




BETTER
CONTROL
BETTER
ENVIRONMENT

onShow

CAREL

Discover our world, experience our solutions, take part of it!



**BETTER
ENVIRONMENT**

**BETTER
CONTROL**



BETTER CONTROL BETTER ENVIRONMENT

In continuity with the past, at Euroshop CAREL once again intends to underline its continuous commitment in the **development of control systems for refrigeration units and systems to making a contribution that improves our environment.**

“There are several environments that CAREL aims to improve: the one that comes immediately to mind is the environment we live in, which we help protect by offering solutions using natural refrigerants and with high energy savings, and through our investments in technologies such as DC inverter control. Indeed, our solutions support the HVAC/R industry in limiting and reducing its carbon footprint. The spaces where both we and our customers work and the ways we conduct our business are also environments that CAREL aims to improve”, commented Alessandro Greggio, CAREL Group Chief Sales&Marketing Officer - Refrigeration.

Operating cost and carbon footprint reduction, ambient comfort in the spaces where we live, aesthetic pleasantness together with the simple use and management of systems are certainly areas where CAREL is delivering significant contribution and unveiling further innovation at Euroshop.



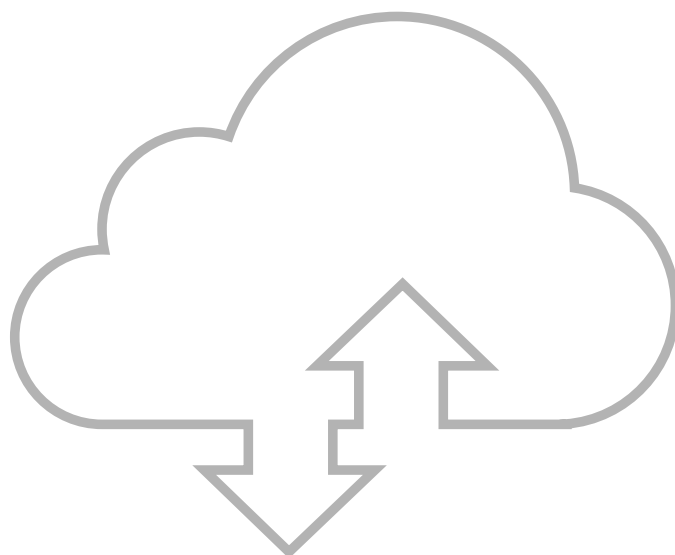
more information on **iot.carel.com**

INNOVATION IN OUR DNA

Renewed solutions in terms of energy efficiency, use of natural refrigerants and digitalisation

Solutions for food retail and, starting this year at Euroshop, **also for food service**, are in the spotlight at the CAREL stand. In all market segments, the main challenges are the drive to save energy, the expectations for human-machine interaction, the need for increasing usability, and cloud connectivity. At CAREL we have tried to respond to all of these demands with a newly-outlined offering.

At Euroshop, we are presenting for the first time some incredible new proposals for food service, the result of years of research and development. All food retail and food service product lines have been injected with major upgrades in terms of range and business model, always with the objective of serving an industry that is calling loudly for solutions that **reduce operating costs, but at the same time feature improved performance, simplicity and faster time to market.**



VALUE ADDED SERVICES

From controllers in the field to cloud services, all the solutions for users of refrigeration applications.

To overcome these challenges, the contribution of intelligent systems is fundamental: by processing the data collected from the systems, the most effective improvement actions can now be immediately identified, so as to optimise system management. At Euroshop, CAREL also presents the **latest evolutions of its digital platforms, the result of synergy between CAREL's different technological and application skills.**



more information on **natref.carel.com**

NATURAL & LOW GWP REFRIGERANTS



The transition to natural refrigerants and the development of new technology in Europe are being incredibly fast

On one hand, cold climate in north Europe has facilitated the use of CO₂ as refrigerant.

The special features of CO₂ have made the use of efficient control and monitoring systems essential, together with specific components to withstand the high pressures and more generally the control requirements and challenges of CO₂. This is not enough for warmer climates, such as south of Europe's countries, where components and configurations to increase the efficiency of CO₂ systems in transcritical mode are required.

On the other hand, the use of propane had gained attention: the modification of IEC 60335-2-89 was finally approved to allow the use of 500 grams in commercial appliances once national legislation and norms are updated.

The big reduction of HFC quota dictated by F-gas will have a huge effect on manufacturers.

The consequences that have already been noticed are significant fluctuations and now a drastic increase of prices and reduction of availability of HFC refrigerants. Still a significant part of the systems are still using very high GWP refrigerants such as R-404A whereas refrigerant distributors have already announced

that they will soon not be sold. Despite most of the F-gas restrictions deadlines are from this year, the reduction of availability, or even elimination, of high GWP refrigerants will force manufacturers to find different solutions.

Natural refrigerant technology has been an important focus for CAREL development during the last years. Our latest innovation path is the use of DC inverter driven compressors, especially with propane and CO₂ as refrigerants, thanks to specific partnership with leading compressors manufacturers and CAREL continuous achievements in delivering natural and efficient control packages in reinforcement and continuity with 2017 Euroshop edition.

This technology, still with large potential to be further exploited, combined with CAREL electronic controls, drives and valves portfolio can actually bring enormous advantages in terms of efficiency, regulation stability, size and weight compared to traditional technologies.



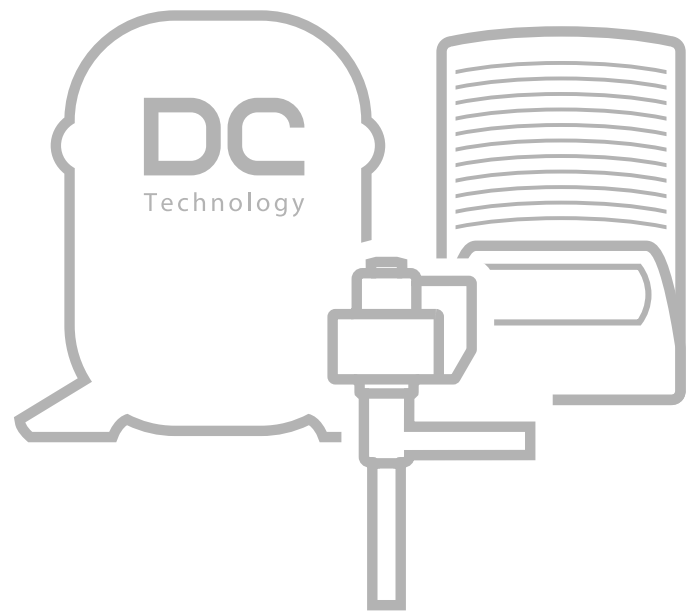
HIGH EFFICIENCY REFRIGERATION APPLICATIONS

DC inverter technology stands out for its real and wide capacity modulation and better overall energy consumption.

The heart of the most efficient technology available in the world for Refrigeration applications is made of a compressor with permanent magnet motors controlled by a DC inverter, an electronic expansion valve and an advanced control and supervisory system.

Variable speed compressors driven by inverters guarantee the best energy performance in every load condition and the lowest noise, reducing operating costs and increasing the quality of food preservation, with stable temperature control ensuring reliable and silent operation. They provide the best way to avoid inefficient ON/OFF cycles that reduce seasonal energy efficiency of the compressor.

Electronic expansion valve allows to save energy by an adaptive optimization of the system parameters during operation. In particular, it is able to operate with a lower pressure difference, allowing a more radical decrease in condensation temperature and reducing the power consumption of the compressor, consequently lowering operating costs.



An **advanced control and supervisory system** with energy saving functionalities is particularly important to adapt its operation to the climatic conditions and the requirements of the end user.

The results provided by the use of these components is the maximisation of the behaviour of each component to obtain a system that achieves best in class energy efficiency performance: power consumption reduced by up to 40%, with an outstanding stability in temperature control and constant control and optimisation of operating conditions to maximise compressor reliability and performance.

Combined with an overall reduction in cost and ease of use they are key factors to support the adoption of natural refrigerants in commercial refrigeration.



STYLISH & CONNECTED

ij is the new CAREL family of controllers for refrigeration Food Service. ij has been designed to cover and overcome the typical requirements of merchandisers and food storage or display equipments.

With ij it is possible to create your style, colour and graphics integrating controller aesthetic in the final unit design.

ij is simply connected to enable IoT services with a cutting edge user experience through smart app for each kind of user. With its modular design ij can easily fit and empower final units improving both functionalities and energy consumption.

Create your style

- Colours and graphics powered by **Flexifit** technology.
- ij has a totally coloured front surface that make it recognizable and fully customizable.
- Buttons and icons graphics can be designed according with specific functions of the final unit increasing the usability during its normal life.
- Design the best solution for each application, allowing controllers to play an active part of your branding and enhance cabinets' total aesthetics.

Simply connected

- A cutting edge user experience locally and remote.
- Starting from production, CAREL offers a in-line tool to easy program controllers thanks to NFC tech.
- Furthermore ij connectivity enables OEMs to offer advanced IoT services and explore new business models.
- Through CAREL APPs, ij on field guarantees a simple unit interaction for end user and service both locally



more information on **ij.carel.com**

A modular solution
to fit and empower your units



Modulating load
driving



Fast VCC
adoption



Accurate
humidity control

Simply reliable in heavy duty environments with electrical and mechanical protections, iJ is also the best energy saving partner with smart algorithms and modulating load driving.



iJm for Merchandisers

Customise the front graphics.
Always keep drinks at the optimum temperature.
Check sales performance, asset tracking, customer engagement. Save energy

iJF for Food storage and display

Display your food offering in the best way.
Preserve its quality, flavour and aroma.
Interact smartly with your unit.
Monitor the temperature wherever you are.



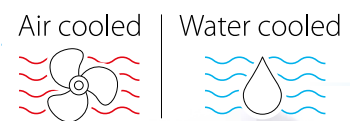
Heos

INCREASING THE OFFERING FOR NATURAL REFRIGERANTS

Heos is the high-efficiency control solution for the management of the advanced plug-in and semi plug in showcases

Traditional multiplex solutions need to meet the demand of units operating in conditions that are often very different from each other, thus meaning operation of the individual showcase cannot be precisely optimised.

In a centralised solution, in fact, optimisation is based on an "average" of evaporator operating conditions, with the result that control is significantly dependent on the showcase in the most demanding conditions. Rather than remote cabinets supplied by long distribution lines and a single compressor rack, Heos proposes the use of plug-in (air cooled) and semi plug-in (water cooled) showcases bringing them to a more advanced performances in energy efficiency and ease of installation/maintenance, equipped also with electronic expansion valves and variable-speed compressors based on DC technology.



Advanced plug-in showcase solutions ensures:

- **reliability**, through to the use of factory-tested units;
- **less risk of leakage**, lower maintenance and installation costs;
- **flexibility** in determining store layout.

DC technology delivers continuous modulation, maximising:

- **efficiency**, which means a genuine reduction in operating costs;
- **control stability**, providing eg. better quality and longer shelf life;
- **lower maintenance cost** through improved remote diagnostics.



Heosbox is the complete solution for managing semi plug-in showcases in a waterloop system.

Heosbox comes with all of the features of the Heos solution, meaning variable-speed compressors based on DC technology and electronic expansion valves, thus delivering all of the benefits to market stakeholders now even more seamlessly.

The profile of the offering supports manufacturers with faster time to market, exploiting CAREL's decades of expertise in DC technology design applied to refrigeration, thus giving end users and service providers an additional option for adopting the Heos ultimate control solution, now even more plug & play and together with superior remote maintenance features.

Beyond the box

Heosbox comes complete with high-value services, including **dedicated in-field and cloud monitoring and diagnostics tools for the industry**: specific and intuitive dashboards in the boss and RED monitoring solutions, powered by smart algorithms to enable real predictive maintenance and perfect monitoring of the tangible results in terms of energy savings and food preservation.



HEOS

HEOSone is CAREL's solution for the **control and management of small size DC inverter refrigerated plug-in.**

HEOSone is today **available for both medium and low temperature applications** thanks to the complete Orione R290 DC compressors line up.

Typical applications are chest freezers and wall standing showcase plug-in coolers for the supermarkets but also professional refrigerators for kitchens or food display cooler for bakeries and small shops.

HEOSone guarantees high energy efficiency and great performance while reducing the environmental impact. The synergic use of modulating devices allows freezers and coolers operation to keep the energy efficiency at the highest possible level. Energy efficiency is always optimised keeping the goods a constant temperature.

HEOSone can ensure results in terms of energy savings that easily exceed the current market benchmarks and indeed anticipate future standards, using a natural refrigerant - propane - to achieve true natural efficiency.



HIGH ENERGY EFFICIENT PROPANE PLUG IN SOLUTION

The main target in the refrigeration market of today is to offer highly-efficient devices, which bring benefits in terms of caring for the environment and reducing electricity bills, along with cooling the stored goods in the best possible way.

- Low energy consumptions
- Natural hydrocarbon refrigerant (propane)
- Perfect goods temperature with stable control and fast pull down
- Time to market
- Full plug in solution
- Data analysis

Heez

Heez M for Merchandizer is the CAREL solution for high efficiency beverage coolers.

Heez M includes the same components kit present in HEOSone but here orchestrated by a specific control software to outclass the current energy consumptions and pull down performance present in the market.

Professional Refrigeration

Energy Consumption

0.85
kWh/day

EEI
-47%

VS
TopTEN.eu
Best cooler average

HRR
-62%

5 h VS 13 h
Half Reload Recovery

tested by

R E G E N T

Tests conducted by a certified third-party laboratory (Re-gent).
EN16902 - 25°C - 60% rH - K2 class 397 l gross volume cooler

Commercial Refrigeration



APPLICA

New user experience and field connection for quick and easy service operations. It includes product documentation updated and available at all times, and simple access to parameters settings with different profile levels.



RED





The new generation of digital services dedicated to **SUPERMARKET chains**

With upgraded content, technology and interface, the new portal is the ideal solution for controlling systems and reducing management costs.

System optimisation, improved food quality levels and lower maintenance costs are all objectives that can be achieved with RED.

Simplification of complex systems

The level of digitalisation and connectivity now available in systems thanks to the new boss family monitoring solutions allows data to be acquired from the installed units. RED then makes effective use of the collected data, providing the information relating to each system in a usable and easily comparable way. Recognition of critical patterns and identification of improvement actions are tasks for a small number of experts when starting from raw data. Exploiting decades of experience in real field applications, thermodynamic expertise acquired in laboratory analysis and modern data mining and artificial intelligence technologies, RED provides practical and easily understandable information.

Preventive maintenance

CAREL supports service departments with the aim of optimising system maintenance processes. Using RED, a problem on a system can be immediately correlated with the behaviour of any similar units installed in the field. Possible malfunctions due to the same cause are

highlighted so as to manage preventive maintenance activities before the problem spreads further.

For retailers, energy consumption optimisation targets are hindered by the need to manually configure their systems. RED on the other hand can easily identify any behaviour that does not comply with the defined standards and eliminate unnecessary energy consumption. Standards can be defined by exploiting the experience of hundreds of systems. RED enables automatic control of all installed units and can be used to improve system performance and quality indicators.

Integrated services

CAREL's proposal, always focused on providing the market with control solutions that guarantee optimisation of performance and consumption, has now been enriched with digital services that extend the concept of efficiency: thanks to RED, the company can work alongside its customers to optimise all system management processes and achieve the planned sustainability targets.

The new RED solution is part of a broader corporate strategy aimed at improving the level of service provided to customers.



T-STORE

The one-stop-shop flexible solution for food retail and food service

Total Store Solution, branded as t-Store, is the combined proposal of solutions and services which facilitates interaction and synergy among the different equipment and sub-plants (REF, HVAC, Energy, Lights) enabling operational expenses reduction and maximising energy optimisation.

Cutting-edge web- based software and local monitoring systems allow the possibility to centralize data generated by the stores and save them into a structured database for back-office operations and advanced analysis.

An example of t-Store offer includes BMS retail panel, the plug&play and ready-to-use electrical switchboard flexible solution tailored to fit specific retail requirements. Extended competence and know-how are provided across all the stages of the project life-time: from the Consultancy and Design phases, featured by a clear understanding of project details and high levels of reliability, to the Prototyping and Industrialisation stages, where fine-tuning solution possibilities and advanced lean production methods ensure maximum customer satisfaction. With HW/SW already on board and high reliability guaranteed by 100% in-house functional test, **BMS retail panel represents the ideal One-Stop-Shop solution for all centralised supermarkets, from express to hyper.**

boss



Fully responsive web design

boss micro, the ideal solution for c-store, petrol station and quick service restaurant applications

Boss micro is the new size in the boss family that extends the offering for local monitoring systems. The new supervisor is intended for systems with a limited number of units, yet that still require the same user experience and advanced system management functions.

Connectivity and security

As part of our continuing digitalisation strategy, the new local boss micro supervisor natively integrates various communication channels to centralised data collection platforms.

The new RED digital services platform with analytics and preventive logics for system optimisation can thus be enabled immediately and adapted to suit each system. Boss micro comes in **four different hardware versions**, depending on the connectivity options, integrating a wi-fi hotspot and a 4G modem for easy local and/or remote access without requiring any

additional infrastructure. Just like the entire boss range, boss micro also implements the **highest security standards to ensure that access to information is always controlled and secure.**

Flexibility

Extensive usability of the interface, an important feature of the boss range, has also been implemented on the micro version, allowing simple and immediate interaction with the system by any user. The intuitive interface - fully compatible with mobile devices and fully customisable - is indeed one of the main strengths of the entire range, representing the perfect tool for installers or shop owners to keep their system under control.

System optimisation

The boss micro supervisor guarantees optimisation of system performance through a wide choice of additional software components, such as management of compressor rack suction pressure or dashboards of performance indicators. Also **worth highlighting is integration with third-party devices and integration into BMS systems** using the most common protocols in HVAC/R, guaranteeing complete management of the system even in systems with multi-brand equipment.

mpx

EXTENSIVE CONNECTIVITY FOR FOOD RETAIL REFRIGERATION UNITS



New solution for supermarket showcases and cold rooms that, for the first time in the sector, revolutionises human-machine interaction through direct connectivity with mobile devices

MPX is the innovative series of electronic controllers for the management of refrigerated cabinets in retail applications.

Developed on platforms that guarantee high flexibility and scalability, this range of products can meet all market demands for this application: from ease of use and installation to highly-efficient performance.

Alongside the consolidated PRO version and the recent one line, the range has been further expanded with two new segments:

- **MPXzero:**

the new entry-level solution for supermarkets

- **MPXone Advanced:**

evolution of the current offering, ensuring high efficiency in compact hardware

In continuity with the current range, all products ensure:

- **Advanced connectivity** with complete cabinet management, wireless technology and seamless BMS and Fieldbus device integration.
- **High efficiency** through advanced control logic, also applied to the devices connected via serial line.
- **Smart user interaction** ensuring uniformity and ease of use across the range, in addition to advanced programming tools for mobile devices.

MPXone Advanced represents the evolution of the current One segment, which integrates management of a CAREL unipolar electronic valve to improve the operating performance of a multiplex cabinet or cold room.

The solution's **compact dimensions** represent the distinctive feature of the controller, meaning the design of the electrical panels can be minimised. Added to this feature are **wireless connectivity** (NFC, Bluetooth) and the most advanced logic functions for optimising control and energy efficiency.

In continuity with the previous series, the new "zero" series has been added to the range, extending the family feeling concept both as regards the software functions and simplicity of use, the thread that runs through all of the controllers in the range.

MPXzero comes with extremely advanced features compared to other controllers in the same category, especially as regards aesthetics, hardware and connectivity.

In addition to the consolidated functions for the management of refrigeration units, this new series features **a latest generation display**, comprising:

- innovative design
- capacitive touch screen
- wide angle of visibility
- intuitive status icons



APPLICA

The extreme versatility of the product is also ensured by the **connectivity features** (NFC, Bluetooth), standard on the latest generation CAREL controllers, which via the APPLICA app simplify routine commissioning and maintenance operations.

pRack

MORE THAN RACKS...

pRack is CAREL's complete offering for the management of compressor racks and condensing units.

With more than 10 years of experience in rack controls, it stands out on the market for:

- innovative control algorithms for energy savings;
- wide compatibility with market control standards;
- extensive connectivity with CAREL supervisory systems and remote services;
- versatility to serve different applications, thanks to a flexible hardware platform and software features.

pR300

for refrigeration applications that use HFC and HFO refrigerants, or CO₂ in subcritical operation.

pR300T

for transcritical CO₂ applications, managing typical system components such as gas coolers, intercoolers, high pressure valves, flash gas valves, parallel compressor lines.



FUTURE-PROOF TECHNOLOGIES

High efficiency CO₂

From small convenience stores to large hypermarkets, CAREL covers a wide range of centralised solutions. Hecu CO₂ and pRack pR300T represent the complete offering for the control and management of centralised CO₂ systems, from small condensing units to large compressor racks.

Their main strengths are:

- continuous modulation
- energy saving and high efficiency
- user simplicity
- total connectivity

Hecu sistema: innovation made compact

Hecu sistema is CAREL's high efficiency solution for condensing units in commercial refrigeration. By using DC inverter compressors, Hecu sistema can offer real modulation of cooling capacity, able to achieve low energy consumption, especially at part loads. Hecu sistema also stands out for its real-time communication with the refrigeration units, allowing an impressive temperature stability for a longer shelf life and food quality.

Another strong value of its synergy with cabinets is the possibility to apply advanced oil return functions which greatly benefit compressors life and therefor system reliability.

pRack multiDC: modulating at its finest

CAREL's full DC booster system bring modulation to outstanding levels. Providing up to 35 kW in medium temperature and up to 10 kW in low temperature, it tunes the provided cooling capacity from 5 to 100%, reducing noise and power consumptions.

This while keeping a strong reliability thanks to its advanced oil management system.

Compact dimension and silent performance make it an excellent choice for retrofits and urban contexts.

EMJ ejectors: CO₂ efficiency without borders

Forget about climate limits for CO₂ applications: with EMJ modulating ejectors it's possible to reach great efficiency performance even in warmer latitudes. Controlling up to three electronic modulating ejectors, CAREL's cutting-edge solution increases the energy efficiency of transcritical CO₂ systems offering:

- Work recovery from gas cooler's high pressure
- Sinergy with cabinets to reduce pressure differential
- Less compressor needed for the same cooling capacity.

Consolidated reliability, now faster

Thanks to a powerful renewed hardware, pRack come now in a new High Speed version. Providing all of the solid and appreciated functions along with new ones, with:

- extremely fast controller start-up (20 seconds);
- field/production line time saving for unit configuration;
- reduce unit down-time after blackout/power fault.

emj



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