

Chillventa @ a glance!

High
Efficiency
Solutions.



CAREL

Heos sistema

Waterloop system for commercial refrigeration

The new frontier in the management of supermarket showcases/cold rooms.
A waterloop system for cooling plug-in units with BLDC compressors.

- System that guarantees high efficiency.
- Faster store set-up and lower costs.
- Greater flexibility when modifying the layout.
- Less space occupied by the refrigeration systems.
- Drastic reduction in the amount of refrigerant used in the system.
- Possible integration with the air-conditioning.
- Less refrigeration system maintenance.



1 PlantVisor PRO

The supervisor optimises system operation, including in terms of energy consumption.

2 Heos

This is the main controller, where system intelligence is concentrated, managing all the components.

3 power +

This inverter can control compressors with permanent magnet brushless motors (BLDC/BLAC)

4 ExV

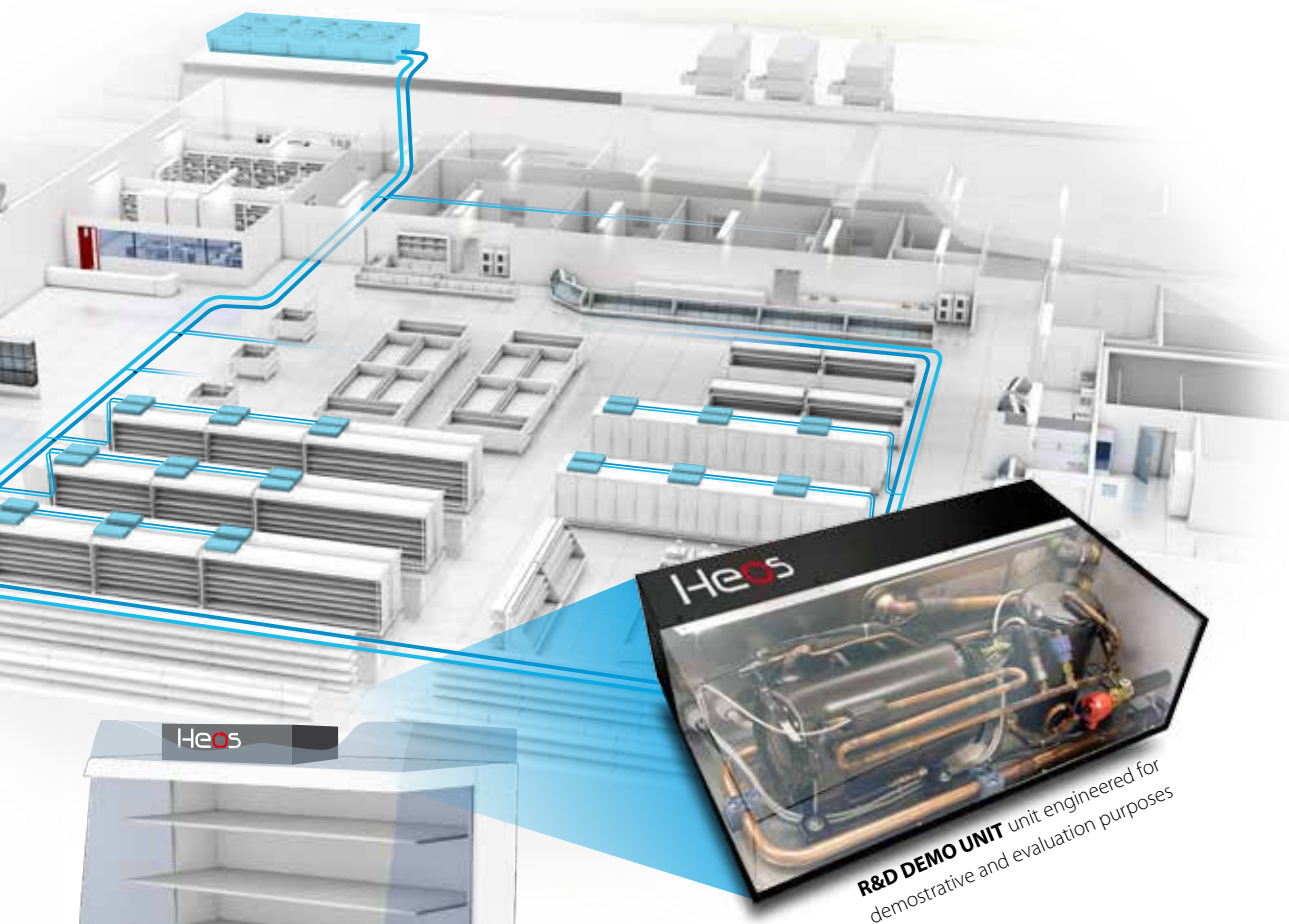
The Carel electronic expansion valves stand out for an exceptionally linear response, even at low flow-rates.

5 HMI

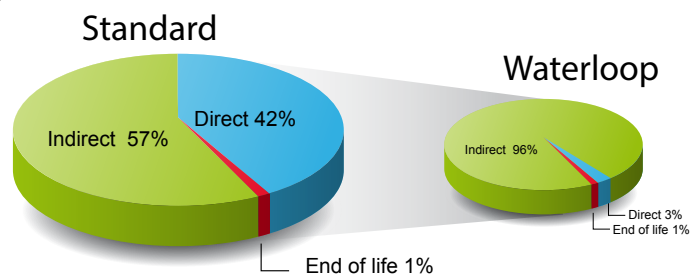
A wide range of user interfaces, meaning the right product is available for all needs.

6 Sensors & accessories

Pressure, temperature, humidity probes, energy meters... complete the offering.



R&D DEMO UNIT unit engineered for demonstrative and evaluation purposes



Predictive algorithms

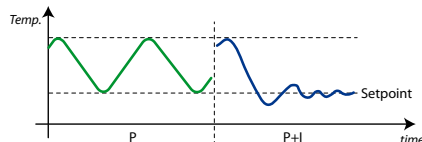
Complete control of the refrigerant circuit by reading the various values (temperature, pressure) and dynamically managing the various components (compressor, expansion valve, fans) allows the implementation of advanced algorithms for:

- defrosting on demand
- estimating refrigerant leaks
- optimising COP
- preventive maintenance



Power+

The compressor with BLDC motor allows considerable energy saving, as operation is optimum at part loads (relating to demand most of the time). The use of a permanent magnet motor means less energy losses, increasing efficiency. The wide range of modulation means the best operating conditions can be achieved, guaranteeing greater stability and less starts/stops.



Factory tested

Benefits of having a fully factory-tested showcase include:

- significantly reducing installation times/costs
- reducing refrigerant leaks (-85%)
- guaranteeing performance

TEWI REDUCTION

TEWI is a measure of the global warming impact of equipment based on the total related emissions of greenhouse gases during the operation of the equipment and the disposal of the operating fluids at the end-of-life. TEWI takes into account both direct fugitive emissions, and indirect emissions produced through the energy consumed in operating the equipment.

Hecusistema

The real capacity modulation for C-Stores

Hecu sistema is the CAREL solution designed specifically for convenience stores. Increasing attention to energy efficiency, in other words lower environmental impact and lower running costs, makes the CAREL solution the perfect response to market needs. Hecu sistema ensures that the condensing units adopting this technology achieve maximum results in terms of energy classification.

High energy efficiency

Hecu sistema guarantees very high levels of energy efficiency through the use of BLDC compressors and electronic expansion valves for oil and liquid injection. Serial communication with the showcases makes a further contribution to energy efficiency by providing real-time information on the operating conditions of each evaporator.

Excellent performance at part loads

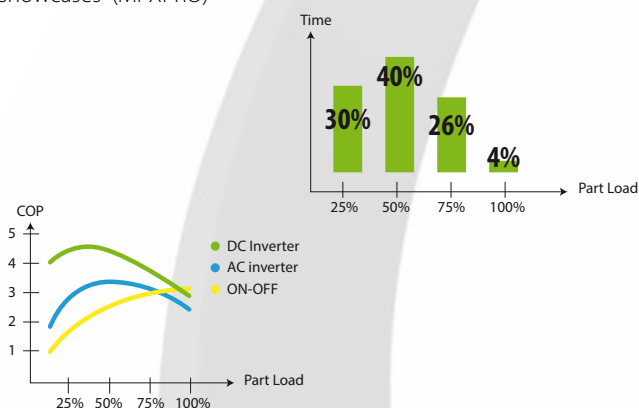
with BLDC technology and the power+ inverter

Minimum energy wastage

with calibrated injection of oil and liquid using the CAREL E²V expansion valve

Real-time energy optimisation

through continuous data exchange with the showcases (MPXPRO)



System reliability

Hecu sistema manages BLDC compressors with the focus on reliability, adopting a series of software functions aimed at ensuring oil return to the compressor. Serial communication with the showcases also allows action to be taken directly on the evaporators, thus managing oil return even more effectively.

Oil return and recovery procedures

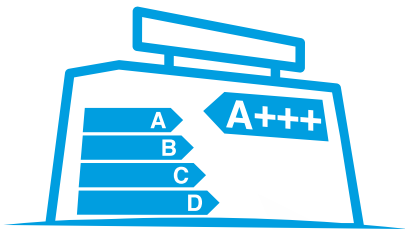
with the Speed Boost function with showcase washing using the CAREL E²V expansion valve

Better return oil flow and easy installation

with the multi-split system and pre-insulated piping



R&D DEMO UNIT: unit engineered for demonstrative and evaluation purposes



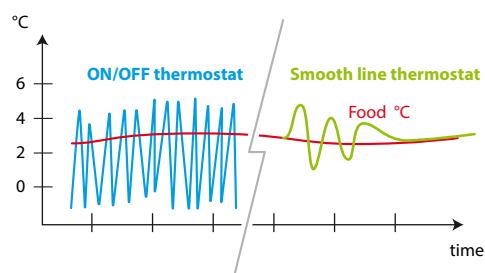
Optimum food preservation

With Hecu sistema, all the components are designed to work together, so as to obtain maximum performance in real operating conditions and in response to continuous changes in the system. These actions have the dual effect of reducing energy consumption and at the same time improving food preservation through fine temperature control.



Very high quality food preservation

thanks to advanced algorithms and tight synchronisation between the components in the system



Extensive usability

Hecu sistema is designed with usability in mind. pRack Hecu comes with a wizard to assist unit configuration, and a fast commissioning procedure that automatically pre-configures the connection to the showcases and the related functions.

Intuitive programming

with advanced PGD and pLD PRO user terminals

Easy set-up and optimisation

with the wizard procedure

Extremely fast commissioning

thanks to automatic pre-configurations and simplified service menu



C-Store solution

Air Conditioning

Comfort and coordination now also in small footprint stores

- Control on average store temperature
- Unit rotation to balance operating hours
- Night-time set point and set point compensation on outside temperature
- ECO-Zone function for controlling and maintaining comfort within set limits
- Notification when temperature outside of 'comfort area'
- Notification when air-conditioning unit maintenance needed

Lighting

Integrated optimisation guiding our core competences in LED technology

- A reliable, multifunctional solution
- Set n'go scheduling
- Integration with occupancy and brightness sensors
- Optimum comfort with dynamic compensation of natural light

Efficiency and comfort with total-reflection patent

- Uniform lighting with anti-glare optics
- Dark sky compliance
- ON/OFF control or daylight-linking option
- Different Kelvin colour temperatures available

Refrigeration

Food quality and energy saving through integrated and scalable solutions

- New Hecu sistema as ultimate refrigeration solution
- Market-leading bottle cooler solutions for all applications (Coolers, SubZero and Street cabinets)
- System components certified by HACCP International
- Dedicated solutions for cold rooms
- Energy optimisation with built-in eco-functions (EEV management, Smart/Skip Defrost, rail heaters)
- Solutions for Embraco fullmotion compressors

Energy and Environment

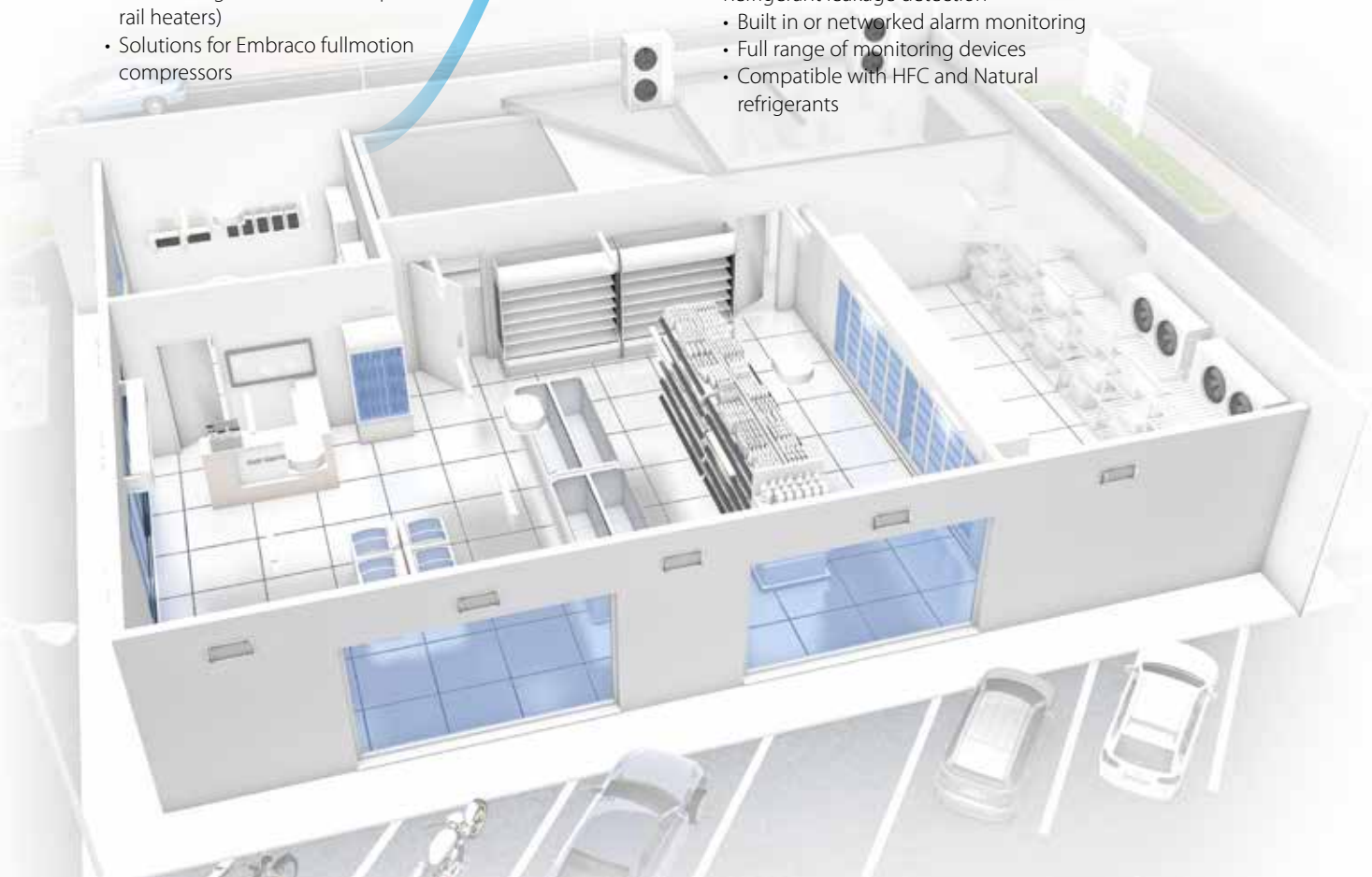
"You cannot manage what you cannot measure..."

Energy monitoring

- 1PH & 3PH energy meter
- Wireless solution for appliance control

Refrigerant leakage detection

- Built in or networked alarm monitoring
- Full range of monitoring devices
- Compatible with HFC and Natural refrigerants



Optimisation and monitoring

pChronoCS



Compact entry-level optimisation

- Single control for all areas
- Ethernet interface for remote monitoring
- Configuration wizard
- Wireless options

pwpro



High-end monitoring

- Higher level to pChrono-CS
- Alarm notification
- In-store data analysis
- HACCP reports

Remote monitoring

remotepro



Maintenance optimisation

- Manage all your stores with one solution
- Add value to your service
- Avoid unnecessary costs



Improved energy performance

- Optimise your installations by identifying top configurations
- Focus your investments on critical areas
- Identify high energy consuming devices



High-end analytics

- Customisable reporting for web and mobile
- Easy-to-read interactive format
- Decision-maker business support



Innovative features on a platform that stands out for flexibility, ease of use and energy saving functions

The complete solution for compressor racks:

- pR300: the standard
- pR100T: CO2 condensing unit
- pR300T: transcritical CO2 booster system



pRack size&more

New App for codes selection, parameters guide and application drawings.



NEW

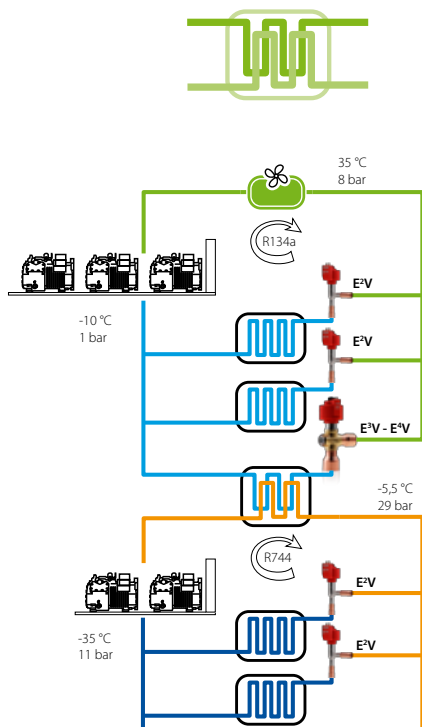
pR300

- Hot Gas function
- Phase loss input
- Discharge Pressure Probe for Safety
- Bypass Condenser



pR300 - solution for subcritical CO₂ system

Cascade



Electronic Expansion Valve Synchronization

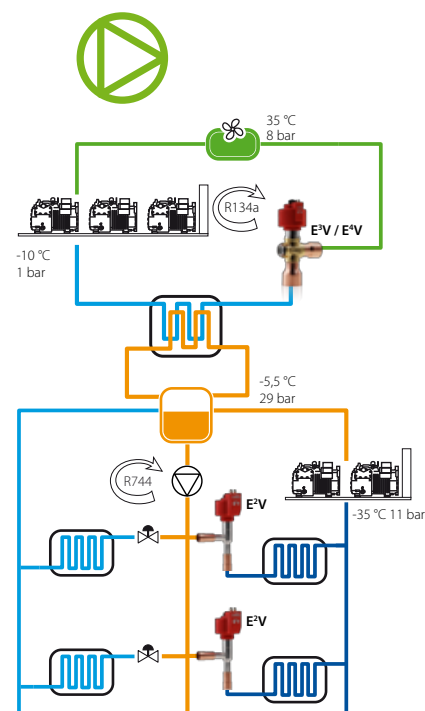
System for direct communication between the compressor rack and electronic expansion valve driver on the plate heat exchanger, built-in on pRack pR300.

The low temperature rack can in this case communicate to the driver any changes in cooling capacity and thus modulate evaporator capacity based on CO₂ **condensing pressure**, without requiring additional probes and ensuring fine and precise condensing pressure control.

The medium temperature rack can in this case use an **auxiliary temperature/pressure probe** and set proportional or neutral zone regulation with all parameters and alarms customizable.

Exchanging information between the compressor rack and the Heat Exchanger can improve traditional superheat control with factors that are critical for this type of installation, such as variation in rack cooling capacity and trend in CO₂ pressure for MT and LT compressors.

Pumped



Compatible with Bitzer CR11

Compressor manufacturer Bitzer has officially declared the CAREL pR300, part of the pRACK range, to be compatible with its CR11 series compressors.

The CR11 system provides extremely precise and continuous cooling capacity modulation, from 10% to 100%, using special technology developed by Bitzer.



pR300T

- Intercooler management
- pRack Expansion board
- Discharge Pressure Probe for Safety
- Main mask configurability



pRack Expansion board for transcritical CO₂ plants

Possibility to have up to 10 universal I/O and 6 DO.

Ideal for managing the maximum available number of compressors' alarms and/or for the probes related to the two possible stages of heat recovery allowed by pR300T



High pressure valve

The E3V-C electronic expansion valve offers a complete range of capacities to suite gascooler valve and receiver valve (HPV, HPRV).

pR100T - solution for CO₂ condensing unit

Complete management of a booster system in a single controller through a simple and intuitive user interface, ideal for condensing unit or small C-store

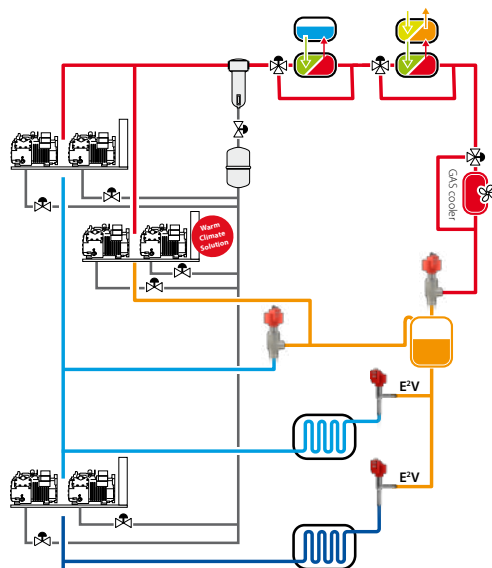


Complete and integrated solution, from controllers to valves featuring:

- Double line management;
- Inverter Management;
- Direct control of HPV and RPRV valves;
- Compact solution;
- Fieldbus communication;
- Supervisory integration.



pR300T - solution for transcritical CO₂ booster system



Double heat reclaim

Up to 2 heat reclaim systems management with ON/OFF or modulating device control. HPV valve and gas cooler fans coordination, integrated pump management. Gas cooler bypass as last step of heat recovery with continuous control of the by passed gas cooler outlet temperature.

Parallel compressor

Solution for higher efficiency at high gas cooler pressure and at high outside temperature. Parallel compressor action synchronized with RPRV opening. Ready solution for warm climates.

Warm Climate Solution





PlantVisorPRO is the CAREL monitoring and supervision system to completely control and optimize the refrigeration and air conditioning plants. It offers an intuitive and customizable user interface to configure and display the status of the plant.



Integration

No longer just refrigeration. Air-conditioning, lights, peak power consumption management and gas leak detection.

CAREL supervisors fully integrate all the critical components in the installation, offering maximum safety and control.

site.web

A new smart way to design custom pages for PlantVisor PRO



Mobile access

Maps created by site.web are pure HTML, so they can be surfed from all desktop and mobile devices just using a browser. The view keeps the proper resolution in all of them and no plug-in installation are required in the browsers.



Powerful customization and wizard approach for widget dynamization

Site.web doesn't require programming skills for creating or inserting logic on widgets, thanks to the wizard function. site.web gives the possibility to create in few steps new widgets modifying which ones already present in the tool, or starting from a static SVG image imported on it.

Improve your maintenance and highlight your savings



Commercial • Residential • Industrial

Enterprise solution for connectivity, monitoring and remote management systems. Whatever the application, RemotePRO is the solution to check with just one click the situation on systems located in different places to be.

The ideal solution to monitor and optimize your sites from one single point

- manage all your stores and customers
- reduce service costs
- find top/flop configurations
- identify energy-consumptive devices
- organize raw data into readable information
- identify issues, spot trends and make better decisions quickly
- keep business users informed to make better decisions

we give you...

Maintenance optimisation

- Manage all your stores with one solution
- Add value to your service
- Avoid unnecessary costs



Energy efficiency

- Optimise your installations by finding top configurations
- Focus your investments on critical areas
- Identify high energy consuming devices



you profit by...

Analysis

- Organise raw data into readable information
- Model, process and display valuable info
- Identify issues, spot trends and make better decisions quickly



Reports

- Present data in an easy-to-read, highly interactive format
- Keep business users informed to make better decisions
- Design interactive reports for the web or mobile devices

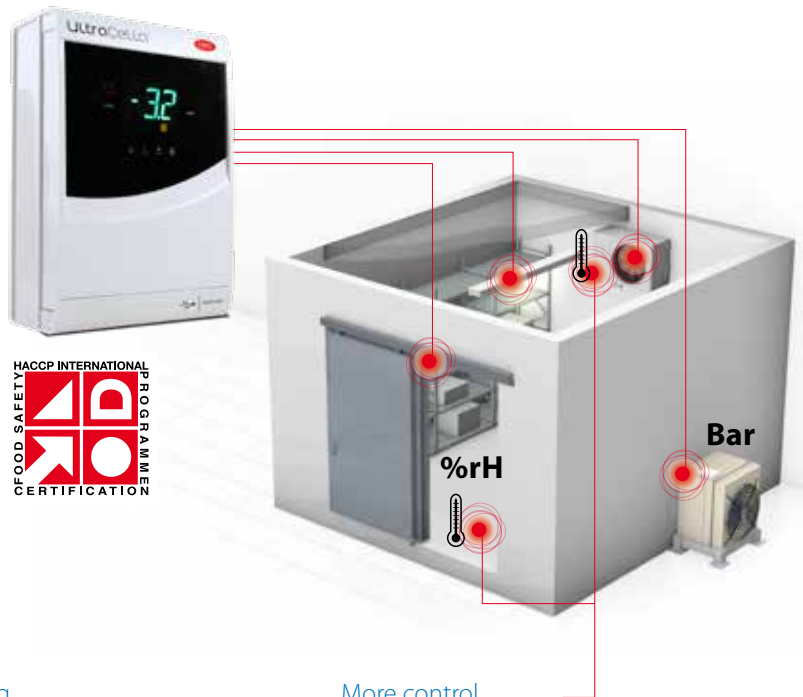


UltraCella

The innovative solution for your cold rooms

Thanks to the new powerful hardware platform and innovative mechanical concept, it has been possible to develop a wide range of new controls, to fit all cold rooms needs in terms of types, features, and size.

- Up to 6 relays (compressor, defrost, evaporator fans, light and 2 auxiliary outputs for additional features);
- Up to 4 temperature probes (NTC / PT1000), humidity and pressure sensors;
- Temperature and alarm data logging (HACCP);
- Configuration through wizard, available on pGD1 Service Tool (optional);
- Easily upgradable with expansion modules thanks to the new mechanical modular system;
- DIN rail track for fast wall mounting.



USB

Configuration export:

- after commissioning you can save parameters on USB key for your next cold room.

HACCP

Temperature and a Alarm data logging:

- user can save data easily on a USB key

More sensing...

- up to 4 temperature probes (NTC / PT1000)
- Intelligent logic based on average measurement of 2 temperature sensors
- Humidity sensor
- Pressure sensor

More control...

- Controlling up to 2 additional features
- 2° compressor
- Pump down
- Condenser fan
- Humidification system

One platform for all your applications

You can upgrade UltraCella with additional contents thanks to the new modular system.

Ultra EVD module

- Easy assembly and connection to UltraCella granting the outstanding energy saving results of CAREL EXV.
- Including internal power transformer



Ultra Power module

- Extremely flexible system to add electric devices or additional features
- Example of:
 - Circuit Breaker
 - Additional 3HP relay for compressor



UltraCella can drive remote 3ph power modules allowing to assemble power contactors close to condensing unit and evaporator.



Ultra 3ph evaporator module

Evaporator from 6kW to 9kW

Ultra 3ph full module

- Condensing unit from 4Hp to 7.5Hp
- Evaporator from 6kW to 9kW

SmartCella

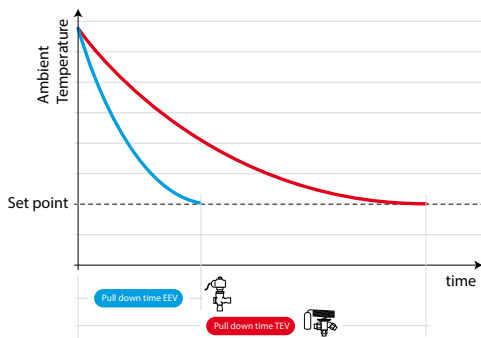


The essential solution for your small cold rooms

- Smart solution based on ir33+ logic and experience
- Intuitive user interface
- Flexible IP65 box ready for additional components
- Modbus and Carel protocols with auto-recognition
- DIN rail for fast wall mounting



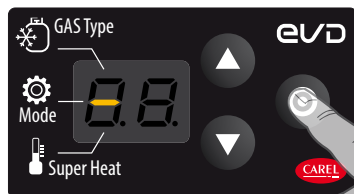
The true performance of CAREL E^xV sistema and EVD **ready&safe** for your evaporator



- Sealed and protected from ice, water, humidity
- Full bundle engineered to operate in cold storage area
- Startup with just 3 parameters
- No additional wiring or external devices needed
- Compatible with Unipolar E²V and E³V proportional valves
- High grade enclosure for safe assembly and operation

Performance and energy saving

- Food quality thanks to extremely short
- Temperature pull down times
- Optimal evaporator efficiency thanks to
- Precise refrigerant flow control
- Ultimate energy saving with EEV,
- Floating suction and condensing pressure

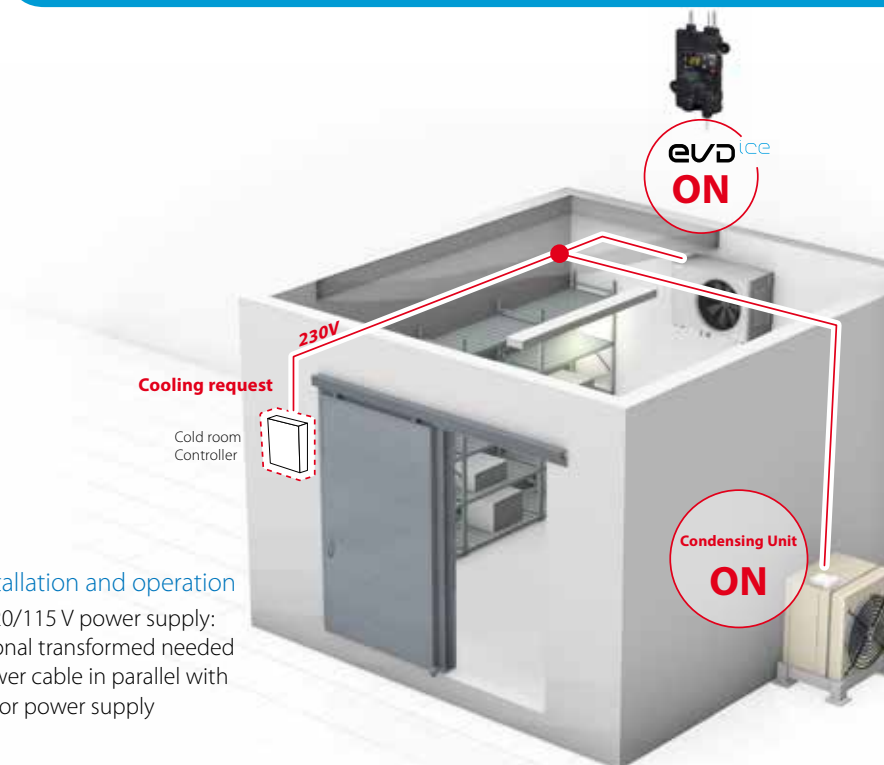


Easy commissioning

- Fast field commissioning with 3 parameters
- Electronic set point to avoid (re)calibration
- Compatible with the most widely-used
- HFC and HC refrigerants

Ease of installation and operation

- Built-in 220/115 V power supply:
- no additional transformed needed
- Same power cable in parallel with
- compressor power supply





High Efficiency Solution for Embraco Fullmotion Compressor



- huge OPEX reduction
- up to 40% energy savings
- fast cooling by Pull Down management
- system and temperature stability
- noise reduction with BLDC technology
- precise defrost management
- eco friendly with the use of natural refrigerant

ir33+ Wide for Embraco Fullmotion compressors simplifies the use and management of variable speed compressors for all customers on the commercial refrigeration market.

Simple to use

Significant variations in compressor capacity and enormous energy reductions can be easily achieved by setting a couple of parameters.

The dedicated PWM frequency output and simple parameter configuration can be used to configure an individual speed table for:

- plug-in islands and units
- catering and professional equipment
- ice cream coolers
- small cold rooms
- wine coolers
- showcases

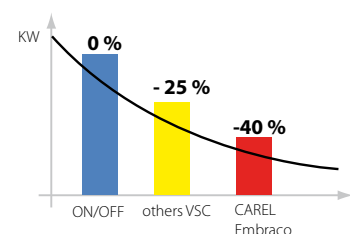
Complete solution

All the knowledge and experience we have acquired from the market and our current ir33+ platform are included and combined together in this controller. Temperature, defrost and fans are managed, functions that are already appreciated on the market. New features in this range are:

- Embraco Fullmotion management
- Special hot gas defrost management
- Pull Down management

High performance

Due to the high efficient Embraco Fullmotion compressor and the use of our ir33+ Wide, significant reductions in energy consumption can be achieved.



Lighting solutions: bright ideas for Retail

Internationally patented optics

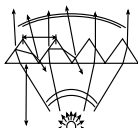
1 **Deflective**
for a wide light beam



2 **Backreflective**
for a collimated light beam



3 **Lensflective**
for a diffused light beam



Design, technology and efficiency

- High-efficiency lights with patented optics
- Uniform LED lighting, no shadows, no dazzling and no glare
- Lighting emission control for light only where needed

The right light for every need

- Indoor and outdoor lighting
- High efficiency and low power consumption
- Different colour temperatures available

The light under control



pChrono

Dedicated lighting control system, ideal for all energy optimisation requirements

- Algorithms for integrating natural light in the daytime with set point control
- Occupancy and brightness sensors, indoors and outdoors
- Wireless option for monitoring temperature, humidity and energy consumption

PlantVisorPRO

System supervision solution

- Astronomical twilight sensor using the GeoLighting plug-in
- Manual overwrite command
- Full integration with CAREL HVAC solutions

Lola

- Total reflection
- Nominated for the Compasso d'Oro award
- Delta de Plata prize-ADI-FAD 2012 Awards





The new family of connected programmable controller



The c.pCO controller family represents the evolution of pCO5+ towards unprecedented networking capabilities.

Thanks to a Multitasking Operating System and the adoption of standard protocols, local and remote connectivity are the key innovation of the new c.pCO system.



Integrated Ethernet Interfaces

Two built-in 10/100 MB/s switched ports
Build networks without external switches
Wide range of integrated services

- Web Server with dynamic content
- FTP Server for upgrades and file upload
- Modbus/TCP Master and Slave
- BACNet/IP B-BC profile
- On-target debugging
- tERA cloud connections

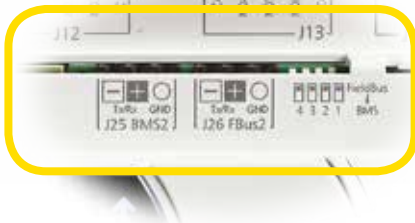
Integrated USB interface

Two built-in USB 2.0 standard ports
USB Host for storage devices
USB Devices for PC connection

- Upload application and OS upgrade packages
- Upload Web pages and generic user documents
- Download data logger CSV files
- Download user documents
- Application Cloning with encryption and digital signature
- On-target debugging



- 5 different sizes to better fit all applications
- ranging from 16 to 55 I/O points
- new controller size: c.pCO mini
- great I/O flexibility with Carel ASIC solution
- integrated BMS, Fieldbus, USB interfaces
- builtin Ethernet ports with Web server, FTP and tERA connection
- open protocols: Modbus®, BACnet™, HTTP, FTP
- integrated energy saving with Valve Driver and Ultracap



BMS & Field Bus connectivity

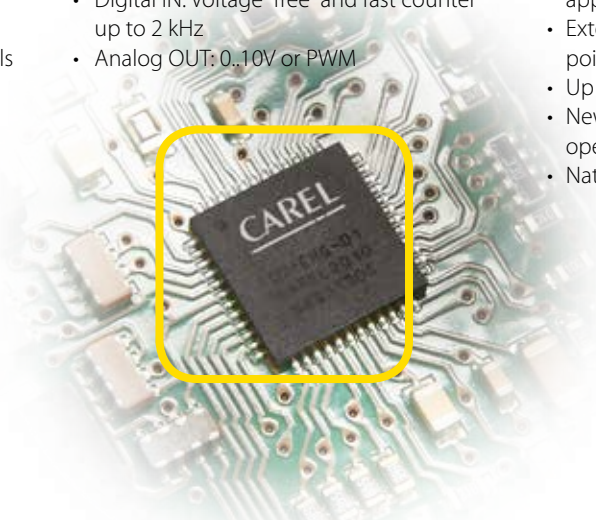
Two built-in RS485 interfaces
Expandable with two additional optional cards.
Multitasking independent protocol engines

- RS485 high speed interfaces up to 115200 bps
- Modbus® RTU Master and Slave protocols
- CAREL optimised Master and Slave protocols
- BACnet™ MSTP B-BC profile
- Custom protocol (Function blocks for Direct RS485 access)

Flexible I/O

Up to 10 Universal I/O channels
CAREL ASIC proprietary silicon technology

- Analog IN: NTC, PTC, PT100, PT500, PT1000, 0..1V, 0..5V, 0..10V, 0..20mA, 4..20mA
- Digital IN: Voltage free and fast counter up to 2 kHz
- Analog OUT: 0..10V or PWM



New Operating system

New Multitasking Operating System
New Virtual Machine for application logic
Optimal usage of onboard system resources.

- Priority management to guarantee application loop speed
- Extended datatypes: 32bit and floating point numbers
- Up to 5x speed increase on pCO5+
- New protocol engines for independent operation
- Native TCP/IP multitasking protocol stack

c.suite

The new programming tool suite to enable efficient team-work



The new programming software for the C.pCO family controllers, designed as a suite of interdependent modules, one for each stage in the development of the HVAC/R system. C.Suite allows a team of professionals with different skills to work as a team on the same project, increasing the efficiency of each team member.



c.strategy

The development tool that most closely follows the concept of the previous 1Tool. With c.strategy, expert programmers of thermodynamic algorithms can prepare the heart of the application logic.



c.mask

With c.mask, the interface developer can work in a specific environment used only for creating the user interface. c.mask can be linked to the c.strategy project, so that any changes made by the algorithm expert are available in real-time to the UI designer.



c.design

This is the real revolution compared to 1Tool. Once the application logic has been completed, and the User Interface defined, these important parts can be subsequently expressed as different unit or system configurations.



c.web

c.web is a very useful tool for creating HTML5 websites to be loaded onto c.pCO. No specific knowledge of web technology is needed, this is a simple visual object tool with a workflow similar to 1Tool Touch Editor.



c.factory

A completely new tool designed for the OEM production line. It is used to program the controllers in the production flow, loading applications and the appropriate unit configuration on assembly.



c.field

c.field is the ideal tool for field maintenance personnel, used to simply and efficiently monitor unit operation.

Cloud services

Tailor -made solution for each user

tERA is the CAREL service-focused platform that exploits the latest technology to provide remote services for HVAC/R applications. The tERA platform not only has the purpose of providing data, but rather transforms raw information into value for all types of users. It can thus represent a remote graphic interface to a controlled system, or provide statistical analysis on thousands of units installed all over the world: all users can access a service that has been made-to-measure to suit their needs

The tERA platform is designed for different targets, with different skills and interests. For this reason, tERA is proposed as platform comprising several services, so as to offer specific solutions for each user.



Secure connectivity

In compliance with international standards



Integrated connectivity

Plug & play solution: all tERA services are available, just plug in the Ethernet connector. No need for an external box, no router configuration.

Simple and fast access to all the information you need;
optimise your work and become more competitive;
offer your customers a cutting-edge proposal using the most advanced technology and your own unique skills



Remote connectivity

- Dedicated service for remote control:
- customised installation view
 - real-time control for main parameters
 - highlight any alarms



Centralized data collection

- Dedicated service for maintenance optimisation:
- real time control with remote parameter setting
 - alarm notification for prompt response
 - graph and report tools for default analysis



Cloud computing

- Dedicated application for data analysis
- Linear, bar, pie chart for checking system performance
 - Scheduled reports with custom dashboard layout



Heat Recovery Units and compact Air Handling Units



Integrated solutions for energy saving

The new CAREL software for active/passive Heat Recovery Units and compact Air Handling Units:

- Based on c.pco mini programmable controller
- Benefiting from the features of the new c.suite development environment
- Leveraging on Carel know-how in High Efficiency Solutions

We developed a comprehensive platform for the management of the most advanced units available in the market, featuring:

- EC fans for precise regulation of the air flow
- Integrated refrigerant circuit, in particular with BLDC compressors, to maximize energy recovery from the exhaust air.
- High efficiency CAREL devices for maximum energy savings: power+ inverters, EEVs, adiabatic humidifiers
- Thermal wheel and cross plate heat exchangers

Among the many functionalities provided by the software we can list:

- Dehumidification on dew point
- Advanced defrost for the heat exchanger and the condensing coil
- Freecooling/freeheating, with control of indoor air quality
- Management of different HMI: pGD1, pLDP, ThTune
- additional IOs through c.pCOe expansion board



All the features of c.pco mini and c.suite are available (depending on the version of controller in use):

- Real Time Operative System for high performances
- Great flexibility: 10 universal channels in just 4 DIN modules
- Built-in Ethernet port for native plug&play tERA connection; web based advanced services and serial communication with standard protocols as Modbus and BACnet
- Serial ports for field devices and BMS communication
- Integrated driver for unipolar EEVs
- Ultracap module for safe electronic valve closure in case of power failure
- NFC tag for machine settings configuration through mobile devices
- USB host and device ports on the same Micro USB connector
- Optimization in programming, thanks to the functionalities provided by c.suite both on machine configuration and sw deployment in the production line



Humidifiers

CAREL humidifiers management for fine humidity control and green cooling.



ExV sistema

Full range of proportional expansion valves for high-efficiency units. For conventional and new refrigerants.



power +

Maximum system efficiency thanks to precise modulating load management. New widened range with 10 and 35 VA models.

Complete range of electronic valves for HVAC/R applications

-14.3%

in supermarket applications energy demand

-30%

possible energy savings in the chiller applications electrical consumption

With E^xV sistema CAREL offers a complete and integrated solution for controlling evaporation temperature in air-conditioning and refrigeration units, through the E^xV electronic expansion valves and the new EVD evolution superheat controller. This solution is the result of decades of experience in the specific application, and thanks to the new EVD evolution driver, it integrates perfectly into the series

of CAREL controllers for the optimised management of the complete refrigeration cycle.

The range of electronic expansion valves offered by CAREL covers cooling capacities up to 2000 kW, thanks to the new E^xV series. All CAREL valves share the same technological solutions, from the larger sizes (E³V, E⁶V, E⁷V) to the high-end solution for 40 kW (E^xV smart).

Electronic valves optimise flow in the refrigerant circuit in all operating conditions. As a result, significant energy savings can be achieved by installing these valves

Energy savings

Operation at minimum possible condensing pressure means less work performed by the compressor, and a consequent reduction in energy consumption.

Easy to use

Quick start with just 4 settings, graphic display with help on the parameters, easy driver and valve installation and maintenance.

Natural refrigerants

CAREL has got the right products both on controls and ExV supporting modern refrigeration circuits based on natural refrigerants, as ammonia (R717), carbon dioxide (R744), propane (R290), butane (R600), isobutane (R600a).

E^xV selection tool



CAREL exvlab is the powerful tool that guides users in the selection and operation of CAREL valves. This is a web-based environment where both expert designers and novices can access tools for selecting and verifying valves for all applications and operating conditions in which ExV valves can be used.

Either transcritical CO₂ and hot-gas by-pass applications are ready to be simulated.



CO₂ Ready

CAREL control systems and EXV valves can manage both subcritical and transcritical CO₂ cycles.





Solution for high efficiency units

Higher Seasonal Performance Factor with DC Inverter technology

Integrated management of DC inverter compressors and the electronic expansion valve ensure very high energy savings.

-30%

The CAREL solution for the control of high efficiency units ensures significant energy savings in the entire system, guaranteeing a high degree of adaptability and integration between heat generator and system.

Management of variable speed compressors with DC inverters, together with the use of the electronic expansion valve in fact allows the widest heat output modulation capacity currently available, maximising performance of the unit in response to the changing thermal loads and climatic conditions throughout the

year. The added possibility of exploiting serial communication to control smart actuators (pumps, fans...) represents a further step forwards in the development of more reliable and efficient units.

CAREL offers ready-to-use application software that integrates all the options provided by pCOsistema+, such as for heat pumps and C.R.A.C.

Power+ DC inverter

Power+ is specifically design to drive DC compressors, tested and approved by several compressor manufacturers. Power+ can work in a wide temperature range and offers flexible installation solution as well as a compact design to easily fit inside your unit.

Integrated with CAREL controllers, Power+ guarantees the highest control performance and energy saving to reach the best Seasonal Performance Factor, and therefore the lowest unit running costs, with comparable capital costs to fixed speed compressors.



CAREL Preferred partners

The close collaboration with high level technological partners let you develop more and more innovative solutions.



10 A - 1pH 230 Vac

Product+

- 200-240 V 1ph input, 10 A to compressor
- The brand-new concept BLDC inverter for low power units
- Optimised footprint for compact units
- EMI filter and Active PFC filter (EN61000-3-12 compliance) for residential compliance**

Flexible installation

- Open board IP00 design & coldplate version
- available for closer integration
- IP20 with plastic cover and heatsink available



18/24 A - 3pH 400 Vac

Product+

- 380-480 V 3ph input up to 24 A to compressor
- EMI filter (for residential environment**)
- External DC choke for harmonics (EN61000-3-12 compliance)
- Optimised new generation heatsink

12/16 A - 1pH 230 Vac

Product+

- 200-240 V 1ph input up to 16 A to compressor
- EMI filter (for residential environment**)
- Optimised Active PFC filter (no external filter to be installed)
- Optimised new generation heatsink

Flexible installation

- IP20 frontside / IP44 backside with sealing gasket
- Heatsink/coldplate version available



35 A - 3pH 400 Vac

Product+

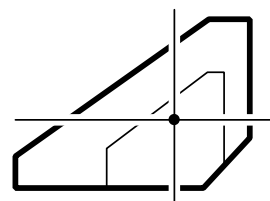
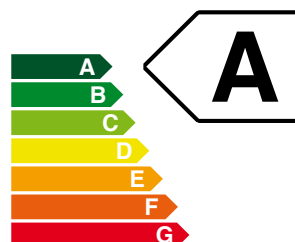
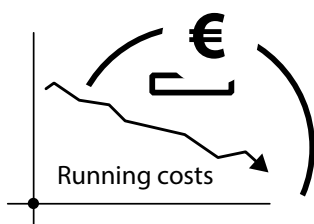
- 380-480 V 3ph, 35 A to compressor
- New concept design for high power units
- EMI filter (for residential environment**)
- Embedded DC choke for harmonics (EN61000-3-12 compliance)

Flexible installation

- IP20 index and heatsink/coldplate version available



Best Seasonal Performance factor
Lower unit running costs
Overall compressor management



DC compressor & power+

Vs fixed speed compressor:
comparable capital costs,
lower running costs

DC compressor technology

guarantee the best seasonal
performance factor (SPF)

pCO sistema & power+

safe and reliable:
overall management by qualified
compressor manufactures

** To be verified in final installation

Flexible and intuitive energy saving solutions for air handling units



Integrated air handling unit control solutions based on programmable controllers and a complete range of accessories.

Air handling unit applications feature a very wide variety of system types, with differing degrees of specificity. CAREL can supply solutions for all installations, whatever their complexity: modular controllers, a wide range of humidifiers and accessories to ensure increased integration, up to complete system supervision so as to ensure total reliability and maximum energy saving. The system approach is combined with flexibility, both in relation to hardware, i.e. architecture and components, and software, starting with the standard application dedicated to AHUs, completely customisable using 1 tool.

- **Flexibility:** Standard, modular and configurable solutions to adapt to the widest variety of needs.

- **Intuitiveness:** The graphic interfaces are easy to navigate and provide immediate access to information.
- **Customisation:** Programmable controllers ensure maximum customisation both in terms of control and user
- **Energy saving:** Controllers, accessories and management algorithms designed to achieve maximum energy saving interface
- **Fieldbus:** System solution based on serial integration of devices: optimised management of a higher quantity of information
- **Connectivity:** Programmable controllers with plug-in options for communication with the most commonly-used BMS systems.

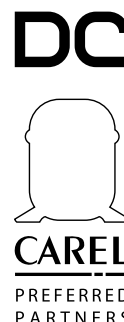


CAREL evaporative cooling and active recovery simulator

CAREL Evaporative Cooling and Active Recovery Simulator is a demo unit to simulate a "Make Up Air" AHU provided with heat recovery systems for Energy Saving. The unit displays many of Carel technologies and the products for High Efficiency, including Evaporative Cooling, Electronic Expansion valves, the Power+ Driver for variable speed compressors and the integration of all of them through the connectivity with pCO controller that optimizes the different devices to control the temperature and humidity of the supply air.

The data of the units are collected by the controller via different serial lines and then shared with a touch screen and also on the tERA system that allows the visibility through Internet with a simple browser.

The system has three working modes to show the different configurations: an electrical heater simulates a summer condition with outside air of 31°C.



DEC and IEC

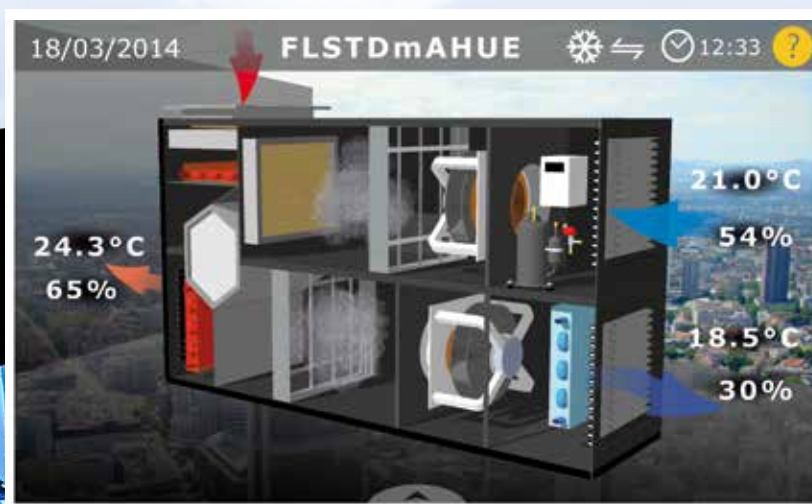
A water atomizer (Humifog) provides cooling effect adding moisture both to supply air (DEC) and also to exhaust air that is cooling the heat recovery (IEC). The pCO5+ controller maintains the supply temperature at temperature and humidity set point communicating with the Humifog controller. The setpoint is achieved modulating the DEC up to maximum humidity and then IEC to have a bigger Energy Recovery on the heat exchanger.

Active recovery

In this configuration a refrigerating circuit is activated to control the temperature set: the variable speed compressor is modulated to achieve the set point on the supply air while on the exhaust air duct the condenser is installed. The exhaust air temperature is lower than the outdoor air so the efficiency of the circuit is higher and it is combined with the heat recovery (Active Recovery) for greater energy saving. The variable load conditions combined with a reduced refrigerant pressure differential require the high performances of the EEV.

IEC with active recovery

The highest efficiency then comes from the synergy of the technologies: in this configuration the IEC is used to increase the static thermal recovery of the heat exchanger but its effect is also a lower exhaust temperature that reduces the condensing pressure. This effect combined with the reduced speed of the compressor increases the efficiency of the refrigerant circuit: this synergy with the same supply temperature may result in an energy saving that is more than 50%.





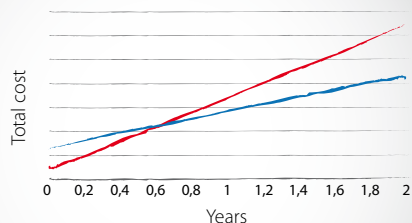
gaSteam

gas-fired humidifiers

the green solution to humidify and save money



Comparison between a traditional electric humidifier and gaSteam



— gaSteam

— traditional electric humidifier

Reference values: electricity 0.15 €/kwh, gas heat value 31.75 MJ/m³, gas cost 0.7 €/m³

gaSteam is a green solution as it operates on natural gas, a clean and economical energy source.

gaSteam works by burning natural gas or LPG, without needing to change burner when changing the type of fuel, but rather simply setting some burner calibration parameters.

Energy saving

Estimated savings of up to 70% in energy costs are possible when using gas rather than electricity as the energy resource to produce steam in normal operation. gaSteam is therefore the ideal choice for applications where steam is needed many hours a day, bringing significant savings in operating costs and a rapid return on investment.

Heat exchanger

Heat exchanger featuring an exclusive design that guarantees high efficiency (94-96%) and easy maintenance. Made from stainless steel to ensure long life, even in heavy-duty operation.

Safety and flame control

Maximum efficiency and safety ensured by the premix burner with proportional gas valve.

The control system connected to the electrical panel directly detects the flame, thus guaranteeing maximum reliability and safety. In addition, in the event of faults the control system attempts to reignite the flame or closes the safety valve, providing an alarm signal.



humiSteam

Immersed electrode steam humidifier

This is the result of CAREL's thirty-year experience in the field of steam humidification, and is the most appropriate choice for a wide variety of applications: civil environments, offices, industrial facilities and steam baths.

humiSteam operates on mains water with conductivity between 75 and 1250 $\mu\text{S}/\text{cm}$ and its control software automatically adapts to the characteristics of the water, optimising operating life without maintenance.

humiSteam comes with the patented AFS system (Anti Foaming System), which detects and manages foam so as to prevent droplets of water from being carried with the steam.

The humiSteam range features three models: Basic, X-plus and Wellness.

The **quick start** function makes it ideal for a wide variety of applications.

The X-plus and Wellness models also feature **automatic time band operation** and the option of other communication protocols.

All humiSteam models offer Modbus® connection.

- three versions available;
- capacity 1 to 130 kg/h;
- control probe and modulating limit probe;
- disposable or openable cylinders;
- drain pump.

ultimateSAM

Energy-efficient steam dispersion system



Hygiene and materials

ultimateSAM is made from AISI 304 steel, with some components made from PPS (Ryton), a material with a continuous operating temperature of 220 °C / 428 °F, plus high temperature silicone gaskets (max 150 °C / 300 °F) not in contact with steam, and EPDM gaskets when in contact with steam.

Short not-wetting distance

Holes set out along the entire height of the upright pipes deliver steam uniformly, ensuring a very short non-wetting distance.



High System efficiency and Best Control

CAREL Power Solutions is the new proposal to add value to finished products, integrating control solutions already available on the market for optimum use in the field.

This ensures best customer service and maximum satisfaction, through an integrated product supplied by just one leading brand, which has always been synonymous with reliability, expertise, flexibility, innovation and service.

Refrigeration&Retail

EEV control unit, fitted with driver and backup battery module. Ideal for both retrofits and new installations.



Climate/Humidification

Remote control for CAREL humidifiers. Supplied with cables and pre-wired accessories, can be customised based on the application.



Cold rooms

Cold room controller fitted with MPXPRO and E²V electronic expansion valve. Supernode with WEB card integrated for monitoring and supervision of energy consumption via energy meter.



Air-conditioning

Masteraria

Control unit for air handling units with up to 2 fans, pCO₂ controller on terminal block, graphic display on door, case with IP65 degree of protection.



Compressor racks

Module for cold room management fitted with latest generation pRack controller. In addition to compressors, it controls condensers and the complete chain of safety devices. Vast series of models available for different capacity ranges.



Cabinets/retail powerBox

Compact control module for refrigerated cabinets. Modular plug&play solution that optimises and reduces installation time.



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