Heos sistema
High efficiency waterloop system
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.

By using a water loop to control the condensing stage on refrigeration units, the condensing units can be standardised, thus significantly reducing installation times/costs. In addition, this technology allows greater integration with the air-conditioning system.

Building/site efficiency is improved by:
- Lower pressure drop in the refrigeration system
- Efficiency of BLDC compressors and electronic expansion valves
- Heat recovery between the various systems in the building
- Each individual unit works in the best operating conditions, independently of the others

Flexibility
The water loop significantly simplifies changes to the position of the showcases inside the supermarket.

Simple installation
Being fully factory-tested, unit installation is greatly simplified, reducing store set-up times.

80% less refrigerant
Refrigerant charge is drastically reduced, being a closed circuit inside the showcase; the same applies to leakages.
COMPATIBILITY with all climates
The diagrams on the side illustrate the possible configurations for a water loop system, based on local climate.
FREE COOLING ONLY: one loop only, controlling the condensing stage on both medium temperature and low temperature units. Can be fitted with adiabatic evaporation systems in the summer.
LT CHILLER: to maximise the energy efficiency of the low temperature compressors, the two loops can be separated, and operate at two different temperatures. Can be fitted with adiabatic evaporation systems in the summer.
LT CHILLER and MT CHILLER; only for very warm climates, to reduce oversizing of compressors and guarantee energy efficiency.
High efficiency plug-in showcases

A water-cooled showcase fitted with a BLDC compressor consumes around 25% less energy compared to a traditional solution.

**Efficienza energetica**

**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.

**E2V valve**

The dynamics of the electronic expansion valve mean significant savings in the refrigeration cycle, due to a highly stable evaporation temperature. Used in perfect sync with the compressor, this device is essential for ensure efficiency at variable flow-rates.

**Water loop**

Water-cooled showcases, as well as improving system stability, above all improve efficiency of the refrigerant circuit, by increasing the COP. The water loop carries away the heat of condensation for greater integration with the air-conditioning system.

**Optimum food preservation**

As well as high energy efficiency, Heos sistema also ensures maximum quality by stabilising food temperature, using advanced algorithms that allow perfect synchronisation between the various components in the system.
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

Factory tested
Benefits of having a fully factory-tested showcase include:
- significantly reducing installation times/costs
- reducing refrigerant leaks (-96%)
- 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.
**Heos sistema**

A complete platform for the management of showcases/cold rooms in a water-loop system.

**Usability**

Various types of user interfaces are available, according to the intended use:
- **PLD or PLDpro** to display showcase temperature.
- **pGDe** for complete programming by service, with a menu divided by functions and a set-up wizard.
- **pGDtouch** for special graphics needs.

**Heos controller**

Programmable controller with extensive hardware resources, including:
- 10 universal channels, for analogue inputs (probes) or digital or analogue outputs (pump, fan modulation) using I/O Chip (Carel proprietary, made using ASIC technology)
- 3 analogue outputs (fans, pumps...)
- 7 digital outputs (lights, defrost, fans on-off, general alarm...)
- 2 commands for single-pole ExV (expansion, bypass, liquid injection)
- 3 RS485 serial ports (local network, Fieldbus, BMS)
- 1 SSR output for anti-sweat heaters
Inverter + Compressor
The use of BLDC compressors guarantees better performance in terms of energy efficiency compared to any other technology, thanks to the extended range of modulation of cooling capacity and high motor efficiency. To achieve this, however, requires sophisticated control (for each model of compressor) of operating pressure (envelope), suitable oil return and management of all alarms.

Power solution
On customer request, we can also develop a complete solution, including the showcase electrical panel with all the system electrical (disconnect switches, contactors...) and electronic components (controller, inverter...).

Supervisor
The supervisory system, as well as optimising system operation, controlling routine maintenance and special service operations, also allows advanced statistical analysis of site energy consumption. Reports, graphs and analysis of the main system KPIs mean users can easily identify the areas of highest energy consumption and check trends over time. All this can be performed locally and/or via remote.
CAREL Heos sistema products

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...

7 Electrical panel
We can also supply the electrical panel, including co-design, on request.

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<tr>
<th>P/N</th>
<th>Description</th>
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<tbody>
<tr>
<td>UP2AH010302SK</td>
<td>Heos controller for cabinet - 230Vac power supply</td>
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<td>UP2BH010302SK</td>
<td>Heos controller for cabinet - 24V power supply</td>
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<td>pGD evolution user terminal, panel mounting, HEOS</td>
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<td>SPKT0006R1</td>
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<td>3-wire cable, l= 2m, for SPKX pressure probes</td>
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