



Cooling equipment with superior operational qualities and high performance levels!!

CLOSE CONTROL AIR CONDITIONERS



Product Guide

COOL SERIES

| | | |
|---------------------------------------|--------------------|--------------------|
| SERIES: DOA/DUA/WOC/WUC | CODE: CC01 | CHECKED BY: |
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The manufacturer reserves the right to modify specifications without notice

- with direct expansion coil
- with chilled water coil

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WE WORK HARD

To always provide the answer



New Series of close control air conditioners

Electronic and comfort applications

Our close control air conditioners are suitable to be applied for air conditioning of telecommunication offices, computer rooms, data servers, high automated offices and special “close control” uses.

They can be used also for application into common business and tertiary environments, as for example conference rooms, shopping centres, restaurants, libraries, and museums.

Hitema close control air conditioners have been designed to minimize the space because we know very well that it is important a minimum foot print and front maintenance space inside technological rooms, but, at the same time **Hitema** close control air conditioners have one of the Market’s most advantage ratios between sensible cooling capacity and base foot print.

Except the replacement of heat-exchange coils, ordinary or extraordinary maintenance can be executed from the front side of the unit, and that means to have more side space available allowing the installation of several units close to each other. The access is really easy and quick through the hinged front doors.



Silent functioning, energy efficiency and ecological impact

- “Cool” series air conditioners is provided with scroll compressor with direct expansion coil and they are more silent than the alternative ones.
- The ecological impact is limited thanks to scroll compressor which have much lower energy consumption than the others.
- In the down-flow units, both chilled water version and direct expansion executions, the cold coil has aluminium fins with hydrophilic treatment that permits to avoid the risk of the air carrying condensation and so to avoid that the coil fills up of water and consequently to reduce the thermal exchange and the air conditioner capacity.
- Using the ozone-friendly refrigerant HFC R407 our air conditioners contribute to the conservation of the environment (R410 and R134 refrigerant is available on request).
- A lower pressure drop is possible because thanks to its larger surface, the filter on the coil allows lower crossing speed.
- The lower energy consumption of [Hitema](#) air conditioners, have a very reduced TEWI (Total Equivalent Warming Impact) compared with other air conditioners at the same efficiency.



Features and Performances

Microprocessor regulation

The μ AC microprocessor manages all the typical air-conditioning functions and it allows, very accurately and at the right moment to cool, heat, humidification, dehumidification, and to filter. Thanks to the microprocessor the regular and optimised functioning is assured for both performance and consumption and it provides for alarm management and self-diagnosis. Instead of μ AC microprocessor it is possible to install the pCO microprocessor as optional if you need to install components that require analogical control (modulating valve or electronic hot-gas by-pass valve). The pCO is the standard microprocessor on special versions such as “Free cooling”, “Two sources” and “Fresh air” units.

Local network management or remote control

Our series of air conditioners can work in local-network mode with several units (up to 8) in the same room. In case of a peak load or of an emergency the slave unit intervenes. A unit slaves all the others and all master units become slave on rotation, for instance every 12 or 24 hours. That permit to equalise the number of running hours.

With a special supervisor or communication protocol as Gateway, Modbus or Bacnet, you can control up to 64 units, in remote control mode, in remote position, via modem.



Cooling circuit

The cooling circuit of air conditioners with direct expansion coil is equipped by scroll compressor with all necessary protective devices as high pressure (manual reset) and low pressure (automatic reset) switches, thermal expansion valve, dehydrating filter with refrigerant sight glass.

DOA, DUA models for pairing both with remote condensers or remote moto-condensing units are equipped with the charge of pressurized nitrogen. The refrigerant charge and, if required, the oil charge can be made on site by the installer.

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



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

As option it is available the electronic hot gas injection valve which permits a perfect modulating regulation from 50 to 100% of the cooling capacity of the frigorific circuit.

Another option available is the electronically controlled valve for refrigerant expansion that can be installed if it is necessary to have modulating regulation from 10 to 100% with very low tolerance on the room temperature even with a high outdoor air flow.

In the case you need these options, remember that they requires the pCO microprocessor (optional) instead of standard μ AC microprocessor.

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

Thanks to the mechanical hot gas injection valve it is possible to modulate the regulation from 60 to 100% of the cooling capacity of the cooling circuit. The valve regulation is made on the refrigerant suction pressure and overheating, so it is not necessary the use of pCO microprocessor (optional).



One or two completely independent compressors

- From the model 107 to the model 148 in the units it is installed one scroll compressors connected with a single cooling circuit;
- From the model 224 to the model 296 in the units it is installed two scroll compressors and two independent cooling circuits, which assure the utmost working safety.



Hydraulic circuit

A finned coil and a three-way throttling motorised valve for water flow regulation are included in the series WOC and WUC that are air conditioners with chilled water coil. The hydraulic circuit has copper tubes with anti-condensate insulation and the coils are optimized for water temperature 7/12 as well as the higher water temperature 12/17. Thanks to the throttling valve (3 points) the unit has a good modulation of the cooling capacity produced in function of the environmental conditions, with constant thermal loads and it slowly responds to their quick changes.

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

Instead of throttling valve you can install a modulating valve, as option, which permits a very precise regulation and a high speed of response and it is suggested in case of you need a functioning with fresh air.

The option of the pCO microprocessor is mandatory because the modulating valve needs an analogue signal instead of the digital one.

Electric board

All the units have their own complete electric board, the main shutter-block switch, magneto-thermic switches, contactors, and all necessary protections are provided as well, as required by the standards in force.

It is standard also the phase sequencer in the electric board of the units equipped with compressors; it prevents the compressor from getting damaged when counter running.

The board has also two free terminals for remote indication of a cumulative alarm and two terminals for starting up and stopping the unit from remote position.

The variation device for the revolution number of the fans is standard in the MRC and MRC/LN air cooled condensers while it is an option in the electric panel of air cooled remote condensers (winter control).

However the variation device can be ordered separately as accessory in the case you have another condenser unit.

Large surface filters

The units are equipped with self-extinguishing class G4 filters. To be able to offer a larger surface and allow lower air crossing speeds, with lower energy consumption, filters have been installed inclined before the cooling coil. As accessory you can have a 450 mm high duct that can be installed for holding a F7 class filter on supply both vertically or for backwards air discharge.

Design suitable to civil environments

This air conditioners series is good to be installed in civil location and it has a good functional design. The structure is made of aluminium profiles and closing panels. 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: the standard one is front grille & top air discharge, the optional is blind front panel, suction from the bottom and top discharge.



Fan section

Standard fans

The standard fan section is provided with one or more backward curved, free running impeller, radial fans (plug fan) with single speed motors which offer a really low noise level but at the same time a high efficiency. An easy cleaning of the blades is assured by the free running impeller. An high available static pressure is guarantee which is perfect for most applications.

The final air flow comes as a consequence of the real pressure drop of the installation.

Standard fans with auto-transformer

An auto-transformer to regulate the fan motors revolution number can be installed as accessory if you need to adjust the air flow during commissioning, or in order to be able to change it during the functioning.

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

Instead of standard fans, it can be installed a special EC fans (electronically commutated plug fans) which adapt the external static pressure to the one requested by the installation.

Besides, these fans have other important characteristics as: a very high fan shaft motor efficiency, up to 90% that reduces a lot the power input and guarantees a lower noise level; an higher available static pressures that is very important in case of it is necessary to install as accessory the air filter F7 this allows a better use of the filter itself without reducing the air flow (see below: constant air flow regulation) and least but not last a very low start up current : soft start function.

With the option of EC fans, also pCO microprocessor is necessary because these fans require a 0 – 10V signal.

It can be requested the following air flow regulation:

1. Electronic fans for constant air flow regulation

The pCO controls the EC fans to guarantee a constant air flow also if the filters become dirty and it might cause a considerable reducing at the air flow. This solution is really suggested when F7 class filters are installed.

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

The pCO controls the EC fans to modulate the air flow basing on the cooling capacity demanded by the system. So, it is 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 units 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 EC fans to maintain a constant pressure in the raised floor (only for units chilled water coil). This regulation is the best one if you have large offices with more 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. Supplied loose and to be installed in the raised floor you have a pressure sensor that informs the microprocessor about the increase in pressure corresponding to the total or partial closure of the dampers.

The pCO microprocessor 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.



Special versions

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

DOHC.../FC, DUHC.../FC air conditioners are units with a “Free cooling” system so they are equipped with 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. The microprocessor cuts out or minimises the compressors' intervention when ambient conditions allow the water to respond totally or partially to the cooling request. In this way, the energy consumption is considerably reduced.

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 the units in “free cooling version” the option hot water heating coil can not be installed, but only the electric one, and as standard they have pCO microprocessor.

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



“Double fluid”, 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. In case of lack of chilled water, a cooling circuit enters in operation. In this way 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 emergency, the chilled-water coil connected with the tap water network.

For the units with direct expansion circuit DOA.../TS, DUA.../TS and for the units with built in water cooled condenser as accessory and with double chilled water coil DOAH.../TS, DUAH.../TS it is available the “two season” version, one for district water and the other for tap water (emergency).

The option hot water heating coil can not be installed in the units in “two sources”, 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 floating (three-way) adjusting valve
- One or two steps low thermal inertia heater-reheater
- Welded plate built in water cooled condensers
- Pressostatic two-way valves (DOH & DUH with water cooled condenser)
- 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 pCO only)
- pCO 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 pCO only)
- Additional electronic expansion valve for 10%- 100% regulation
- Pressostatic hot gas injection valve for cooling capacity regulation.
- Duct hood for F7 filter to be installed on the discharge (h=450 mm).
- Auto-transformer for the fans.
- Electronic EC fan for constant air flow regulation.
- Electronic EC fan for the regulation of the airflow in relationship to the cooling capacity.
- Electronic EC fan control to assure constant pressure inside the double floor.
- Filtered connection for fresh air intake: max 200 m³/h
- Air discharge or suction plenum (h=450 mm) with front grilles.
- Air discharge or suction plenum (h=450 mm) with front and side grilles
- Adjustable base frame. Specify the height.
- Adjustable base frame 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. Allow approx. 2 dB(A) reduction of unit SPL for up flow air discharge models, and approximately 4 dB(A) reduction for down flow air discharge models
- Double skin panels with 25 mm insulation inside.
- Blind front panel and open base for bottom air intake
- Gravitational over-pressure dampers on the air discharge mouth
- Motorised over-pressure dampers on the air suction mouth (down flow units)
- Humidity sensor and modulating board for dehumidification control only, or remote humidifier control (not supplied by Hitema)
- Clock board for time band control
- RS 485 communication board
- Water alarm (supplied loose)
- Out-of-range air active discharge temperature alarm



UPFLOW AIR CONDITIONERS : TECHNICAL CHARACTERISTICS

DOA/H models with air- or water cooled remote condenser

| MODELS | 107 | 110 | 112 | 114 | 116 | 119 | 122 | 126 | 128 | 132 | 139 | 144 | 143 | 148 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|-------|------|-------|
| Total cool. capac.Kw | 6.6 | 9.3 | 11.6 | 13.4 | 15.6 | 19.1 | 20.3 | 22.9 | 26.4 | 32.1 | 38.1 | 42.3 | 41.2 | 46.1 |
| Sens. cool. capac. Kw | 6.6 | 9.3 | 10.8 | 12.2 | 15.6 | 17.5 | 20.1 | 21.0 | 22.7 | 29.1 | 31.9 | 41.4 | 33.2 | 43.0 |
| Airflow m3/h | 3130 | 3130 | 3130 | 3610 | 5210 | 5210 | 7410 | 7410 | 7410 | 9360 | 9360 | 14930 | 9360 | 14930 |
| EER | 3.38 | 3.47 | 3.36 | 3.19 | 3.11 | 3.19 | 3.40 | 3.32 | 3.03 | 3.46 | 3.27 | 3.39 | 3.14 | 3.31 |
| SPL dB(A) | 49 | 49 | 49 | 55 | 55 | 56 | 58 | 58 | 58 | 58 | 58 | 63 | 58 | 64 |
| Length:mm | 750 | 750 | 750 | 750 | 750 | 750 | 860 | 860 | 860 | 1410 | 1410 | 1750 | 1410 | 1750 |
| Depth:mm | 630 | 630 | 630 | 630 | 880 | 880 | 880 | 880 | 880 | 880 | 880 | 880 | 880 | 880 |
| Height:mm | 1965 | 1965 | 1965 | 1965 | 1965 | 1965 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 |
| Net weight Kg | 170 | 170 | 170 | 210 | 270 | 270 | 300 | 315 | 330 | 400 | 420 | 440 | 420 | 490 |

| MODELS | 224 | 227 | 234 | 240 | 245 | 243 | 250 | 260 | 268 | 275 | 280 | 287 | 296 |
|-----------------------|------|------|------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| Total cool. capac.Kw | 23.0 | 25.2 | 29.9 | 36.5 | 42.4 | 40.8 | 46.4 | 54.4 | 64.4 | 71.2 | 76.4 | 83.3 | 93.9 |
| Sens. cool. capac. Kw | 21.0 | 21.9 | 28.7 | 31.9 | 41.4 | 33.7 | 43.1 | 46.0 | 60.0 | 57.7 | 65.2 | 67.6 | 83.3 |
| Airflow m3/h | 7410 | 7410 | 9780 | 9780 | 14930 | 9780 | 14930 | 14430 | 18710 | 14430 | 18710 | 18710 | 21710 |
| EER | 3.26 | 2.96 | 3.27 | 3.29 | 3.56 | 3.14 | 3.37 | 3.12 | 3.47 | 3.24 | 3.28 | 3.18 | 3.55 |
| SPL dB(A) | 58 | 58 | 58 | 59 | 63 | 59 | 64 | 64 | 67 | 62 | 67 | 68 | 68 |
| 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 | 450 | 450 | 490 | 450 | 500 | 520 | 580 | 540 | 620 | 660 | 740 |

WOC models with chilled water coil and upflow air discharge

| MODELS | 20 | 30 | 50 | 80 | 110 | 160 |
|-----------------------|------|------|------|-------|-------|-------|
| Total cool. capac.Kw | 21.3 | 29.3 | 39.5 | 64.8 | 95.7 | 131.1 |
| Sens. cool. capac. Kw | 16.4 | 23.2 | 33.3 | 55.0 | 77.5 | 106.9 |
| Airflow m3/h | 3980 | 6010 | 9060 | 14930 | 18230 | 27580 |
| SPL dB(A) | 48 | 50 | 58 | 59 | 62 | 64 |
| Length:mm | 750 | 750 | 860 | 1750 | 1750 | 2640 |
| Depth:mm | 630 | 780 | 880 | 880 | 880 | 880 |
| Height:mm | 1965 | 1965 | 1990 | 1990 | 1990 | 1990 |
| Net weight Kg | 155 | 180 | 250 | 450 | 450 | 650 |

Characteristics referring to : R407 refrigerant; condensing temp. °C 45; inlet air temp. °C 24, 50% RH; water temp. °C 7 / 12, 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 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

DUA/H models with air- or water cooled remote condenser

| MODELS | 107 | 110 | 112 | 114 | 116 | 119 | 122 | 126 | 128 | 132 | 139 | 144 | 143 | 148 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|-------|------|-------|
| Total cool. capac.Kw | 6.6 | 9.3 | 11.6 | 13.0 | 15.3 | 18.7 | 20.6 | 22.6 | 26.9 | 31.9 | 38.1 | 43.0 | 41.4 | 47.5 |
| Sens. cool. capac. Kw | 6.6 | 9.3 | 10.8 | 11.3 | 15.3 | 17.1 | 20.6 | 22.6 | 24.2 | 30.6 | 33.2 | 43.0 | 34.7 | 45.9 |
| Airflow m3/h | 3130 | 3130 | 3130 | 3130 | 5210 | 5210 | 7410 | 7410 | 7410 | 9360 | 9360 | 14930 | 9360 | 14930 |
| EER | 3.38 | 3.47 | 3.36 | 3.09 | 3.05 | 3.11 | 3.45 | 3.28 | 3.09 | 3.44 | 3.27 | 3.45 | 3.16 | 3.41 |
| SPL dB(A) | 49 | 49 | 49 | 49 | 51 | 51 | 57 | 57 | 57 | 58 | 58 | 63 | 58 | 63 |
| Length:mm | 750 | 750 | 750 | 750 | 750 | 750 | 860 | 860 | 860 | 1410 | 1410 | 1750 | 1410 | 1750 |
| Depth:mm | 630 | 630 | 630 | 630 | 880 | 880 | 880 | 880 | 880 | 880 | 880 | 880 | 880 | 880 |
| Height:mm | 1965 | 1965 | 1965 | 1965 | 1965 | 1965 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 | 1990 |
| Net weight Kg | 170 | 170 | 170 | 210 | 255 | 270 | 300 | 315 | 330 | 400 | 420 | 440 | 420 | 470 |

| MODELS | 224 | 227 | 234 | 240 | 245 | 243 | 250 | 260 | 268 | 275 | 280 | 287 | 296 |
|-----------------------|------|------|------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| Total cool. capac.Kw | 23.4 | 26.5 | 29.9 | 36.7 | 43.2 | 41.1 | 46.2 | 55.6 | 65.1 | 71.2 | 77.7 | 83.6 | 93.9 |
| Sens. cool. capac. Kw | 22.8 | 24.1 | 29.9 | 33.2 | 43.2 | 35.0 | 46.2 | 49.3 | 62.2 | 57.7 | 67.4 | 70.2 | 83.3 |
| Airflow m3/h | 7410 | 7410 | 9780 | 9780 | 14930 | 9780 | 14930 | 14430 | 18710 | 14430 | 18710 | 18710 | 21710 |
| EER | 3.32 | 3.11 | 3.27 | 3.30 | 3.63 | 3.17 | 3.36 | 3.19 | 3.51 | 3.24 | 3.34 | 3.19 | 3.55 |
| SPL dB(A) | 57 | 57 | 59 | 59 | 63 | 60 | 63 | 62 | 66 | 62 | 66 | 65 | 66 |
| 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 | 450 | 450 | 490 | 450 | 500 | 520 | 580 | 540 | 620 | 660 | 740 |

WUC models with chilled water coil and downflow air discharge

| MODELS | 20 | 30 | 50 | 80 | 110 | 160 | 200 |
|-----------------------|------|------|------|-------|-------|-------|-------|
| Total cool. capac.Kw | 20.7 | 28.4 | 42.5 | 64.8 | 95.3 | 143.1 | 193.6 |
| Sens. cool. capac. Kw | 16.4 | 22.4 | 35.5 | 55.0 | 76.9 | 116.8 | 156.9 |
| Airflow m3/h | 3980 | 5710 | 9060 | 14930 | 18810 | 28980 | 38630 |
| SPL dB(A) | 48 | 51 | 56 | 58 | 59 | 62 | 63 |
| Length:mm | 750 | 750 | 860 | 1750 | 1750 | 2640 | 3495 |
| Depth:mm | 630 | 780 | 880 | 880 | 880 | 880 | 880 |
| Height:mm | 1965 | 1965 | 1990 | 1990 | 1990 | 1990 | 1990 |
| Net weight Kg | 155 | 180 | 250 | 450 | 450 | 650 | 900 |

Characteristics referring to : R407 refrigerant; condensing temp. °C 45; inlet air temp. °C 24, 50% RH; water temp. °C 7 / 12, 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 performances don't consider the heat generated by the fans which must be added to the thermal load of the system.



