

Press release

Danfoss Cooling
Danfoss A/S

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CO₂ Adaptive Liquid Management – New Danfoss solution further improves efficiency of CO₂ refrigeration in all climates

The new CO₂ Adaptive Liquid Management (CALM) solution from Danfoss extends the portfolio of solutions for CO₂ refrigeration in food retail applications. CALM includes the ground-breaking new Liquid Ejector in combination with the innovative case controller algorithm – Adaptive Liquid Control (ALC) – ensuring optimum liquid management. With CALM, the Danfoss CO₂ portfolio offers solutions for all system types, store sizes and climates.

The new CO₂ Adaptive Liquid Management (CALM) solution allows full utilization of the evaporator surface in display cases and cold rooms, improving energy savings with CO₂ refrigeration in any store. CALM is a complete solution; in addition to intelligent pack and case controllers and a system manager, it includes two ground-breaking Danfoss innovations: The Liquid Ejector and the Adaptive Liquid Control case controller algorithm.

New Liquid Ejector completes the Danfoss Multi Ejector Solution™ portfolio

With CALM, Danfoss introduces the new Liquid Ejector which can optimize and improve any transcritical CO₂ booster or parallel compression refrigeration system. Like existing Danfoss ejector offerings, the Liquid Ejector is driven by expansion energy from the gas cooler but uses it to remove liquid from the suction side. As it requires little energy to run, the Liquid Ejector is efficient in all ambient temperatures, providing a truly global optimization solution for any climate.

“The new Liquid Ejector strengthens the Danfoss ejector portfolio,” comments Danfoss Product Manager Przemyslaw Kalinski. “We now offer an ejector solution for all climates, CO₂ system types, and system sizes. In short: an efficient CO₂ refrigeration solution for everyone.”

Adaptive Liquid Control algorithm optimizes evaporator control

As the Liquid Ejector protects compressors by removing liquid from the suction side, the new Adaptive Liquid Control (ALC) case controller algorithm can safely increase evaporator utilization by injecting more refrigerant, thereby increasing the evaporation temperature and controlling superheat close to zero. As a result, evaporator performance is optimized, suction pressure is increased, and the compressors consume less energy.

“While an adaptive Minimum Stable Superheat algorithm is the most efficient and robust solution for injection control with dry expansion, Adaptive Liquid Control is the most efficient and robust algorithm for liquid control, for example in transcritical CO₂ systems,” says Danfoss Product Manager Ejnar Luckmann.

CALM provides significant energy savings and cost reductions

Increasing the evaporation temperature makes it possible to save significant amounts of energy because the increased suction pressure reduces the load on the compressors. In fact, the Adaptive Liquid Control algorithm can achieve energy savings of typically 5% compared to Minimum Stable Superheat solutions and twice as much when compared to solutions with fixed superheat.

The CALM solution further ensures a reduction of first-cost investments. As an example, a smaller suction accumulator will be sufficient to handle the limited amount of liquid in the suction line. There will also be a reduction of compressor capacity need and therefore, there is the possibility of installing smaller or fewer compressors.

“We Love CO₂”: Danfoss working to make the refrigerant transition happen

As refrigerant legislation tightens, and the consequences of climate change are becoming increasingly clear, the transition to climate-friendly refrigerants is a top priority. Thousands of CO₂ refrigeration installations prove that Danfoss components can help customers make this transition whilst saving energy, and without compromising on food safety and reliability. With the CALM solution, Danfoss now offers an even greater selection of CO₂ solutions for all climate zones and store sizes, helping businesses make the refrigerant transition all over the world.

“These benefits are now available to end-users all over the world and it’s a major step forward in developing solutions that benefit the climate. We are proud to say that “We love CO₂”, and we hope that decision makers in the food retail industry will join us in making the refrigerant transition happen,” says Anja Sofie Meiner Jensen, Project Launch Manager.

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Related links:

Read more: www.multiejectorsolution.danfoss.com

Find out why “We Love CO₂”: [Video](#)

Photo caption:

CALM is a complete solution; it includes two ground-breaking Danfoss innovations: The Liquid Ejector and the Adaptive Liquid Control case controller algorithm.

Danfoss engineers advanced technologies that enable us to build a better, smarter and more efficient tomorrow. In the world’s growing cities, we enable the supply of fresh food and optimal comfort in our homes and offices, while meeting the need for energy-efficient infrastructure, connected systems and integrated renewable energy. Our solutions are used in areas such as refrigeration, air conditioning, heating, motor control and mobile machinery. Our innovative engineering dates back to 1933 and today Danfoss holds market-leading positions, employing 27,000 and serving customers in more than 100 countries. We are privately held by the founding family. Read more about us at www.danfoss.com.