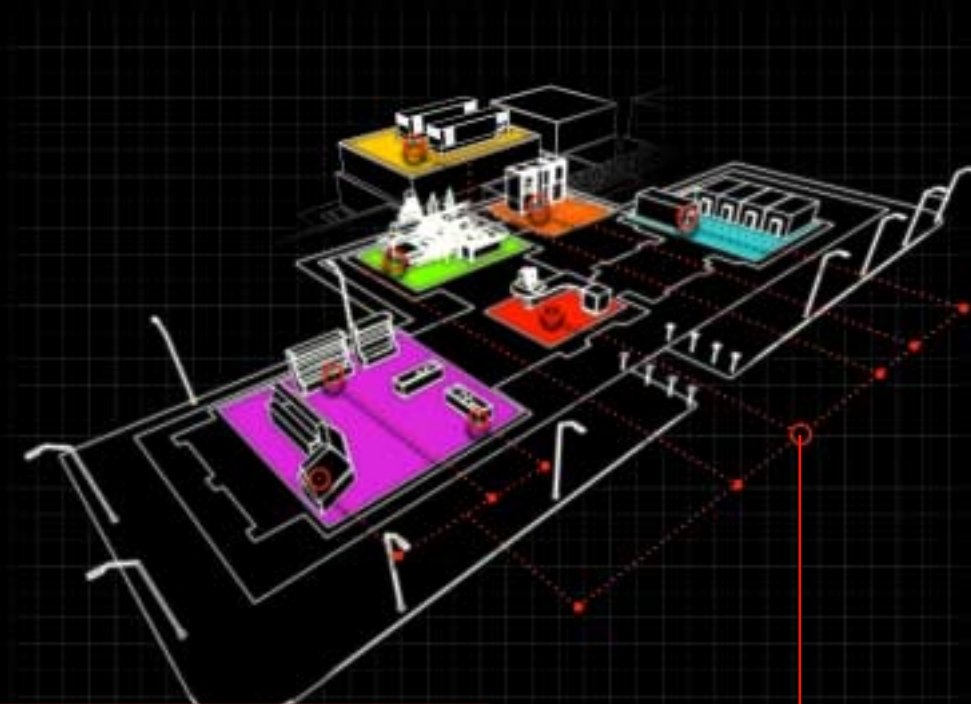# ❄ CarelRetailSolutions

...the components!

HACCP

CAREL
Technology & Evolution

Carel Retail Solutions

...solutions for Commercial Refrigeration

For more than 25 years Carel has been designing and manufacturing electronic controllers and remote management systems for Air-Conditioning and Refrigeration applications. The quality and innovation of its products has made Carel one of the established leaders in the industry, operating all over the world through a widespread network of branches and distributors. "Carel Retail Solutions" is Carel's latest proposal for the optimized control of Air-Conditioning and Refrigeration units in large retail structures.

"Carel Retail Solutions" allows the use of advanced supervision and remote management systems, with effective savings in installation maintenance costs.

"Carel Retail Solutions" means reducing running costs and simplified management of HACCP procedures. The path Carel proposes will allow you to evaluate the innovative aspects of its solutions and understand today what others will offer tomorrow.

...solutions for Commercial Refrigeration

...the concepts

CAREL

...the concept

Energy Saving

Our solutions for commercial Refrigeration allow energy savings of up to one quarter of annual consumption.

Telemaintenance

Air-Conditioning and Refrigeration systems under control, using our supervision and monitoring systems. In the event of faults, you will receive a fax or SMS message on your mobile phone, or alternatively you can check your installation on the Internet.

HACCP

HACCP

Our wide range of electronic controllers simplify the procedures required to adapt systems to the food safety and hygiene regulations in force.

Showcase Controller

Cold Room Controller

Rack Controller

PlantVisor

PlantWatch

AHU controller

Energy Management

Retrofit Solutions

Web-Gate

Mastercase

Mastercase is the integrated system proposed by Carel for the complete management of showcases.

Mastercase controls and manages the entire refrigeration unit, both electrically and electronically.
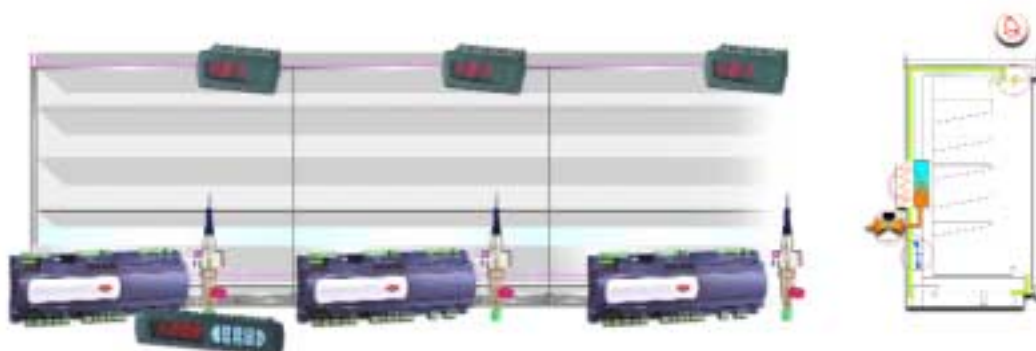
The use of power relays means that Mastercase does not require an extra electrical panel, and can directly control the lights, defrost heaters, fans, cooling actuators...

Mastercase can be connected to a local network to co-ordinate operations on a group of utilities, such as automatically changing the set point on an island, or starting a simultaneous defrost.

In addition, Mastercase can be integrated into the PlantVisor system, which saves and displays all the showcase operating data.

Mastercase is available for both mechanical expansion valves and in the version with built-in driver for the management of PROPORTIONAL electronic expansion valves (the first product of this type on the market), which maximize the performance of the refrigeration unit. The electronic valve optimizes the evaporation temperature and superheating, and reduces the power consumption of the unit.

Product conservation quality and lower weight loss are ensured by the greater temperature stability and the reduced need for defrostings using Mastercase.

MPX

MPX is the flexible system that Carel proposes for the complete management of showcases.

MPX can manage traditional showcases (with mechanical or capillary expansion valves), or alternatively, when suitably connected to an external device (driver), can manage systems with proportional electronic expansion valves (the only product of this type on the market).

The MPX controllers are thus ideal for situations in which the same unit may be fitted with traditional or electronic expansion valves.

The controller and the electrical panel do not change, only the expansion device changes.

The MPX series controllers feature 4 relay outputs: cooling control, defrost control, evaporator fan control and light switch. They can be connected to an optional display for the remote display of the showcase temperature.

The MPX controllers can also be connected to a local network for coordinating operations on a group of utilities.

The proportional electronic expansion valve option allows the operating parameters (evaporation temperature and superheating) to be controlled, thus increasing the efficiency of the showcase and achieving tangible energy savings.

MasterCella series

This is the range of Carel controllers for cold room cooling control.

There are two products in the range: MasterCella compact and MasterCella split.
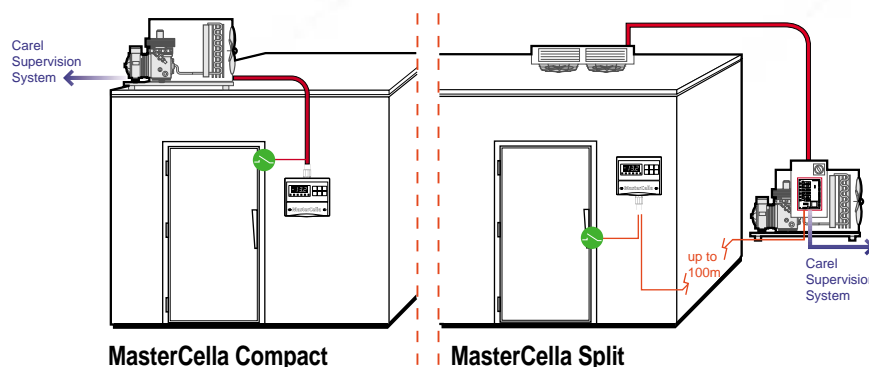
MasterCella represents the complete electronic solution for single-phase/three-phase cold rooms, both static and ventilated, and can be connected to Carel supervisory systems.

The relay outputs control: the compressor (up to 2HP), the evaporator fans, defrosting, the lights and an alarm relay. The high index of protection - IP65 - means MasterCella can also be installed in cold rooms with high humidity levels.

MasterCella with Real Time Clock allows the defrost cycles to be scheduled at set times.

In addition, it simplifies the HACCP procedures by providing the user information on the correct temperature trends, activating a local alarm (buzzer) and remote alarm (via the special relay) if the set temperature limits are exceeded.

MasterCella is pre-programmed to manage the door contact: when the door is opened, the compressor and the evaporator fans are stopped, the temperature alarms are delayed and the light is switched on.

Carel
Supervision
System

up to
100m

Carel
Supervision
System

MasterCella Compact   **MasterCella Split**

pCO^2 *rack*

pCO^2 rack is a control system for the management of compressor packs.

It manages a very complex control system using a simple and clear display and user interface.
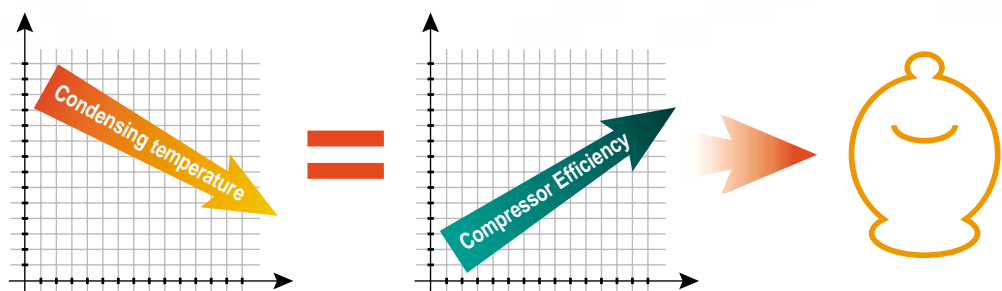
The pCO^2 rack controller can be used for the simultaneous management of up to 6 compressors with 3 capacity stages each, and 16 condenser fans.
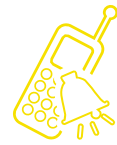
As well as the possibility of setting the number of compressors and fans present in the compressor pack, pCO^2 rack also includes various settable alarm thresholds for the pressure values measured, and various general operating parameters. In addition, the most important parameters are protected by password.

pCO^2 rack also displays the instant power input of the compressor pack (via TA), and counts the daily, monthly and annual energy consumption, using a dedicated 4-20mA input.

pCO^2 rack is configured for the management of systems with electronic expansion valves.

By maintaining the condensing temperature as low as possible and thus increasing the efficiency of the compressor pack, pCO^2 rack ensures significant energy savings (up to 25%).

Condensing temperature = Compressor Efficiency

*p*CO-AHU

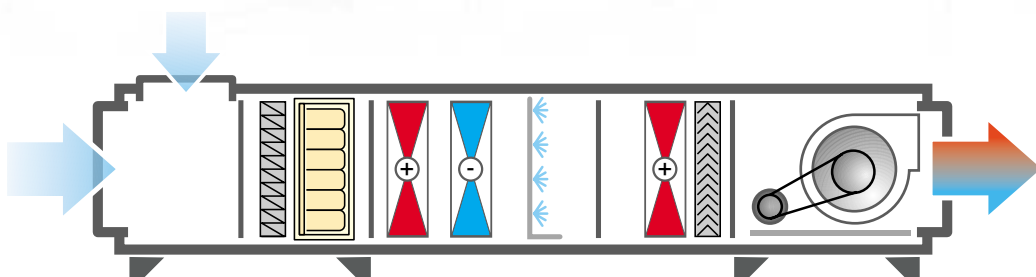This system is used to control air handling units.

pCO-AHU controls all the air handling unit functions: cooling, heating, humidification, dehumidification, post heating.

The flexibility of the software allows functions such as freecooling, enthalpy control, set point compensation, heat recovery and fresh air management to be enabled, thus satisfying various specific needs.

pCO-AHU also manages the alarms corresponding to the fans, air filters and external devices, such as chillers. In addition, the speed of the inverter-controlled fans can be managed, so as to maintain the outlet pressure constant, even in variable flow-rate systems, and thus optimize energy savings.

Versions are available with built-in display (on the machine) and remote display, which allows the data to be displayed away from the physical location of the unit. All the parameters can be modified and are protected by three levels of password: user, installer and manufacturer.

The pCO-AHU controllers can be connected to the PlantVisor or PlantWatch supervision systems, by RS485 serial connection, as well as the Modbus® protocol.
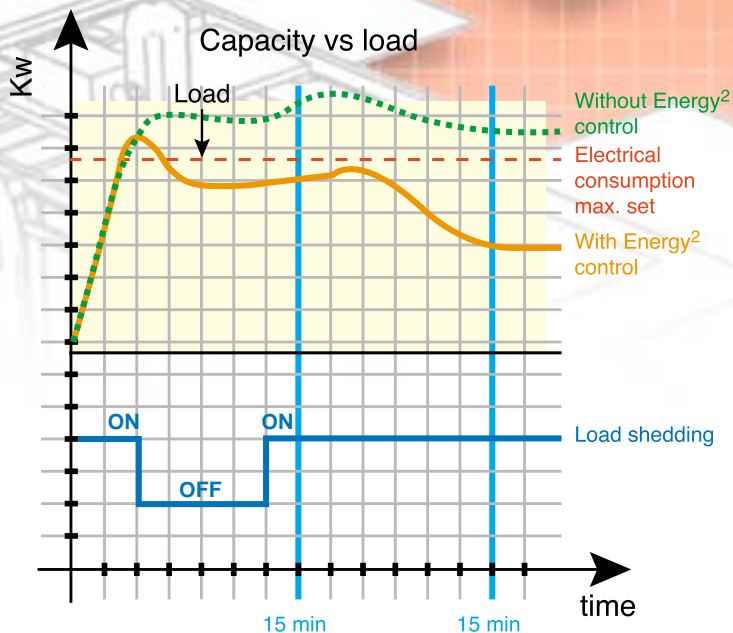
Energy²

Energy² is a control system for electrical loads.

Energy² is connected to the power meter (supplied by the electricity company), and measures the active energy consumption, change in time band and synchronism over a programmable time (typically 15 minutes), so as to control peaks in consumption.

Energy² operates by estimating the power requirements in the synchronous period.

Momentary excess power values are allowed, and the control action starts only when the average expected value exceeds the maximum limit set.
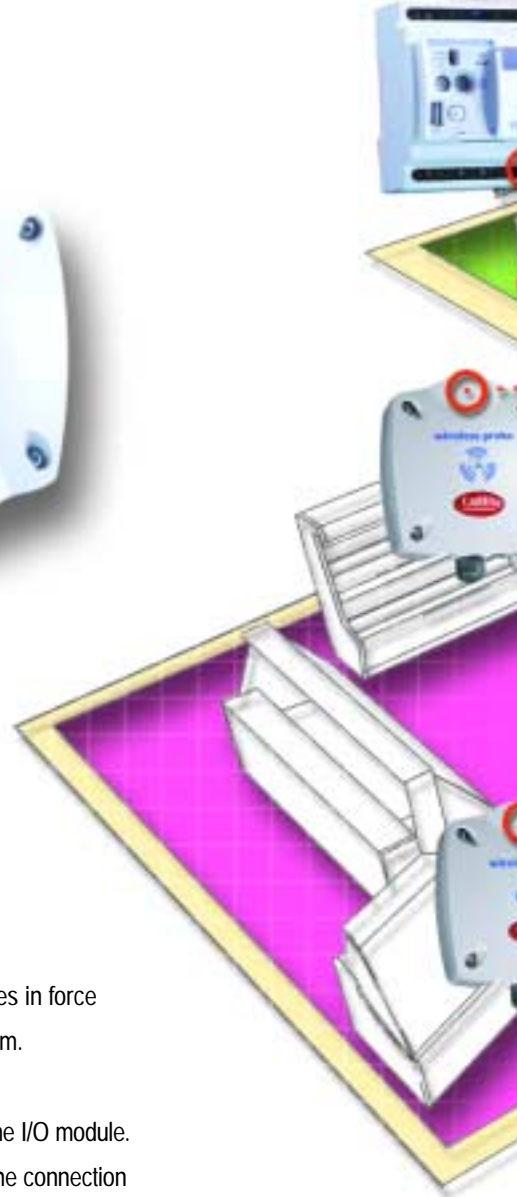
This method avoids tariff penalties.

The control action is performed by acting on the electrical loads connected to Energy², deactivating those that are not strictly necessary and thus bringing the values within the allowed limits. The devices forced off are then re-activated when the system conditions allow.

The disconnection mode and priority can be programmed for each electrical load.

The flexibility of the Energy² software means that the unit can be quickly programmed, via the user interface with LCD display and multilingual messages, and using the keypad to access all the information corresponding to the values and the parameters measured.

Capacity vs load

- Kw (vertical axis)
- Load
- Without Energy² control
- Electrical consumption max. set
- With Energy² control
- Load shedding
- ON
- OFF
- ON
- time
- 15 min
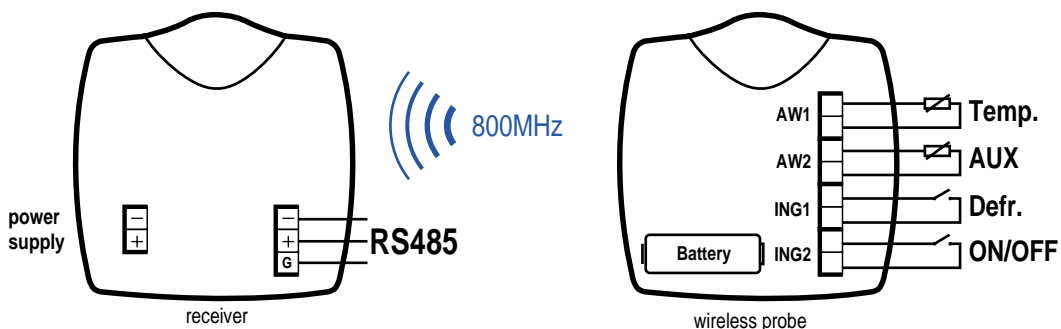- 15 min

Retrofit solutions

Retrofit Solution is the Carel proposal for adapting the existing systems to the hygiene directives in force (HACCP) and for connecting them to a local or remote supervision and telemaintenance system.
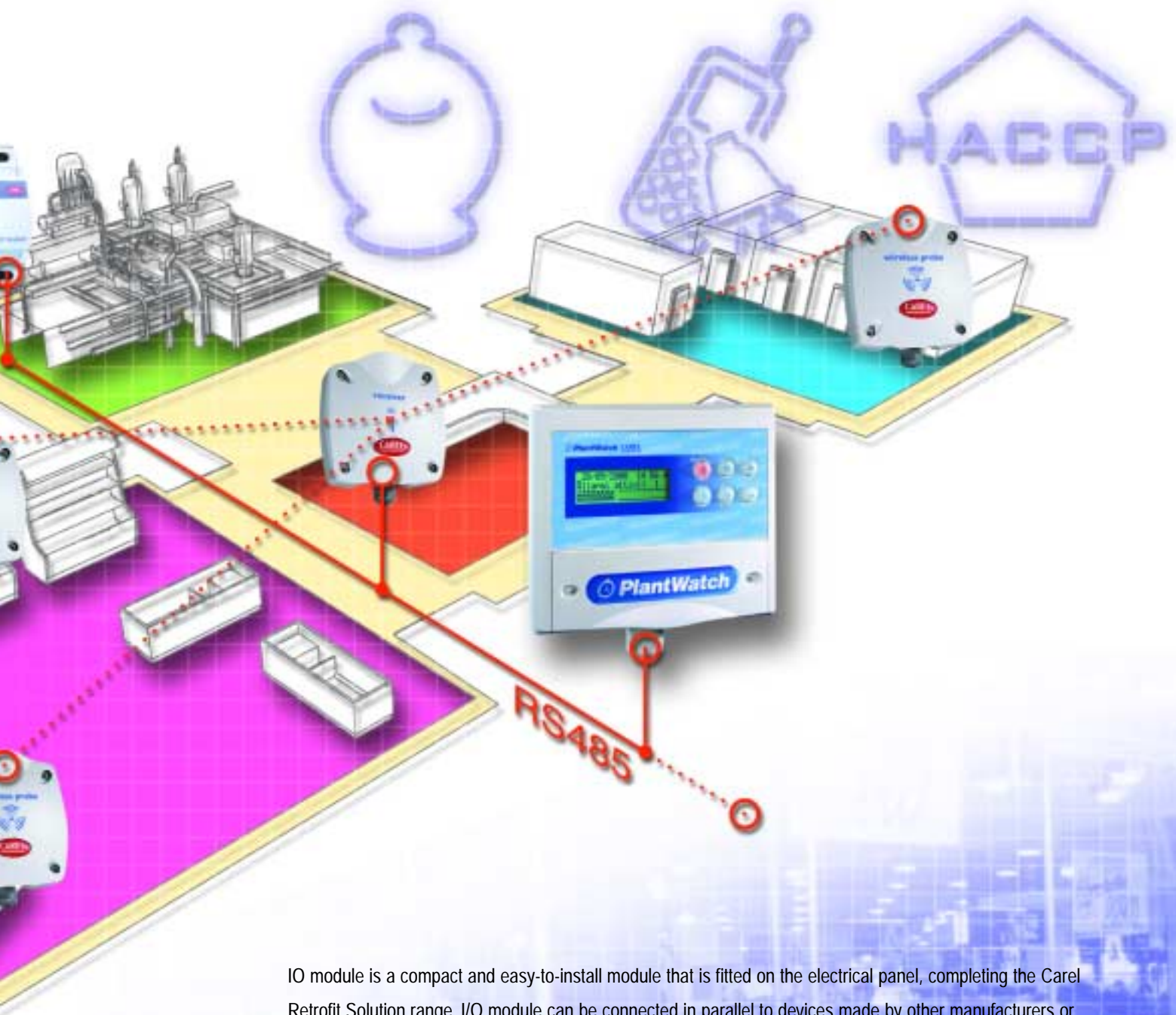
The Retrofit Solution components have been designed to drastically reduce installation costs.

The Retrofit Solution range features three devices: the wireless probe, the wireless receiver and the I/O module. The wireless probe has been designed for installation near the refrigerating utilities, and allows the connection of up to two temperature probes (product temperature and defrost temperature), and two contacts, for the defrost and cooling actuators. It is fitted with a long-life battery that guarantees at least four years of operation, signaling when replacement is required.

The wireless receiver is located near the monitoring system, and can manage up to 20 "Wireless Probes" located in the installation, up to a max. distance of 100m.

power supply

800MHz

RS485

receiver

AW1	Temp.
AW2	AUX
ING1	Defr.
Battery	ING2	ON/OFF

wireless probe

IO module is a compact and easy-to-install module that is fitted on the electrical panel, completing the Carel Retrofit Solution range. I/O module can be connected in parallel to devices made by other manufacturers or electromechanical controllers to acquire the main operating parameters from compressor packs, air-conditioning systems, condensing units, etc....
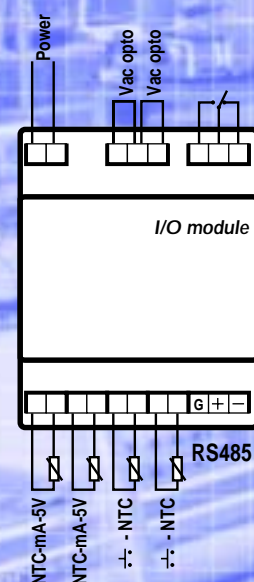
I/O module can manage:

- up to 4 NTC temperature probes, or alternatively 2 NTC probes and two 4/20mA or 0/5Vdc transducers;
- up to 4 digital contacts;

as well as controlling a relay output to activate actuators or local alarm systems.

The Retrofit Solution system can be connected to all Carel supervision and telemaintenance systems: PlantVisor, PlantWatch and WebGate.
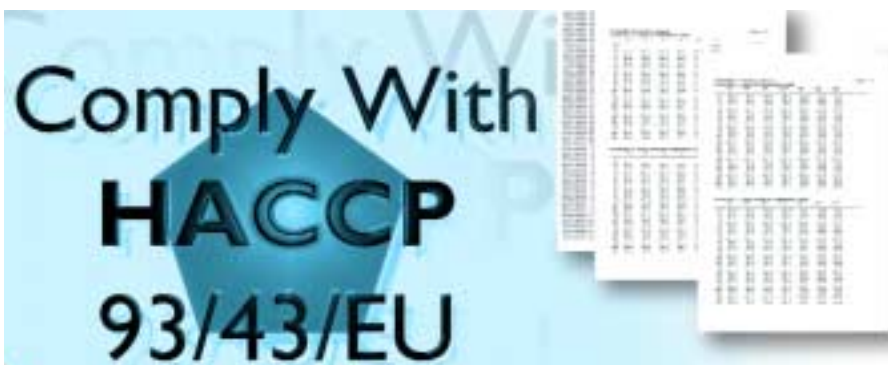
I/O module

RS485

PlantWatch

In more compact systems, yet where the control needs are the same as those in larger installations, PlantWatch offers the complete integrated solution for MONITORING, TELEMAINTENANCE and REMOTE MANAGEMENT. PlantWatch is a versatile DATA RECORDER, a formidable installation TELEMAINTENANCE SYSTEM, and an exceptional REMOTE CONTROL tool.

PlantWatch allows installers, managers, technicians and maintenance personnel complete control over Refrigeration, Air-Conditioning, heating and other systems. PlantWatch can be connected to up to 32 instruments, such as controllers for showcases, cold rooms, compressor packs, roof top units and chillers, and as well as light controllers, boilers, etc…

The messages can be displayed in one of the five available languages, and the unit features a built-in modem (only PSTN). PlantWatch records the temperature, pressure, humidity and any other value useful for the control of your installation. For each critical situation, you can decide if PlantWatch should warn you by a buzzer, by sending a FAX, an SMS message to your GSM mobile phone, or simply save the event, print it or call the service centre!

PlantWatch can print the data, automatically or on request, transfer them to a PC or to a data processing centre.

Comply With
HACCP
93/43/EU

WebGate

Thanks to this gateway with "Web Server" capability, all Carel controllers can now be connected to any corporate 10 Mbps Ethernet™ network. The following functions are therefore possible:

- information access (such as network variables and parameters) from each controller using a standard web browser as Internet Explorer™ or NetScape Communicator™ on any PC over local networks or WANs.
- transferring the data to a supervising PC connected to the local network using the SNMP standard protocol.

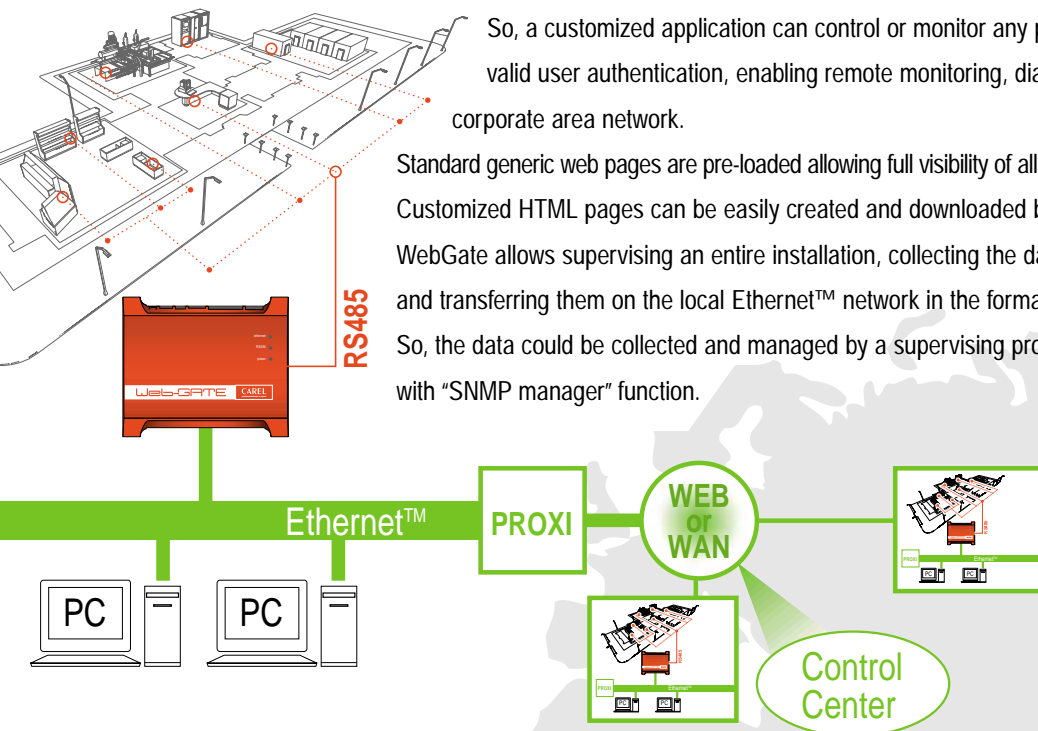The built-in web server allows standard HTML pages to be supplied directly by your Internet browser.

So, a customized application can control or monitor any part of the control network, subject to valid user authentication, enabling remote monitoring, diagnostics and support through the corporate area network.
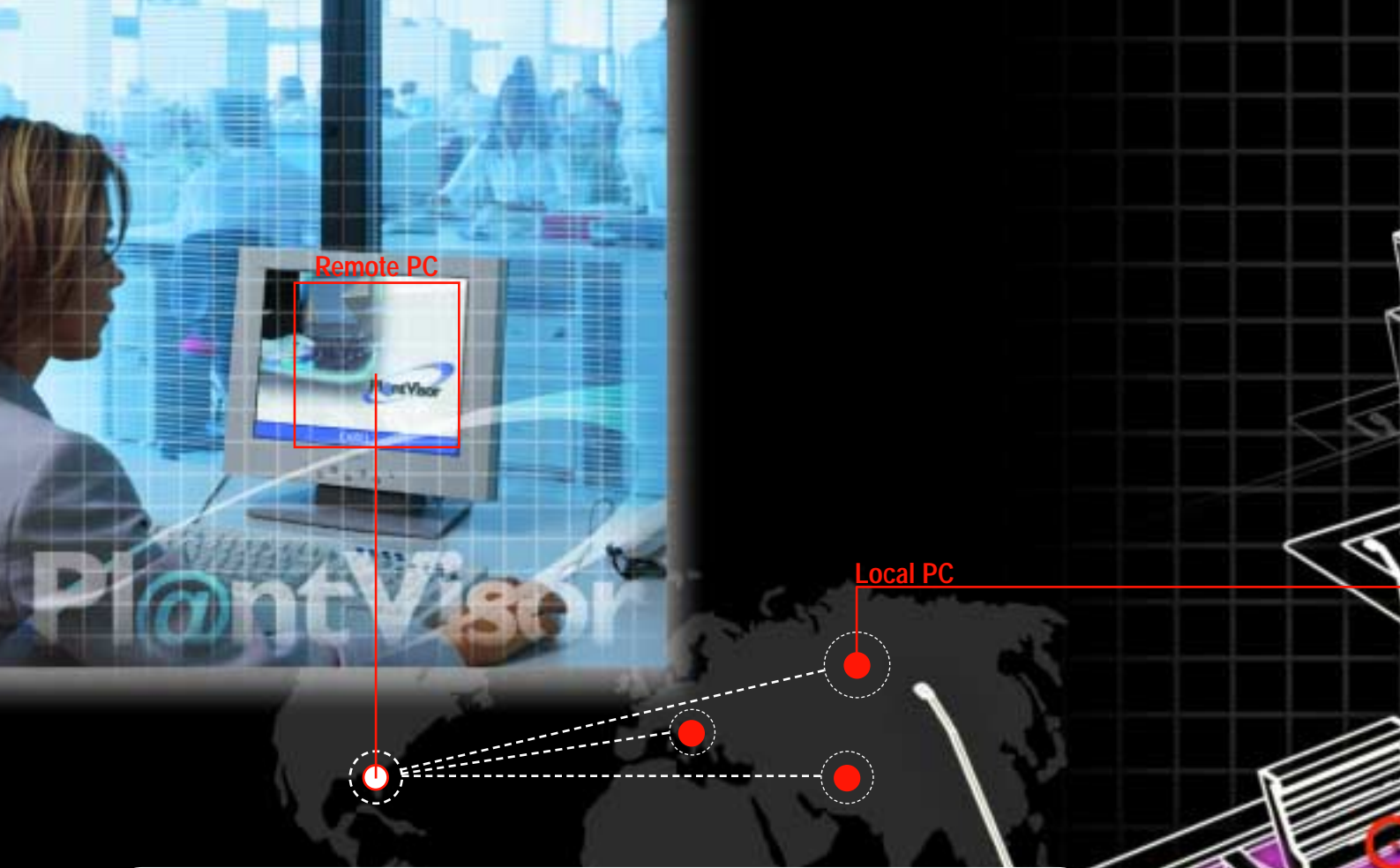
Standard generic web pages are pre-loaded allowing full visibility of all Carel controller parameters.

Customized HTML pages can be easily created and downloaded by the end user itself.

WebGate allows supervising an entire installation, collecting the data of the Carel connected controllers and transferring them on the local Ethernet™ network in the format told by the SNMP protocol.

So, the data could be collected and managed by a supervising program on a PC connected in the network with "SNMP manager" function.

RS485

Ethernet™ PROXI

WEB or WAN

PC   PC

Control Center

Remote PC

Local PC

PlantVisor

PlantVisor is the Carel program for the Monitoring and Telemaintenance of medium and large Refrigeration and Air-Conditioning systems managed by Carel controllers.

PlantVisor, thanks to its WEB SERVER function, can work also on PCs connected in TCP/IP network. This allows sharing the data and information dealt with by the PlantVisor with more than one user at the same time. The access to the data is protected by different levels of password.
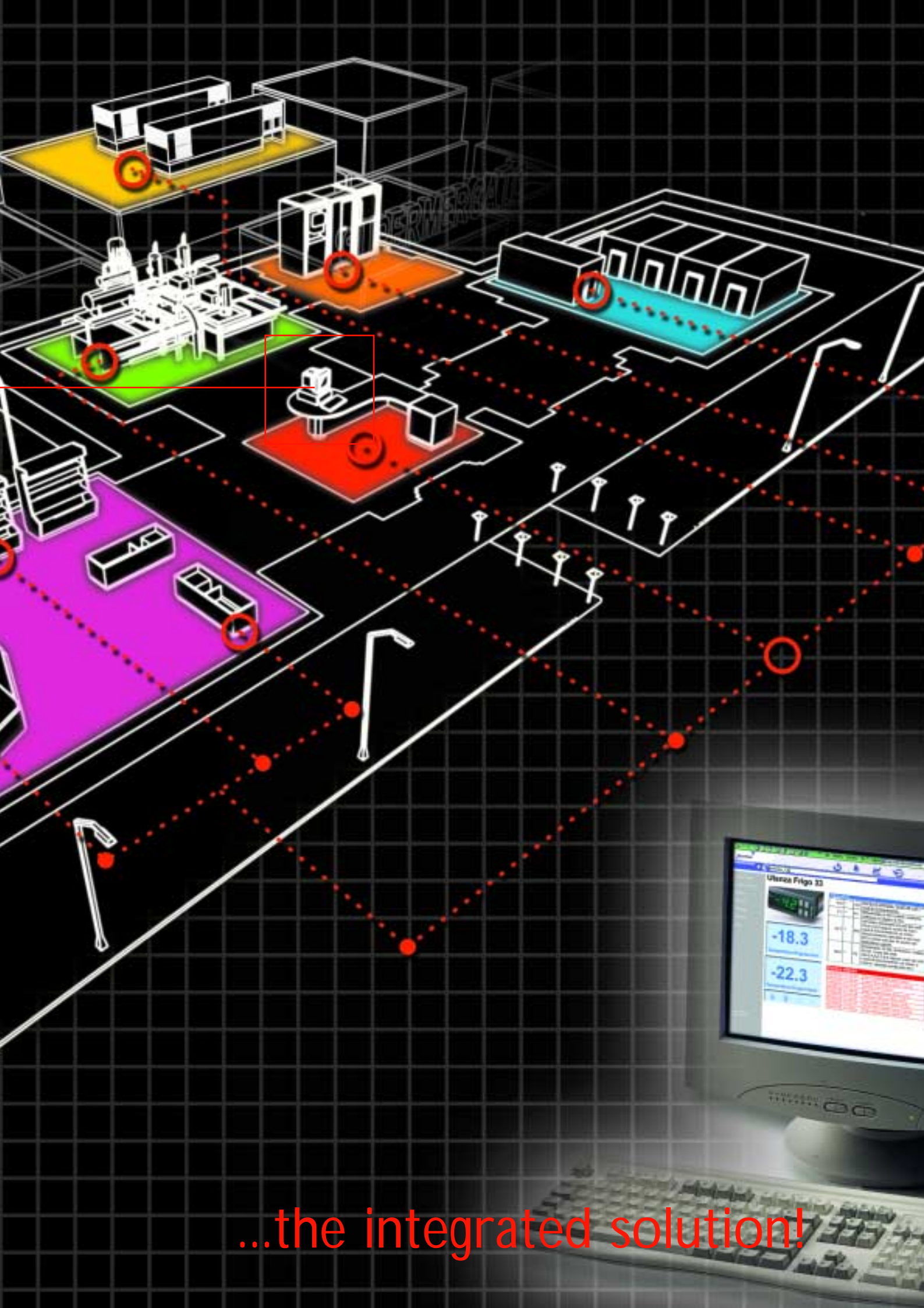
PlantVisor manages also traditional and GSM modems for the connection to remote PlantVisor units and to the PlantWatch, to send faxes and SMS. PlantVisor allows up to 800 Carel instruments to be connected in an RS485 serial network. The main functions of PlantVisor are:

• central control, by PC, of all the parameters for the showcase, cold room, compressor pack, chiller, roof-top and humidifier controllers;

• control of all the system operating parameters by modem, allowing a series of installations in different locations to be controlled from one PC;

• scheduling of actions to be performed in the event of alarms and according to set time bands;

• saving of the temperature, pressure and humidity values, as well as any alarm events, in compliance with the EU directives.

PlantVisor installed on a PC fitted with a modem can be connected via phone line to dozens of installations monitored by PlantWatch, receiving and saving the corresponding data.

Once connected to the system using PlantWatch, you can then interact with the instruments in the field.

The PlantVisor program is available on CD in five languages: Italian, English, French, German and Spanish.

...the integrated solution!

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