ENGINEERING
TOMORROW

Danfoss

Data Sheet

Inclination position sensor
Type **DST X730**

For mobile hydraulic applications

The Danfoss DST X730 high 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 X730 series uses MEMS technology for single and dual axis with measurement ranges up to 360° in both single and redundant versions, with extended resolution and linearity.

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 safety-critical applications.

Features
- MEMS technology for almost infinite sensor life time
- Single or Redundant ranges up to 360° (±180°)
- Output: Analogue or CANopen
- Electrical connector: M12, 5-pin or cable
- IP protection IP67, IPX9K
- Accuracy: <± 0.15% FS ≤ ± 60° dual axis and 180° single axis; 0.3 FS ± 85° dual axis
- Resolution 0.01°

Functions

Zero function

Available for analog single circuit versions in DST X730

XY configuration (dual axis)
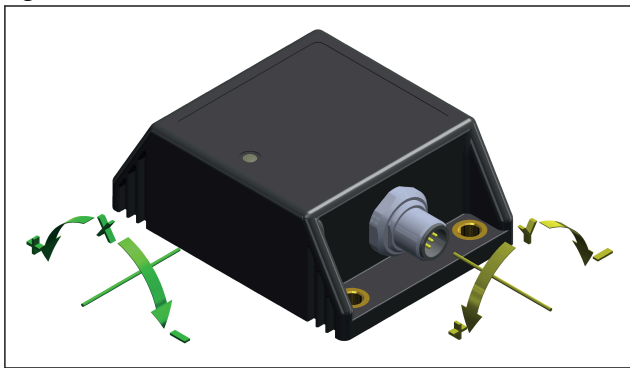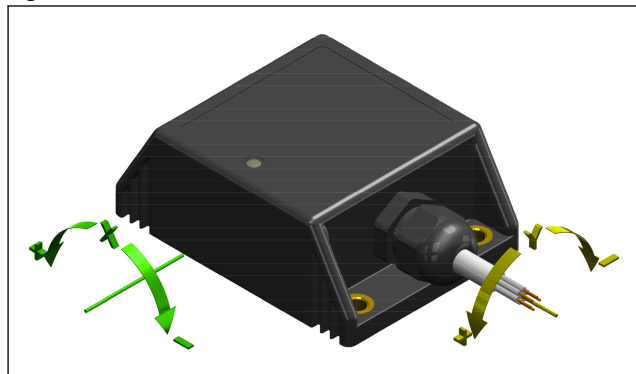
Figure 1: M12 version

Figure 2: 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 ±4.5° 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.

Figure 3: Magnetic pen

Product specification

Technical data

Table 1: Performance

Measuring range	±10° ±15° ±20° ±30° ±45° ±60° ±85° (single axis Z / XY dual axis) 360° (±180°) (single Z axis)
Accuracy (Factory verification @25 °C)	Single axis: <± 0.15% FS Dual axis: <±0.15°% FS in the range ≤± 60°, ± 0.3% FS otherwise
Temperature coefficient @ 0°	Typical < ±0.006°/°K
Long term repeatability	Single axis: Typical <±0.5° in the range ±180° Dual axis: Typical <±0.5° in the range ≤ ± 60°, ± 2° otherwise
Resolution	CANopen output; 0.01°; 12 bit analog output

Table 2: 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)

Table 3: 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
Enclosure			IP67, IPX9K

Table 4: Mechanical characteristics

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

Output signals graphs
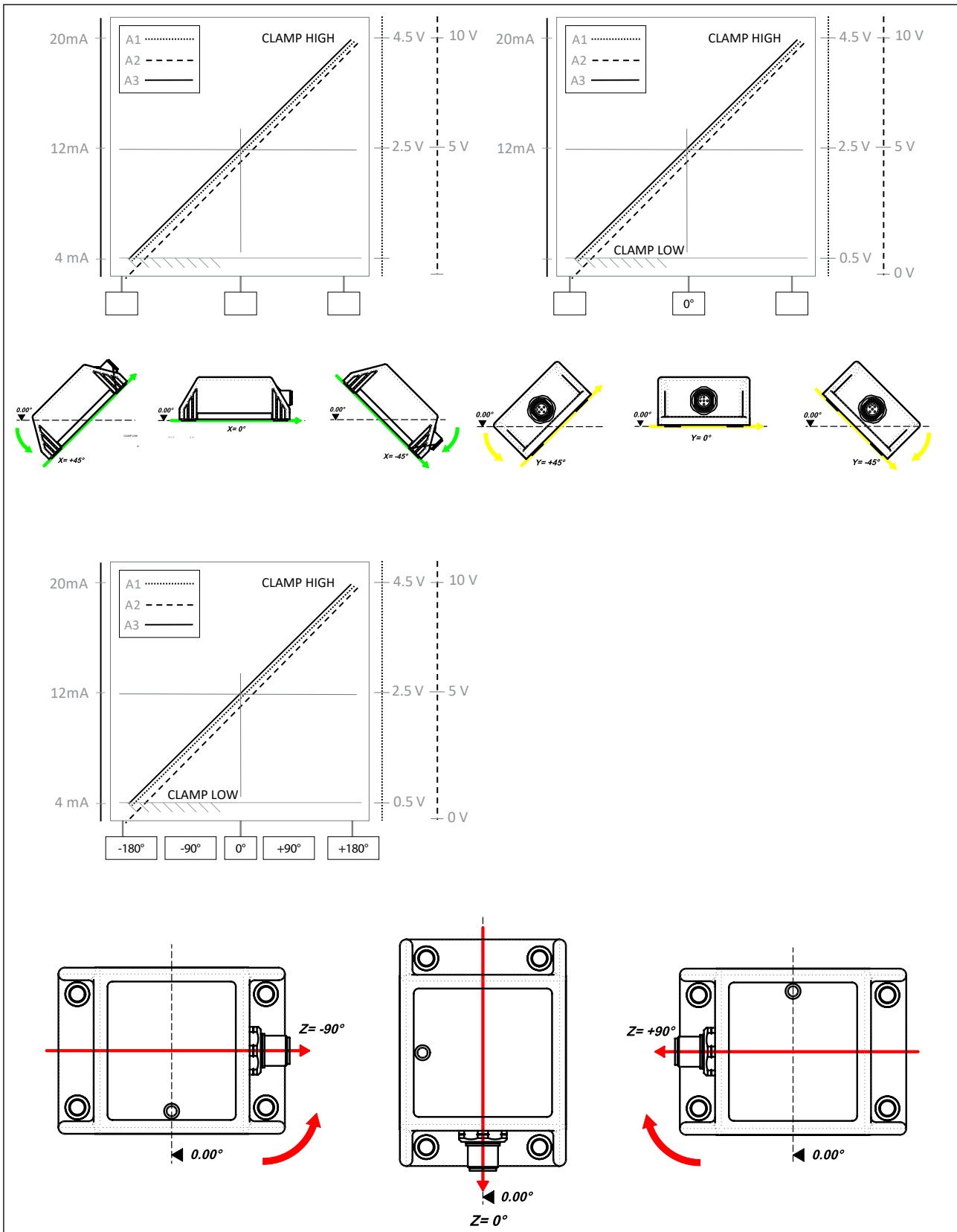
Load conditions

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

Figure 4: M12 version

66

Ø 5.8

Metal insert
Max. lightening
torque: 2.5 Nm

X+

Y+

75

90

M12x1

45

Figure 5: Cable version

66

45

Ø 5.8

Metal insert
Max. lightening
torque: 2.5 Nm

X+

Y+

75

90

24

Cable IEC
7 pole 0.5 mm²
OD 6.4 mm
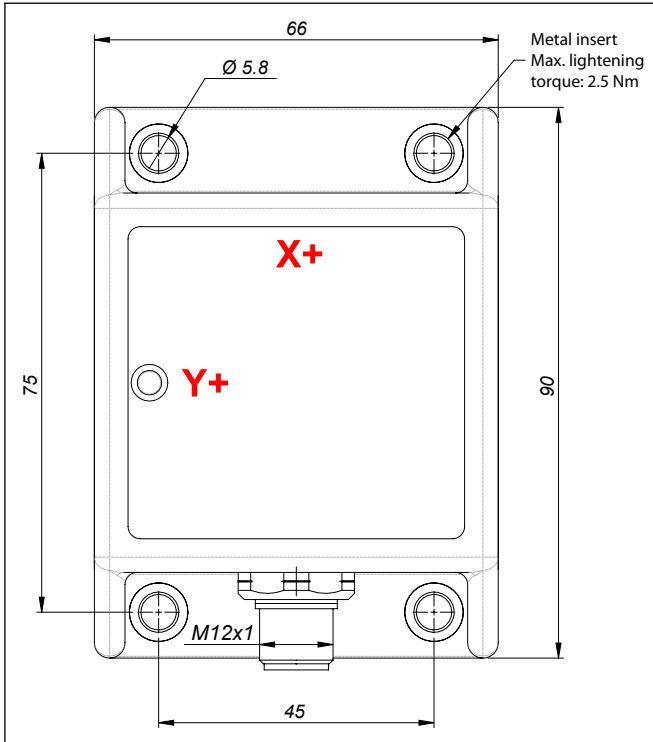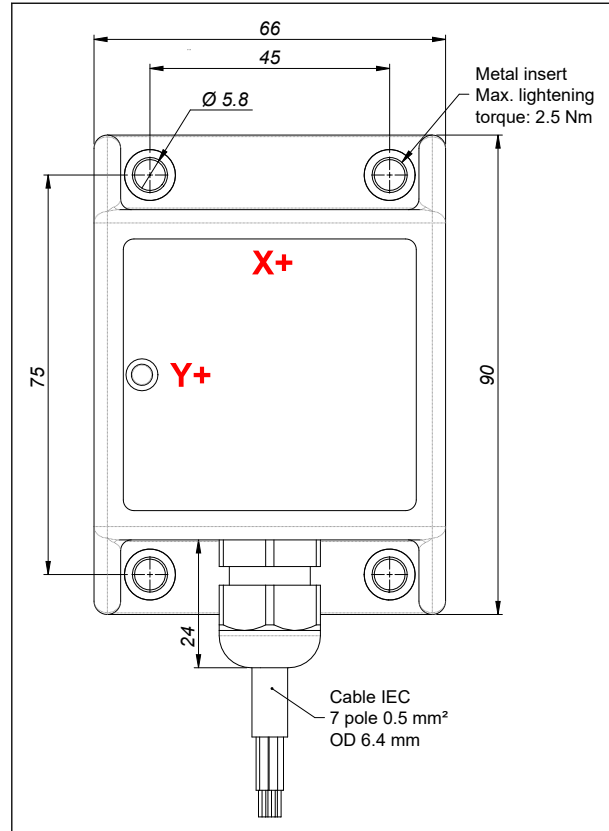
Electrical connections

Figure 6: M12 version

M5 DIN 6796 A2 conical spring
washers MUST be used (4 pc.)

CONEC M12x1.5-pin
43-01090 connector

34.5

6.9

1

ø 11

TOP

1 4
5
2 3

Single axis

Dual axis
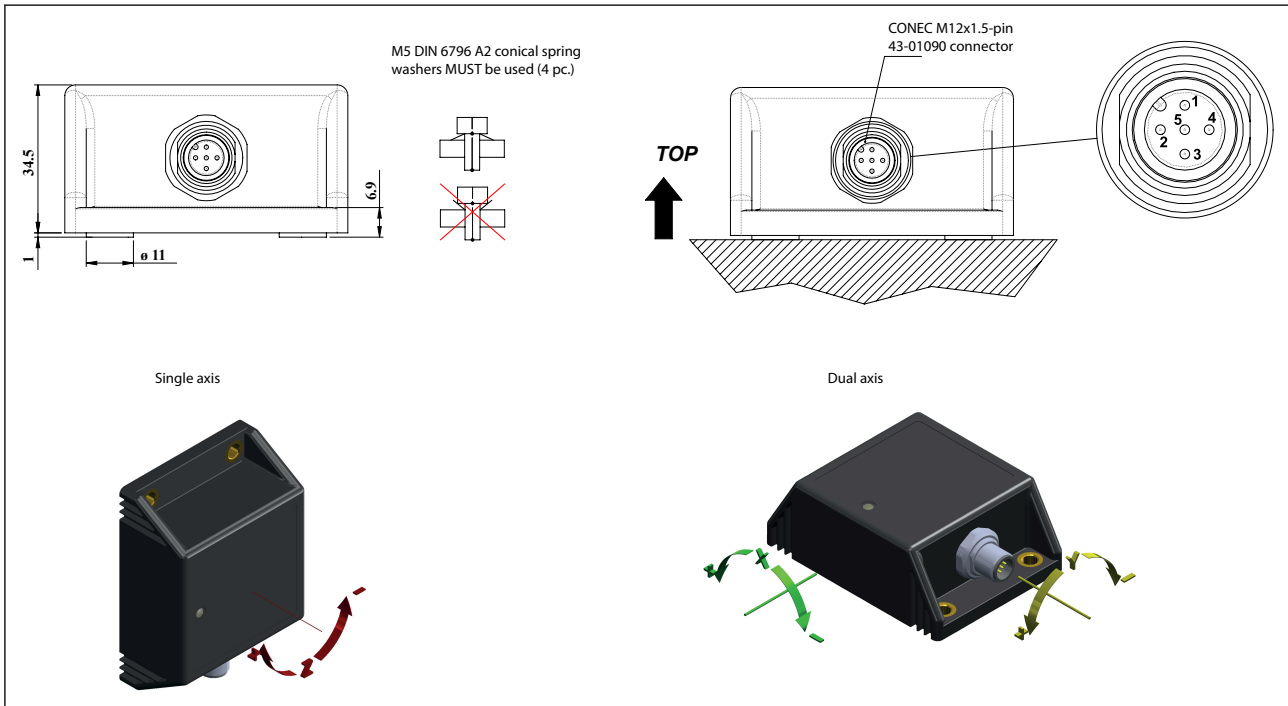
Connections

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

Figure 7: Cable version

M5 DIN 6796 A2 conical spring washers MUST be used (4 pc.)

34.5

6.9

1

ø 11

TOP

Single axis

Dual axis
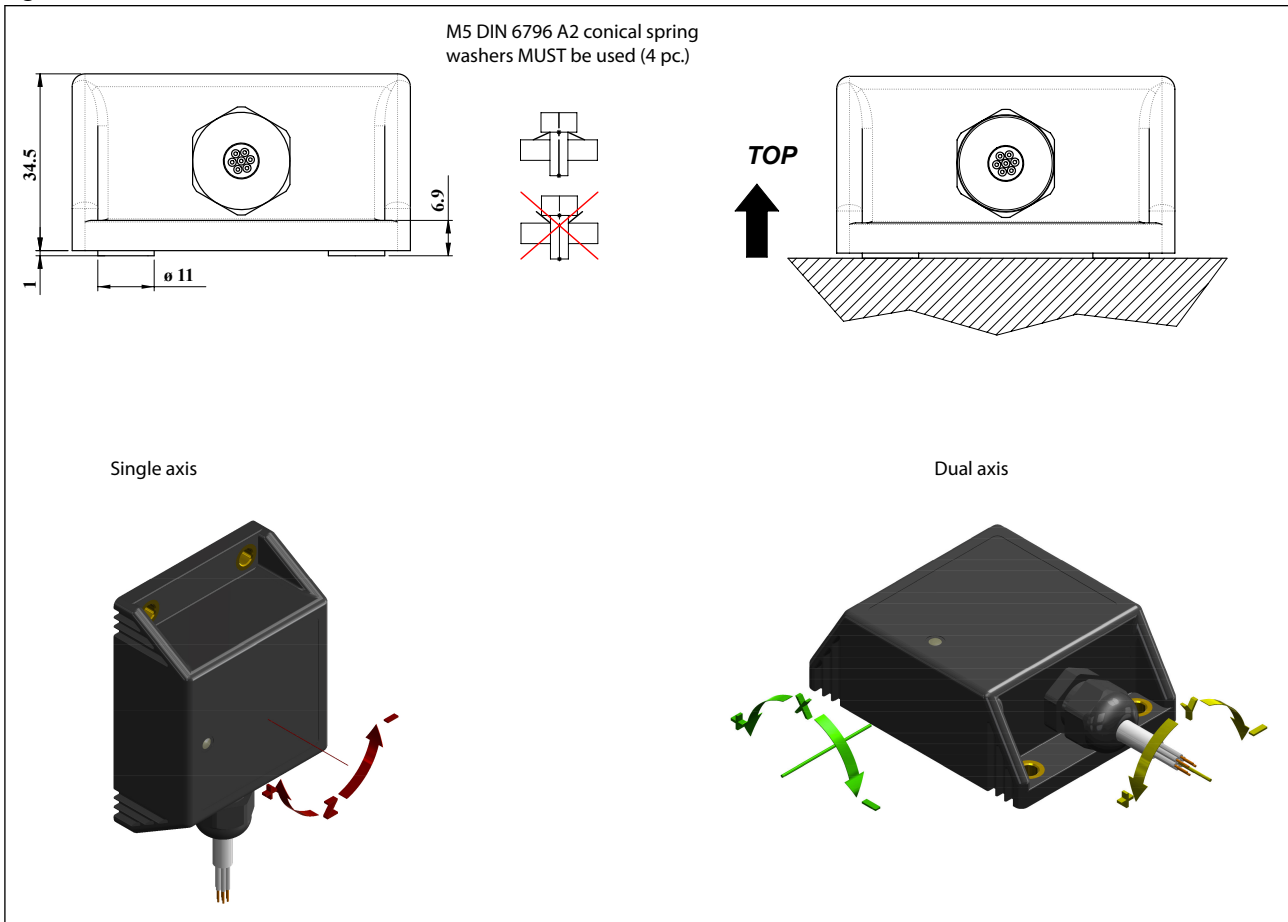
Connections

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

CAN Connections

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

Ordering

Table 5: Ordering type

Type	Output signal	Cofigurations	Code no.
DST X730	36 V CANopen	1 x M12 5p; Single axis; ±180°; 36 V	098G3500
	36 V CANopen	2 x M12 5p; Single axis; Redundant; ±180°; 36 V	098G3501
	36 V CANopen	1 x M12 5p; Dual axis; ±85°; 36 V	098G3502
	36 V CANopen	2 x M12 5p; Dual axis; Redundant; ±85°; 36 V	098G3503

Others on request

Ordering code -on request

Electrical connections	
M12 connector output	M
Cable output (specify cabel 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) single axis always 360° dual axis ±10° ±15° ±20° ±30° ±45° ±60° ±85°	xxx

Output 2 Measuring range (Only for redundant version)	
Measuring range (indicate) single axis always 360° dual axis ±10° ±15° ±20° ±30° ±45° ±60° ±85°	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	-

Table 6: Example of ordering: DST X730-MVR360360HC10 0033X00

M	M12 connector
V	Single (Z axis)
R	Redundant
360	±185°
360	±185°
H	+5 V DC
A1	10 - 36 V DC
C1	CANopen
0	Reserved
0	No certificate
033	Standard
X	No accessories
00	Not defined (only cable version)

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.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 7: Declarations

Document name	Document type	Document topic	Approval authority
098R0009	EU Declaration	EMCD/ROHS	Danfoss

Conformity
- CE
- RoHS

Online support

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

The Danfoss Product Store

The Danfoss Product Store is your one-stop shop for everything product related—no matter where you are in the world or what area of the cooling industry you work in. Get quick access to essential information like product specs, code numbers, technical documentation, certifications, accessories, and more.
Start browsing at store.danfoss.com.

Find technical documentation

Find the technical documentation you need to get your project up and running. Get direct access to our official collection of data sheets, certificates and declarations, manuals and guides, 3D models and drawings, case stories, brochures, and much more.

Start searching now at www.danfoss.com/en/service-and-support/documentation.

Danfoss Learning

Danfoss Learning is a free online learning platform. It features courses and materials specifically designed to help engineers, installers, service technicians, and wholesalers better understand the products, applications, industry topics, and trends that will help you do your job better.

Create your Danfoss Learning account for free at www.danfoss.com/en/service-and-support/learning.

Get local information and support

Local Danfoss websites are the main sources for help and information about our company and products. Find product availability, get the latest regional news, or connect with a nearby expert—all in your own language.

Find your local Danfoss website here: www.danfoss.com/en/choose-region.

Spare Parts

Get access to the Danfoss spare parts and service kit catalog right from your smartphone. The app contains a wide range of components for air conditioning and refrigeration applications, such as valves, strainers, pressure switches, and sensors.

Download the Spare Parts app for free at www.danfoss.com/en/service-and-support/downloads.