

ENGINEERING
TOMORROW



Food Retail | Smart Store brochure

Maximize operational efficiency from case to cloud



Learn more at
smartstore.danfoss.com



**1
Million+**
connected
devices installed



smartstore.danfoss.com

Are you **ready** to turn challenges into opportunities?

When the way we live, work, or shop changes, new food retail technology is close behind.

Megatrends like electrification, digital communication, and the fight against climate change are creating both opportunities and challenges for the food sector, worldwide.

At Danfoss, we see that firsthand because we work with hundreds of food retail chains in more than 60 countries. In particular, we see five big, overlapping changes that shape today's workload of supermarket teams.

Global trends call for new Smart Store strategies

Increasing food safety and reducing food loss are more important than ever.



Connectivity helps reduce food loss and cut service costs.



Climate change regulations makes refrigerant choices critical.



Treat refrigerant selection as a long term decision.



Urbanization drives new retail formats and integrated energy systems.



Utilize supermarkets as new energy hubs.



Intense pressure on operating margins makes cost savings essential.



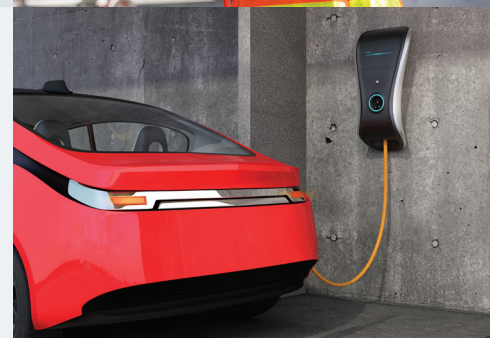
Digitalization of operation creates transparency on where to focus the effort.



Electrification of transportation will challenge the energy infrastructure.



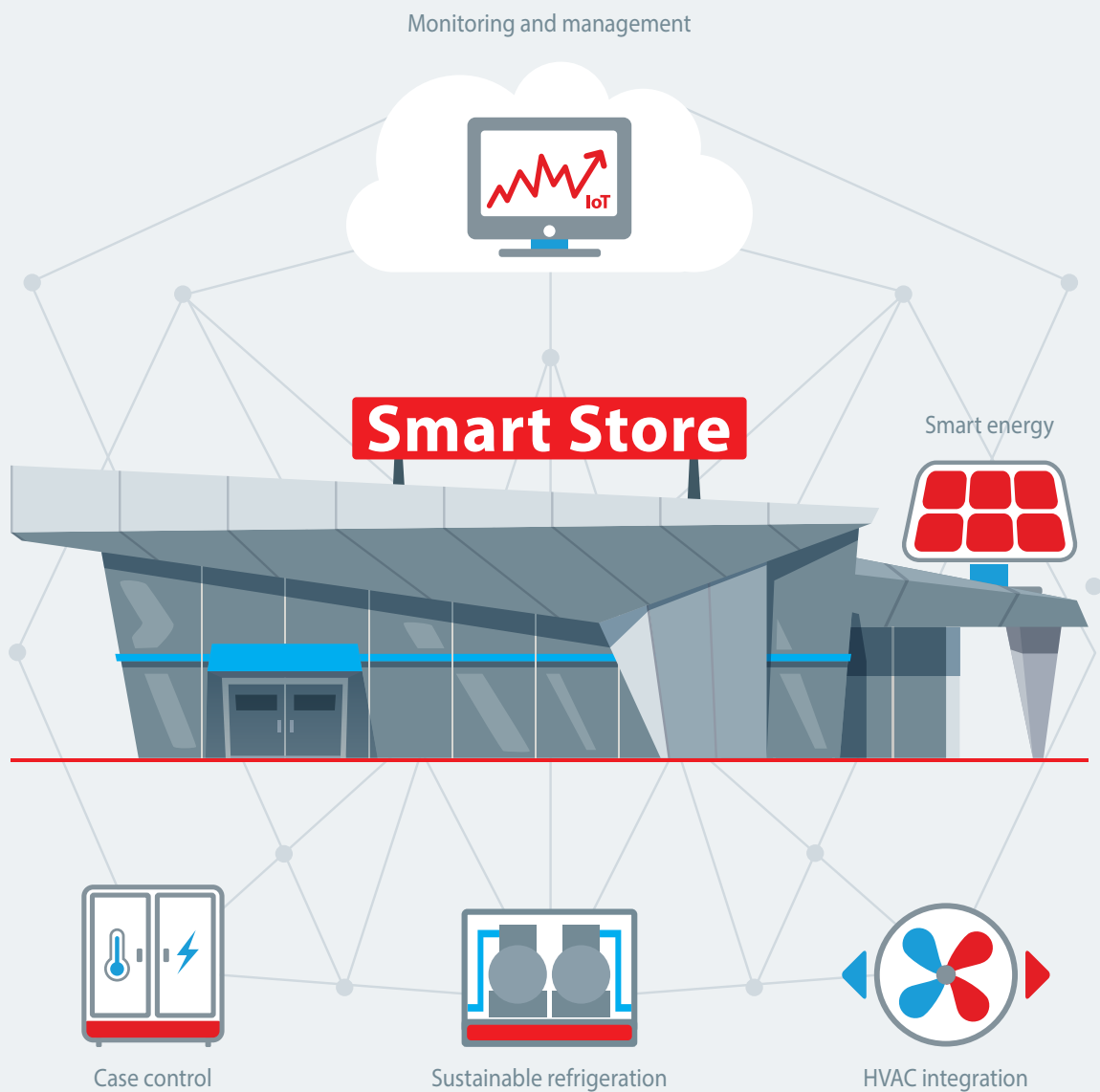
Opportunities with renewables, energy arbitrage, and car charging for shoppers.



Five ways to **maximize efficiency**

The five global megatrends influence each other. For example, the opportunity to reduce energy tariffs by optimizing electricity demand is all the more compelling because of the need to find cost savings wherever possible.

In the same way, the changing food retail energy landscape needs a coordinated approach. We have identified five technical strategies which, when combined, will help supermarkets stay ahead of – and in some cases benefit from – society's emerging demands.





Monitoring and management

Automatic and remote monitoring services deliver cost savings through performance optimization, reduced energy consumption, and fewer service calls.

Technologies:

- Alsense® Food Retail
- Case-to-cloud connectivity
- ADAP-KOOL® System Manager
- Telemetry devices

Benefits:

- Lowest total cost of ownership
- Full transparency of all relevant assets across Danfoss and non-Danfoss controlled stores
- 24/7/365 alarm management
- Enhanced data security in the cloud

Up to

30%

reduction in
service calls



Sustainable refrigeration

Thanks to our new technologies, efficient CO₂ solutions are available for all climates and store sizes.

Technologies:

- Multi Ejector Solution™
- Pack control solutions and plug and play condensing units for small to large plants
- CO₂ Adaptive Liquid Management

Benefits:

- Keeping up with new regulations on refrigerants
- Energy-efficient CO₂ refrigeration in all climates
- Optimum pack control

More than

30%

reduction of
carbon footprint
on store level



Case control

Case controls boost refrigeration efficiency by balancing capacity and demand. This secures food safety without wasting energy on unnecessary cooling output.

Technologies:

- ADAP-KOOL® case control solutions
- Adaptive superheat
- Commissioning and service smartphone app

Benefits:

- Save energy without compromising food safety
- Connected solutions for optimum efficiency
- Save time during commissioning and service

Up to

12%

energy savings
compared to other
EEV technologies



HVAC integration

Harness the benefits of integrated refrigeration, heating, air conditioning, and ventilation solutions.

Technologies:

- Heat recovery
- Multi-pack systems
- Danfoss Turbocor® for large plants

Benefits:

- Reduce complexity
- Recovered heat can be used for own heating purposes or sold to other premises
- One system for all your heating, cooling, and A/C needs

90%

reduction in
your heating
costs



Smart energy

Smart energy can turn traditional supermarkets into the supermarkets of tomorrow by taking advantage of renewable sources, energy storage, and arbitrage.

Technologies:

- Solar energy
- Demand response
- Car charging
- Electric and thermal storage

Benefits:

- Cut your energy costs
- Offer car charging to customers
- Become an energy producer
- Strengthen your green profile

Take a step
towards a

zero

energy store

Monitoring and management

Alsense® Food Retail Services

Whether you are responsible for your supermarket's operational efficiency, asset performance or energy efficiency, you probably sometimes wish you had a sixth sense for knowing exactly how to prioritize your efforts. Not to mention the ability to seamlessly view data and deliver precise reporting.

Alsense® IoT Food Retail Services bring you a new level of sense by offering scalable, digital, and expert-managed services through our secure and future-proof portal for optimizing the performance of your food retail operations: Alsense® IoT Cloud—a state-of-the-art solution based on the proven Microsoft Azure.

With Alsense as your custom crystal ball, you'll be able to easily track refrigeration asset performance, respond to alarms, integrate 24/7 monitoring, reduce energy consumption, and much more in one integrated, modern platform with the market's most user-friendly interface.

Improved Energy Efficiency

- Energy optimization of instore assets
- Controls upgrade (if necessary)
- Monitoring, targeting, and cost avoidance

Increased Operational Efficiency

- Reduction of after-hours service calls
- Triage and remote fix before dispatch
- Issue analysis and insight upon dispatch

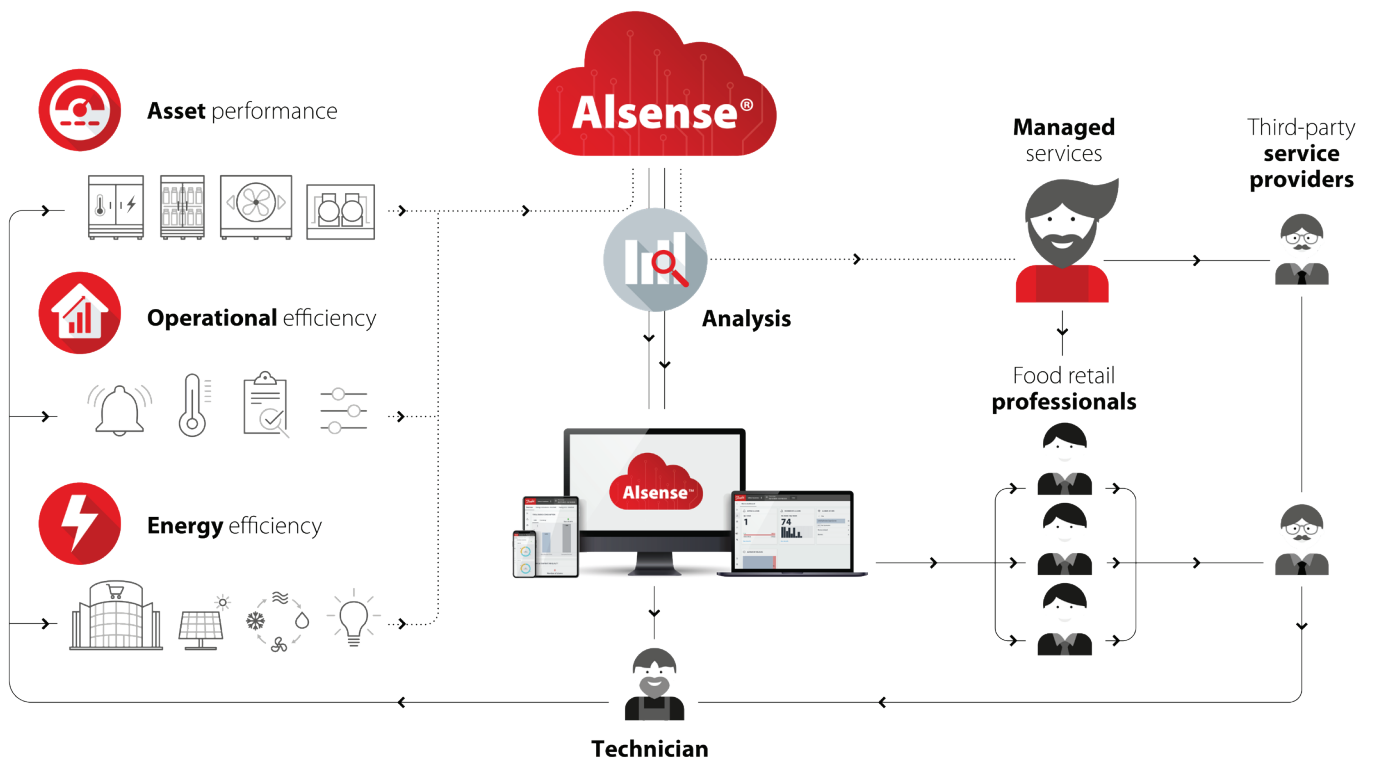
Reduced Food Loss Potential

- Improved food quality and reduced waste
- Reduced risk of missed critical alarms
- Improved temperature management



Alsense® Food Retail

A fully connected service platform
providing actionable insights.



Our domain expertise has reached the cloud

Focusing on creating value-added services through IoT



15,000+
Stores connected



250,000+
Cabinets and
dispensers connected



1.6 Million+
Alarms processed
monthly



1 Million+
Connected devices
installed

Full impact calls for a full solution

Real change requires more than connected components. You need the full picture to boost both store performance and enable cross-chain optimization. As the key component of the intelligent Danfoss ADAP-KOOL® refrigeration and HVAC systems, the System Manager AK-SM 800A is the link that ties everything together. Seamless connectivity from case to cloud—ensuring data-driven transparency and insights that deliver measurable impact:

- Optimized operations
- Optimum level of food quality
- Increased energy efficiency

Highlights include:

- Powerful new electronics platform supporting new operating system
- Industry best practice IT security protocols (HTTPS, SSL/TLS 1.2, and WPA2 encryption)
- Enhanced UI/UX, including new, yet familiar touch screen
- Full remote access to your system through StoreView Web
- Retro-fit ready with EOL and legacy control functions



Alsense Food Retail and AK-SM 800A—the perfect match

Alsense Food Retail services is our IoT cloud solution for supermarkets and food retail applications offering a sustainable, scalable, and secure portal for optimizing operations—so you can spend less on energy and operational costs.

The System Manager AK-SM 800A is Alsense-ready—delivering full transparency from site level to chain level so you can get even more value from your data.

StoreView—full web access and easy overview

StoreView Web offers a clean interface to your system manager built on modern web technologies, and will be available on browser, desktop, and all major mobile platforms. It replaces a portfolio of legacy applications with improvements, including:

- Direct integration with the Alsense platform for a seamless and connected user experience
- Using industry best practice and technologies for IT security
- Multiple deployment options – browser, desktop or mobile
- Single sign-on and role-based access for easy and secure authentication
- Constant evolution of features and enhancements, based on customer feedback and usage analytics



Implementing industry best practice for **IT Security**

The AK-SM 800A in connection with Storeview Web is implementing the industry best practice for IT security, maintained through continued security updates. In this way we want to help you in staying secure from case to cloud.

Examples of IT security features

- Encrypted web traffic (HTTPS) and communication (email)
- Password management
- User authorization
- Network isolated Wi-Fi with timeout
- Built-in firewalls

Efficient CO₂ solutions for all system types, store sizes, and climates

Around the world, CO₂ is fast becoming food retailers' refrigerant of choice. At Danfoss alone, we are currently seeing supermarkets switching to CO₂ refrigeration systems at a rate of around 10,000 a year—and that number is growing fast.

Meanwhile, alongside the traditional large applications, CO₂ is being used in a broader range of settings than ever, including very small systems like remote condensing units.



CO₂ solutions for small systems



Optyma™ iCO₂ condensing units

Available during 2020

For a green and sustainable choice, Optyma™ iCO₂ is the new range of outdoor condensing units using CO₂ refrigerant. The first unit in the range provides cooling capacities from 1.5 to 4.7 kW for medium-temperature applications. A single unit can handle the cooling capacity of multiple display cabinets or cold rooms, making it the perfect solution for smaller stores.

Features and benefits:

- One unit can handle the cooling capacity of 1.5 to 10 meters of display cabinets
- Connectable with Danfoss ADAP-KOOL® system managers for remote monitoring and management
- Plug-and-play stackable solution



CO₂ MiniPack Solution with CCMT

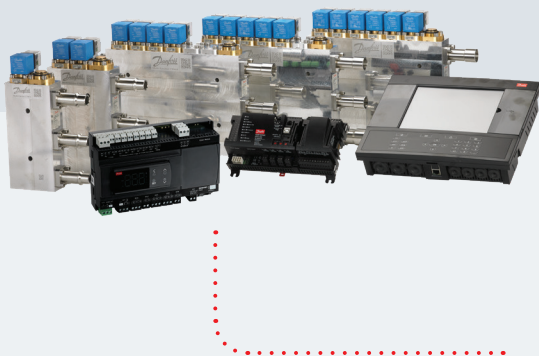
With the new series of high pressure valves – CCMT Light – Danfoss can now offer a complete control solution portfolio for compact CO₂ packs. The solution now covers both AK-PC 572 Pack Controller, Variable Speed Drives, Valve drivers, pressure sensors and power back-up.

Features and benefits:

- Compact and light components
- Wizard setup for fast and easy programming
- Proven technologies for robust and safe installation

The Danfoss Multi Ejector Solution™ takes CO₂ to a higher level

Danfoss offers a full range of Multi Ejectors – covering the needs for all store sizes, CO₂ systems, and climates. All ejector types are available as a complete Multi Ejector Solution™ where the ejector is controlled with the AK-PC 782A pack controller to provide the robust system control necessary for efficient and reliable operation.



CO₂ Adaptive Liquid Management – CALM

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 Controls case controller algorithm.



Big opportunities in smaller formats

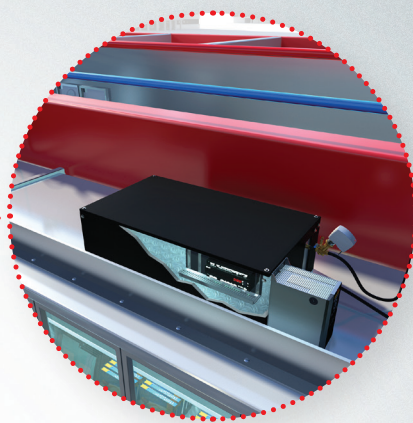
With semi plug-in and water loop solutions

Semi plug-in or water loop systems have individual refrigeration units installed in each cabinet. The heat rejection in the semi plug-in system does not happen in a traditional air-cooled condenser. This has been replaced with a water-cooled condenser. The central part of the system is the water loop that supplies each cabinet with chilled water. The heat is carried by the water loop out of the system and is either rejected by a dry cooler, or even better, connected to a heat pump and reused for heating purposes.

Features and benefits:

- Tailor-made solution for natural refrigerants
- Plug and play installation
- Supported by high reliability products
- Energy efficiency





Case
Controllers



Thermostatic
Expansion Valves



Drives



Micro Plate Heat
Exchangers



Hydronic
balancing and
control valves

Danfoss gas sensors

– ensure
peace of
mind 24/7

The Danfoss gas sensor series (DGS) is based on an all-new digital platform, making it easy to install and use.

The sensors can easily be integrated into Danfoss ADAP-KOOL® systems, giving you 24/7 remote service access to parameters and alarms. Furthermore, it gives you long calibration intervals for reduced maintenance costs, and sensor heads are easily replaced with a simple plug-and-play process.



Features and benefits:

- More than 30 refrigerants covered with just five models
- Ensures peace-of-mind 24/7
- Plug-and-play commissioning and easy integration in Danfoss ADAP-KOOL® systems

Case control

Use smart refrigeration case control to **reduce operating costs**

To optimize refrigeration efficiency, it is important to match capacity to demand. Too much cooling, and you waste energy; too little, and you risk system damage and food loss. An adaptive case controller, like the Danfoss ADAP-KOOL® series, can balance refrigeration performance to the load. And our adaptive superheat control algorithm maintains the minimal stable superheat, so there is always just enough cooling.

As refrigeration technology gets more sophisticated, you can rely on the Danfoss ADAP-KOOL® Case Controls Solution to handle the complexity - optimizing efficiency and supporting valuable decisions. With a full range of controllers, Danfoss can offer an ADAP-KOOL® Case Controls Solution for both thermostatic expansion valves (TXV) and Electric Expansion Valves (EEV).



The name
“ADAP-KOOL®”
is a shortened
adaptation of
the phrase
“adaptive cooling”

ADAP-KOOL® Case Controls Solution

The new Danfoss ADAP-KOOL® Case Controls Solution for food retail applications drives down cost and takes user friendliness to the next level with a new smartphone app that simplify design, installation, service, and use. The solution includes four new products: new case controller platform, electric expansion valve, pressure transmitter, and temperature sensor – all designed for an optimum solution.



Introducing **AK-CC55.** **Superior as always** – stronger than ever

The new AK-CC55 case controls deliver energy savings of 6-10% compared to the next best alternative. It relies on acknowledged and advanced Danfoss adaptive superheat algorithms to control refrigerated display cases and cold rooms. For example, the large terminals on the AK-CC55 make it easy to loop the pressure transmitter cable from one controller to the next one.

Benefits:

- Significant energy savings with adaptive superheat control algorithms and adaptive defrost
- Simplified installation and service with smartphones and large terminals
- Suitable for any store size with Compact, Single Coil and Multi Coil variants



Take **user-friendliness** to the next level with **AK-CC55** **Connect app**

The AK-CC55 remote display comes in a Bluetooth version, which enables wireless connection to the AK-CC55 Connect service app. Use it on a smart phone or tablet supported by iOS or Android operating systems.

Benefits:

- Controller setup in less than 2 minutes
- Real time overview of cabinet performance
- Alarms including checklist function
- Monitoring as well as manual operation
- Configure with no need to unload cases

HVAC integration

Integrate each store's systems to gain economies of scale

The closer you align your heating, ventilation, air conditioning, and refrigeration systems, the easier it will be to save money, safeguard stock, and reduce your environmental impact. Integrated solutions unlock the full potential of each application and increase the efficiency of the entire system.

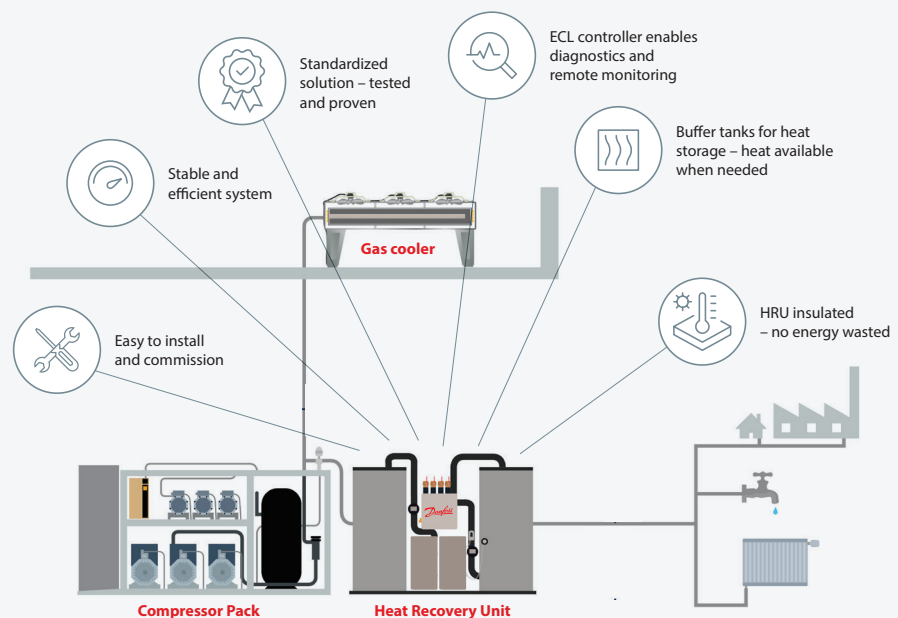
Heat Recovery Unit

The Danfoss Heat Recovery Unit helps to eliminate the technical challenges of managing heat recovery. The HRU is an integrated solution managing and buffering the heat from the refrigeration pack – to be reused for space heating, hot tap water, or even sold to neighbors or district heating grids.

Features and benefits:

- Maximum heat recovered and reused
- Standardized solution – tested and proven
- Easy to install and commission
- Stable and efficient solution
- Eliminates the need for a boiler

With an Heat Recovery Unit, **get maximum heat recovered and reused** with no or minimum need for additional heat sources.



Recycling heat to cut costs and CO₂

A busy Danish supermarket has significantly reduced its annual heating bill and carbon footprint by utilizing the excess heat from its refrigeration system.

In supermarket chain Meny's Fredericia store, a Danfoss Heat Recovery Unit (HRU) was installed to recycle heat from the CO₂ refrigeration system to warm up its 1,900 m² and provide plenty of hot tap water all year round.

Today, the store manager can see exactly how much energy, money, and CO₂ has been saved. During the first year alone, energy consumption was reduced by 135 MWh in total—and as a bonus, installation was so simple that employees didn't even notice the new unit for the first year of operation.

- 89.7% energy savings
- Carbon footprint reduced by 6.7 tons
- No operational disruptions



Components that will **boost the performance** of your **HVAC system**



Roof top unit

Check out our solutions for rooftops, chillers, and air handling units that will really make a difference and save on applied and running costs.

Features and benefits:

- All you need in one place
- Highly experienced experts
- High energy efficiency
- Optimized for low GWP refrigerants



New MCX controller

Best-in-class connectivity, VZH compressor control logic, high system safety, and better response time with the new MCX**B2 system controller.

Features and benefits:

- Easier commissioning and troubleshooting
- Integration with BMS
- Advanced applications with high execution speed and bigger memory
- Energy efficiency, comfort, and flexibility with I/O improvements



VLT® HVAC Drive FC 102

Obtain higher reliability and lower total cost of ownership in your heating, ventilation, and air-conditioning installations, with this unique drive optimized for building automation systems.

Features and benefits:

- Energy efficiency
- Optimal motor control
- User-friendliness

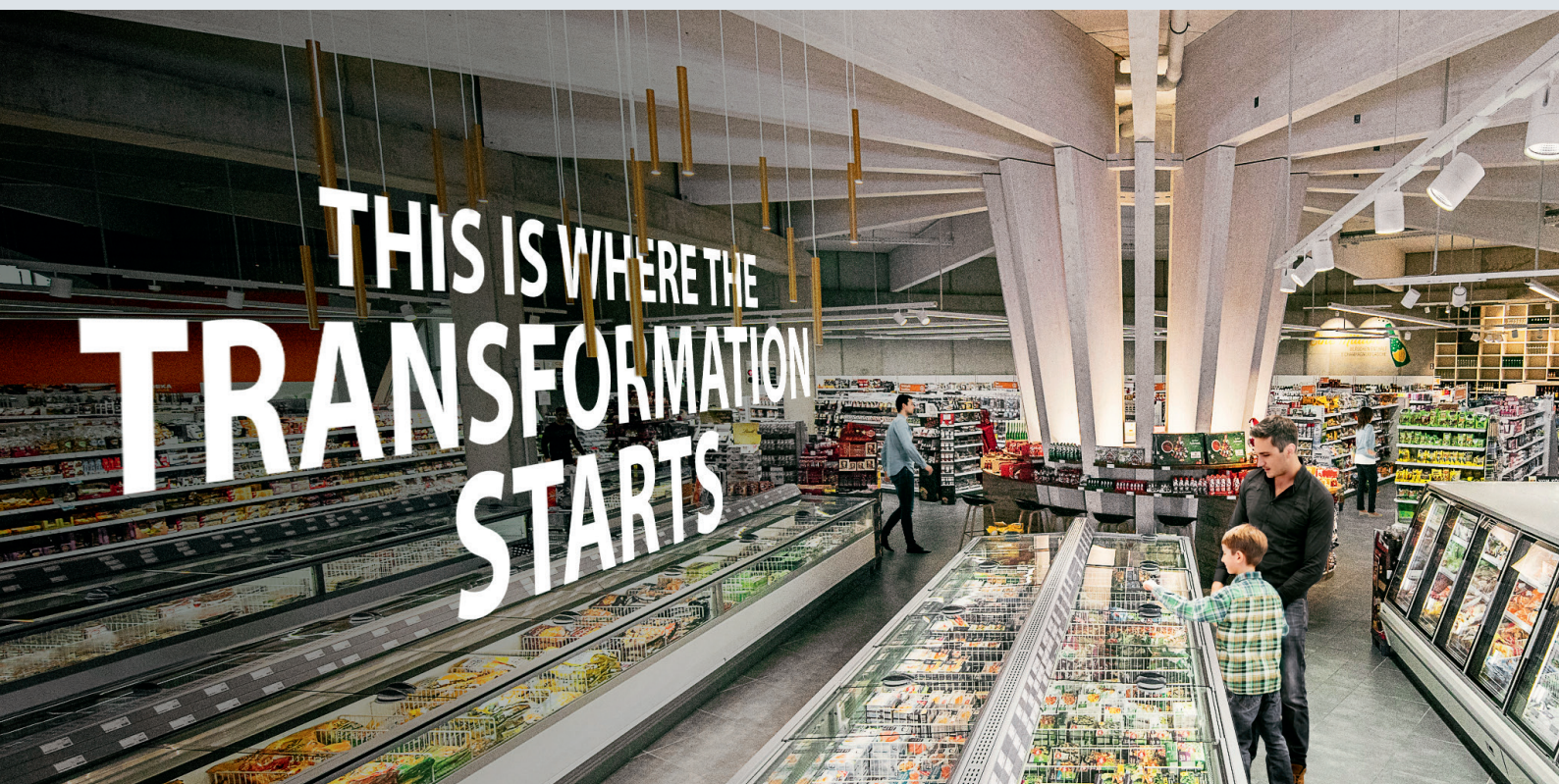
Optimize your energy solutions with smart energy

Energy cost is one of the biggest expenses in the daily operation of supermarkets. Therefore, retailers increasingly look to enhance the energy efficiency within the stores.

At Danfoss, our long-term ambition is to enable net-zero stores or even stores that give more than they take in terms of energy. Smart energy solutions can turn traditional supermarkets into the supermarkets of tomorrow by taking advantage of renewable sources, energy storage, and arbitrage.

Danfoss smart energy solutions

With Danfoss smart energy solutions, we reveal some of the exciting opportunities available in order to constantly maximize energy efficiency in the food retail sector. Solar energy, demand response, car charging, and electric and thermal storage are just some of the solutions that are available today.



Features and benefits:

- Cut your energy costs
- Offer car charging to customers
- Become an energy producer
- Strengthen your green profile

4 core technologies



PV/Solar



Energy management



Energy storage (batteries)



E-mobility (car charging)

The future of smart supermarkets is here.

Cooperation between Danfoss and SMA in Oldenburg

Supermarkets need to decrease their environmental footprint, while enhancing food safety. With Danfoss solutions for smart control of refrigeration, HVAC, lighting, and energy, Active & Irma supermarket in Oldenburg has transformed its approach to energy management. The refrigeration system, running on natural refrigerants, keeps food fresh, and through the heat recovery solution, supplies the heat for the store, while the overall energy use is optimized through real-time insights.



Green and Sustainable



Redistributes Surplus Energy



Hyper-Efficient Systems



Solutions ready for engineering tomorrow's supermarkets

One-Stop-Shop

Danfoss is your one-stop-shop offering flexible solutions for all food retail applications.



Sustainable Refrigeration



Pack Controller



Drive



Condensing Unit



Multi Ejector



Pressure and Temperature Sensor



Balancing Valve and Actuator



High Pressure Valve



User Interface

Applications:
Condensing Units, Mini Packs,
Large Packs, Water loop systems

Refrigerants:
CO₂, Propane, HFC, HFO



Case Control



Case and Room Controller



Service and Commissioning App



Compressor



Color-coded Temperature Sensor



Telemetry device



Electric Expansion Valve



Thermostatic Expansion Valve



Micro Plate Heat Exchanger



Pressure Transmitter and Switch

Applications:
Remote Cases/Cold Rooms, Semi Plug-in Cases/
Cold Rooms, Plug-in Cases/Cold Rooms

Refrigerants:
CO₂, HFC, Propane



Monitoring and Management



Individual assets



Convenience stores



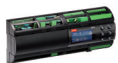
Supermarkets



HVAC Integration



Smart Energy



Programmable
Controller



Scroll
Compressor



Inverter Scroll
Compressor



Turbocor Oil-free
Compressor



PV/Solar



Energy
Management



Heat Exchanger



Heat
Recovery



Electric
Expansion Valve



Line Component



Energy storage
(batteries)



E-mobility
(car charging)

Applications:

Air Handling Units, RoofTop Units, Chillers,
Heat Pumps, Multi Pack, Heat Recovery

Refrigerants:

CO₂, HFC, HFO

Applications:

PV Systems, E-Mobility, Energy Storage,
Demand Response, Peak Shaving, Energy Measurement

Worldwide training in CO₂ refrigeration

Hands-on CO₂ training is coming your way

Since it was launched in 2016, the Mobile CO₂ training unit has provided our customers and partners with hands-on CO₂ training. Today, the Mobile CO₂ training unit has been on 3 world tours, visited 4 continents and 15 countries and trained more than 2,000 people. The mission is still clear – to make both the technology and understanding of CO₂ refrigeration immediately available to industry professionals.

The Mobile CO₂ Training Unit provides easy-to-access, hands-on training for the thousands of installers, service technicians, and OEM engineers worldwide that want to take full advantage of the natural refrigerant.

Features and benefits:

- Simple booster system
- Parallel compression
- Parallel compression with ejector
- Commissioning of CO₂ systems
- Set up of pack and case controls
- Service procedures
- Troubleshooting and correction



Learn with Danfoss. **Anytime. Anywhere**

Danfoss Learning gives you access to online courses, webinars, training programs, and materials that will increase your knowledge, boost your skills, and help reduce your service and installation time. Danfoss Learning has hundreds of training courses available in up to 26 languages, with more being added all the time.

Sign up for a free Danfoss Learning account today and get started. It is fast, easy, and you will quickly feel the effect of more knowledge in your daily work.

Join over 45,000 learners to:

- Keep up with the latest trends
- Fulfill education requirements
- Learn how to install and service
- Learn new skills
- Earn completion certificates

Danfoss is with you. **All the way**

The food retail industry is more challenging than ever. New consumer demands, technologies, and competitors, plus low profit margins and regulatory uncertainties, are just some of the key issues you are facing. But we can help you turn challenges into opportunities.

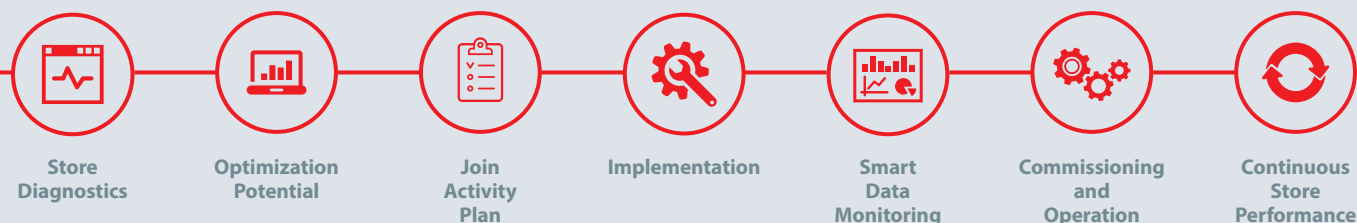
With more than 50,000 food retail installations worldwide, Danfoss is your dedicated end-to-end partner and application expert for store optimization. We help facilitate the whole process of optimizing your stores to make your business more efficient and profitable by reducing complexity and increasing predictability.

It is a process made possible with the Danfoss Smart Store – our end-to-end solution where we start by understanding the potential of your stores to ensure that every goal is met before, during, and long after implementation.



Danfoss **Smart Store**

An end-to-end solution
to maximise store efficiency



Discover the **opportunities** with Danfoss **Smart Store** solutions

Danfoss Smart Store is the supermarket of tomorrow. We have made it our business to continuously improve the 5 key areas of food retail facility operation. And by connecting these areas we can harvest the synergies and take efficiency and food safety to the next level.



Learn more at
smartstore.danfoss.com

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