Save energy and operational costs without compromising food safety

Danfoss ADAP-KOOL® case controls take food retail refrigeration to the next level.

33%

energy savings on optimized control of retail cooling

ADAP-KOOL® the way you work

Adapting to a changing world for 30 years with state-of-the-art refrigeration control system

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

ADAP-KOOL® is a family of high-end adaptive refrigeration controls developed by Danfoss for all food retail applications.

First introduced in 1987, Danfoss ADAP-KOOL® products have a long history of adapting to change. And ever since their introduction, the solutions have been defined by the same basic values: robust, reliable, and adaptive display-case and cold-room refrigeration that ensures high food safety and significant energy savings.

Robust and reliable control

A robust adaptive superheat algorithm can save 8-12% of energy use by ensuring the evaporator is always fully utilized under all conditions. But it requires several components to work together perfectly, and each new advance in technology makes a system more complex.

This is where modern case control solutions make the difference. As refrigeration technology gets more sophisticated, you can rely on ADAP-KOOL® case control to handle that complexity - optimizing efficiency and supporting valuable decisions.

The power of adaptive refrigeration

If operating conditions in food retail refrigeration never varied, setting up a refrigeration solution would be a lot easier. But conditions do change, and that means constantly fluctuating system loads.

To optimize refrigeration efficiency, ADAP-KOOL® avoids the "one size fits all" approach. With adaptive controls, you don't need to manually adjust system operation for changing conditions.

Full range of controllers

Thermostatic expansion valve solutions (TXV)

- → EKC 223/224
- → EKC 302
- → AK-CC 350
- → AK-CC25 Pro
- → AK-CC55 Compact
- → AK-CC55 Water Loop

Electronic expansion valve solutions (EEV)

- → AK-CC55 Compact
- → AK-CC55 Single Coil
- → AK-CC55 Single Coil UI
- → AK-CC55 Multi Coil

Learn more here

Find more information on each controller in the product overview on pages 6-7.

Save energy and enhance food safety with adaptive control algorithms

Over the decades, data from thousands of installations have proved the superiority of adaptive superheat control.

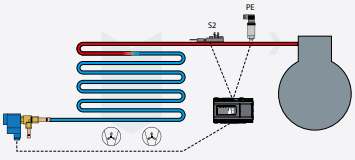
In refrigeration, superheat is the temperature difference between the actual temperature of the refigerant vapor and its saturation temperature.

For every Kelvin the superheat can be decreased, there is an equal potential to increase the evaporating temperature. For every Kelvin the evaporating temperature is increased, 2-3% energy can be saved in a refrigeration system.

Danfoss Adaptive Minimum Stable Superheat Control (MSS)

With MSS, utilization of the evaporator surface is maximized while ensuring that no liquid exits the evaporator.

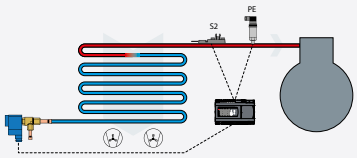
The MSS algorithm, in combination with suction pressure optimization, delivers maximum system efficiency in systems with dry expansion.



Danfoss Adaptive Liquid Control (ALC)

The ALC algorithm typically used in transcritical CO_2 systems with a suction accumulator and liquid ejectors, injects greater amounts of refrigerant into the evaporator, fully utilizing the entire surface. Increasing the amount of the refrigerant in the evaporator increases the evaporation temperature, bringing the superheat very close to zero.

The new Danfoss ALC algorithm provides the highest utilization of evaporator capacity, enabling up to 5 Kelvins higher suction pressure compared to MSS control and even twice as much compared to systems with fixed superheat.



The Danfoss ADAP-KOOL® case control solution enables advanced analytics and visibility of the store operations with reduced energy cost.

- **Ensure food quality**
- **Improve energy savings**
- **Optimize store operations**
- **Minimize climate impact**

Superior as always.
Stronger than ever

Covering full range from basic to advanced applications

AK-UI55 Single Coil UI

AK-UI55 Bluetooth

AK-CC25 Pro

Danfoss offers a solution that makes it easy to save on adaptive and reliable food retail refrigeration:

AK-CC55 case controls deliver energy savings of 6-10% compared to the next best alternative. They rely on acknowledged and advanced Danfoss adaptive superheat algorithms to control refrigerated display cases and cold rooms.

The latest ADAP-KOOL® case control generation ensures that the system provides the same great value as always and delivers superior user experience, no matter whether you're an OEM, installer, service technician or food retailer.

Benefits of AK-CC25 Pro

Learn more about the controllers

One controller, many applications:
A single hardware variant covers MT/LT switch mode, dual compressors or circuits, flexible I/O, and broad sensor compatibility. Approved for CO_2 and flammable refrigerants (A3, A2L), it reduces complexity and inventory.

Easy setup with Bluetooth®:
Commission quickly via the AK-CC Connect App, KoolProg, or KoolKey for simplified installation, configuration, and monitoring.

Efficiency and food safety:
Supports modulating control and variable speed compressors for energy savings and reliable cooling. Enhanced diagnostics and condenser monitoring minimize downtime. HACCP-compliant.

Proven reliability:
Built on 35+ years of ADAP-KOOL® expertise with robust protection, advanced diagnostics, and safe operation in tough conditions.

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

24-hour
history logs for primary control parameters

The AK-CC Connect is an industry-first wireless tool for the configuration and service of the AK-CC controlling refrigerated display cases and cold rooms.

Simplified and convenient with Bluetooth

The AK-CC25 and AK-CC55 (enabled by the AK-UI55 Bluetooth) offer wirelesss connection to the AK-CC Connect Service App on a smartphone or tablet supported by iOS or Android operating systems.

The app allows configuration and testing in a user-friendly, intuitive manner. Without the need to unload products, remove panels or establish physical connections.

Real-time operating conditions can be monitored directly at the display case or cold room, which ensures convenient overview and troubleshooting.

Full text and graphic display

The enhanced user interface provides full text and graphic display of data not available on conventional multi-segment displays.

Truly, for installers, commissioning agents, and service technicians, the AK-CC Connect is a tool that makes the task easier and more efficient.

Benefits

Installation

- New configuration wizard available for AK-CC25
- Controller setup in less than 2 minutes
- Send and receive setting files via email

Service

- Controller firmware update
- Real-time overview of cabinet performance with 24-hour history
- Alarms including checklist function
- Monitoring and manual operation of inputs/ outputs
- Performance dashboards available

Value

- Ease-of-use optimized for installation and service
- No need to unload cases to configure or troubleshoot equipment
- Enabling time savings and first-time fix
- Safe operation with patented Bluetooth lock function

Download the app here:

GET IT ON Google Play

Download on the App Store

Case controller overview

Expansion device	 EKC 223/224	 EKC 302 / AK–CC 350	 AK–CC25 Pro	 AK–CC55 Water loop
	Conventional TXV case controller	**Conventional TXV case controller**	**Flexible TXV case controller**	**Flexible TXV case controller (semi plug–in)**
	TXV	**TXV**	**TXV**	**TXV**
Control principle	ON – OFF	ON – OFF	Modulating or ON – OFF	Modulating or ON – OFF
Quick set–up with application macros	✓	✓	✓	✓
Communication	Modbus external adapter	Modbus built–in	Modbus built–in	Modbus built–in
Sensor Inputs: Pt 1000 / AKS 32R	2 / –	3/–	3 / – (S3/S4/S5)	5 / – (S3/S4/S5/S7/S8)
Flexible sensor input: PTC/NTC/user defined	–	–	(S3/S4/S5/S5b/Sc)	(S3/S4/S5/S7/S8)
Digital Inputs: dry cont. / 230 VAC	2 / –	2/–	2 / –	2 / –
Digital outputs (relays)	3 / 4	4	4	5
Customised setup of output functions	–	–	✓	✓
SSR digital outputs (AKV)	–	–	–	–
Overcurrent protected AKV ouptuts	–	–	–	–
CO_2 injection control with EEV	–	–	–	–
A3/A2L compliant	✓	–	✓	✓
Analogue output (PWM/0–10V/freq.)	–	–	Variable speed compressor (freq.) via DI2	Variable speed compressor/pump control or PWM rail heat control
Dual compressor control	–	AK–CC 350 only	✓	✓
Adaptive defrost	–	–	–	–
Rail Heat on/off control	–	–	Day/night, dew point	Day/night, dew point
Hot gas defrost control	–	–	–	–
Heating thermostat	✓	–	✓	–
Humidifier on/off control	–	–	–	–
Remote displays – UI	–	1	–	1
Bluetooth connection to AK–CC Connect App	–	–	✓ – built–in on Pro BT variant	✓ – via AK–UI55 Bluetooth
Supply Voltage	115VAC or 230 VAC	230 VAC	115 VAC – 230 VAC	115 VAC – 230 VAC

				
AK–CC55 Compact	**AK–CC55 Compact**	**AK–C55 Single coil**	**AK–CC55 Single coil UI**	**AK–CC55 Multi coil**
Flexible TXV case controller	**Flexible EEV case controller**	**Flexible EEV case controller**		
TXV (appl. 1–4)	**AKV (appl. 5–9)**	**AKV**	**AKV**	**3 x AKVP**
Modulating or ON – OFF	MSS Superheat /ALC control	MSS Superheat /ALC control	MSS Superheat /ALC control	MSS superheat /ALC control
✓	✓	✓	✓	✓
Modbus built–in	Modbus built–in	Modbus built–in, Modbus TCP/IP option module	Modbus built–in, Modbus TCP/IP option module	Modbus built–in, Modbus TCP/IP option module
5 / – (S3/S4/S5)	4 / 1 (S2/S3/S4/S5)	6 / 1 (S2/S3/S4/S5/S6/(S5b))	6 / 1 (S2/S3/S4/S5/S6/(S5b))	6 / 1 (S2A/S4A/S2B/S4B/S2C/ S4C)
(S3/S4/S5)	(S3/S4/S5)	(S3/S4/S5/S5b)	(S3/S4/S5/S5b)	(S4A/S4B/S4C)
2 /–	2 / –	2 / 1	2 / 1	2 / 1
4	3	5	5	4
✓	✓	✓	✓	✓
–	1	1	1	3
–	–	1	1	1
–	✓	✓	✓	✓
✓	✓	✓	✓	✓
PWM rail heat control	PWM rail heat control	0–10V external stepper driver control or PWM rail heat control	0–10V external stepper driver control or PWM rail heat control	PWM rail heat control
✓	✓	✓	✓	–
–	✓	✓	✓	✓
Day/night, dew point	Day/night, dew point	Day/night, dew point	Day/night, dew point	Day/night, dew point
–	–	✓	✓	–
✓	✓	✓	✓	–
–	–	✓	✓	✓
1	1	2	1	2
✓ – via AK–UI55 Bluetooth	✓ – via AK–UI55 Bluetooth	✓ – via AK–UI55 Bluetooth	✓ – via AK–UI55 Bluetooth	✓ – via AK–UI55 Bluetooth
115 VAC – 230 VAC	115 VAC – 230 VAC	115 VAC – 230 VAC	115 VAC – 230 VAC	115 VAC – 230 VAC

Enhance your case cooling performance

The Danfoss ADAP-KOOL® case control solution for food retail applications drives the cost down and takes user friendliness to the next level. The solution includes: case controller, electric expansion valve, pressure transmitter, and temperature sensor – all designed for maximum compatibility to ensure optimum and efficient system performance. The solution also includes a smartphone app to simplify design, installation, service, and use.

Discover the case controller solution package, designed to optimize your refrigeration systems.

Learn more here

Quick answers for installers and technicians: from wiring to diagnostics to firmware.

Case controllers FAQ

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