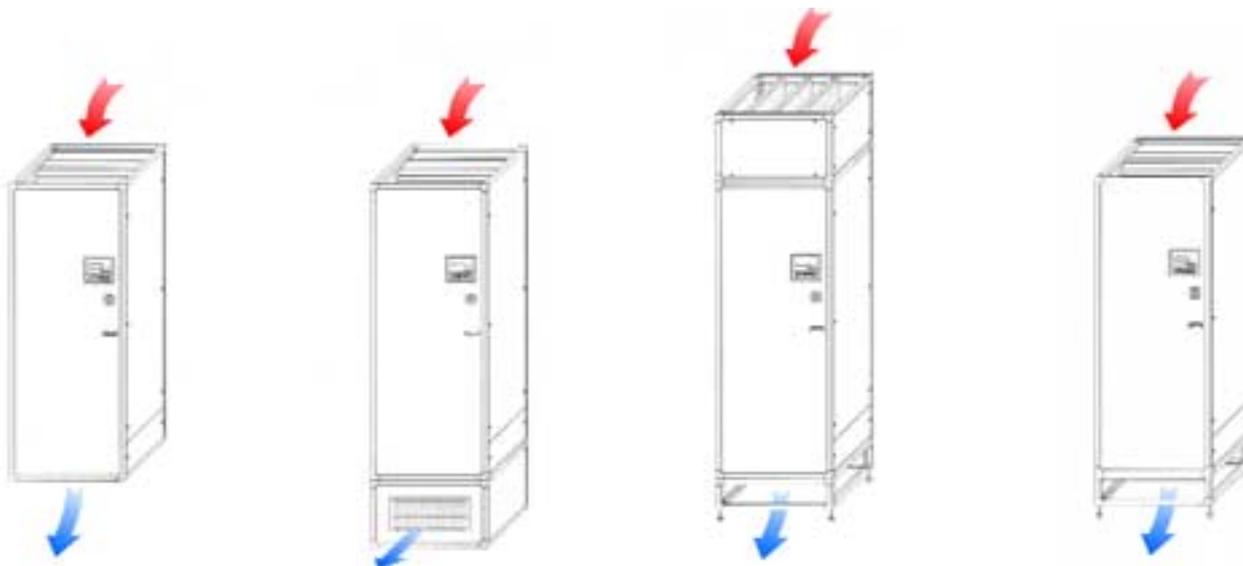


condensing units, are already equipped with a pressurised refrigerant charge. The definitive charge, and the oil top-up (if required), shall be made by the installer on site. OKW & UKW air conditioners self-contained type with built-in water-cooled condenser, are supplied with full refrigerant and oil charge.

Modulating 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 50% to 100% of the cooling capacity of the frigorific circuit. In case of necessity of a modulating regulation from 5% to 100% 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 pCO² microprocessor (optional) instead of standard μ AC.

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

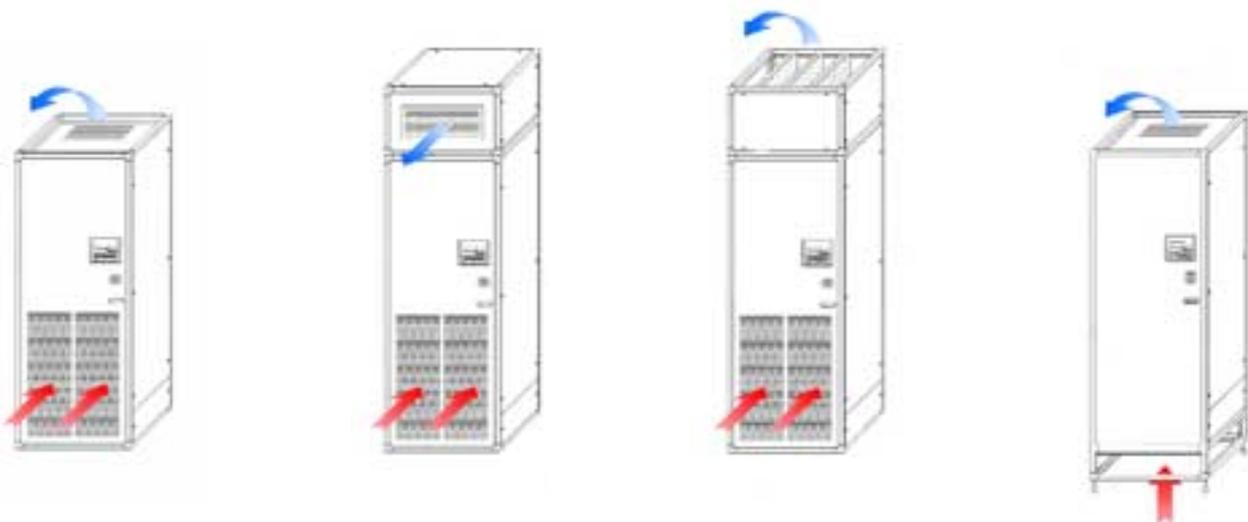
A mechanical hot gas injection valve allows obtaining a modulating regulation from 70% to 100% of the cooling capacity of the frigorific circuit. The valve regulation is made on the refrigerant suction pressure and overheating, and therefore the use of the pCO² microprocessor (optional) is not mandatory.

One or two parallel or independent compressors

All the air conditioners have one frigorific circuit with one

compressor compartmentated from the air flow, excluding these models:

- Size 131.2 is equipped with two scroll compressors tandem connected with a single cooling circuit allowing a remarkable increase of working C.O.P. with partial thermal loads, which are the most frequent during the life of the system, and therefore great operating cost saving. Installation costs are reduced too, thanks to the single external condenser connecting circuit.
- Sizes 101, 131 and 151 are equipped with one scroll compressor connected with a single cooling circuit. In this execution the compressor is not compartemented from the air flow.
- Conversely, sizes 72, 102, 132, and 152 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: OKU and UKU, 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 throttling valve (3 points) allows good modulation of the cooling capacity produced as a function of the environmental conditions, especially with constant thermal loads, as it responds quite slowly to their quick changes.

Depending on the application, four-row coil units are available for water 7/12: in such case, the last number of the code is 4; alternatively, six-row coils are available too, for higher water temperatures: in this case, the last number is 6.

Units with 6 rows cooling coil cannot have hot water ones.

Modulating regulation of the cooling capacity

(units equipped with chilled water coil)

On the contrary, if a very precise regulation and response speed are required, a modulating valve (optional) can be installed in lieu of the throttling one.

However, the modulating valve needs an analogue signal, not digital, so the installation of the pCO² micro-processor (optional) is absolutely required.

Fans

The fan section is made of one or several centrifugal direct-driven single speed fans with double air-suction, mounted on antivibration supports functioning soundlessness. The static pressure available is suitable for most applications. However, external transmission is

available too on request (optional), if higher static pressure is required.

Electric board

All 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 Regulations in force.

The electric board of the units equipped with compressors ("A" or "W" as third letter of the identification code) have a standard 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 LB. 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 regenerative self-extinguishing class-G3 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. Alternatively, efficiency-G4 filters can be installed too (optional).

Design suitable to civil environments

K Series air conditioners have a nice and functional design, suitable for installation in civil environments. Their structure consists of an anodised-aluminium plate frame onto which special galvanised-steel plate panels are hinged.

These panels are coated with a light-grey PVC layer, thermo-acoustically insulated by a 25mm-thick polyurethane layer, and further coated with a plastic film.

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

For downflow units too there are two versions: suction from top and discharge from the bottom (standard) or suction from front panel and always discharge from the bottom one (optional).

Fittings

- Electronic immersed-electrode modulating humidifier and dehumidification control
- Two-row hot-water heating-rehating coil with floating (three-way) adjusting valve
- One- or two-step thermally-protected low-heat-inertia heater- reheader
- Pressostatic two-way valves (OKW & UKW)
- Pressostatic three-way valves (OKW & UKW)
- Single phase variator of the revolution number of the condenser fans. Max. 8A
- Three-way modulating valve, in lieu of the floating one (units with only pCO² only)
- pCO² microprocessor in lieu of the standard μ AC
- Hot-gas injection and expansion electronic valves for a perfectly modulating cooling capacity regulation: 50% 100% (units with only pCO² only)
- Additional electronic expansion valve for 5%- 100% regulation
- Pressostatic hot gas injection valve for cooling capacity regulation.
- G4 efficiency air filters in lieu of standard G3
- Variable belt-drive and -pulley fans in lieu of standard direct driven fans.
- Power factor correction condenser for compressor
- 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 dimension.
- Adjustable under base with air conveyor. Specify the height dimension.
- Sound damped hood (h=450 mm) for air discharge or suction. Allows approx. 4 dB (A) reduction of unit SPL.
- Layer lead plate sound damping panels. Allow approx. 2 dB (A) reduction of unit LPS (up flow air discharge models) (series OK), and approx. 4 dB (A) reduction of unit LPS (downflow air discharge models) (series UK)
- Double skin panels with 25 mm insulation inside.
- Blind front panel (OK) and open base for bottom air intake
- Grilled front panels for UK units for front air intake.
- Gravity over-pressure dampers (series OK) on the air discharge mouth
- Motor-driven over-pressure dampers (series UK) on the air suction mouth
- Humidity sensor and modulating board for dehumidification control only, or remote humidifier control (not supplied by Tecnair)
- Clock board for time band control
- RS 485 communication board
- Water alarm (supplied loose)
- Out-of-range air active discharge temperature alarm

Special versions

“Free cooling”, using renewable energy sources

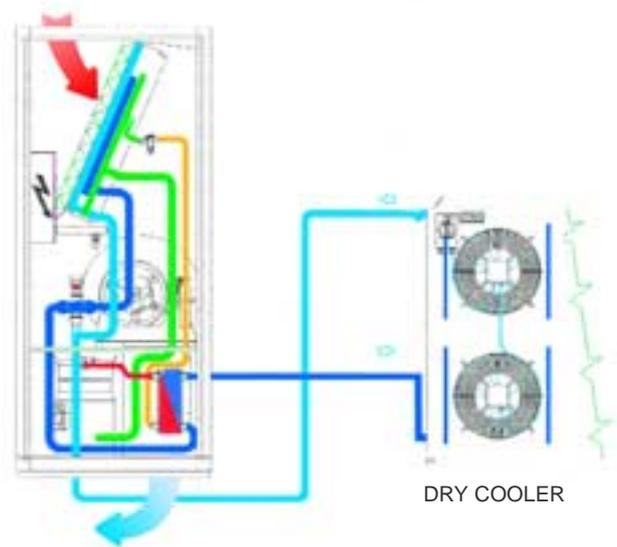
OKW - UKW/FC air conditioners (from model 71L) are equipped with a “Free cooling” system consisting of an additional chilled-water cooling coil integrated in the aluminium fins of the unit's direct expansion coil, with a three-way modulating valve controlled by the microprocessor.

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.

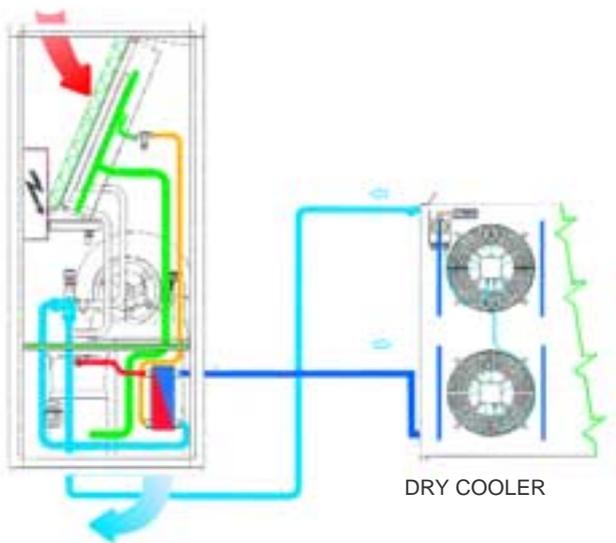
The three way pressostatic valve installed on the condenser allow constant water flow in the circuit so that the use of a variable speed pump is not requested.

The pumps and the expansion tank are not included in Tecnair LB'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 pCO² microprocessor

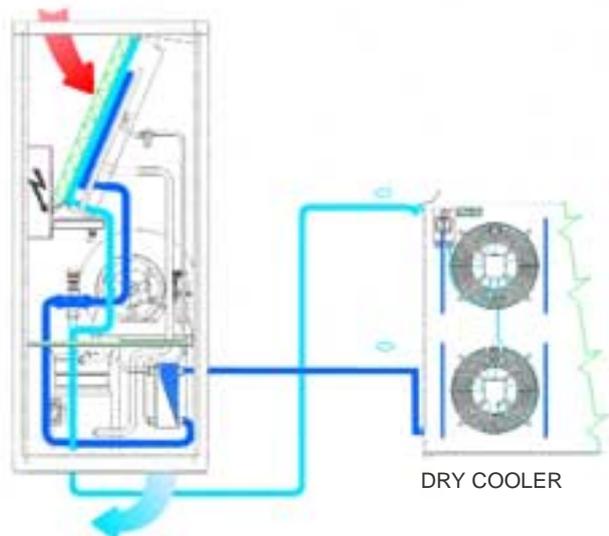
The system widely uses the outdoor air—a renewable energy source—in lieu of or in addition to the mechanical cooling.



FREE COOLING SYSTEM
“SPRING-AUTUMN WORKING”
(Direct expansion + chilled water)



FREE COOLING SYSTEM
“SUMMER WORKING”
(Direct expansion)



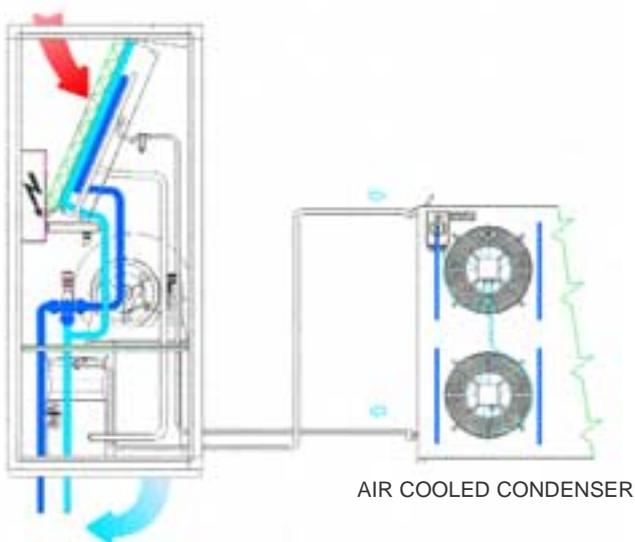
FREE COOLING SYSTEM
“WINTER WORKING”
(Chilled water)

“Two seasons”, using excess of energy

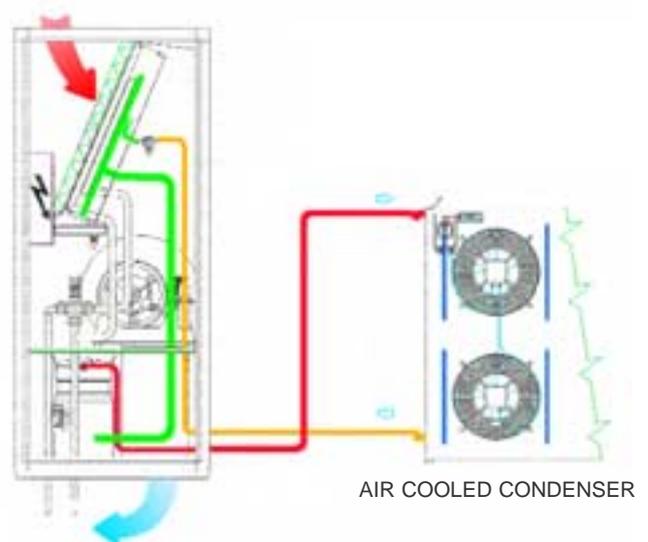
This system (available from model 71L) consists of the same chilled-water cooling coil as the “Free cooling”, but unlike those ones, this one is fed by the building water chiller. However, in this case too, the compressors are stopped or partially operated as long as the system cooling capacity is available. The excess of cooling power of the central system can be recovered for nearly all the year, so the direct expansion system is only used for summer peaks or in winter, when the system is either at the end of its capacity or out of order: The result is a remarkable reduction of both consumption and running costs.

Units in “two seasons” cannot install the option hot water heating coil, but only the electric one, and have as standard the pCO² microprocessor

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 city water network.



“TWO SEASON SYSTEM”
Working (chilled water)



“TWO SEASON SYSTEM”
Working (Direct expansion)

Technical characteristics

OKA / UKA models with air- or water-cooled remote condenser

Models	31-L	31-H	41-L	41-H	51-L	51-H	71-L	71-H	81-L	81-H	101-L	101-H	131-L	131-2L	131-H
Cooling cap. total, kW	8,2	8,5	10,8	12,2	13,9	15,8	18,1	18,9	24,1	26,2	30,5	32,9	35,6	35,9	37,8
- sensitive, kW	7,0	7,0	9,9	11,0	11,8	15,8	16,4	17,9	22,2	24,7	26,2	31,7	32,0	33,1	38,4
Abs. power kW	2,0	2,0	2,9	2,9	3,8	3,6	5,2	5,3	6,8	7,0	8,2	8,3	10,2	10,3	9,9
Airflow, m3/h	1.830	2.360	2.360	3.230	3.230	4.960	4.950	5.780	5.780	7.260	7.260	9.880	9.880	9.880	11.700
S.P.L.: dB (A) UK/OK	45/46	47/48	47/48	48/50	48/50	50/53	51/54	50/53	52/56	52/55	52/55	52/57	52/57	58/60	54/59

Characteristics referring to: Refrigerant R 407C; condensing temp. 45 °C; inlet air temp. 24 °C, 50% R.H., Static pressure 30 Pa
S.P.L. at 2 mt in free field with ducted air discharge.

OKW / UKW models with incorporated water-cooled condenser

Models	31-L	31-H	41-L	41-H	51-L	51-H	71-L	71-H	81-L	81-H	101-L	101-H	131-L	131-2L	131-H
Cooling cap. total, kW	8,4	9,3	11,3	12,6	14,5	16,3	20,2	19,3	24,8	27,0	32,4	34,4	37,8	36,7	39,8
- sensitive, kW	7,3	7,3	8,3	11,4	12,3	16,1	17,5	19,0	22,5	25,1	27,0	32,0	33,5	34,0	37,3
Abs. power kW	1,8	1,8	2,7	2,7	3,4	3,4	5,0	5,2	6,5	6,7	8,0	8,1	9,9	10,0	9,7
Airflow, m3/h	1.830	2.360	2.360	3.230	3.230	4.960	4.960	5.780	5.780	7.260	7.260	9.880	9.880	9.880	11.700
S.P.L.: dB (A) UK/OK	45/46	47/48	47/48	48/50	48/50	50/53	51/54	50/53	52/55	52/55	51/56	52/57	52/57	58/60	54/59

Characteristics referring to: Refrigerant R 407C; condensing temp. 40 °C, water in temp. 30 °C; air temp. 24 °C, 50% R.H., Static pressure 30 Pa
S.P.L. at 2 mt in free field with ducted air discharge.

OKE / UKE models to be matched to remote condensing unit

Models	41	51	71	81	101	131	151
Cooling cap. total, kW	11,4	14,3	22,5	29,7	38,5	31,2	57,3
- sensitive, kW	9,8	11,9	18,9	22,4	30,3	31,7	45,2
Airflow, m3/h	2.360	3.230	4.960	5.780	7.250	9.880	11.710
S.P.L.: dB (A) UK/OK	46/47	46/48	49/52	49/52	51/54	53/56	55/58

Characteristics referring to: Refrigerant R 407C; evaporation temperature: 4.2°C; air temp. 24°C; 50% R.H., Static pressure 30Pa
S.P.L. at 2 mt in free field with ducted air discharge.

OKU / UKU models with chilled water coil

Models	44	46	54	56	74	76	84	86	104
Cooling cap. total, kW	8,0	10,7	15,4	17,5	18,6	20,7	28,8	32,3	39,4
- sensitive, kW	7,7	8,6	13,1	14,0	16,4	17,8	23,2	26,0	31,0
Airflow, m3/h	2.420	2.360	3.300	3.230	4.960	4.750	5.780	5.650	7.260
S.P.L. dB (A) UK/OK	44/45	44/45	45/48	45/48	49/52	49/52	48/52	48/52	51/54

Characteristics referring to: Chilled water temp. 7/12 °C; inlet air temp. 24 °C, 50% R.H. Static pressure 30 Pa
S.P.L. at 2 mt in free field with ducted air discharge.

Note: The above performances do not consider the power absorbed by the fan, which must be added to the thermal load of the system.

Dimensions and weights

OKA /UKA /OKW/ UKW models, dimensions in mm

Models	31-L	31-H	41-L	41-H	51-L	51-H	71-L	71-H	81-L	81-H	101-L	101-H	131-L	131-2L	131-H
Width	750	750	750	750	750	750	750	900	900	1.190	1.190	1.460	1.460	1.460	1.720
Depth	600	600	600	600	600	750	750	850	850	850	850	850	850	850	850
Height	1.960	1.960	1.960	1.960	1.960	1.960	1.960	1.990	1.990	1.990	1.990	1.990	1.990	1.990	1.990
Net weight kg	165	175	195	206	215	265	270	305	315	340	350	400	405	420	450

OKU / UKU models, dimensions in mm

Models	44	46	54	56	74	76	84	86	104	106
Width	750	750	750	750	750	750	900	900	1.190	1.190
Depth	600	600	600	600	750	750	850	850	850	850
Height	1.960	1.960	1.960	1.960	1.960	1.960	1.990	1.990	1.990	1.990
Net weight kg	160	156	180	185	230	240	280	290	330	340

OKE / UKE models, dimensions in mm

Models	41	51	71	81	101	131	151
Width	750	750	750	900	1.190	1.460	1.720
Depth	600	600	750	850	850	850	850
Height	1.960	1.960	1.960	1.990	1.990	1.990	1.990
Net weight kg	150	180	230	290	310	380	420

Series K air conditioners

131-2H	151-L	72-H	102-L	102-H	132-L	132-H	152-L
37,6	47,5	25,8	29,3	32,1	36,9	37,6	47,5
37,6	41,5	24,3	25,7	31,5	33,1	37,6	41,5
12,6	13,8	5,8	7,2	7,2	12,3	12,6	12,9
11.710	11.710	7.260	7.260	9.880	9.880	11.710	11.710
58/60	58/60	51/54	52/55	54/57	58/60	58/60	58/60

131-2H	151-L	72-H	102-L	102-H	132-L	132-H	152-L
38,2	48,1	25,9	30,1	32,8	36,9	38,1	48,8
38,0	42,0	24,6	26,3	31,8	35,6	37,8	41,9
12,2	13,5	5,6	6,9	7,0	12,0	12,2	12,5
11.710	11.710	7.260	7.260	9.880	9.880	11.710	11.710
58/60	58/60	51/54	52/55	54/57	58/60	58/60	58/60

102	132	152
38,5	34,2	57,3
30,3	31,7	45,2
7.260	9.880	11.710
51/54	53/58	55/58

106	134	136	154	156
44,5	56,4	60,8	56,3	62,4
34,9	43,2	48,1	45,2	48,9
7.080	9.880	9.710	11.710	11.430
51/54	53/58	53/58	55/58	55/58

131-2H	151-L	72-H	102-L	102-H	132-L	132-H	152-L
1.720	1.720	1.190	1.190	1.460	1.460	1.720	1.720
850	850	850	850	850	850	850	850
1.990	1.990	1.990	1.990	1.990	1.990	1.990	1.990
485	490	360	370	420	425	485	490

134	136	154	156
1.460	1.460	1.720	1.720
850	850	850	850
1.990	1.990	1.990	1.990
350	395	450	460

102	132	152
1.190	1.460	1.720
850	850	850
1.990	1.990	1.990
290	300	400

Basic models

OK - UK / H : high airflow units for central office and computer centre application.

OK - UK / L: low airflow units for comfort application.

Air discharge

OK: up flow air discharge and front or downflow air suction.

UK: downflow air discharge and front or up flow air suction.

Direct expansion

OKA - UKA

To be matched to air- or water-cooled remote condenser, with R407C or R22 refrigerant.

OKA/TS- UKA/TS

Equipped with "two season" system, and to be matched to air- or water-cooled remote condenser, with R407C or R22 refrigerant.

OKW - UKW

With incorporated water-cooled condenser, with R407C refrigerant.

OKA/FC-UKW/FC

Equipped with "Free cooling" system and incorporated water-cooled condenser, with R407C refrigerant.

OKE-UKE

To be matched to remote condensing unit, with R407C refrigerant.

Chilled water

OKU - UKU

With chilled water coil, to be matched to a remote water chiller.



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