

ENGINEERING
TOMORROW



April 2023 | Danfoss Climate Solutions for cooling

TECH INSIDER



Introduction

Danfoss Tech Insider keeps you updated with the latest news on the cooling and industrial products portfolios from Danfoss Climate Solutions. The content is intended to give a quick overview of core technical news and updates in our product portfolio, including links to relevant documentation and more information.

Danfoss Tech Insider is sent out, on a monthly basis, to ensure you are always up to date with the latest innovations and changes made to Danfoss products and solutions.

We hope you will enjoy reading Danfoss Tech Insider!

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Optyma™ iCO₂ 4.6 kW MT and 20 kW MT – 10 kW LT Package Unit Launch

Danfoss is pleased to confirm the launch of the new Optyma iCO₂ condensing unit codes, allowing the use of very low GWP non-flammable, nontoxic refrigerants R744, those 2 models can offer variable load, low noise operation and high ambient temperature working envelope. They are now available from stock.

F-gas regulations impose major reductions in quotas which impact refrigerant availability and prices. For cold rooms, installers can still use A1, A2L but you can use also very low GWP refrigerants as CO₂. Our focus remains to have our products be easy to use and adapt, supporting to installers' ways of working. Therefore, Danfoss has evolved the existing ranges best in class features for ultra-low GWP CO₂ refrigerants.

Features and benefits

1. **Optyma iCO₂ OP-MPAM005COP04G 4.6kW MT**, code 114X6001
 - a. BLDC scroll compressor giving variable load 30 to 100 %
 - b. MCHE gas cooler for high reliability
 - c. 1 suction accumulator (2.5 l) + 2 liquid receiver (2 x 2.5 l) to increase charge flexibility and ensure long term reliability
 - d. 35 dB(A) at 10 m for low noise operation
 - e. Open doors for easy maintenance
 - f. Stacking up to 2 units
 - g. Working envelop from -20°C to +46°C ambient, and evaporating up to +10°C
 - h. Comply with AKV and TE2 mechanical expansion valve operation
 - i. Condensing unit is PED cat I
2. **Optyma iCO₂ OP-UPAM015COP04E 20kW MT – 10kW LT**, code 114X6003
 - a. 2 stage rotary + scroll compressor to operate on Medium Temperature or Low Temperature
 - b. Blue fins coated condenser
 - c. 1 suction accumulator (7.6 l) and 2 receives (2 x 7.6 l) for high reliability
 - d. 45 dB(A) at 10 m for low noise operation
 - e. 100 m maximum equivalent pipe length (12.7 mm diam)
 - f. Oil separator and flow back management for high reliability
 - g. System oil management facilitated by Module Controller 118U5498 and AK-CC55 usage
 - h. Working envelope from -20°C to +43°C
 - i. Comply with AKV expansion valve operation
 - j. Condensing unit is certified by notified body PED cat II



Available documents OP-MPAM005COP04G 4.6 kW MT

- [Commercial brochure](#)
- [Catalogue](#)
- [CO2 solutions for small commercial cold rooms](#)
- [Application guideline](#)
- [Refrigerant and Oil Charge Calculation \(new version\)](#)
- [Instruction manual](#)
- [Commissioning video example](#)
- [Manufacturer's declaration](#)
- [Sound spectrum](#)
- [Declaration of incorporation \(EU\)](#)
- [Declaration of conformity \(UK\)](#)

Available documents OP-MPAM015COP04G 20kW MT – 10kW LT

- [Commercial brochure](#)
- [Data sheet](#)
- [Application guideline](#)
- [Module controller guideline](#)
- [Instruction manual](#)
- [Manufacturer's declaration](#)
- Module controller [Declaration of incorporation \(EU\)](#)
- [Declaration of conformity \(UK\)](#)

Condensing unit performance data, local language translation is available in Danfoss [Ref Tools, CoolSelector2](#).
Local languages available selecting "language" in Product Store and "language and country" in CS2.

Codes are available to order now, and products are available for our stock.

Please, contact your local Danfoss contact for more information about the impact for each product and other solutions Danfoss can offer. Alternatively, you can consult instructions on the [Danfoss YouTube channel](#).

ICV Upgrade to 65 bar

As a result of increasing number of heat pumps and CO₂ systems, Danfoss experience a demand for an upgrade of the maximum working pressure of ICV platform from the existing MWP of 52 bar (754 psi) to 65 bar (943 psi).

To reach that higher MWP for ICS valves, consequently the pilot valves need to be upgraded to higher working pressure too. Relevant pilots CVP, CVPP and CVC have now been upgraded to MWP 65 bar (943 psi).

Please note

Please note that CVP-L, and CVC-L will still have MWP of 52 bar (754 psi).

The existing valve design can meet the higher MWP so no change to form, fit, and function. Only marking of MWP on the housing is changed.

There are no changes to the existing interfaces.



Modifications:

The only visible change to the valve will be the MWP on the label

Affected products

Please see the full overview of mechanical pilots and their MWP values in this table.

Valve type	Max. working pressure		Pressure range		Code no.
	[bar]	[psi]	[bar]	[psi]	
CVP-L	52	754	-0.66 - 7	19.5 in Hg to 102	027B0920
CVP-M	65	943	4 - 28	58 - 406	027B0921
CVP-H	65	943	25 - 52	363 - 754	027B0922

CVPP-L	65	943	-0.66 - 7	19.5 in Hg to 102	027B0930
CVPP-M	65	943	4 - 28	58 - 406	027B0931

CVC-L	52	754	-0.66 - 7	19.5 in Hg to 102	027B0940
CVC-M	65	943	4 - 28	58 - 406	027B0941

Customer impact

This change has no impact for normal business. No change to form, fit, and function.

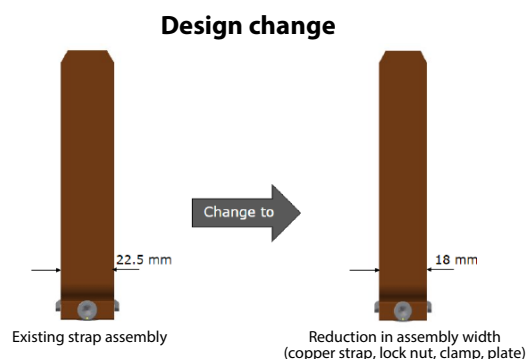
Only the label on the valve will change.

This change will be effective from March 1st, 2023.

If you have any questions regarding this information, please contact your local Danfoss representative.

TXV-PU-CC Bulb Strap Width Changed from 22.5 mm to 18 mm

In order to maintain service levels to our customers and to improve sustainability, Danfoss is changing the bulb strap used for all thermostatic expansion valves. The width will change from 22.5 mm to 18 mm and alternate sources for the complete strap as well as select raw materials will be added from actual supplier; also, we are adding an alternative supplier for dual source for certain valves. The thermostatic expansion valve form, fit, function, and performance remains the same. There is a fit change to the bulb strap (accessory) only. Please note, in order to align across the various versions of bulb straps, Danfoss will also remove the sizing information stamped on a few of the bulb strap models.



The scope covers all bulb straps used with the following Danfoss TXV models: TU, TC, T2, TD1, TE5-55, TR6, and TGE, impacting the following Danfoss TXV production locations: Denmark, Mexico, and China. Cross- reference list of spare bulb strap as raw material is in the next table, if bulb strap is required as a spare parts, new sales code can be found on the table next page.

Before			After		
Plant	Current Accessory Code	Description	Plant	New Accessory Code	Description
A106	068N2532	Bulb Strap Ass'y I/48	A106	068U3519	Bulb Strap Ass'y I/48
A106	068U3507	Accessory bag with short bulb strap M/25	A106	068U3520	Accessory bag with short bulb strap M/25
A106	068U3505	Accessory 0.4 mm bulb strap I/45	A106	068U3525	Accessory 0.4 mm bulb strap I/45
A106	068-1214	Accessory with long bulb strap I/250	A106	068U3526	Accessory with long bulb strap I/250
A106	068U3506	Accessory 0.4 mm bulb strap I/45	A106	068U3527	Accessory 0.4 mm bulb strap I/45
A106	068U3508	Accessory bag with long bulb strap M/45	A106	068U3528	Accessory bag with long bulb strap M/45
G202	067N0557	Spare part bulb strap L225 mm I/40	G202	067N0587	Spare part bulb strap L225 mm I/40
G202	067N0559	Spare part for bulb strap L350 mm I/40	G202	067N0589	Spare part for bulb strap L350 mm I/40

Current 22.5 mm wide bulb strap will be phased out.

Expected implementation date of bulb strap starts different per product.

Affected products

All thermostatic expansion valves with bulb strap.

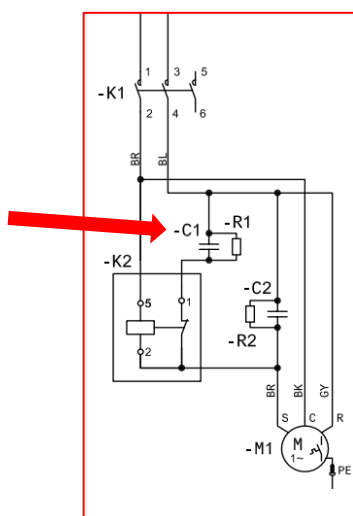
Current 22.5 mm wide bulb strap will be phased out.

New Starting Device for Optyma™ Package Condensing Unit

As part of Danfoss' continuous product improvement, our Optyma package condensing unit equipped with single phase NTZ048 and NTZ068 compressor will undergo new starting device to improve the start ability of the unit close to the compressor specification limits.

Product improvement features and benefits

CSR wiring will be upgrade from Start capacitor 330V, 98 µF (Article code 8173001) to 161-193 µF 330V (Article code 120Z0400)



English/Deutsch/Français	
-B1	condensing press./Kondensationsdruck/press.de cond.
-B2	suction pressure/Saugdruck/press.de aspiration
-B3	high pressure/Hochdruck/haute pression
-B4	low pressure/Niederdruck/basse pression
-R1	ambient temp./Umgebungstemp./temp.ambiante
-R2	discharge temp./Druckgastemp./temp. de refoulement
-R3	suction gas temp./Sauggastemp./temp. du gaz aspiré
-R4/5	Aux.temperature/diverse Temp./réserve température
-E1	Crankcase heater/Kurbelwannenheizung/Résistance de carter
-M1	Compressor/Kompressor/Compresseur
-M2	Fan motor/Lüfter/Ventilateur
-C1	Start capacitor compr./Startkondensator/Condensateur démarrage
-C2	Run capacitor compr./Betriebskondensator/Condensateur fonctionnement
-X1	Terminal/Anschlussklemme/borne

New wiring improves

- Starting torque
- Start ability, upon favorable power supply

Impacted products and replacement parts

All packaged Optyma™ condensing unit ranges operating with single phase reciprocating NTZ compressors:
114X7282,114X3204,114X3206,114X7244,114X7053,114X7255,114X7055,114X7087,114X7089,114X7171,114X7173,
114X7181,114X7183,114X7257,114X3225,114X3241.

Old Starting Capacitor Code	Old Starting Capacitor Designation	New Starting Capacitor Code	New Starting Capacitor Designation
8173001	Start capacitor 330V, 98 µF	120Z0400	Start capacitor 161-193µF 330V

Implementation date

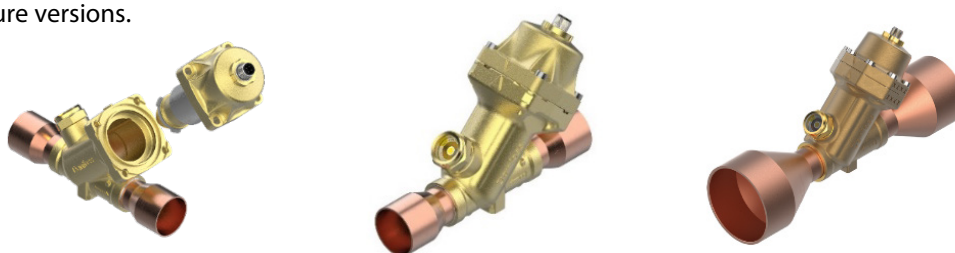
All packaged Optyma™ condensing units starting from serial number XXXXXCG1423 will be affected on week 14/2023.

Please contact your local Danfoss representative for more information about the impact of this update, as well as other Climate Solutions from Danfoss.

Electric Expansion Valves, ETS 175L, 250L, 400L and 500L Standard and Oil Free/High Temperature Versions

Danfoss is pleased to announce that the ETS Large extended and upgraded portfolio is now completed and ready for sale.

The ETS Large portfolio includes the ETS 175L, ETS 250L, ETS 400L and ETS 500L standard and oil-free/high-temperature versions.



The ETS 12.5 to ETS 400 models shall now be replaced with equivalent ETS C and ETS L (S curve) models.

The last order of old ETS products is September 29, 2023, and production of these products will conclude in December 2023.

The new ETS L models are designed for higher inlet media temperatures to cover all relevant application needs. The extended ETS 175L to 500L ranges from 169 to 507 TR (595 to 1786 kW) (R134a). ETS 500L capacity can be achieved with a single valve for better control. The new models are direct replacements of existing models. These new models will also improve serviceability as there is no need to remove the valve body from the system if service is ever required. All models come with linear or S-flow curves to optimize system performance. Also, the refrigerant compatibility with all common refrigerants, including next generation within low GWP versions, is covered. All ETS L models are UL approved.

For more information, please visit our Danfoss Store, the Data Sheet, [Coolselector2](#) (release March 2023) or contact your local sales representative.

VZH M&L Code J/H New Models with R410A/R452B/R454B Release

Danfoss has released new variable-speed compressors VZH088/117/170 code J/H models after code G, which can be used with multiple refrigerants: R410A, R452B, and R454B. Danfoss is now offering a complete VZH medium & large variable speed multi-refrigerant R410A/R454B/R452B range VZH088/117/170 for all motor codes.

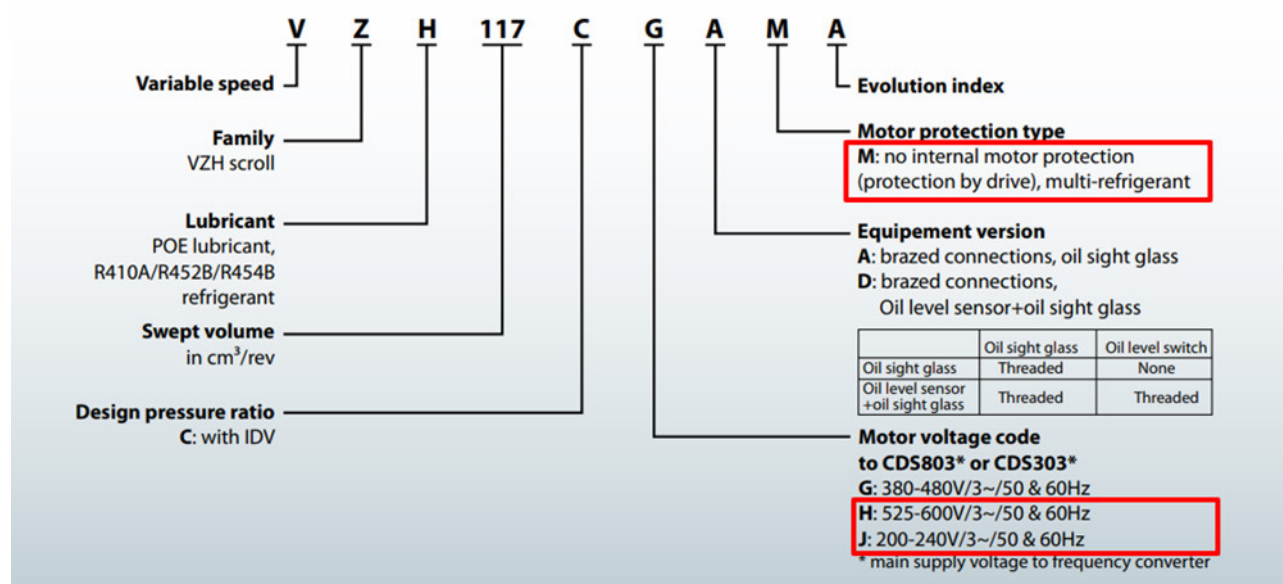
Simultaneously, Danfoss will extend the right corner of the VZH088/117 operating map from 25°C/55°C to 25°C/60°C, similar to the VZH170 in March 2023. CDS303 drives for VZH088/117/170 all codes have been upgraded to A2L application. Meanwhile, the CDS803 18.5/22/30 kW drive can also be used for code G.

These new models with R410A/R452B/R454B are for motor code J (200~240 V/3 phases/50 & 60 Hz) and code H (525 V~600 V/3 phases/50 & 60 Hz).

R452B and R454B are HFO/HFC blends with similar capacities to R410A. Due to their limited discharge temperature difference, they are currently the best candidate for direct drop-in replacements for the R410A. While R452B and R454B are classified A2L, it is considered the least flammable of all the leading R410A replacements.

New models and sales codes have been released:

- Nomenclature



- New sales codes
 - Single pack:

New codes

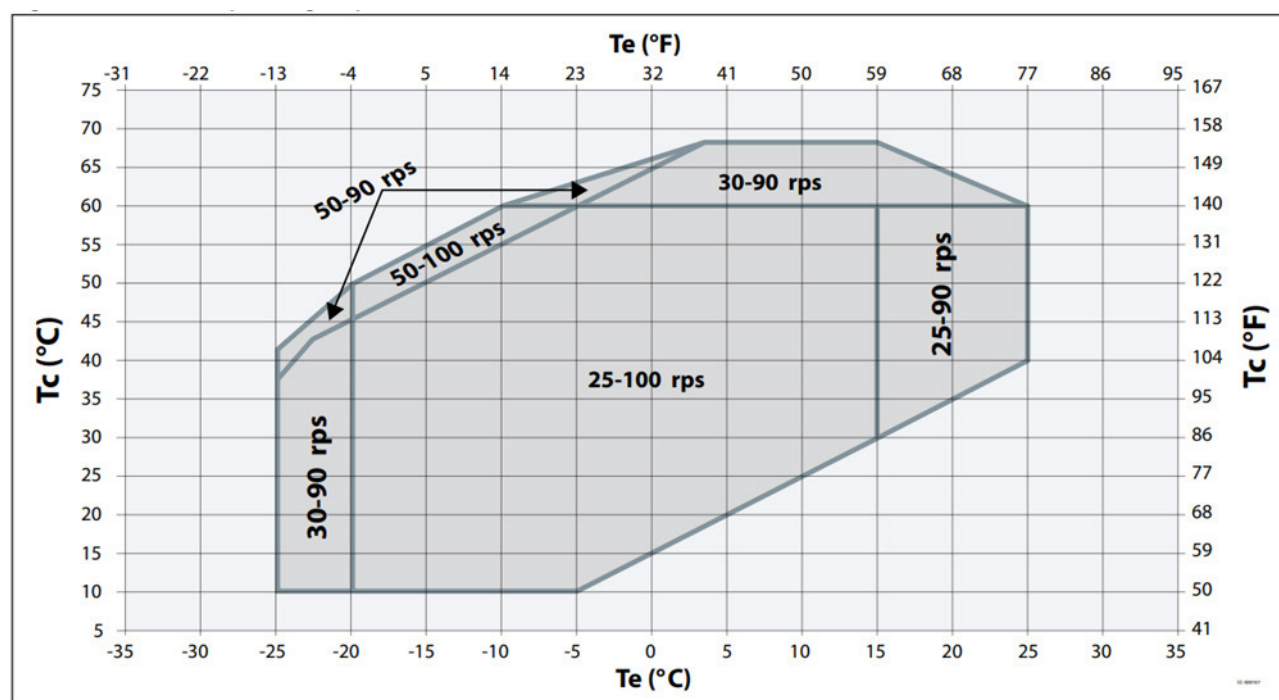
Compressor Model	Equipment Version	Technical Name	X= Motor Code		
			G	J	H
			380-480 V/3ph/ 50 & 60 Hz	200-240 V/3ph/ 50 & 60 Hz	525-600 V/3ph/ 50 & 60 Hz
VZH088	OSG	VZH088CXAMA	120G0305	120G0321	120G0329
VZH088	OLS+OSG	VZH088CXDMA	120G0307	120G0325	120G0330
VZH117	OSG	VZH117CXAMA	120G0309	120G0323	120G0331
VZH117	OLS+OSG	VZH117CXDMA	120G0311	120G0327	120G0332
VZH170	OSG	VZH170CXAMA	120G0313	120G0338	120G0335
VZH170	OLS+OSG	VZH170CXDMA	120G0315	120G0340	120G0336

- Industrial pack:

Compressor Model	Equipment Version	Technical Name	X= Motor Code	
			G	J
			380-480 V/3ph/ 50 & 60 Hz	200-240 V/3ph/ 50 & 60 Hz
VZH088	OSG	VZH088CXAMA	120G0306	120G0322
VZH088	OLS+OSG	VZH088CXDMA	120G0308	120G0326
VZH117	OSG	VZH117CXAMA	120G0310	120G0324
VZH117	OLS+OSG	VZH117CXDMA	120G0312	120G0328
VZH170	OSG	VZH170CXAMA	120G0314	120G0337
VZH170	OLS+OSG	VZH170CXDMA	120G0316	120G0339

↑
New codes

- Operating envelope



Since VZH088/117/170 all codes have been released with A2L refrigerant, Danfoss will also provide new suction separator kits for the Hybrid manifolding tandem VZH multi + DSH. These new kits conform to A2L requirements for the PED certificate. Customers can get these new kits by ordering the using the new sales codes on the table next page.

Hybrid Tandem Model	Suction Separator Kit for R410A	Suction Separator Kit for A2L
VZH178H (60 Hz) -L	120Z0675	120Z0868
VZH178H (60 Hz) -R		
VZH178H (50 Hz) -L	120Z0676	120Z0869
VZH178H (50 Hz) -R		
VZH208H (60 Hz) -L	120Z0658	120Z0866
VZH208H (60 Hz) -R		
VZH208H (50 Hz) -L	120Z0664	120Z0867
VZH208H (50 Hz) -R		
VZH257H (50 Hz) -L	120Z0666	120Z0863
VZH257H (50 Hz) -R		
VZH257H (60 Hz) -L/VZH278H (50 Hz) -L	120Z0665	120Z0864
VZH257H (60 Hz) -R/VZH278H (50 Hz) -R		
VZH278H (60 Hz) -L	120Z0674	120Z0865
VZH278H (60 Hz) -R		
VZH301H (50Hz/60 Hz) -L	120Z0656	120Z0862
VZH301H (50Hz/60 Hz) -R		
VZH354H (50 Hz) -L	120Z0683	120Z0860
VZH354H (50Hz/60 Hz) -R	120Z0687	120Z0861
VZH354H (60 Hz) -L	120Z0655	120Z0858
VZH465H (50Hz/60 Hz) -L		
VZH465H (50Hz/60 Hz) -R		
VZH410H (50Hz/60 Hz) -L	120Z0657	120Z0859
VZH410H (50Hz/60 Hz) -R		

For detailed capacities, please refer to Coolselector2. Polynomial coefficients are also available directly in [Coolselector2](#).

The VZH088/117/170 code J/H new models with R410A/R452B/R454B, released in Feb 2023.
CDS303 drives for VZH088/117/170 all codes have also been upgraded to A2L application.

If you need additional information regarding the VZH M&L code J/H new models with R410A/R452B/R454B release, please contact Danfoss technical support.

IT SECURITY: Danfoss Strongly Recommends Protecting Your Danfoss Control System on IP Networks.

Common security terms applicable for all products and services connected to digital networks:

Danfoss takes IT-security and the integrity of its applications seriously and is continuously investing in bringing to market products and services that have best-in-class security features and technologies.

Danfoss would like to make you aware, that several units have been scanned in public network environment. That means without any firewall protection in place. To help keeping your Danfoss products secure and protected, we strongly recommend that you implement below cybersecurity best practices. Following these recommendations may help significantly reduce your company's cybersecurity risk.

Security recommendations

Danfoss strongly recommend protecting any network devices (no matter vendor or product) with a firewall and secure remote access principles.

The problem that may be experienced is that systems which are not fully updated may contain known remote exploits, that can have negative effects on the system. Known exploits are often published in the CVE databases, and on many security research sites.

This means that mapping the devices directly out on the internet is not recommended, but if it is necessary, it is important to use several safeguards to protect the system from direct internet access.

The general concern for the device is

1. DDOS – no software patches can protect against this kind of attack. (Thus, firewall protection is necessary)
2. Known remote executions can allow an attacker too, therefore all software upgrades are necessary to remove known exploits.
3. The exploitation of various known and unknown security vulnerabilities can cause system downtime.

General recommendations

1. Devices should always be fully updated to the latest software version available, issued by Danfoss.
In every newer version there might be some security updates, which is explained in the appendix.
2. Ensure that the device is always protected from direct internet exposure. (Install network devices behind a firewall)
3. Do not expose System Manager ports to the internet, as that makes the device vulnerable to DDOS.

You can read more about IT Security best practices and recommendations on Danfoss FAQ Page

[Danfoss keeps the focus on IT Security | Danfoss](#)

Common Security Terms

- **CVE:**

Short for Common Vulnerabilities and Exposures, is a list of publicly disclosed computer security flaws.

- **DDOS:**

Distributed denial of service, this is when 100 000's of remote devices attacks a single device on the net, this is a highly effective attack on a system. Not even large corporations, and security organizations can maintain operations during such as attack, these attacks have been measured to include 400+ Terabits/second attack rates, which simply floods out the connection to the device, this cannot be mitigated at any level at other than the internet backbone. There is no cheap defence against these kinds of attacks and the only effective way of mitigating these attacks is to avoid them, by hiding.

- **Remote Exploit:**

One can assume that all software that faces the internet will contain exploits. Therefore, researchers are continually searching for these, and when found, the software providers create patches that mitigate the exploit. It is therefore extremely important to update software and keep it up to date with the latest versions to prevent vulnerabilities in the system.

For example: older Systems Managers used the 1.12.1 version of Nginx, which has had several vulnerabilities discovered, and patched, thus the newest System Manager version 3.1.9 now uses the 1.21.0 version of Nginx, which currently has no known vulnerabilities, and thus it is important to upgrade to the latest Danfoss release – the release numbers may have increased after the writing of this document because new exploits are continually discovered.

Videos on YouTube and Infograms

- Infogram: Optyma™ iCO₂ 4,6 kW enables the use of CO₂ in smaller commercial systems - [LINK](#)
- Video: Smart Store solutions for convenience store chain - [LINK](#)
- How to videos:
 - How to start with MCX Design - [LINK](#)
 - MCX design – User interface - [LINK](#)
 - AK-PC 782 A/B FAQ – Heat Recovery Overview - [LINK](#)



Details for Additional Information

UK/IE

[Cooling United Support Hub](#)

[Support Made Easy](#)

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