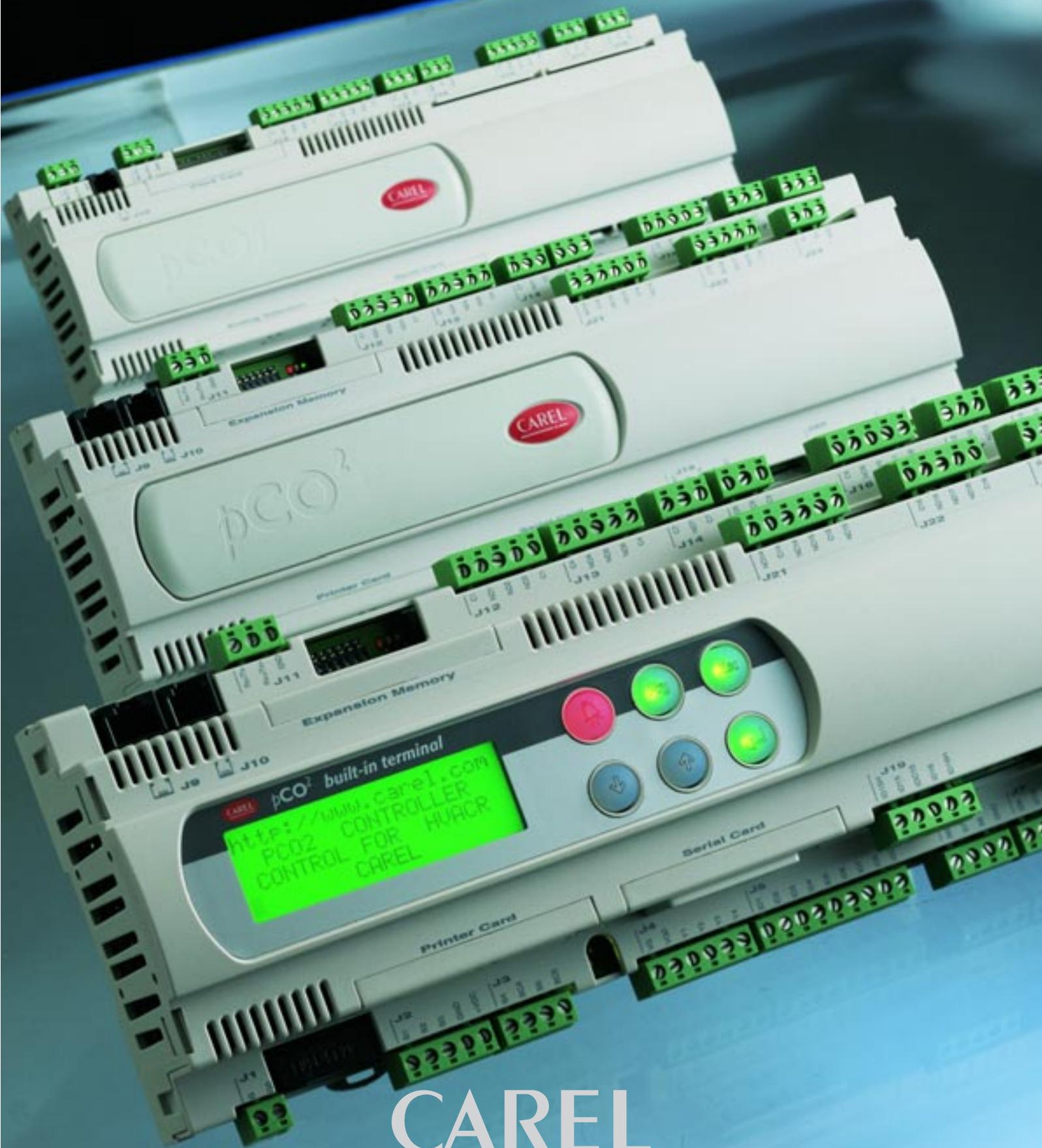


pCO sistema

programmable controllers



CAREL
Technology & Evolution

pCO sistema



programmable controllers

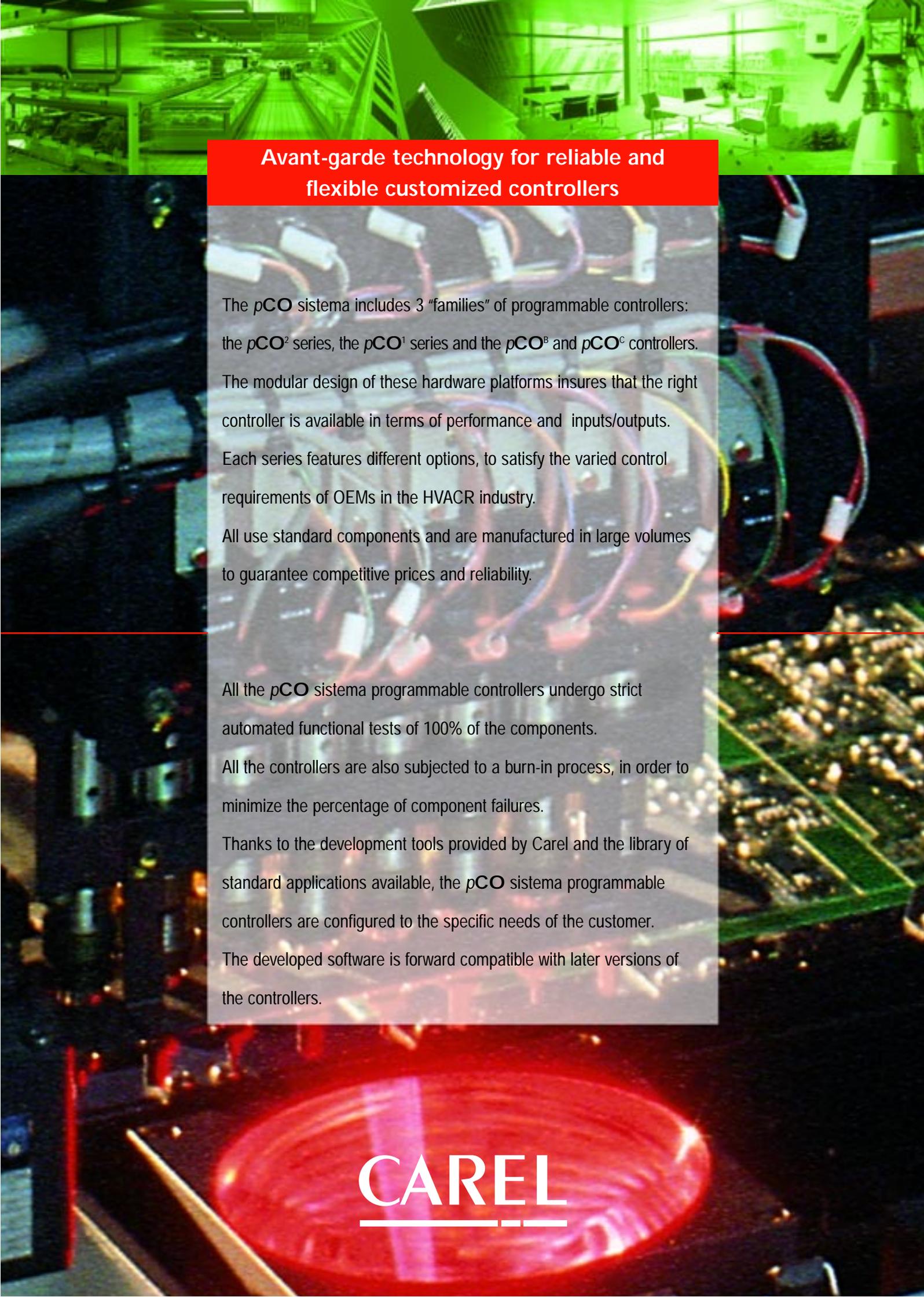
pCO sistema is the result of Carel's long experience in the design and manufacturer of programmable controllers for HVACR units.

pCO sistema consists of programmable controllers, user interfaces, software development tools, communication interfaces and remote management systems.

pCO sistema is powerful yet flexible, and can be easily interfaced with the more widely used Building Management and proprietary supervisory systems.

pCO sistema is a unique "family" of controllers, designed to be reliable, flexible, and provide the functionality required by today's OEM companies.

This is why *pCO* sistema, sets the standard for controls in the HVACR industry.



Avant-garde technology for reliable and flexible customized controllers

The *pCO* sistema includes 3 “families” of programmable controllers: the *pCO*² series, the *pCO*¹ series and the *pCO*^B and *pCO*^C controllers. The modular design of these hardware platforms insures that the right controller is available in terms of performance and inputs/outputs. Each series features different options, to satisfy the varied control requirements of OEMs in the HVACR industry. All use standard components and are manufactured in large volumes to guarantee competitive prices and reliability.

All the *pCO* sistema programmable controllers undergo strict automated functional tests of 100% of the components.

All the controllers are also subjected to a burn-in process, in order to minimize the percentage of component failures.

Thanks to the development tools provided by Carel and the library of standard applications available, the *pCO* sistema programmable controllers are configured to the specific needs of the customer.

The developed software is forward compatible with later versions of the controllers.

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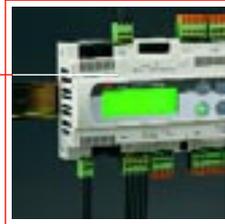
Faster wiring



The *pCO*² and *pCO*¹ series are fitted with plastic enclosures that guarantee high mechanical protection of the board and reduce the risk of electrostatic discharges due to incorrect handling.

The quick DIN rail mounting feature reduces the time required for assembly and wiring.

The plastic enclosures also allow the most complex controllers to be fitted with a built-in user interface featuring a 4x20 LCD, with 6 buttons and 4 LEDs. The inputs and outputs are separated, further reducing wiring time and protecting against electromagnetic discharge.



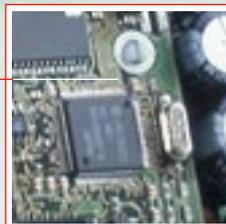
High technology



Thanks to the high capacity of the flash memory and clock with battery back-up, all the alarm situations, the values of the sensors (temperature, pressure, humidity...) and the status of the controlled devices (compressors, fans, pumps...) can be saved, even for extended periods, just like a real black box recorder.

A high performance 16-bit microprocessor guarantees high speed and efficient management of the interfaces and the expansion boards, including control of faster glitches.

All the parameters are protected by various password levels (manufacturer, user ...).



Multi-standard inputs/output



The inputs can be used with the most common and widely used industry standards (NTC, PT1000, 0-1Vdc, 0-5Vdc, 0-10Vdc, 0-20mA, 4-20mA, ON/OFF). The PT1000 standard means that *pCO* controllers can also be used in very high or low temperature applications. Some models feature ON/OFF - SSR relay outputs.

Programmability



The exclusive Carel Easy Tools development system allows rapid configuration, made even simpler by the use of Flash memory. The software can be transferred directly to the controller or alternatively using an electronic "key". Part of the software can also be updated on-site activation.



Flash memory



real-time clock



black box



easy programming key

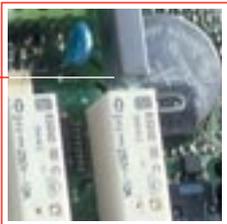


remote programming via modem



alarms and commands via SMS

puts



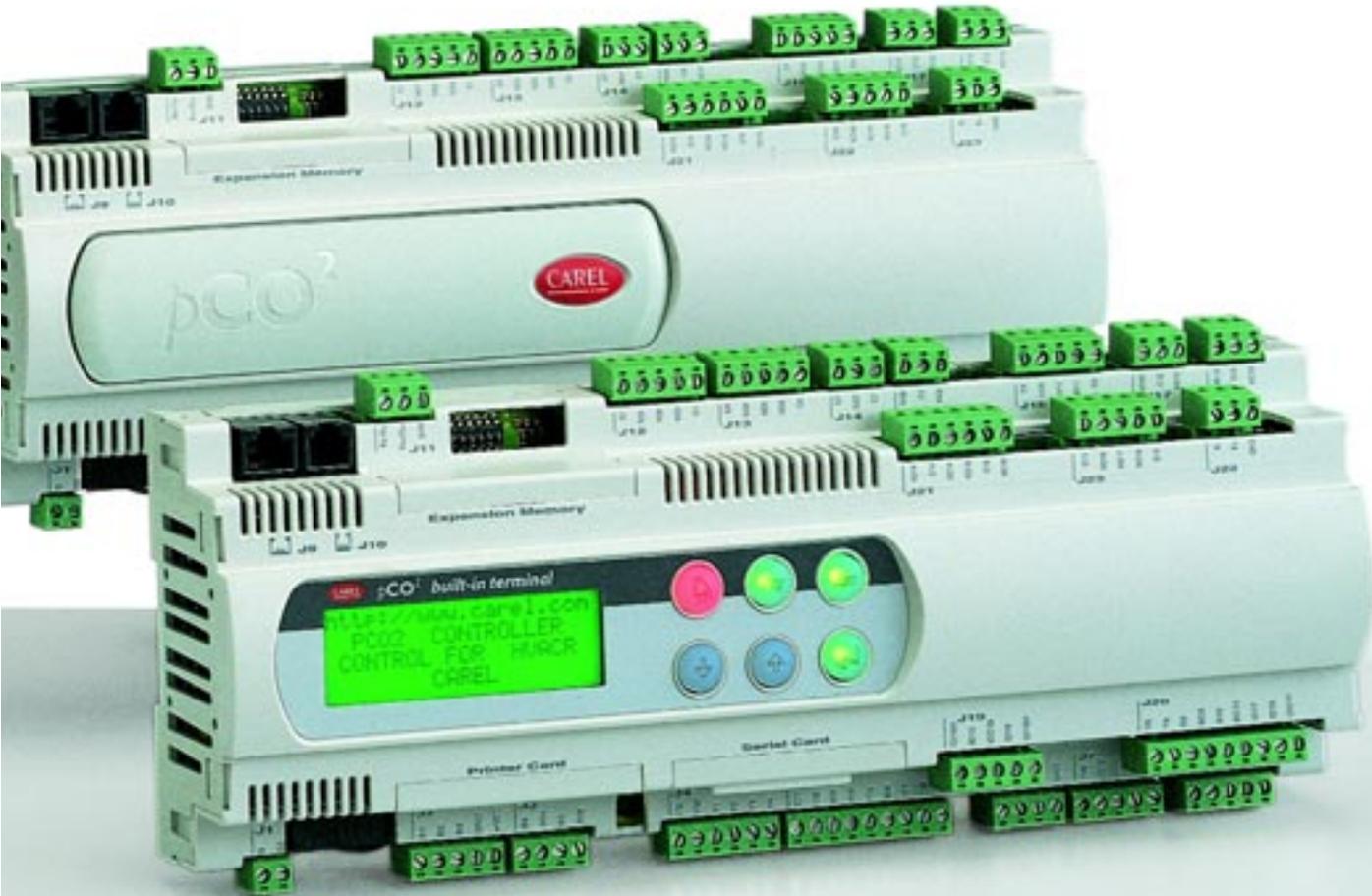
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Wide range



The *pCO* controllers series includes "3 families" of products (*pCO*², *pCO*¹, *pCO*^B/*pCO*^C), allowing the right controller for every application.

A complete range of sizes is available, depending on the number and type of the inputs/outputs, the use of the optional built-in terminal, and *pLAN* network connection (see table at the end). The boards can also use a DC power supply to satisfy special applications.

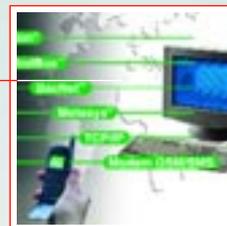


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plug & play" key.
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Communication



An important aspect in HVACR is compatibility with supervisory systems.

The *pCO* series controllers interface with the more widely-used communication standards, using gateways or software packages developed by Carel (ModBus[®], BacNet[™], Johnson Metasys[®], DLL for Windows[®], TCP/IP, SNMP, LonWorks[®], Trend ...). Interfacing is also possible with intranet/internet networks, by using a special gateway that converts the Carel protocol to 10Mb/s TCP/IP Ethernet[™]. The multi-protocol software allows direct connection, without using an external gateway, to various communication standards, including LonWorks[®] and ModBus[®]. To provide greater reliability and simpler maintenance of the air-conditioning and refrigeration systems, the *pCO* sistema controllers are also able to send and receive SMS messages using a simple GSM modem.



pCO²

The pCO² series is the top of the pCO sistema range of programmable controllers. These have been designed to satisfy the more complex equipment manufacturers in the industry, who require increasingly innovative and flexible products.

All pCO² series controllers feature a 16-bit microprocessor, flash memory (expandable up to 6 Mb) and a real time clock, to ensure greater performance (black box, multi-language, multi-protocol, ...).

The pCO² series is fitted with plastic enclosures that guarantee high mechanical protection of the board and reduce the risk of electrostatic discharge due to incorrect handling; quick DIN rail mounting means faster assembly and wiring.



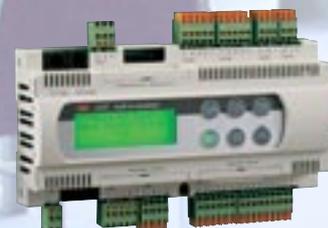
The range

The pCO² controllers are available in three sizes, according to the I/O and power requirements: pCO² Small, pCO² Medium, pCO² Large.

All sizes feature a built-in user interface with a 4x20 LCD, 6 buttons and 4 LEDs.

Some models feature a SSR relay to control devices that require frequent starts and stops.

The pCO² inputs can be fully configured by modifying a software parameter and the characteristics of the inputs can be adapted to the more common industry standards (NTC, PT1000, 0-1Vdc, 0-10Vdc, 0-20mA, 4-20mA, ON/OFF).



DC/DC module

Thanks to the optional DC/DC power supply module, the entire range of **pCO** controllers can be powered using 48Vdc storage batteries that are typical of telephone applications.

The input voltage can range from 21 to 58Vdc, while the output voltage is 24±1Vdc or 30±1Vdc.

DIN rail mounting is made possible by the 4 DIN module plastic enclosure.



EVD

The EVD driver for electronic expansion valves with stepping motor is an electronic controller for managing expansion in a refrigerant circuit.

The EVD driver can be connected to the **pLAN** network, allowing communication with the **pCO** controllers.

Management via **pLAN** allows the simple integration of the electronic valve as an accessory, without having to modify the wiring of units with thermostatic valves.

The EVBAT battery module is available as a back-up power supply in the event of sudden power failures.

The EVD driver can be used with the entire range of **pCO** controllers.



Programming key

The programming keys for the **pCO**² and **pCO**¹ series controllers provide easy software updates during both end-of-production testing and maintenance procedures.



Modem board

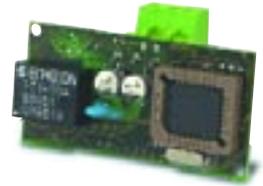
All models in the **pCO** range can be connected, using an optional RS232 board, to a PSTN or GSM modem, enabling remote control of the various functions.



Echelon® board

With millions of devices installed worldwide, the LonWorks® system developed by Echelon® is one of the dominant solutions on the market for the automation and control of industrial, commercial, residential and transport applications.

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.



pCO umid

The **pCO** umid interface allows the control of OEM humidifiers manufactured by Carel directly from the **pCO** electronic controller. The standard humidifier control is no longer required, providing significant cost savings. The **pCO** umid interface can be used with the entire range of **pCO** controllers.



accessories



pCO¹



The pCO¹ series has been designed to provide the significant innovations introduced by the pCO² series for those applications that require greater competitiveness. All pCO¹ series controllers feature a 16-bit microprocessor, and flash memory expandable up to 2 Mb, (multi-language, multi-protocol, ...).

The pCO¹ series controllers are also fitted with plastic enclosures that guarantee high mechanical protection of the board and reduce the risk of electrostatic discharges due to incorrect handling; quick DIN rail mounting means faster assembly and wiring.

The range

The pCO¹ controllers are available in two sizes, according to the I/O and power requirements: pCO¹ Small, pCO¹ Medium.

Some models feature a solid-state relay (SSR) to control devices that require frequent starts and stops.

The pCO¹ inputs can be configured using dip-switches, allowing the characteristics of the inputs to be adapted to the more common industry standards (NTC, 0-1Vdc, 0-5Vdc, 0-20mA, 4-20mA, ON/OFF).

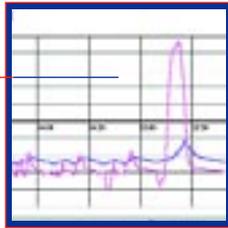


All pCO¹ controllers can be connected without using additional boards to the pLAN local area network, allowing communication of the data and information.

This means that a distributed control system can be created simply and reliably for the optimum management of the installation.

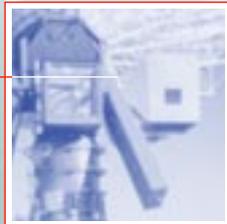
Data logging management

The data logging management performed through an optional board and real time clock allow the pCO¹ to act as a true black box recorder, saving all the alarm situations, the values of the sensors, and the status of the controlled devices. The black box data recorded can be transferred to the programming key or to a PC, including via modem.



Applications

The pCO¹ series has been designed by Carel for medium complexity HVACR applications, which require software customization, like shelter conditioners and close control units.



Interfaces

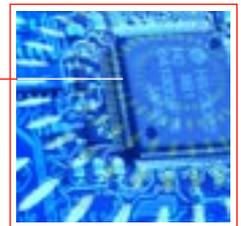
The range of user interfaces that can be used with the pCO¹ guarantees the OEM the perfect solution for each application.

The pCO series terminals are available in panel or wall-mounted versions, with LED, alphanumeric and graphic LCD displays, allowing the messages to also be shown in Chinese, Cyrillic, Arabic, Japanese ...



New technology

With the pCO¹ series, Carel has for the first time introduced 3.3 Volt technology into its products, the standard of the future. The use of ratiometric probes is also part of Carel's commitment to provide new technological solutions for HVACR.



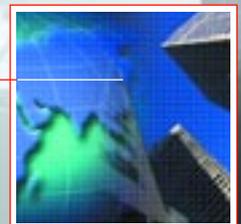
Communication

By using an external gateway, the pCO¹ controllers can interface to various communication standards, such as BacNet™, Johnson Metasys®, TCP/IP, SNMP, LonWorks®, Modbus®, Trend.

The pCO¹ can also be connected directly to a PSTN or GSM modem for communication to a remote supervisor. Interfacing is also possible to intranet/internet networks, by using a special gateway that converts the Carel protocol to 10Mb/s TCP/IP Ethernet™.

The multi-protocol software allows direct connection without using an external gateway to various communication standards, including LonWorks® and Modbus®.

To ensure greater reliability and simpler maintenance of the air-conditioning and refrigeration systems, the pCO sistema controllers are able to send and receive SMS messages using a simple GSM modem.





pCO^c

From the *pCO^B* to the *pCO^c*, i.e. how to safeguard your investments.

In the early 1990s Carel launched the *pCO^B* programmable controller, full of the innovative technology that made it a success among the leading air-conditioning and refrigeration OEMs throughout the industry.

Today, almost 10 years later, the *pCO^B* is the most commonly used programmable controller in HVACR units because of its proven reliability and excellent price/performance ratio.

When developing and designing its new 16-bit programmable controllers, Carel paid special attention to those customers who had chosen the *pCO^B*, and decided to develop a new version, the *pCO^c*, more powerful and upgraded to include 3.3V technology, while still being compatible with the *pCO^B* in terms of dimensions, I/O layout, and software. A "pin to pin" controller upgrade.

The *pCO^c*, with improved memory and processing capacity, allows the management of multi-language applications, multi-protocol communication, SMS messages and more.

Customers, who require faster processing or more memory, can replace the *pCO^B* with the *pCO^c*, without having to modify the layout of the electrical panel and thanks to EasyTools, without having to modify the software.

All current manufacturers can upgrade their units in terms of electronics, without needing to modify the wiring in any way.

This demonstrates the attention Carel pays to protecting its customer's investments.

Device	pCO ²			pCO ¹		pCO ^C
	Small	Medium	Large	Small	Medium	
Maximum Flash memory capacity	6M	6M	6M	2M	2M	1M
Real time clock	●	●	●	○	○	○
BUS expansion	●	●	●	–	–	–
Programming key	●	●	●	●	●	●
Built-in display	○	○	○	–	–	–
LED indicators	○	○	○	–	–	–
I/O expansion	▲	▲	●	–	–	–
Multi-language	●	●	●	●	●	●
Black Box	●	●	●	○	○	○
Carel compatible	●	●	●	●	●	●
Metasys® compatible	●	●	●	●	●	●
Modbus® compatible	●	●	●	●	●	●
LonWorks® compatible	○	○	○	○	○	○
Bacnet™ compatible	○	○	○	○	○	○
TCP-IP compatible	○	○	○	○	○	○
pLAN	●	●	●	●	●	●
Modem ready	●	●	●	●	●	●
GSM modem ready	●	●	●	●	●	●
SMS ready	●	●	●	●	●	●
Maximum number of analogue inputs	5	8	10	6	8	8
PT1000 inputs	2	2	4	–	–	–
0÷10Vdc inputs	3	6	6	–	–	–
0÷1Vdc inputs	3	6	6	4	4	4
4÷20mA o 0÷20mA inputs	3	6	6	4	4	4
NTC inputs	5	8	10	6	8	8
0÷5 Vdc ratiometric inputs	–	–	–	4	4	–
AIN setting by software	●	●	●	–	–	–
AIN setting by dip-switch	–	–	–	●	●	●
Maximum number of digital inputs	8	14	18	8	14	12
24Vac/Vdc inputs	8	14	18	8	14	12
230Vac/Vdc inputs	–	2	4	–	2	2
Free contact inputs	2	2	4	2	2	–
Maximum number of analogue outputs	4	4	6	4	4	2
0÷10Vdc outputs	4	4	6	2	2	2
PWM outputs	–	–	–	2	2	–
Maximum number of digital outputs	8	13	18	8	13	13
SPST relay outputs	7	10	13	7	10	10
SPDT relay outputs	1	3	5	1	3	3
SSR outputs	1	2	3	2	4	–

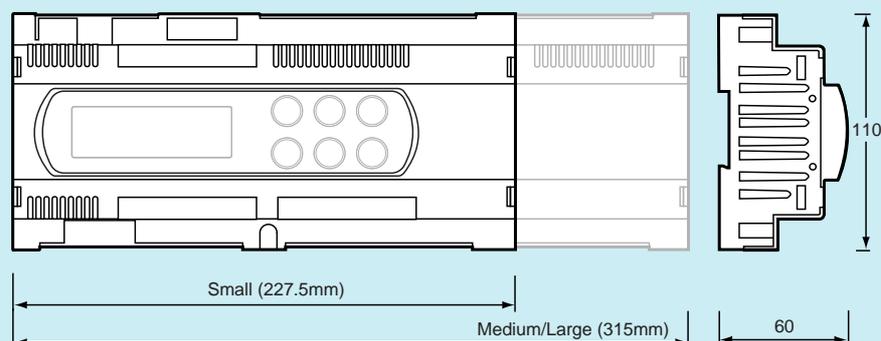
● standard

○ optional

– not available

▲ only with built-in display

Dimensions





Aria

Aria is a terminal designed for room installation, featuring a temperature sensor and an optional humidity sensor. Aria can be connected to the **pLAN** serial network for all versions of the **pCO** series controllers. In this configuration, the instrument measures the temperature and humidity of the room, sends this information by serial line to the machine's controller (**pCO**), which based on the information received from the other zone terminals, decides the operating logic. Aria can also manage local dampers for effective zone-by-zone control.

for further information +302240301

pCO controllers options



FCS series

The FCS units are electronic voltage regulators that use the principle of phase cutting and an input control signal to regulate the voltage supplied to the load.

These controllers can manage asynchronous axial electric motors (low capacity and class H) for devices such as fans, pumps, mixers, stirrers, etc.

The FCS controllers have been designed to be directly managed by the **pCO** controllers using 0-10Vdc or PWM signal. A single-phase version is also available.

for further information +302235171



All pCO² controllers can be connected without using additional boards to the pLAN local area network, allowing communication of the data and information. This means that a distributed control system can be created simply and reliably for the optimum management of the installation.

Data logging management

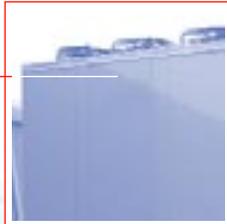
The high memory capacity (up to 6 Mb) and real time clock allow the pCO² to act as a true black box recorder, saving all the alarm situations, the values of the sensors, and the status of the controlled devices.

The black box data recorded can be transferred to the programming key or to a PC, including via modem.



Applications

The pCO² series has been designed by Carel for high complexity HVACR applications, which require software customization, a high number of inputs/outputs and a large memory capacity (chillers with semi-hermetic compressors, screw compressors, ...).



Communication

By using the external gateway, the pCO² controllers can interface to various communication standards, such as BacNet™, Johnson Metasys®, TCP/IP, SNMP, LonWorks®, Modbus®, Trend. The pCO² can also be connected directly to a PSTN or GSM modem for communication to a remote supervisor. Interfacing is also possible to intranet/internet networks, by using a special gateway that converts the Carel protocol to 10Mb/s TCP/IP Ethernet™.

The multi-protocol software allows direct connection without using an external gateway to various communication standards, including LonWorks® and Modbus®.

To ensure greater reliability and simpler maintenance of the air-conditioning and refrigeration systems, the pCO sistema controllers are able to send and receive SMS messages using a simple GSM modem.



Interfaces

The range of user interfaces that can be used with the pCO² guarantees the OEM the perfect solution for each application.

The pCO series user interface terminals are available in panel or wall-mounted versions, with LED, alphanumeric and graphic LCD displays, allowing the messages to also be shown in Chinese, Cyrillic, Arabic, Japanese ...



I/O expansion

The Large version features an additional serial interface for connection to any I/O expansion board to manage even the most complex units.



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