

Transcritical CO₂ booster system

A natural solution for supermarket refrigeration

EmersonClimate.com



CX/EX Valve

Emerson's patented valve design is ideally suited for R-744 (CO₂) applications due to:

- Gate port design provides fast reaction speed and linear flow capacity
- Wide and accurate capacity range (10-100%)
- Direct coupling of motor and valve for high reliability
- Ceramic slide for minimal wear
- Positive shut-off valve
- Corrosion resistant stainless steel body
- Maximum working pressure: CX 1740 psig (120 bar)
EX 870 psig (60 bar)

The CX valve is recommend for the high pressure valve and the EX valve acts as the expansion valve for the medium and low temperature loads. The bypass valve can be either the CX or EX valve depending on the design pressure required.

XM678 Case Controller

The XM case controller manages all aspects of a transcritical refrigeration case including lights, fans, defrost, heaters and expansion valve (superheat) control with the following capabilities:

- Stepper valve control
- Embedded intelligence for tight temperature control
- Standard, demand or pulse defrost available
- On-board relays, communications and integrated power supply
- Optional display for configuration and status

The XM case controller is fully integrated with the E2 supervisory controller making set point changes and status checks user friendly.



Services

Emerson provides a variety of field and remote services that are ideal for R-744 (CO₂) systems.

- Onsite commissioning services for proper startup
- Remote monitoring services ensure optimum performance and mitigate potential failures
- Alarm management assist with sorting, analyzing and resolving any alarm conditions
- Energy monitoring and setpoint management ensure maximum efficiency years after installation
- Emerson's smart dispatch reduces operating costs associated with untimely and insignificant alarms

Contact your Emerson representative with your R-744 (CO₂) service needs to see how we can assist.

High Pressure Controller

The high pressure controller is an integral part of Emerson's transcritical control system as it is critical to control the high and intermediate pressure for proper system operation. The high pressure controller features:

- Subcritical and transcritical mode of operation based on temperature
- High pressure valve control based on gas cooler outlet temperature to ensure optimum efficiency during transcritical operation
- Bypass valve control maintains flash tank pressure to provide pressure drop across evaporator expansion valves
- Optional heat reclaim mode

The E2 module constantly communicates to the high pressure controller allowing users to manage and monitor all aspects of the high pressure controller.

Copeland™ 4MTLS Compressors

The superior design of Copeland transcritical CO₂ compressors includes:

- Optimized refrigerant flow and heat transfer for superior efficiency
- Balanced design and valving for industry leading sound, vibration & discharge pulse
- Operating pressure up to 1740 psig (120 bar)
- Standstill pressures of 1958 psig (135 bar) high side and 957 psig (66 bar) low side
- Onboard CoreSense™ electronics that prevent problems before they occur
- Variable speed rated from 30-60 Hz

The UL approved compressors were subjected to rigorous durability testing to ensure peak performance over their entire life.

Valves, Controls and System Protectors

Emerson Climate Technologies has developed a new range of valves, controls and system protectors that fulfills the requirements of all common CO₂ applications. Emerson offerings include oil controls, filter driers, moisture indicators, solenoid valves, check valves, ball valves, pressure controls and transmitters. Trust an experienced leader to provide high quality components to keep your system running at peak efficiency.



Commander HSK Inverter Drive

The variable speed HSK provides the precision control needed for the dynamic operating conditions present in a transcritical CO₂ booster system. The HSK is capable of:

- Variable speed control of the medium temperature compressors from 30-60 Hz
- Gas cooler fan speed control by single pressure control or two sensor temperature difference control

The Commander HSK inverter drive is simple to use, compact, and communicates via Modbus to the E2 controller.

E2 Controller

The E2 complete facility controller has been updated to include complete CO₂ refrigeration control as a standard feature in the E2 Rx. In the CO₂ transcritical booster system, the E2 controller is responsible for:

- Synchronized compressor staging for the low and medium temp racks
- Condenser/gas cooler control based on ambient temperatures and system pressures
- Supervisory platform for the XM case control, the high pressure controller, Copeland 4MTLS compressors and HSK variable speed drives

The E2 controller provides status, logging and alarm information, both on site and via a remote software interface.

Copeland Scroll™ ZO Compressors

The ZO range of Copeland Scroll compressors based on Emerson's compliant scroll design feature:

- Axial and radial compliance for improved liquid and debris handling
- Low sound and vibration
- High volumetric efficiency
- Operating pressure up to 580 psig (40 bar)
- Standstill pressure of 624 psig (43 bar) high side and 406 psig (28 bar) low side

Precision machined scrolls wear-in over time, so you can expect better performance with increased run time. Digital modulation is also available providing 10-100% capacity and superior system operation.

