Efficient, safe and green
Get it all with Danfoss Smart Store

Proven in more than 50,000 installations around the world

Learn more at smartstore.danfoss.com
Are you ready to face the **challenges**?

Climate change, new demands to energy efficiency, concerns about food safety, and new opportunities to raise profitability with big data are just some of the trends that drive the present development in food retail.

At Danfoss we have made it our business to help you make the most of the opportunities.

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**Combat Climate Change**

Synthetic refrigerants like HCFCs and HFCs have a global warming potential 2-4,000 times higher than that of CO₂. All too often, system leakages occur and detrimental gases escape into the atmosphere. At least 50 million tons of equivalent CO₂ leaked into the atmosphere could be avoided every year, if grocery stores across the world switched from synthetic to natural refrigerants such as CO₂.

A lot of forward-thinking retailers have already made the move to natural refrigerants. Are you the next? Danfoss Smart Store will help you boost the energy efficiency of your stores and the green image of your brand.

60% CO₂ reduction when replacing HFCs with natural refrigerants

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**Maximize Energy Efficiency**

As the global population continues to grow, energy use is expected to rise by one third in 2035. To avoid global warming and its alarming consequences, the situation calls for technologies that can maximize energy efficiency.

With the Danfoss Smart Store concept, we reveal some of the exciting opportunities available in order to constantly maximize energy efficiency in food retail. Our long-term ambition is to enable net-zero stores or even stores that give more than they take in terms of energy.

50% energy savings with Danfoss Smart Store solutions

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**Optimize Food Safety**

Today, roughly one third of the food produced in the world for human consumption gets lost or wasted. About one fourth of the food loss takes place in the retail sector. With a global population of 10 billion in 2035, the immense food waste is a key challenge.

Danfoss solutions not only ensure the perfect conditions for food in temperature controlled environments, they also help achieve near-zero downtime on store applications in order to improve food safety and reduce food loss. The Smart Store solution from Danfoss predicts failure and triggers just-in-time maintenance.

24/7 temperature monitoring with Danfoss Smart Store solutions

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**Think ahead with Big Data**

The use of big data opens a new world of opportunities. Many retailers are already embracing the opportunities of big data to improve revenue streams, control costs and drive change in business and delivery models.

But when it comes to big data, we have only just seen the beginning. Danfoss Smart Store has been developed to make the most of big data in food retail. This means that you can focus all your energy on retailing while we ensure that your store is optimized at all times.

5,000 stores worldwide use Danfoss Smart Store to be in control
As a market leader with more than 50,000 food retail installations worldwide, Danfoss leads the development of integrated Smart Store control solutions. And not only that. Our 250 food retail specialists can help you answer some of the difficult questions, for instance what solution is most cost efficient? How to get the most out of a CO₂ system with heat reclaim? Or if a central or decentral compressor solution is the most cost-efficient for your type of store.

The Danfoss Smart Store solution has been developed based on more than 30 years of close cooperation with the global community of food retailers through ADAP-KOOL® solutions and more than 80 years in the HVAC industry. The solution is running in more than 5000 stores worldwide and the proven savings are up to 50% per store.

The Smart Store solutions enhances food safety and bring down the energy bill by integrated control of refrigeration, HVAC, lighting and other applications, connecting and optimizing your supermarket from case to cloud. Every day, we are dedicated to make your supermarket just a little smarter.

Let Danfoss help you unleash the opportunities

smartstore.danfoss.com

2 to 3 years is all it takes to pay back a Smart Store solution.
The compressor is at the heart of the refrigeration system. When asking yourself how you can optimize the energy efficiency of your stores, you need to consider the compressors first, i.e. how to meet the new regulation on refrigerants, how to reduce the total cost in pack production and how to minimize the risk of break-downs causing food loss and inconvenience to shoppers.

Danfoss Smart Store offers optimum pack control integrating variable speed drives and options for heat recovery. When choosing Danfoss you get a one-stop-shop for complete pack control for systems of any size and refrigerant.

See the full product portfolio for your next CO₂ solution at smartstore.danfoss.com/powerpack.

Discover the hidden treasures of the compressor room

30% of the compressor capacity is used for cooling. The rest is available for heating and other purposes.

The supermarket that gives more than it takes

Studies have shown that in normal applications, only about 30% of the cooling capacity of the compressors is used. The excess capacity can be used to turn the supermarket into an energy producer – for itself and for its surroundings. All it takes is to use the compressors as heat pumps in periods when the cooling load is low and the heating load is high, typically during cold season. Excessive heat from the refrigeration system can be sold into the district heating system. And when combined with solar energy, the supermarket can be transformed to a local micro heat and power system.

Make the most of your CO₂ system

CO₂ is rapidly conquering the market for food retail refrigeration as one of the most clean and competitive solutions available after the gradual phase-out of traditional HFC solutions.

At Danfoss, we have made it our business to pioneer technologies for natural refrigerants. Do you want to know more about CO₂ with heat recovery, CO₂ booster systems, CO₂ ejector, and other CO₂ solutions go to smartstore.danfoss.com/powerpack.

Long Term Sustainability

CO₂ Ejector Systems

Indirect/CO₂ + cascade

CO₂ Booster

Watercooled

Semi-plug-in

Indirect/Glycol + cascade

Plug-in units + A/C

Short Term Viability

Norwegian retailer saves up to 50 % on the energy bill with Smart Store

CO₂ with heat reclaim, geothermal heat pump in the ground, solar panels on the roof, additional insulation, integrated control of refrigeration, HVAC and light, smart grid integration – these are some of the Smart Store technologies that helped Norwegian supermarket achieve energy savings of up to 50%.

German supermarket saves 20 % CO₂

How can we improve energy efficiency and protect the climate? The two questions spurred an innovative development at a major German food retailer. First of all, the store management decided to switch the refrigeration system to CO₂ in order to make the system more climate-friendly and meet EU regulations. They put in heat recovery in order to save energy for space heating and hot water. And finally they added variable speed drives to the compressors to bring up energy efficiency. The advanced control solution has returned several advantages:

- Substantial savings in energy costs and CO₂ missions
- Effective heat recovery
- Long service life of compressors and evaporators
- Simple system configuration with central System Manager

Comparison of natural refrigerant solutions

smartstore.danfoss.com/powerpack
Danfoss is your one-stop-shop which offers flexible control solutions for all Food Retailers. Through our wide range of adaptive products and solutions, Danfoss is your business partner that will enable you to achieve the optimal solution in your supermarket through:

- Supplier base consolidation
- One point of contact
- Time savings through reduction of order handling
- Field and electronically delivered services, all in one
- Application design support
Energy costs is one of the biggest expenses in operating a Supermarket. Therefore, retailers increasingly look to enhance the energy efficiency within the store as one way to tackle the climate and energy challenge.

But it is not the only way. Flexibility in energy demand – or smart grid integration – is also part of the solution. Flexibility in cooling demand, connection to district heating/cooling networks and use of surplus compressor capacity are some of the exciting new opportunities that can make your store an energy supplier, adding valuable capacity to the energy network and new revenue streams to your business.

Unlocking Smart Grid Potential for the Food Retail Sector

A new smart-grid solution can enable food retailers to have their energy managed remotely. The new service aggregates potentially hundreds of thousands of electronic assets, such as refrigeration and HVAC devices, across multiple retail sites and offers reliable and safe control in real-time.

By remote energy management, retailers can avoid peak tariff charges, generate new risk-free revenue streams and protect themselves against future energy price rises.

In cooperation with Reactive Technologies, Danfoss is running a pilot program that enables demand shifting in supermarket refrigeration and ensures food quality as an extra benefit to the Danfoss ADAP-KOOL® refrigeration control system.

From energy consumer to energy supplier

Danish food retailer is a first mover in supplying the local community with surplus heat recovered from the supermarket’s refrigeration system. With the new solution designed by Danfoss, close to 20 homes in the neighborhood now receive their entire heating supply from the local supermarket. And that is not all. The heat recovery system has also reduced the CO2 load from the supermarket by 34 % by utilizing the surplus heat from the refrigeration system to heat tap water for cleaning. In this way, the supermarket saves close to 30,000 euro on gas consumption.

80 % load shedding can be your contribution to energy network flexibility

From component to grid – your store is part of the solution

Supermarkets can play a significant role in smart and integrated energy systems. With only modest investments your supermarket can add valuable flexibility to the electricity network. With heat recovery and connection to the district energy network, your stores can even become energy suppliers providing heating to the local community that your store is part of.

Look outside to save costs inside

smartstore.danfoss.com/refrigeration
A profitable supermarket relies on flawless operation of cold cases and freezers regardless of ambient temperatures and load conditions. At the same time, cold cases and freezers account for close to one third of the total energy consumption of the supermarket. Optimized control of cold cases and freezers without compromising food safety can save up to 33% on the energy bill.

No two store concepts are the same, but with the wide range of control products from Danfoss, you have the required flexibility to configure the most reliable and energy efficient solution for every store in your chain.

Save 35% on the energy bill with adaptive control technology

Danfoss has performed a test in two convenience stores in Ukraine to determine the advantages of using adaptive control technology. The thorough testing returned convincing results about the advantages of adaptive control:
- Energy savings up to 35%
- Possibility to reduce compressor size
- Longer life time of power pack

Save up to 12% on the energy with adaptive superheat control

With adaptive superheat control you save a lot of energy, because the injection of refrigerants to the individual evaporators is measured exactly and based on actual demands at any time. With adaptive superheat you get the following advantages:
- Energy savings of 8-12% compared to a TXV system
- Constant adaptive adjustment and optimum utilization at all load conditions
- Works under all operation considerations

Second-to-none reliability

The Danfoss AKV electric expansion valve was the first ever electric valve for food retail refrigeration. Today, the AKV has been installed in more than two million refrigeration systems across the world due to its outstanding performance and reliability.

The AKV range represents the most comprehensive assortment of electronic expansion valves in the market with a model for any application, including HVAC. The product range is constantly developed and expanded to match new refrigerants, notably CO₂, new energy efficiency standards and innovative system configurations.

The optimum operation of the AKV valves results in energy savings of up to 12% compared to best-in-class TXV solutions. Energy consumptions can be reduced by up to 33% if you take advantage of the full ADAP-KOOL® system with suction and condensing pressure optimization. The built-in defrost control ensures constant high energy efficiency without compromising food safety.

Reduce complexity with integrated case control

The number variants and complexity of gear trays in display cases can be greatly reduced with the new ADAP-KOOL® AK-CT 200®. The controller tray gathers all switchgear on one circuit board, thanks to the build-in current measurement and zero crossing technology. Additions and changes to the control system are performed by simple software configuration instead of manual substitution of electrical components and wiring. The new controller tray allows easy trouble-shooting, service and maintenance, and the integrated design allows for compact installation.
- One version with software configuration of relays and application “soft wiring”
- Configurable fuse size (4 to 16 Amp)
- One common label for all display cases
- Power management from 10 Watt to 10kW
- Single or 3 phase defrost

*Only available with 240V supply voltage
Many stores operate separate control systems for refrigeration, HVAC, and light. But why not integrate monitoring and control of all power-consuming applications in one place? Integrated control of refrigeration, HVAC, and light reduces complexity and operational costs. Integrated control unlocks the full potential of each application and increases the efficiency of the entire system.

Variable speed drives energy efficiency
Variable speed HVAC solutions offer a great potential for energy savings. With the latest VLT HVAC Drive from Danfoss, you get automatic energy optimization, automatic motor adaptation regardless of brand, constant monitoring of energy consumption, and compact design to fit almost any application.

In 2014, the VLT HVAC Drive FC102 frequency converter was awarded the prestigious Singapore Green Building Products certification with the score “Excellent”. The energy efficiency of the VLT drive was measured to be between 96 and 99%.

20% savings during daytime, 46% savings at night
A discount store in France made a bold move to take full advantage of the opportunities offered by Danfoss Smart Store. 20% energy savings during the day and 46% savings during the night were achieved by:

- Installing a new pack control with variable speed on compressor/condenser
- Installing a new Front-end for integrated control of refrigeration, HVAC, and light
- Implementing light zoning and activation according to daylight and usage patterns
- Applying reversible heat pumps

The hypermarket of tomorrow
When one of Europe’s leading retailers decided to go green, they went all the way. With a transcritical CO2 system with heat recovery, the total demand for heating and hot water is covered by the store itself. Furthermore, the whole store is fitted with LED lighting and automatic light control. All in all, the retailer expects annual energy savings of 20-25%. The Smart Hypermarket will serve as model store for all future new builds.

Save up to 30% on the energy bill
The Danfoss System Manager is the brain of the Smart Store solution. The System Manager enables seamless integration of refrigeration, heating, air conditioning, ventilation, and indoor/outdoor lighting. Designed specifically for food retail applications, the System Manager provides all the functionality and tools for control, maximum reliability, and high energy efficiency. Accessible from any device, the System Manager offers 100% availability remote or on-site.

What’s in it for you?
- Get connected from case to cloud
- Optimize performance of the complete refrigeration system from compressors to cold cases, HVAC, and lighting.
- Take advantage of heat recovery to save energy without compromising food quality.
- Switch to climate-friendly refrigerants to reduce the carbon footprint of your facilities.
- Set up your system to automatically generate and forward updated HACCP reports.
- Avoid food loss and secure the right temperature at all times with the automatic alarm-handling function.
- Monitor your facilities by means of user-friendly dashboards or detailed reports.
- Configure your solution with easy-to-use wizards to achieve fast commissioning and reliable operation.
- Access your system from any platform, stationary or mobile.

smartstore.danfoss.com/integratedcontrol
Turning **big data** into value

Information continues to grow exponentially, and food retailers are taking advantage of big data like never before – not only to increase revenues and customer loyalty, but also ensure efficient operation of facilities. Data integration and connectivity enable full transparency, new insights and proactive decision-making across sites, adding value to the bottom line and to the customer experience.

In the pool of new opportunities arising from the use of big data, Danfoss Smart Store is constantly developed to leverage the possibilities. When seen over a ten year period, the operating costs of the electrical appliances account for 90 % of the total life cycle costs. In other words, it pays off to use big data to monitor, manage and operate your systems for maximum efficiency.

Full transparency – the way you like it

The Smart Store enterprise management system collects all relevant data from refrigeration, HVAC and light systems and present them the way you want:

1. The data can be exported in XML, if you want to perform the analytics yourself.
2. The AK-EM 800 is a software license, designed to manage critical enterprise management tasks, including Alarm handling from multiple location sites, HACCP reporting and history collection.
3. Or you can subscribe to the Danfoss Electronically Delivered Services (EDS) that will handle everything from alarms to energy and COP management.

### Using COP to benchmark your supermarket

Coefficient of Performance, or simply COP is your short-cut to energy savings. By comparing how much cooling you get to how much electrical power you use, you arrive at the efficiency of your system. When you have the COP for a given installation you can compare it to similar installations and find out where to improve.

For COP management, Danfoss has developed the AK-LM 350 logging module. The module is easy to install and returns a highly reliable monitoring of the refrigeration system. It records and reveals all the details of the refrigeration systems, cooling state and energy consumption. The AK-LM 350 performs the calculations while the system is running showing real-time COP and the COP for the last hour and 24 hours.

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Protect your investment

With more than 5,000 supermarket installations using Danfoss Services, we have experienced that savings become more substantial and sustainable when you continuously measure, monitor, analyze and implement your supermarket’s performance.

The Danfoss monitoring set-up provides a professional call center comprising advanced IT infrastructure. So far we monitor 5,000 installations and collect over a million datapoints every week, adding up to 3 million alarms annually being handled.

Among others, Danfoss Services offer:

- **Operational stability**: access Danfoss system controller data for a user-friendly overview of operations to make sure that all equipment is running efficiently.
- **Food safety**: set-up Temperature Quality Reports (TQR), Hazard Analysis and Critical Control Points (HACCP) and Temperature Quality Index reports (TQI).
- **Energy savings**: benefit from benchmarking reports on energy usage to compare store performance and identify where improvements can be made.
Danfoss Electronically Delivered Services (EDS) provides you full on-demand insight into the operation, consumption, equipment lifecycle analysis at all levels of aggregation.

- Login to a web dashboard and execute setpoint changes across groups of sites, and obtain significant energy savings and system optimizations made during initial store setup or re-commissioning projects.
- Promote energy efficiency and environmental awareness of your stores and divisions through energy benchmark reports.
- Identify performance issues and implement corrective actions to avoid food spoilage and excessive energy usage based on the HACCP set-point values based on the product type per display case/cold room and the associated HACCP regulatory requirements.
- Perform chainside Refrigerant Tracking, to avoid unnecessary losses and maintain the high efficiency you only get with optimum charged systems.
Danfoss is **with you** all the way

Are you in the market for high-performing turnkey solutions for control of your stores? Are you looking for expert application knowledge to design your next generation control solution? Or do you want to dive into leading-edge technologies and solutions for CO2 refrigeration, COP management or smart grid integration?

Before committing to your next solution, you should consult with Danfoss to get the most reliable, safe, energy and cost efficient solution.

At Danfoss, we build our business on trust and integrity. In everything we do from product design to delivery and service, we stand by you, ready to respond to your needs and always keeping our promises.

When only the best is good enough

The Danfoss product portfolio for food retail is among the most complete and innovative in the world. We work hard every day to make sure that our products and services delight our customers every time. Our strict quality control ensures that our products comply with national and international regulation.

All Smart Store Products are TS 16949 certified for top quality, ultimate endurance and lowest cost of ownership.

Danfoss Services

Services at every stage of your store’s lifecycle.

**Retrofit/Upgrade**
- Design to meet new regulatory requirements and/or optimal performance and implement new technology.
  - Audit
  - Refrigeration Plus
  - Incentives

**Operation**
- Ensure constant high performance and preventive maintenance to minimize downtime and sustain food safety, reducing energy costs.
  - Danfoss Certification
  - Refrigeration Plus
  - System Management & Electronically Delivered Services
  - Compliance Offer
  - Training

**Incident Management**
- Identify, resolve and prevent issues fast and efficiently.
  - System Management & Electronically Delivered Services
  - Training
  - Compliance

**Comissioning**
- Perform or supervise commissioning to meet the highest performance standards.
  - Optimization
  - Continuous Commissioning
  - Retro-commissioning

**Installation**
- Supervise installation according to specifications.
  - Project Management
  - Certification
  - System Management - EDS

**Construction**
- Implement the latest design strategies and the most cost-effective equipment and systems for new stores.
  - Design
  - Project Management
  - Incentives

Learn more. Achieve more.

Learn more about Danfoss’ many energy saving and efficient products and solutions at Danfoss Learning. Our new online education platform is packed with courses developed by experts - and is open 24/7.

All our courses have been developed according to best practice principles by trained trainers who know their field to the smallest detail. This is your guarantee that your time at Danfoss Learning is well spent.

Visit Danfoss Learning today and get started. It’s fast, easy and you will quickly feel the effect of more knowledge in your daily work.
Let’s talk

At Danfoss we believe that long term partnerships starts with a good dialog.

- To understand your situation
- To find the best solution
- To provide the evidence

Contact your local Danfoss representative – and let’s talk.
As a market leader with more than 50,000 food retail installations worldwide, Danfoss leads the development of integrated control solutions.

Our Smart Store solution has been developed based on 30 years of close cooperation with the global community of food retailers. The solution is currently running in more than 5,000 stores worldwide, returning savings of up to 50%.

Danfoss continuously develops its portfolio of components, controllers and advanced algorithms with the long-term ambition to create net-zero stores or even stores that give more energy than they take.

Together with forward-thinking retailers around the world we take sustainable solutions to the next level through constant development of sustainable technologies and service concepts.

Visit Danfoss Smart Store at:
smartstore.danfoss.com