



Inclination position sensor

DST X720

For mobile hydraulic applications

Description

The Danfoss DST X720 mid level Inclination sensors are developed to ensure a robust and high-performance solution for applications such as agricultural- and construction machines, as well as material handling equipments. These sensors are typically used in safety applications in order to keep the inclination of a machine, or just a part of it, a safety zone for working people, under control.

Danfoss DST X720 series uses MEMS technology for single and dual axis with measurement ranges up to 360° in both single and redundant versions.

All sensors are designed for off-highway applications and resistant to shock and vibrations and with high electromagnetic compatibility, and comes with either analogue or CANopen output.

Single and redundant sensor types are available, making the complete portfolio suitable for safetycritical applications.

Features & benefits

- MEMS technology for almost infinite sensor life time
- Single or Redundant ranges up to 360° ($\pm 180^\circ$)
- Output: Analogue or CANopen
- Electrical connector: M12, 5 pin or cable
- Accuracy $< \pm 0.5\%$ FS
- Resolution 0.01°
- IP protection IP67, IPX9K

Ordering

Product code numbers

Type	Output signal	Configurations	Code no.
DST X720	36 V CANopen	1 x M12 5p; Single axis; $\pm 180^\circ$; 36 V	098G3000
	36 V CANopen	2 x M12 5p; Single axis; Redundant; $\pm 180^\circ$; 36 V	098G3001
	36 V CANopen	1 x M12 5p; Dual axis; $\pm 85^\circ$; 36 V	098G3002
	36 V CANopen	2 x M12 5p; Dual axis; Redundant; $\pm 85^\circ$; 36 V	098G3003

Others on request

Ordering code -on request

Electrical connections	
M12 connector output	M
Cable output (specify cable length)	F

Axis type	
Dual axis (XY axis)	O
Single axis (Z axis)	V

Circuit type	
Single	S
Redundant	R

Output 1 Measuring range (Output for single circuit)	
Measuring range (indicate) $\pm 10^\circ \pm 15^\circ \pm 20^\circ \pm 30^\circ \pm 45^\circ \pm 60^\circ \pm 85^\circ$ (single axis Z for analogue output-dual axis XY); $360^\circ (\pm 180^\circ)$ for single Z axis only	xxx

Output 2 Measuring range (Only for redundant version)	
Measuring range (indicate) $\pm 10^\circ \pm 15^\circ \pm 20^\circ \pm 30^\circ \pm 45^\circ \pm 60^\circ \pm 85^\circ$ (single axis Z for analogue output-dual axis XY); $360^\circ (\pm 180^\circ)$ for single Z axis only	xxx

Supply voltage	
+5 V DC (only for A1 output)	L
10 - 36 V DC (see output signal for right supply voltage)	H

Output type	
0.5 - 4.5 V DC output (available with supply L = ratiometric output and with supply H = 0.5 - 4.5 V output)	A1
0 - 10 V DC output (powered at 11 - 36 V DC)	A2
4 - 20 mA output (powered at 10 - 36 V DC)	A3
CANopen output (powered at 10 - 36 V DC)	C1

Reserved	
Always "0"	0

Certificate	
No certificate attached	0
Linearity curve to be attached	L

Version	
Standard	033

Accessories	
No accessories	X
Magnetic pen (PKIT 312)	Y

Cable length	
100 mm	01
200 mm	02
500 mm	05

Cable length	
1 m	10
2 m	20
Other length on request	-

Example of ordering: DST X720-MOR045045LA10 0033X00

M	M12 connector
0	Dual Axis (XY axis)
R	Redundant
045	$\pm 045^\circ$
045	$\pm 045^\circ$
L	+5 V DC

A1	Ratiometric 10 - 90% of Vs
0	M12 version
0	No certificate
033	Standard
X	No accessories
00	Not defined (only cable version)

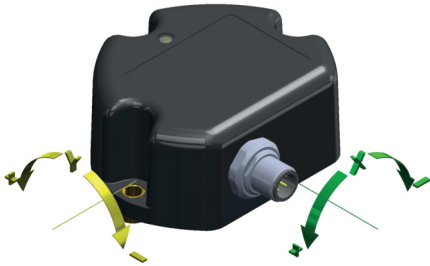
Note: For a detailed overview of our existing code numbers, please visit the Danfoss Product Store at store.danfoss.com. You can use the filtering options to find the right sensor for your specific needs.

Functions

Zero function

Available for analog single circuit versions in DST X720
XY configuration (dual axis)

M12 version



Cable version



To activate the Autozero function make sure that:

- sensor is powered
- fixing surface is free of dust or grease
- sensor is fixed on the horizontal plane with suitable screws

ATTENTION:

The Autozero function can be defined within a maximum range of $\pm 4.5^\circ$ from the original zero position (factory set).
Hold the **magnetic pen** (accessory to order PKIT312) to the **ZERO POINT** indicated on the product label.
Hold the position for **at least 3-5 seconds** so that the operation is successful.

Magnetic pen



Product details

General data

Performance

Measuring range	$\pm 10^\circ \pm 15^\circ \pm 20^\circ \pm 30^\circ \pm 45^\circ \pm 60^\circ \pm 85^\circ$ (single axis Z / XY dual axis) $360^\circ (\pm 180^\circ)$ (single Z axis)
Accuracy (Factory verification @25°C)	$\leq \pm 0.5\%$ FS
Temperature coefficient @ 0°	Typical $< \pm 0.006^\circ/\text{K}$
Long term repeatability	Single axis: Typical $< \pm 0.5^\circ$ in the range $\pm 180^\circ$ Dual axis: Typical $< \pm 0.5^\circ$ in the range $\leq \pm 60^\circ$, $\pm 2^\circ$ otherwise
Resolution	0.01° CANopen output; 12 bit analog output

Electrical specifications

Electrical connections	M12 connector or cable
Output signal	CANopen, Ratiometric 10-90% of Vs, 0.5 - 4.5 V DC, 0 - 10 V DC or 4 - 20 mA
Supply voltage	CANopen, 0.5 - 4.5 V DC, 4 - 20 mA: 10 - 36 V DC, 0 - 10 V DC : 11 - 36 V DC Ratiometric: 10 - 90% of Vs: 5 V DC
Current consumption	Analogue: < 20 mA / pr. channel (no load) CANopen/J1939: < 15 mA / per channel (no load)
MTTFd [Years]	CANopen: 631 (Single channel) Analogue: 731 (Single channel)

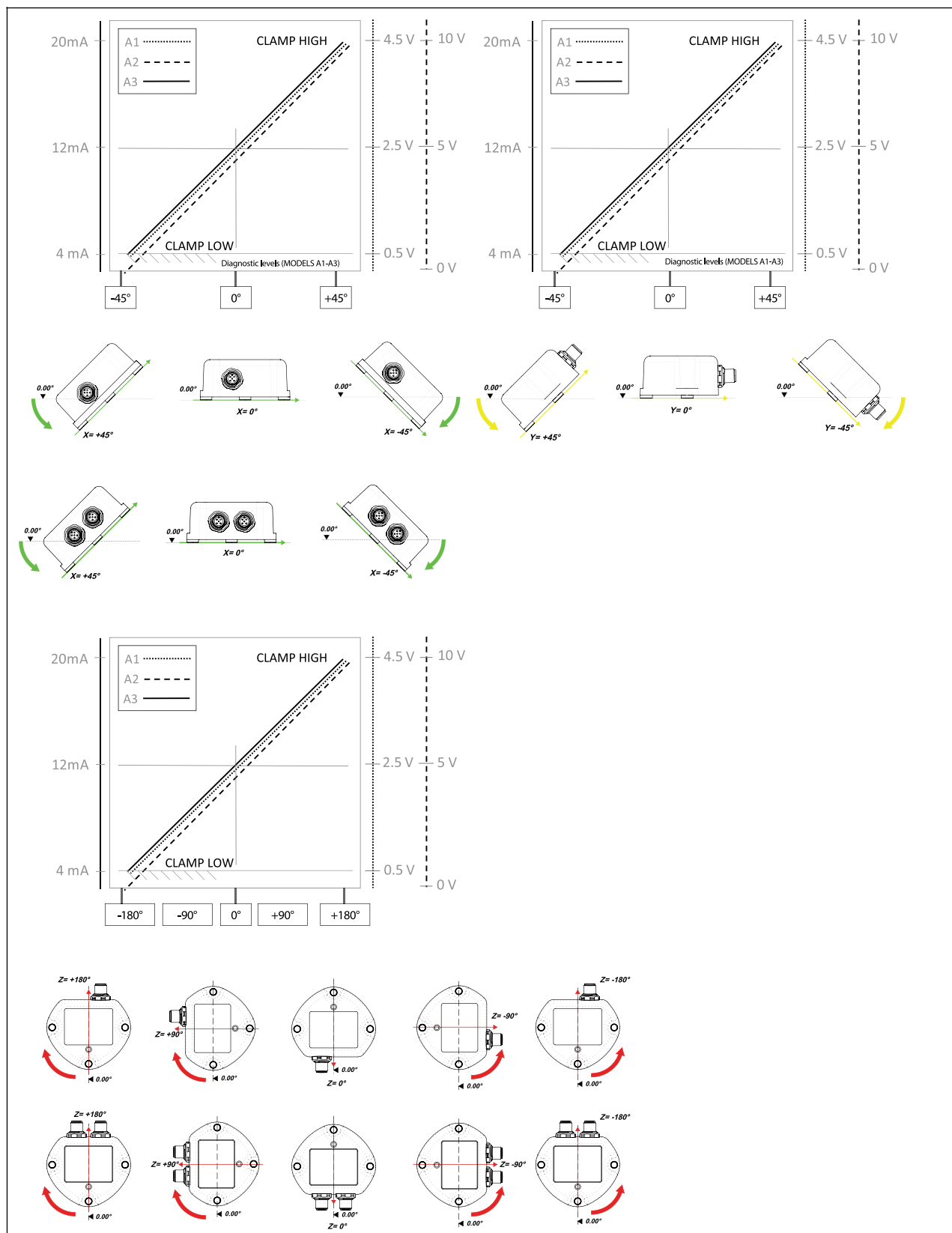
Environmental conditions

Operating temperature range			-40 – 85 °C
EMC		Emission	EN 55011
		Immunity	EN 61236-3-2
Vibration stability	Sinusoidal	20 g, 10 Hz – 2,000 kHz	IEC 60068-2-6
Shock resistance	Impulsive on 3 axes	50 g, 11 ms	IEC 60068-2-27
IP rating			IP67, IPX9K

Mechanical characteristics

Materials	Enclosure	PBT (Polybutylene terephthalate)
Net weight		0.26 kg (without cable)

Output signals graphs

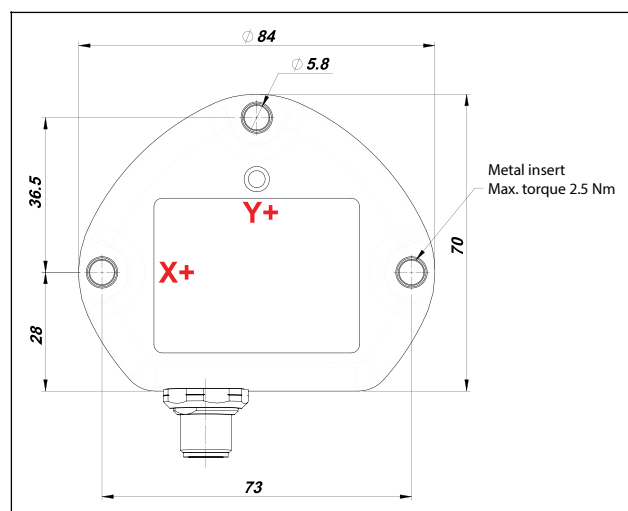


Load conditions

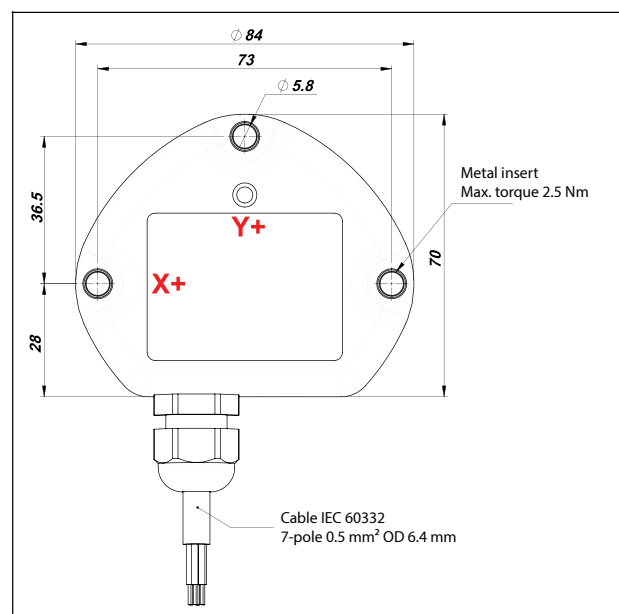
0.5 - 4.5 V DC output with power 10 - 36 V DC and 0 - 10 V DC output with power 11 - 36 V DC: apply a load resistance > 100 kΩ

Dimensions

M12 version



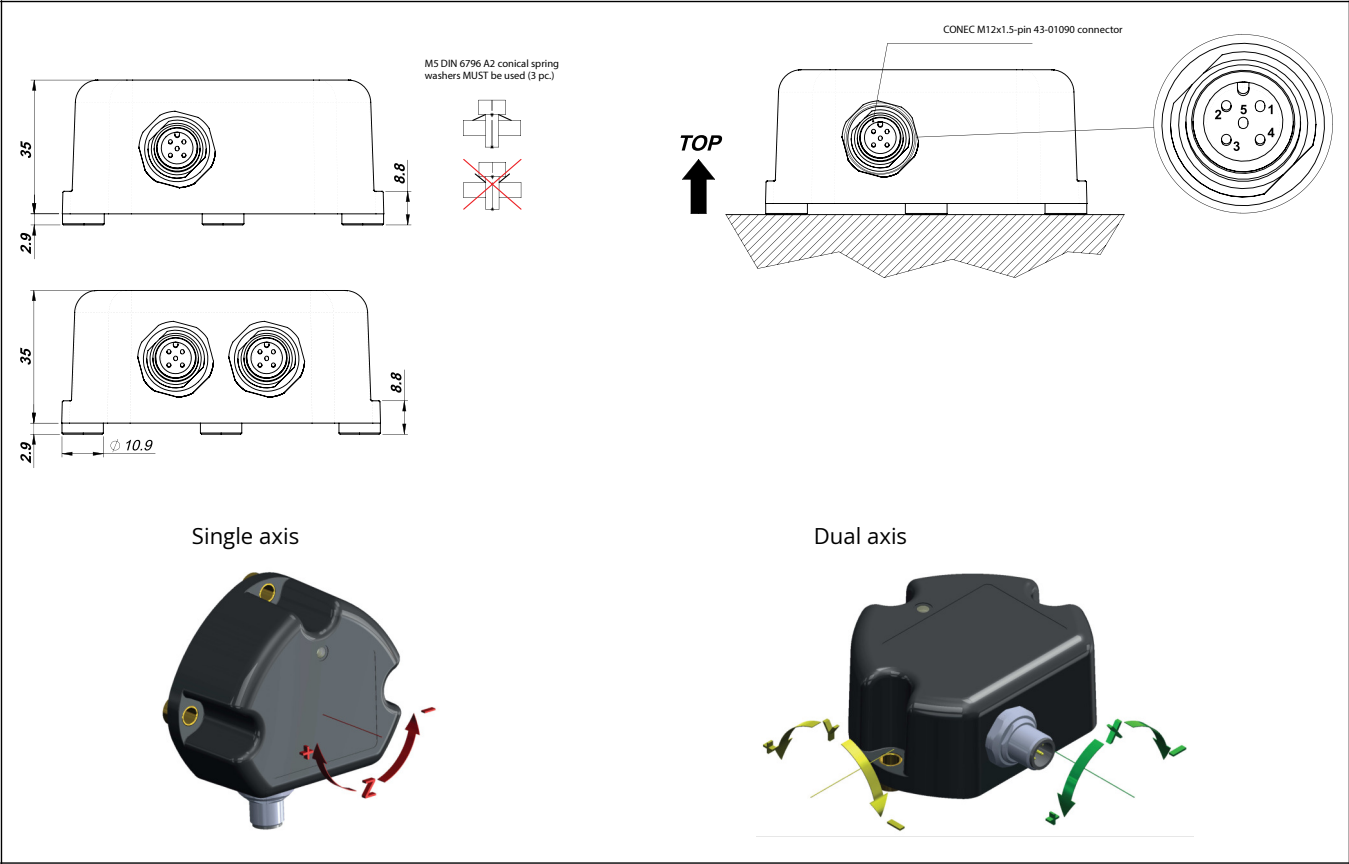
Cable version



Note: Dimensions are in mm, unless stated otherwise.



Connections
Electrical connections
M12 version



Connections

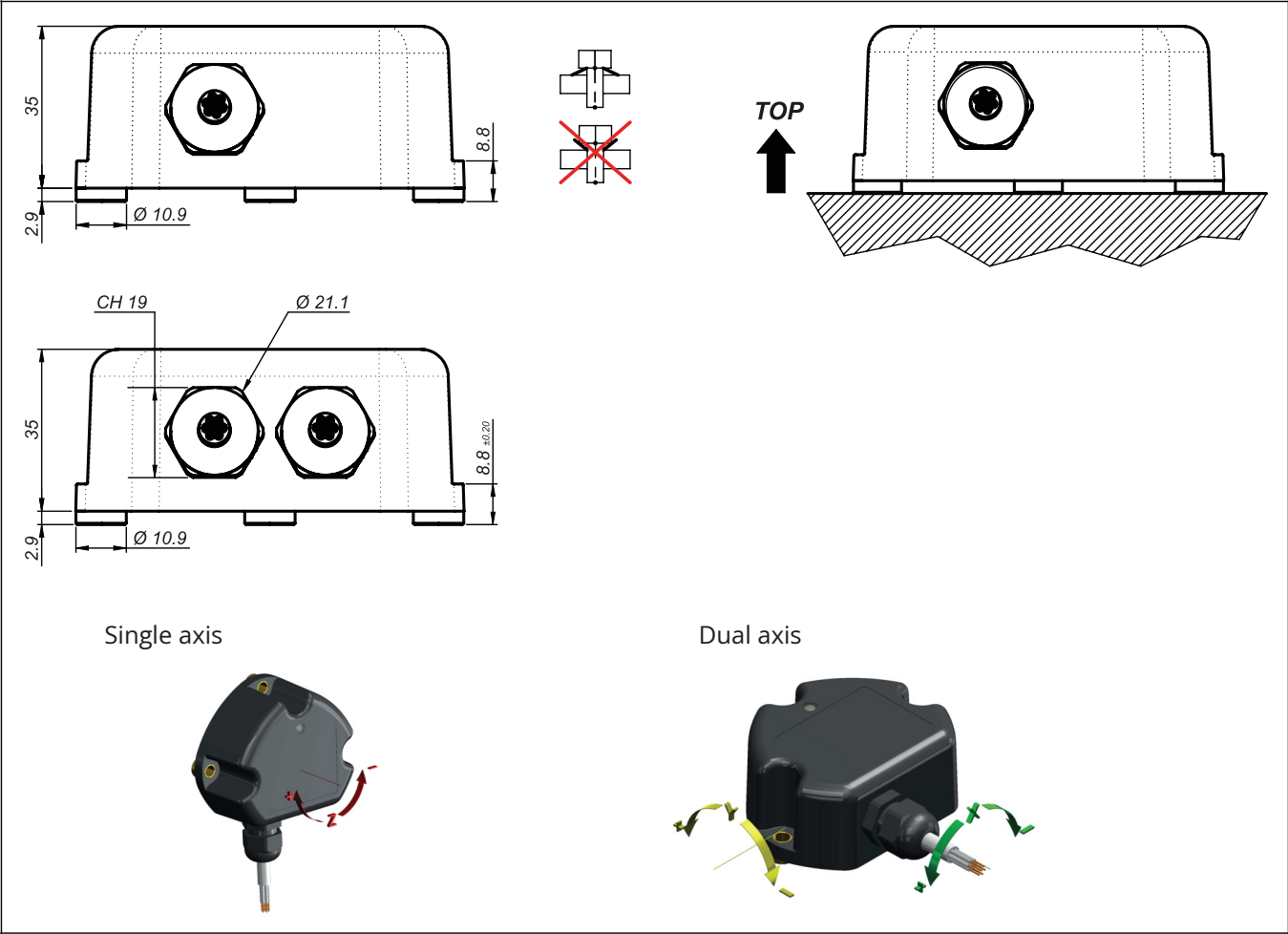
1	+ Supply
2	Output Y
3	Ground
4	Output X
5	n.c.

CAN Connection

1	n.c.
2	+ Supply
3	Ground
4	CAN H
5	CAN L



Cable version



Connections

White	+ Supply
Yellow	Ground
Grey	Output X
Blue	Output Y
Pink	n.c.
Green	n.c.
Brown	n.c.

CAN Connection

White	+ Supply
Yellow	Ground
Grey	CAN H
Blue	CAN L
Pink	n.c.
Green	n.c.
Brown	n.c.

Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Certification body	Approval topic
EU-UK Declaration	Danfoss EU-UK 098R0009.04	Danfoss	UK RoHS
UA Declaration	Danfoss UA 2023-01-10 Regulators PL01 PL04	Danfoss	PED
Pressure Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1015.05-22	LLC CDC EURO TYSK - Ukraine	Pressure
UA Declaration	Danfoss UA 2024-07-25 cooling sensors	Danfoss	EMC
Export Control Declaration	Pressure & Temperature Sensors	Danfoss	
Export Control Declaration	Refrigerant Leakage Sensor	Danfoss	

Contact details

Online support

Danfoss offers a wide range of support along with our products, including digital information, software, mobile apps and expert guidance. See the possibilities below.



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