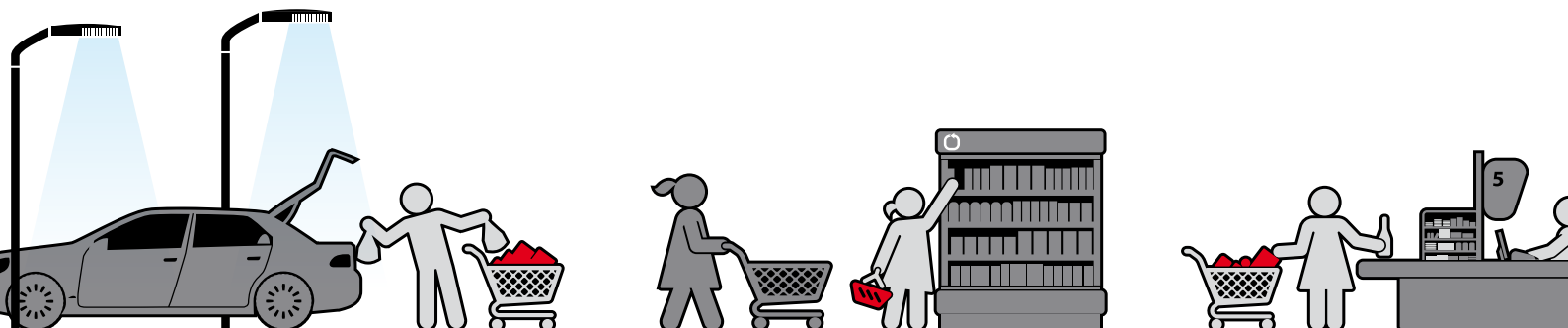




Energy saving and
complete store management



Driven by CAREL: we make the difference in...

Our values are the foundations that support everything we do. During our over forty-year history, the values we believe in have remained unchanged.



Watch the video!

Innovation as a business model

Research & Development are the heart of our commitment. A total of 7% of consolidated sales is reinvested in Research & Development, in order to anticipate customer needs and supply advanced solutions. A further 3% of sales is regularly invested in production process technology, so as to ensure ongoing improvement and growth. CAREL also operates two research laboratories, one focused on thermodynamics and the other on humidification, true points of excellence in their respective fields.

Out of the Group's more than 1,000 staff, 18% are employed in Research & Development, a number that reaches almost 25% when considering the designers and technical personnel working at our Italian headquarters. Moreover, 55% of all our employees are university graduates, with an average age of 37, confirming our continuous investments in

human resources, above all young people, going against the norm both nationally and internationally.

Training is another area where we devote significant resources (6,500 hours in 2013), applied to all areas of the company with the aim of developing our personnel, both in terms of soft skills and technical competencies.

High reliability

Our responsibility towards our customers goes well beyond the value of our sales. The products we develop are in fact components that account for approximately 2 to 10% of the value of our customers' finished products, depending on the application.

Moreover, being components that are difficult to source elsewhere, we have adopted a disaster recovery system that involves at least two production sites for the majority of our products. This means we can guarantee the supply of our components even in extreme situations.

Continuous growth

Founded in 1973, CAREL today has consolidated sales of 181 million euros (7% more than in 2013). Around 80% of sales are from exports, through an extensive sales and customer support network. Specifically, we have operations in the Americas (North, Central and South), Asia Pacific, Africa and Europe; we have 18 fully-owned subsidiaries and 6 production sites, in addition to partners and distributors in a further 75 countries.

We serve almost 4,000 customers, with 6,200 active products and annual production of more than 7 million units.



CAREL is one of the world leaders in control solutions for air-conditioning, refrigeration and heating, and systems for humidification and evaporative cooling.

Our products are designed to bring energy savings and reduce the environmental impact of equipment and systems. Our solutions are used in commercial, industrial and residential applications.



High Efficiency Solutions.



We recognize environmental issues as a corporate priority

Francesco Nalini, CAREL Group CEO

Our mission of high efficiency solutions summarises the CAREL model, both the starting point and the final objective that enclose the entire process, from conception to production and marketing of our systems. As an innovative consultant and technological partner, CAREL anticipates market requirements, proposing energy efficient solutions that guarantee the highest performance. Continual improvement is our modus operandi, the process that allows us to achieve a certain standard without this ever representing a limit, rather progressively exceeding it and subsequently defining another at a higher level.

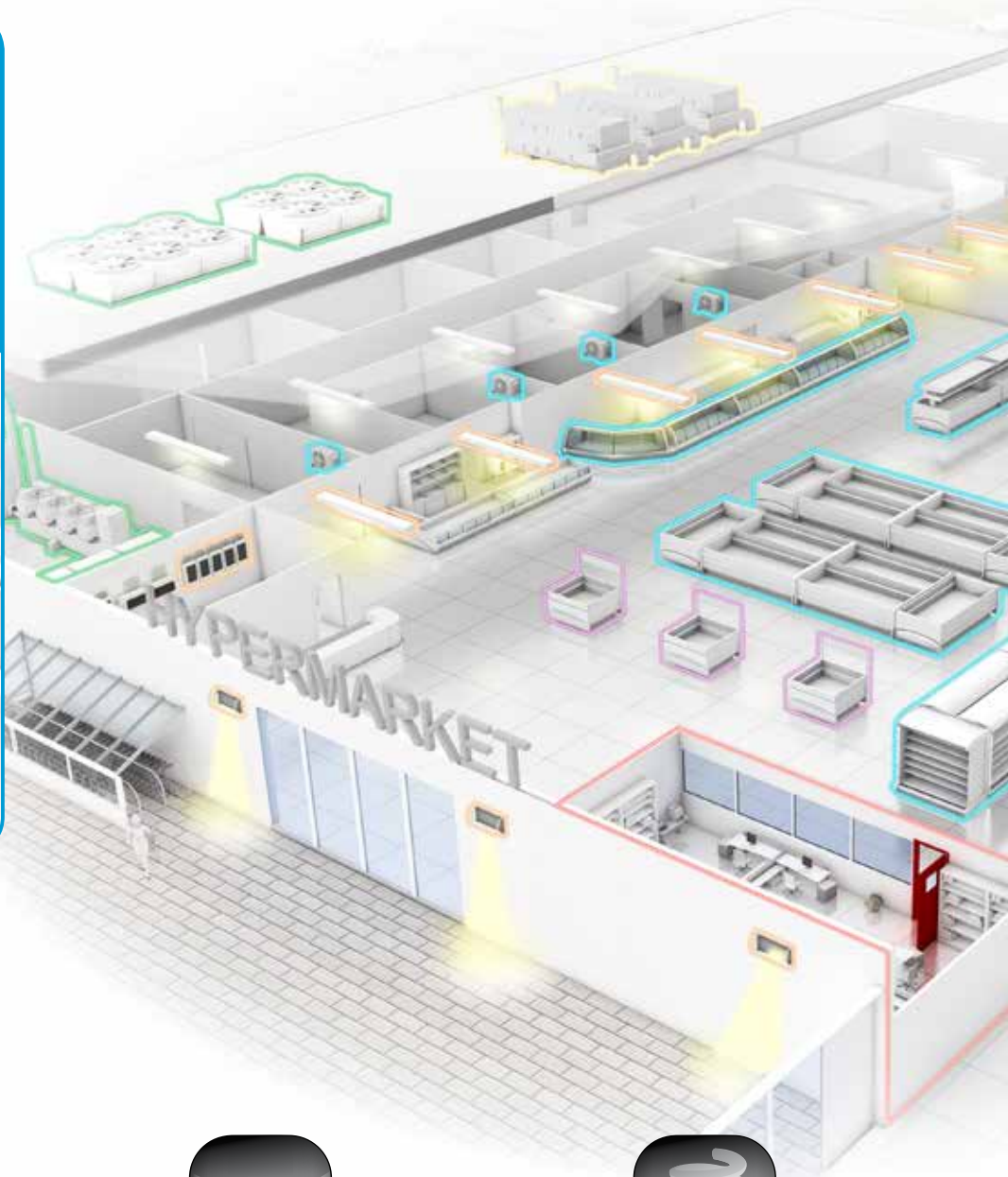
Research, innovation and technology are the keys to our success: for more than forty years, customer needs have been the at the centre of our design work, so as to offer elements of differentiation in terms of both functions and appearance.

The Group's strength lies in integration between different contexts; its overall vision, wide-ranging experience and skills allow us to go beyond the boundaries of individual products and represent a single partner capable of identifying integrated solutions.

Optimise the supermarket system, ensuring comfort and low energy consumption

A supermarket is a complex system with great potential for energy saving. CAREL offers standard, open and scalable solutions (for different store formats), for integration and control of all the systems in the store

Solutions are available for minimarkets and supermarkets: same guaranteed high-level performance, maximum usability and attention to costs.



Energy saving

The higher the efficiency of the solution adopted, the lower the energy consumption and CO₂ emissions in the environment.



Reliability

Reliable technological products, easy to install, based on CAREL's experience in the design and production of precision electronic controllers.



Flexibility

Multiple functions, complete and versatile solutions, easy installation and configuration: a solution that can adapt to numerous needs.



Refrigeration

CAREL provides supermarkets high-efficiency solutions that help achieve maximum energy savings, using dedicated electronic controllers for the refrigeration system.

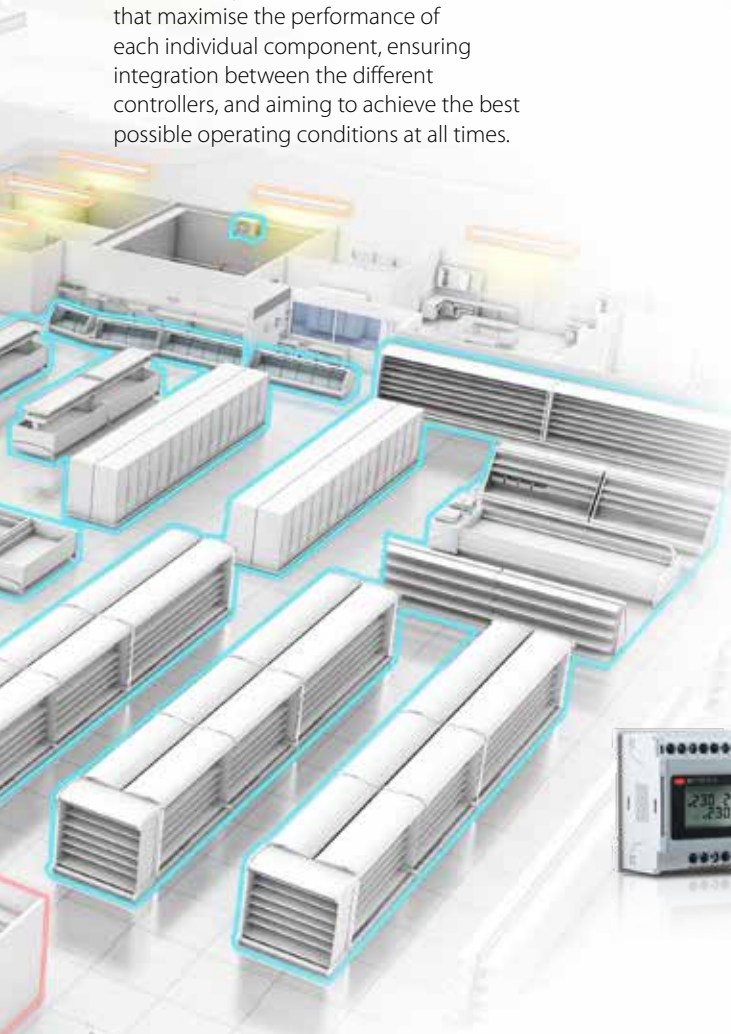
Optimisation is guaranteed by managing the latest technology available on the market, applying advanced algorithms that maximise the performance of each individual component, ensuring integration between the different controllers, and aiming to achieve the best possible operating conditions at all times.



Air-conditioning

The same integrated approach adopted to optimise the refrigeration system is also proposed for the management of air-conditioning: the solutions include modular controllers, a wide range of accessories to ensure increased

integration, and even complete system supervision. All with the focus on total reliability and maximum energy saving



Energy and lighting management

Energy is a critical and fundamental aspect in every industrial and commercial business, and represents a growing expense item. Rational energy management can bring significant economic and environmental advantages. The CAREL energy management proposal works by effectively monitoring system performance and the trend in site energy consumption, so as to define the best system configuration and highlight the effective



energy savings obtained by implementing specific control and optimisation strategies.

Analysis of site energy consumption is presented on easy-to-read graphs and reports.

As well as controlling the electrical system, the supermarket lights can also be managed, ensuring the right atmosphere in every section of the store and thus highlighting the right value of the goods for sale.



Monitoring

The Carel solution for system monitoring, management and optimisation allows complete control of the system in every stage of operation:

- **Start-up:** centralised configuration of all the parameters for the installed devices, unit monitoring on commissioning;
- **Daily operation:** system interface, data logging, reports, activity scheduling, automatic optimisation of operation;
- **Maintenance:** remote access, alarm management with automatic signals and response.



Measurement is knowledge

A successful performance optimisation strategy can only be achieved based on awareness of how energy is consumed. CAREL therefore offers a complete range of devices for measuring the main electrical parameters and instant and total power consumption of the connected loads. The site manager can therefore:

- identify when and where energy is consumed;
- identify incorrect behaviour and uses;
- troubleshoot faults and abnormal consumption;
- assess which energy saving actions to adopt.

Food cooling control

Fresh food quality means customer satisfaction.
Energy costs can be reduced while improving food preservation.



MPXPRO



UltraCella



The objective of the CAREL proposal is to strike the perfect balance between the highest levels of food safety and the lowest energy costs needed to ensure the right standards of refrigeration and food preservation. By using dedicated controllers, such as MPXPRO and UltraCella, and modulating electronic expansion valves (EEVs) on the cabinets, coordinated operation can be implemented between the multiplexed units, and between the cold rooms and the compressor racks, where food cooling is "generated".

Solutions for centralised compressor racks



pRack

The compressor rack is the most important and complex part of a refrigeration system, as well as one of the biggest energy consumers in a supermarket. Consequently, the priority is to improve its efficiency and ensure that only the "necessary" cooling is provided, without waste. pRack is the modular and scalable CAREL solution for the control of both small and large systems, guaranteeing simple and flexible configuration. Maximum energy savings and system optimisation are guaranteed by the innovative algorithms adopted to manage the compressors and condensing units.

Natural refrigerants

CAREL offers control systems and EXV valves that are designed for use with natural gases, as well as specific solutions for both transcritical and subcritical CO₂ systems.



Heos sistema

The new frontier in the design of supermarket refrigeration systems.

The system uses compact, high efficiency refrigeration units, pre-assembled directly on the refrigeration cabinet, which exchange the heat rejected during cooling via a water loop. Consequently, there is no refrigerant gas circulating through the supermarket (around an 80% reduction in refrigerant charge), but rather just water, which then exchanges heat naturally with the outside.

The use of DC inverter compressors, thanks to their wide range of modulation and high efficiency at part loads, means each individual unit can always operate at the best possible conditions, combining the flexibility of a water loop system with the high efficiency of DC compressors.



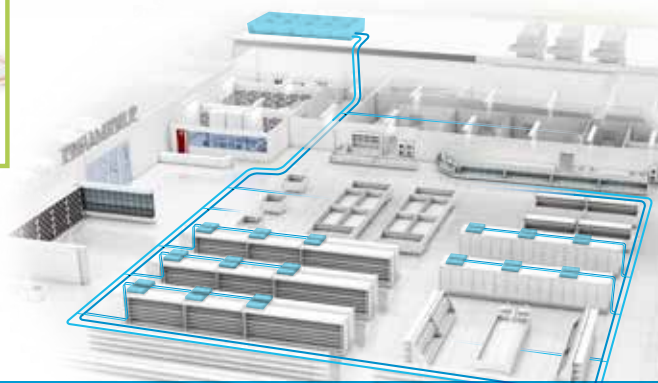
96%
Reduction of refrigerant leaks

80%
Refrigerant charge reduction



Watch the video!

25%
Energy Savings



DC inverter compressors

Technology	Saving
Inverter AC vs. On-Off	fino a 9 %
power+ Inverter DC vs. On-Off	fino a 25 %
power+ Inverter DC vs. INV AC	fino a 15 %

Optimum food preservation

Heos and Hecu combine high energy efficiency and maximum quality of food preservation, stabilising the storage temperature through perfect synchronisation between the various system components.

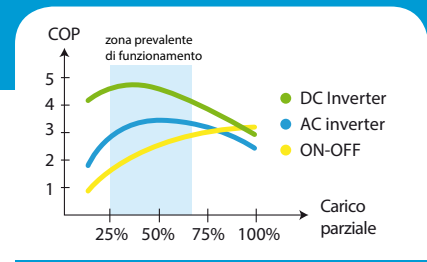
Efficiency at part loads

The variable-speed compressor delivers the exact cooling capacity needed by the system, thus guaranteeing, compared to other technology, maximum efficiency and the highest COP in the most frequent operating conditions throughout the life of the system.

Comparison with other technologies

DC inverter technology meets all the current and future energy classification requirements.*

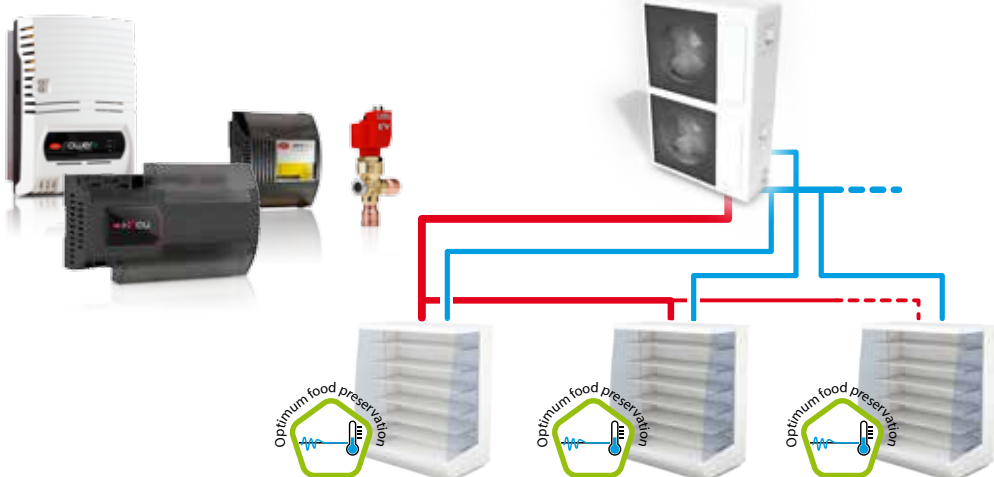
* La Direttiva 2009/125/EC (Energy Related Product, ERP) nota come "Ecodesign", fissa a partire dal 1 Luglio 2016 il livello minimo di COP (coefficient of performance) per le unità inferiori ai 5kW ed il livello minimo di SEPR (seasonal energy performance ratio) per unità tra 5 e 20kW. I limiti diventeranno più restrittivi a partire dal 1 Luglio 2018.



Hecu sistema

High efficiency for compact refrigeration units

Hecu sistema is the CAREL solution with DC inverter technology for managing compact condensing units, achieving the highest levels in energy performance. Designed especially for smaller stores, where due to requirements or space available compressor racks are not used, the ideal application is in convenience stores, grocery stores, butcher's and minimarkets, and in places where the existing systems need to remain in place in the event of expansion.



Lighting and automation management

A single solution for managing lights and automated field devices

pChrono The entire supermarket is managed by a controller using specific algorithms and functions, aimed at satisfying all the requirements of large stores: lighting, measurement of values such as T/H/CO2, management of disabled restrooms, wireless management of I/Os and interfacing with security systems. All this is available on pChrono.

pChronoCS pChronoCS is the complete response for small stores; air-conditioning unit management and monitoring of unit on/off, room temperature control, night-time set point, specific algorithms to prevent air stratification, set point compensation based on outside temperature.



LED lighting

Following its acquisition of Arianna Spa, CAREL can now also offer innovative LED lighting systems that, thanks to their international patent, can ensure the right light in all the different sections of the supermarket, while bringing significant energy savings. An integral part of the lighting is the remote control system, designed to cut waste and rationalise use of the light, so as to save costs and reduce environmental impact.

arianna
a CAREL company

ArCa
Ideal for offices and exhibition areas.

Quadro
Ideal for retrofits.

Cheope
Available with different beam angles.



Lola
Solution for car parks and outdoor areas with patented total reflection optics.





Watch the video!

Controllers for HVAC systems and indirect evaporative cooling

CAREL develops standard, modular and scalable solutions designed to manage heating, cooling and domestic hot water production systems. Management logic and optimisation of heating/cooling sources (including heat recovery) are integrated into the control system. The objective is to produce the hot or cold water using the most cost-effective combination of technologies.

System on/off times are optimised using dedicated algorithms that calculate system inertia (ECO HVAC), by constantly measuring the inside and outside temperature.

To optimise overall efficiency, CAREL also proposes the use of evaporative cooling solutions.

This is the ideal way to bring temperatures down while limiting energy consumption and consequently running and investment costs.

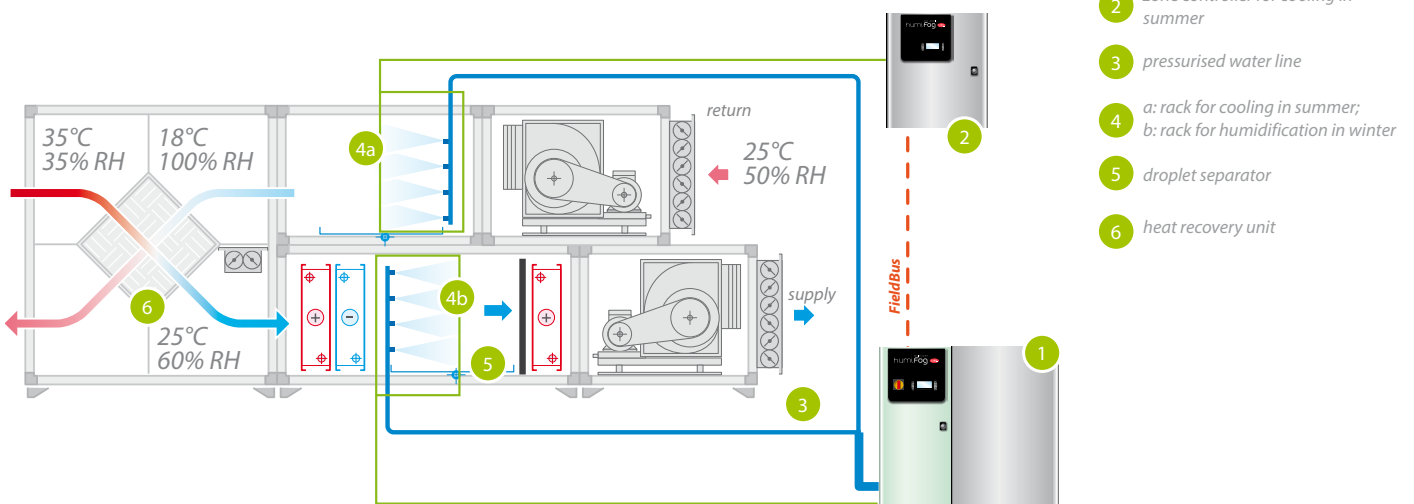
The air is cooled due to spontaneous evaporation of the droplets of water produced using an atomisation process: the change in state from liquid to vapour absorbs energy from the air, which consequently is cooled.

100 kg/h of water absorbs 69 kW of heat from the air when evaporating.

The exhaust air can be cooled by several degrees without limits in terms of humidity, being discharged by the AHU. This cooling capacity can be used to cool the fresh incoming air, via a heat

exchanger, with an efficiency that easily exceeds 50%!

As a result, required cooling capacity is lower, as is the energy consumption of the air-conditioning unit.



Local supervision

Monitoring, control and reports on energy consumption and system status

Carel supervisory systems are scalable to suit the needs of different applications. Different versions are available, with features designed for each type of system and packages of functions for different needs.



Supervision for small-medium systems

PlantWatchPRO is a compact and versatile supervisor that allows installers, maintenance personnel and store managers to control and optimise their systems and monitor all the desired performance indicators and energy consumption values.

It is the ideal solution (combined with the rTMSE Wireless series sensors) for retrofits on existing installations. Remote access, using a web interface on PC or mobile device, allows users with access credentials to modify system parameters for maintenance or optimisation. PlantWatchPRO simplifies and reduces system setup, by limiting the critical steps in the commissioning procedure. All system alarms are managed according to priority and time band, and are notified via email/SMS. Energy consumption data and critical system parameters are logged and used to create reports, making PlantWatchPRO the ideal tool for ensuring compliance with HACCP requirements.

Supervision for medium and large systems

PlantVisorPRO offers a customisable interface for displaying and configuring data relating to the entire site. As well as displaying the status of individual devices, PlantVisorPRO applies innovative algorithms that maximise system energy efficiency, assist commissioning and maintenance, display energy consumption and activate safety modes in the event of malfunctions.

Thanks to the web server function, it can be easily connected to the internet, thus allowing remote access to all the devices on site. Due to the importance of its functions and the information its manages, PlantVisorPRO guarantees total reliability and data security.

This supervisory system is available both as a complete all-in-one solution (Touch), and in the Box version.

All data logged by supervisory system are readily usable, any alarms are forwarded directly to specific recipients by email, SMS, fax, or activate physical devices, based on the configuration.

Carel monitoring and supervision systems can be integrated with third-party tools and other systems to exchange data and allow more advanced management logic.

pvpro



site.web

An effective new way to create custom pages

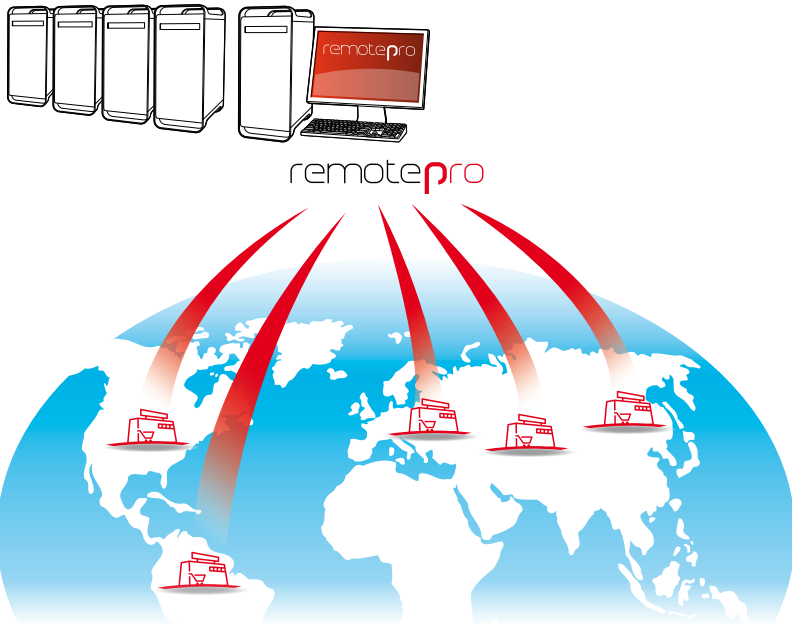
Graphic development of system maps and overviews with customisable images to make the status and main variables of each part of the system usable and easily interpretable.

All the graphic interfaces created can be viewed on any platform, PC or mobile, using a browser.



Multi-site supervision

Monitoring, control and energy and system reports



A platform designed to manage and integrate all facility and energy management requirements in one single solution.

RemotePRO is the ideal solution:

- accessing all the connected systems from one central point
- monitoring and optimising operation
- creating standardisation clusters for each store
- reducing service costs
- identifying the best configurations
- creating advanced benchmarks for comparison between different stores
- organising raw data into useful and usable information
- identifying problems, recognising trends and making the right decisions quickly
- keeping users informed and making data available based on user profiles.

Optimised maintenance

- Manage all the stores using one shared solution with partners
- Add value to maintenance
- Avoid needless costs



Energy efficiency

- Optimise systems by identifying the best configuration
- Focus investments in critical areas
- Identify the devices that consume most energy



Encapsulates the concepts of internet of things, smart machines, cloud computing, wireless connectivity and mobile applications



tERA is the plug & play solution for managing systems in the fastest possible way.

Using a cloud

portal, users can immediately access:

- Data logging
- Alarms with email notification
- Detailed reports and graphs of variables
- Real-time trends in variables
- SW update on programmable controllers
- Scheduled delivery of customised reports
- Modification of system set points

The native GSM connection with worldwide coverage means the necessary information is available when needed.

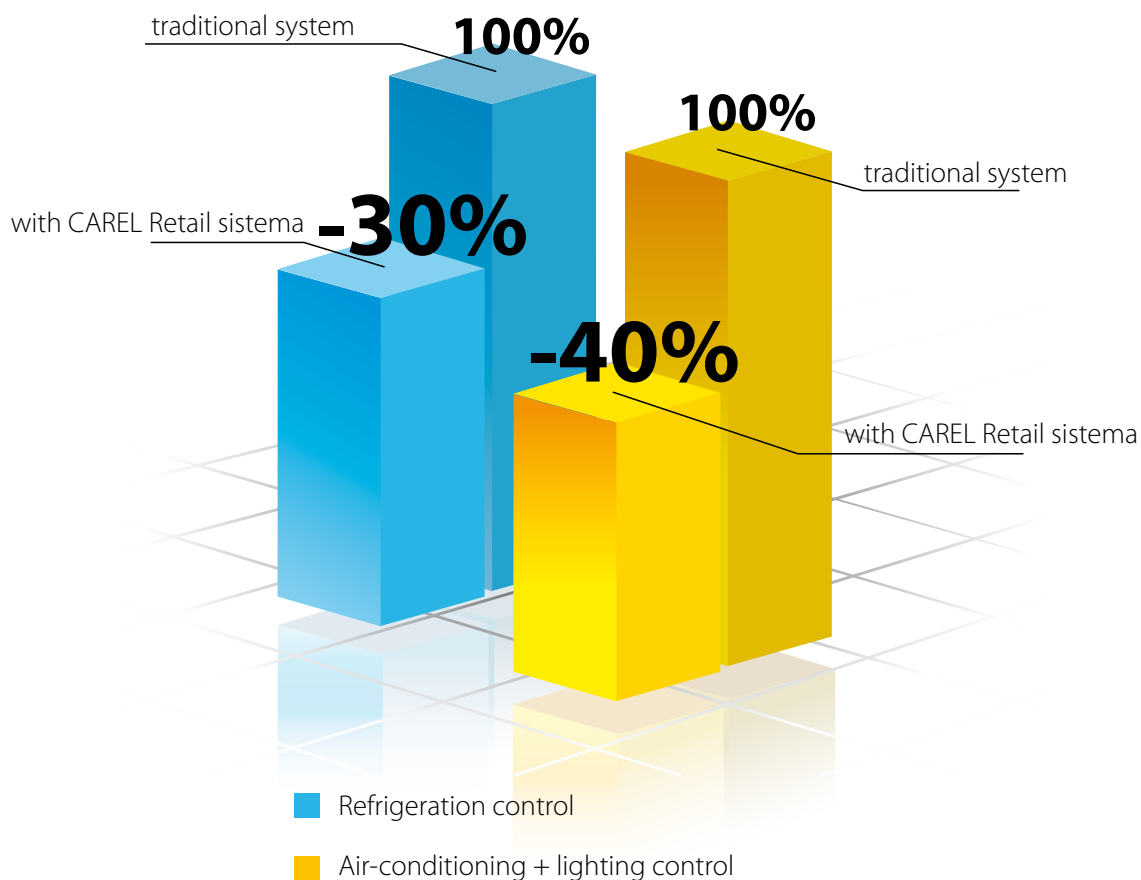


- check system status
- receive alarm notifications
- analyse site behaviour



Integration is synonymous with energy saving

Fully integrated solution with a low environmental impact



-30% average energy saving, based on various experiences.

-40% average energy saving, based on various experiences.

Example of monthly energy consumption with CAREL Retail sistema

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