

Micro Thermo Technologies

Transcritical CO₂



Micro Thermo Technologies Provides Complete Control For First-Ever Transcritical CO₂ Supermarket Installation In The U.S.

"We needed a robust and reliable control system to ensure that this pilot store test was successful. High marks from other key subsystem suppliers along with our own analysis made Micro Thermo Technologies a straight forward choice for us."

**Director of Equipment Purchasing, Maintenance and Energy
Major New England U.S. Food Retailer**

Customer Profile

This customer is a large, public food retailer headquartered in New England. This customer also has a presence in Europe.

Business Challenge

Awareness of climate change has altered the landscape of modern refrigeration. A focus on greenhouse gases (GHG), the carbon "footprint" of organizations and regulatory limits on HFCs has encouraged many organizations to look for alternative ways of providing refrigeration.

One way in which companies lower their contribution to GHGs is using alternate refrigerants - like Carbon Dioxide (CO₂) - that have significantly reduced impact on the environment. Micro Thermo Technologies recently worked with a large customer to manage the first supermarket transcritical CO₂ refrigeration system in the U.S.

Transcritical CO₂ systems are desirable because they use no HFC refrigerants. They also have good heat rejection (which is captured and re-used for space and water heating) and overall lower cost of ownership due to lower energy and refrigerant costs. This particular customer decided to pilot a transcritical CO₂ store in order to begin the process of proving that this technology worked. It was important to this customer because they had internal corporate initiatives to reduce the environmental impact of their operations, as well as external commitments within the industry.

So the business challenge for this organization was to pilot the first-ever transcritical CO₂ refrigeration system for food retail in the U.S., do so in an "energy neutral" way, and meet their internal and external metrics for reducing GHGs and HFC usage.

At A Glance

Customer: Major Food Retailer
Location: New England, U.S.A.
Industry: Food Retail

Business Challenge:

Provide complete store control for first-ever U.S. grocery store using transcritical CO₂ as a refrigerant. This install is to be a technology demonstration for entire corporation of the ability to use environmentally safe refrigerants while still meeting or exceeding energy management expectations.

Solution:

MT Alliance coupled with MT hardware to control lights, HVAC, refrigeration, leak detection, power monitoring and other key systems. Hardware included case controls and rack controls optimized for high pressure, transcritical CO₂.

Results:

- Lowered GHG emissions by providing best in class transcritical CO₂ control
- Graphical interface providing visibility to benefits and potential issues not realized before
- Accurate control of EEVs providing additional benefits of better temperature control
- Potential additional savings from reclaiming rejected heat in Winter



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Solution Overview

Reliable Control For A Critical Pilot Installation

Once the decision was made to move forward with a pilot store utilizing transcritical CO₂ as a refrigerant, a number of challenges had to be overcome. Among these challenges were the need for specialized compressors and a way to control them and the very high pressures that are utilized in transcritical CO₂ systems. Since both of these subsystems were new and relatively unfamiliar to this food retailer, the support needed to specify, install, commission and support these systems was critical. Micro Thermo Technologies has extensive experience providing advanced controls to manage not only transcritical CO₂, but also subcritical CO₂ and glycol - both of which were also used in this particular installation.

The Choice

After reviewing a number of potential incumbent and new controls suppliers, this food retailer settled on Micro Thermo Technologies. Several key reasons were given, including:

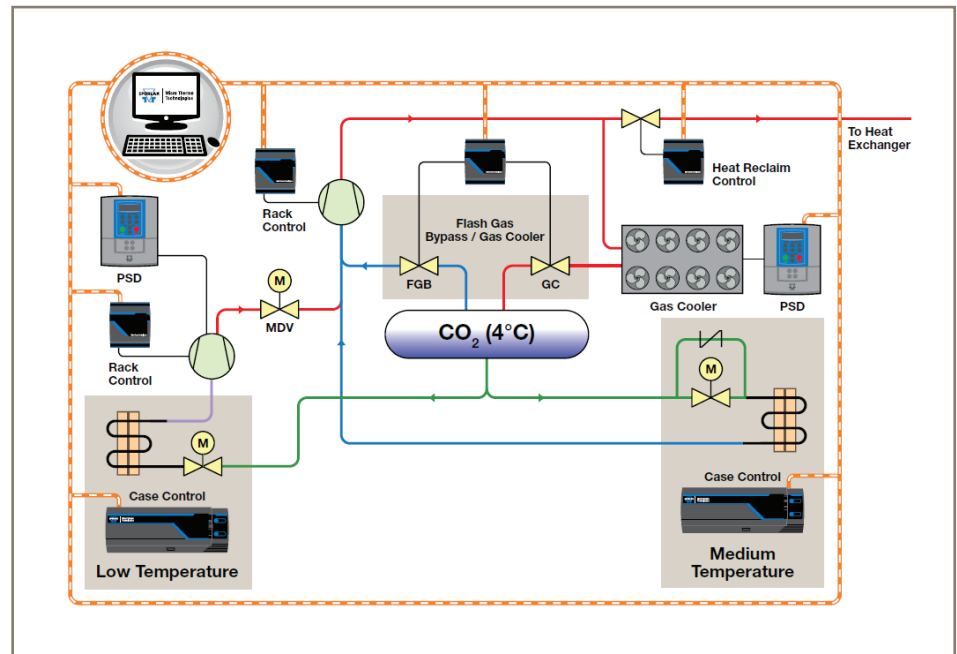
- Micro Thermo Technologies has a long history of designing controls for CO₂, having done more transcritical CO₂ refrigeration controls installations in North America than any other refrigeration controls company
- Micro Thermo Technologies has worked closely with the chosen rack manufacturer for a number of years and already had dozens of transcritical rack controls in the field with this manufacturer

This extensive experience provided a high level of confidence for success in this retailer's U.S. pilot store. In fact, when asked, the rack manufacturer specifically suggested that this customer consider using a Micro Thermo Technologies system.

Benefits From Using Micro Thermo Technologies

Micro Thermo Technologies provided rack controls, case controllers, condenser controls, temperature and pressure monitoring and the Alliance software management suite that ties all the subsystems together and monitors and collects data from the entire system.

The entire refrigeration system including set points, operating conditions and alarms can all be viewed and managed from one location via Alliance. In fact, the store manager of this installation was quoted as saying "... the system is really easy to use. The user interface is great - thanks to whoever designed that..."



Business Results

This customer was immediately able to lower its overall carbon footprint by moving to CO₂ refrigerant because of its **significantly lower GWP**. This fact alone immediately satisfied several corporate initiatives that were noted as drivers for this project.

In addition, by having the full Micro Thermo Technologies Alliance system controlling all facets of the store's HVAC, refrigeration, and lighting this customer will realize - in addition to the advantages related to CO₂ - other advantages of using a **highly integrated**, enterprise wide system (Alliance) that regularly delivers **significant energy savings** due to **enhanced alarm management, optimized valve control** (for electric valves) and other energy saving schemes (ie: floating head pressure, etc).

These benefits don't include the energy savings from the heat reclaim advantages of transcritical CO₂, which they will track and measure once the heating season begins.

