

success story



where

- Carrefour Express
- Millenium Bazaar
- Istanbul (Turkey)

what

- CO₂ system:**
- Transcritical
 - Chillbooster
 - Remote management

why

- full green solution
- natural refrigerant
- energy saving
- synergy with Chillbooster

when

- May 2012

Transcritical CO₂ in Turkey: made possible with CAREL

Carrefour Millenium Bazaar: CAREL retail sistema in the first transcritical installation in Turkey.

Thanks to the opportunity offered by Carrefour it has been possible to create a "green supermarket" in Istanbul. Cozum Sogutma deployed this installation with partnership of CREA and CAREL Turkey CFM Sogutma.

The medium and low temperature units are served by a transcritical CO₂ booster compressor rack. At the end of June, an article on this installation was published on the R744.com community (<http://www.r744.com/news/>).

Widely used in northern Europe, these types of systems are normally recognised as being efficient in climates where average annual temperatures do not exceed 15 °C.

It may come as a surprise that Istanbul has a temperate climate, specifically halfway between Oceanic and Mediterranean, and as a result falls into the area of "acceptable efficiency" defined by various studies. on such installations

The main purpose of this installation was to verify the sustainability of CO₂ in this area, and to demonstrate how specific CAREL solutions can improve operation on critical days: there are on average five days a year in Istanbul when the temperature exceeds 32 °C, and CAREL technology helps manage these critical situations, while increasing overall efficiency throughout the year.



Description of the installation

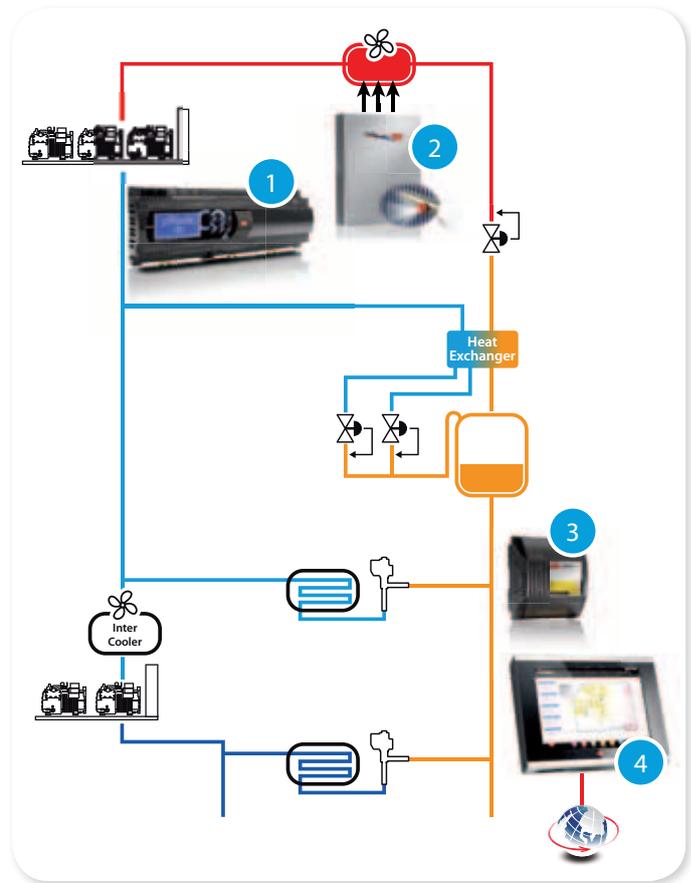
In detail, the entire compressor rack is managed by just one pRack pR200T controller; this flexible and versatile device can manage the low temperature and medium temperature compressors and the transcritical section at the same time.

The medium temperature line consists of four compressors, the first featuring modulating operation and controlled by inverter; the gas cooler is fitted with the Chillbooster evaporative cooling system to cool the inlet air, reducing the temperature by 5 -10 °C and thus optimising energy efficiency in periods with high outside temperatures. The HPV (High Pressure Valve), managed directly by pRack pR200T without requiring additional accessories, optimises gas cooler pressure; receiver pressure is controlled by two RPRVs (Regulating Pressure Receiver Valves) in parallel, these too managed directly by pRack without any additional devices.

A plate heat exchanger serves the dual purpose of subcooling the liquid delivered to the units and heat the gas expanded by the same units.

There are 17 medium temperature showcases, all controlled by MPXPRO devices designed to manage multiplexed refrigeration units or systems made up of groups of units that need to operate in a "coordinated" manner, and E²V proportional expansion valves. The low temperature line, on the other hand, uses just one inverter-driven compressor, with the discharge gas - after having been cooled by an intercooler stage - joining the gas coming from the medium temperature showcases and the flash valves, before being taken in again by the medium temperature compressors.

There are two low temperature showcases, again controlled by MPXPRO with E²V.



1 pRack pR200T

The integrated CAREL solution for control and management of CO₂ compressor racks is the ideal solution to respond to many different market needs, by providing:

- a high number of inputs and outputs for control functions;
- innovative management algorithms for energy saving;
- dedicated algorithms for the management of CO₂ systems;
- considerable integration/supervision possibilities

2 Chillbooster

This is a system used on condensers and gas coolers for refrigeration applications. ChillBooster atomises water into very fine droplets that evaporate spontaneously, cooling the air. The coil gas cooler is thus cooled by a flow of colder air, allowing more favourable operating conditions.

This allows condensers to deliver their rated capacity even during the hotter periods of the year, which often coincide with operation at maximum load. All without costly system oversizing.

3 MPXPRO

The CAREL offering for innovative cold units management, managing:

- built-in drivers for managing E²V proportional electronic expansion valves;
- evolved algorithms for energy saving and optimising evaporator efficiency;
- commissioning tools to simplify operations for installers and maintenance personnel

4 PlantVisor PRO

Complete and reliable solution for the management, monitoring and optimisation of refrigeration and air-conditioning systems with up to 300 units, featuring:

- management of complex large systems using an intuitive web interface;
- HVAC-ECO optimisation package;
- faster installation on site;
- alarm management using a powerful engine of rules, conditions and notification channels;
- complete with reports and documents such as HACCP and SYSTEM REPORT.

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