

The integral solution for Air Handling Units



CAREL
Technology & Evolution

Air Handling Units

For over 25 years Carel has been dealing with the design and production of electronic controllers and supervision systems for Air-Conditioning and Refrigeration applications. The quality and innovation of its products and its increasing sales successes make Carel one of the world leaders in the sector today. Carel's main customers are manufacturers (OEM) and installers, assisted by an extensive sales organisation present in the main countries around the world.

Carel now offers a solution for the Air Handling Unit market, completing the range and complimenting the Air-Conditioning and Refrigeration solutions already available, offering all the components required to control the many different unit types.

... the integral solution

Electrical panels, pressure, temperature, humidity and air quality sensors, differential pressure switches, programmable controllers, humidifiers, new programming tools, supervision and technical service from the office and in the field, give manufacturers, designers and installers new opportunities for the control of even the more sophisticated installations, at a limited cost.

With options available to allow integration into the majority of Building Management Systems or Carel's own PlantVisor supervisory system.

Moreover, our cooperation with Belimo means that customers can complete the solution with valves and servocontrols for dampers, so as to create a reliable and economical control system. The following pages detail all the solutions that are available.

CAREL



Avant-garde technology for reliable and flexible custom controllers

pCO sistema

the range of programmable controllers, terminals and accessories has been enriched by the pCO¹ and pCO² controllers

Programs

a new standard program is available for controlling 24 different pre-configured systems, selected from the most commonly-used models available

Sensors

new differential air pressure transducers, air quality probes, differential pressure switches and air flow switches, in addition to the standard solutions

EasyBuilder

new programming software for Carel pCO sistema controllers, with a completely graphic and modular interface, for creating custom programs in just a few minutes

Electrical panels

sized for supply and return fans with one or two steps, with either direct or star/delta starting and power ratings of up to 75Kw

Remote management

the pCO sistema controllers can be interfaced to the main Building Management Systems and remote management systems, using widely used open communication protocols, such as Modbus[®], BACnet[™], LON and TCP-IP

Technical service

Carel has extended its network, providing service both during the design phase and for the commissioning of the application



The Air Handling Unit Control Application

The new application for Air Handling Units has been designed to be simple yet flexible enough to satisfy the majority of functions required by the main models of air handling unit currently in the market.

A total of 24 different pre-configured systems are available, and can be selected by setting just one parameter.

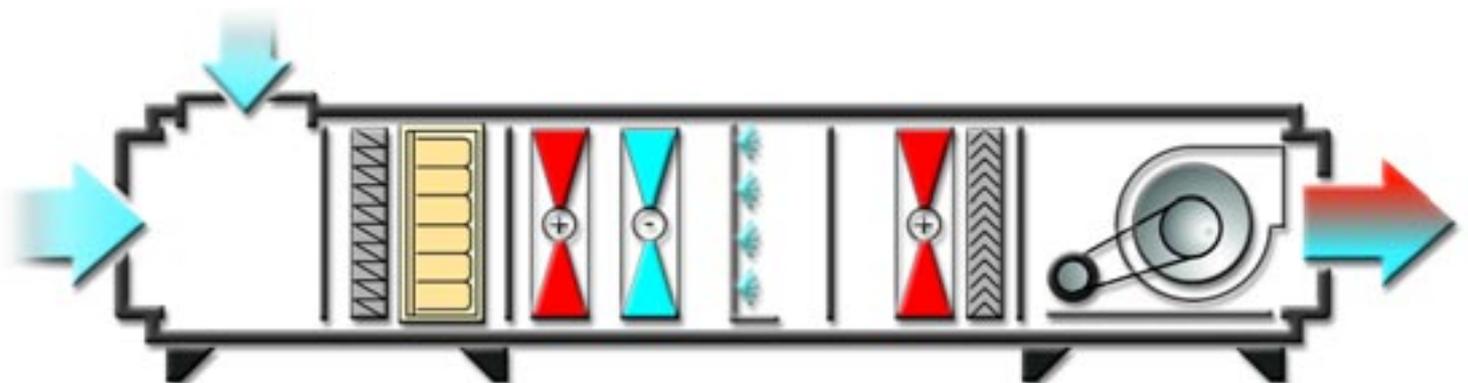
For each model, a table of inputs and outputs is provided, sized for the pCO² Small, Medium and Large boards, with or without built-in terminal.

All the functions required for the operation of the system are available for each module of the air-handling unit.

The following is a list of the main modules managed by the standard application:

- outside air and air mixture damper, with free-cooling, free-heating and enthalpy control;
- supply and return fan, with two steps or inverter control;

- water heating coil and electric heaters, with pre-heating management;
- water cooling coil;
- direct expansion with condenser control;
- direct expansion with three ON/OFF steps;
- cross-flow and double coil heat recovery unit;
- supply and return air filter;
- adiabatic/steam humidification with ON/OFF or modulating control;
- built-in daily/weekly timer;
- Carel/Modbus[®] supervision incorporated.





EasyBuilder intuitive system

Very often, in companies that operate in HVACR there is profound knowledge of the units being controlled, yet not similarly detailed knowledge of the related programming tools; in addition, in general a "standard" controller is sufficient, or in any case only a minimum degree of customisation is required. For this reason, in many cases the EasyTools System is too powerful. Therefore, Carel has designed new development software: EasyBuilder.

The main characteristics of EasyBuilder are:

- use of a completely graphic, user-friendly and easy-to-learn programming language;
- automatic creation of the design documents (wiring diagram for the connection of the controller, control algorithm, user interface, functions of the buttons, supervisor variables, values printed and values logged);



- on-line help;
- multi-language user interface.

These advantages mean that the user can create, in a very short time and with no difficulty whatsoever, application software that is perfectly in line with the needs of the market.

Supervision and integration with BMS

Carel controllers can be connected to a supervisor in the following ways:

- with PlantVisor: Web Server-based supervisory system using the Carel protocol;
- directly, as the protocol can be selected on the pCO sistema series controllers;
- via a gateway that converts the Carel proprietary protocol to the protocol used by the BMS.

Pl@ntVisor

This is the latest generation "WEB based" supervisory software. It allows refrigeration and air-conditioning systems to be monitored and controlled using a simple Internet browser: the pages displayed on the PC are in HTML format, the language of the worldwide web.

Modbus®

The pCO sistema series controllers can communicate directly in Modbus® protocol.

Type of supported protocol: Modbus® slave, RTU mode; RS485 and RS232 communication standard.



The pCO sistema series of controllers are LonWorks® compatible, using a special serial board.

Electrical supported standards: RS485 and FTT10.

Carel is a LonMark® Partner.



This is the protocol designated in 1995 by ASHRAE.

Carel provides a gateway through which all Carel controllers can interface to BACnet™ systems.

Types of supported protocol: BACnet™, Point-To-Point and RS232 communication standard.



Trend is a building Automation System very widespread in the Anglo-Saxon countries and in general in Europe.

The controllers of the pCO System series are Trend compatible, through the proper serial card.



Metasys® is the building automation system developed by Johnson Controls.

Johnson itself handles the implementation of the software to control the interfaced devices into its system.



Differential pressure transducer

The differential pressure transducer uses a new ceramic sensor. It provides a voltage or current signal that is calibrated and compensated according to the temperature.

It is ideal for measuring low pressure values in air-conditioning systems, rooms, laboratories and clean rooms (air and non-corrosive gases).



Air quality probes and combined CO₂+VOC air quality probes

These analyse the quality of the air using an SnO₂ gas sensor for VOC (Volatile Organic Compounds) or SnO₂ gas sensor for VOC plus CO₂ sensor, with a range from 0-2000 ppm:

- measuring air quality in offices, hotels, meeting rooms, homes, shops, restaurants, etc.;
- performing quantitative analysis of contamination by polluting gases.



Differential pressure switch

Carel supplies differential air pressure control units for filters, fans, air ducts, air-conditioning and ventilation systems.



Servocontrols for valves and dampers

All the Carel controllers can manage any servocontrol for dampers and valves.

Belimo has been chosen as our preferred partner for the supply of the actuators.





Temperature and humidity probes

Carel has designed an entire range of probes that respond to the needs of HVACR installers and manufacturers, as well as for the control of Carel's own line of humidifiers. The range includes temperature and humidity sensors for various applications, with installation in sockets or ducts, in residential or industrial environments.



Adiabatic humidifiers

Carel produces a complete range of adiabatic humidifiers, with different outputs and using atomised water, with and without compressed air. The high efficiency of these units and the complete absence of recirculated water prevents any dangers associated to the Legionella bacteria.



Air flow switch

Carel supplies flow switches to control the flow of air or non-aggressive gases inside distribution ducts in air-conditioning or air handling systems.



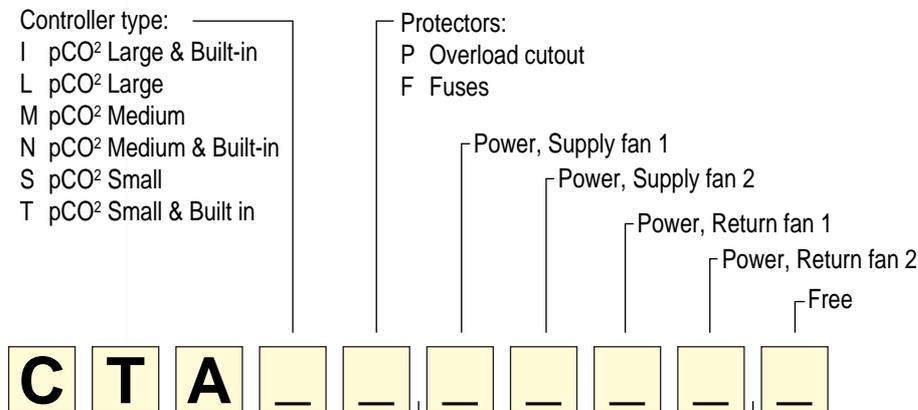
Isothermal humidifiers

Carel produces a complete range of isothermal humidifiers, with different outputs, using electric heaters, immersed electrodes or gas boilers, and complete with all the accessories required for installation in the application. In particular, the high energy efficiency and low running costs of gaSteam, our gas humidifier, make this model highly competitive compared to adiabatic humidifiers, while still maintaining the advantages of isothermal humidification.

Description of the panels for Air Handling Units

General characteristics:

- electrical panel with metal structure, single or double door, index of protection IP54;
- door inter-locked isolator with yellow and red indication;
- three-phase 400V 50hz power supply;
- isolating transformer for the auxiliary circuit;
- fan protection by fuse or thermal overload circuit breaker, depending on the model;
- components supplied by the best brands in the market;
- terminal block for auxiliary connections (probes, micro-switches, sensors, pressure switches etc.);
- valve and damper 24V power supply connections on the terminal block;
- fan running and stopped signal;
- pCO² Small, Medium or Large electronics in the panel, with external terminal (double door) or built-in terminal (single door);
- additional contactor option for auxiliary connections;
- Soft-Start option for reducing the peak inrush current of the fans.



Direct starting		Star - Delta starting	
1	0Kw	D	0,18-5Kw
2	0,18-3Kw	E	7,5Kw
3	4Kw	F	11Kw
4	5,5Kw	G	15-18Kw
5	7,5-11Kw	H	22-30Kw
6	18,5Kw	I	37Kw
7	22Kw	J	45Kw
8	30Kw	K	55Kw
9	37Kw	L	75Kw
A	45Kw		
B	55Kw		
C	75Kw		



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