

Data sheet

Entry level Inclination sensor

DST X710



The Danfoss DST X710 entry 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 X710 series uses contactless MEMS technology for both single and dual axis with measurement ranges up to 360°.

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.

Danfoss DST X710 is designed to be double mounted with specific spacers in order to have a full redundant space-saving version.

Features

- MEMS technology for almost infinite sensor life time
- Dual axis up to $\pm 85^\circ$, Single axis 360° ($\pm 180^\circ$)
- Output: Analogue or CANopen
- Electrical connector: AMP Superseal 6p 282108-1 or cable
- Accuracy: $< \pm 0.5\%$ FS
- Resolution; 0.01°
- IP protection level IP67 - IPX9K with female mating connector

Conformity

- CE
- RoHS

Technical 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 / dual axis XY) 360° ($\pm 180^\circ$) single axis Z
Accuracy (Factory verification @25 °C)	$< \pm 0.5\%$ 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	AMP Superseal 6P 282108-1, cable or cable +M12 5Pin
Output signal	CANopen, Ratiometric 10-90% of Vs, 0.5 - 4.5 Vdc, 0-10 Vdc or 4-20mA
Supply voltage	CANopen, 0.5–4.5 Vdc, 4–20 mA: 10–36 Vdc; 0–10 Vdc: 11–36 Vdc Ratiometric: 10-90% of Vs: 5 Vdc
Current consumption	Analogue: < 20 mA (no load) CANopen: < 15 mA (no load)
MTTFd [Years]	CANopen: 496 Analogue: 554

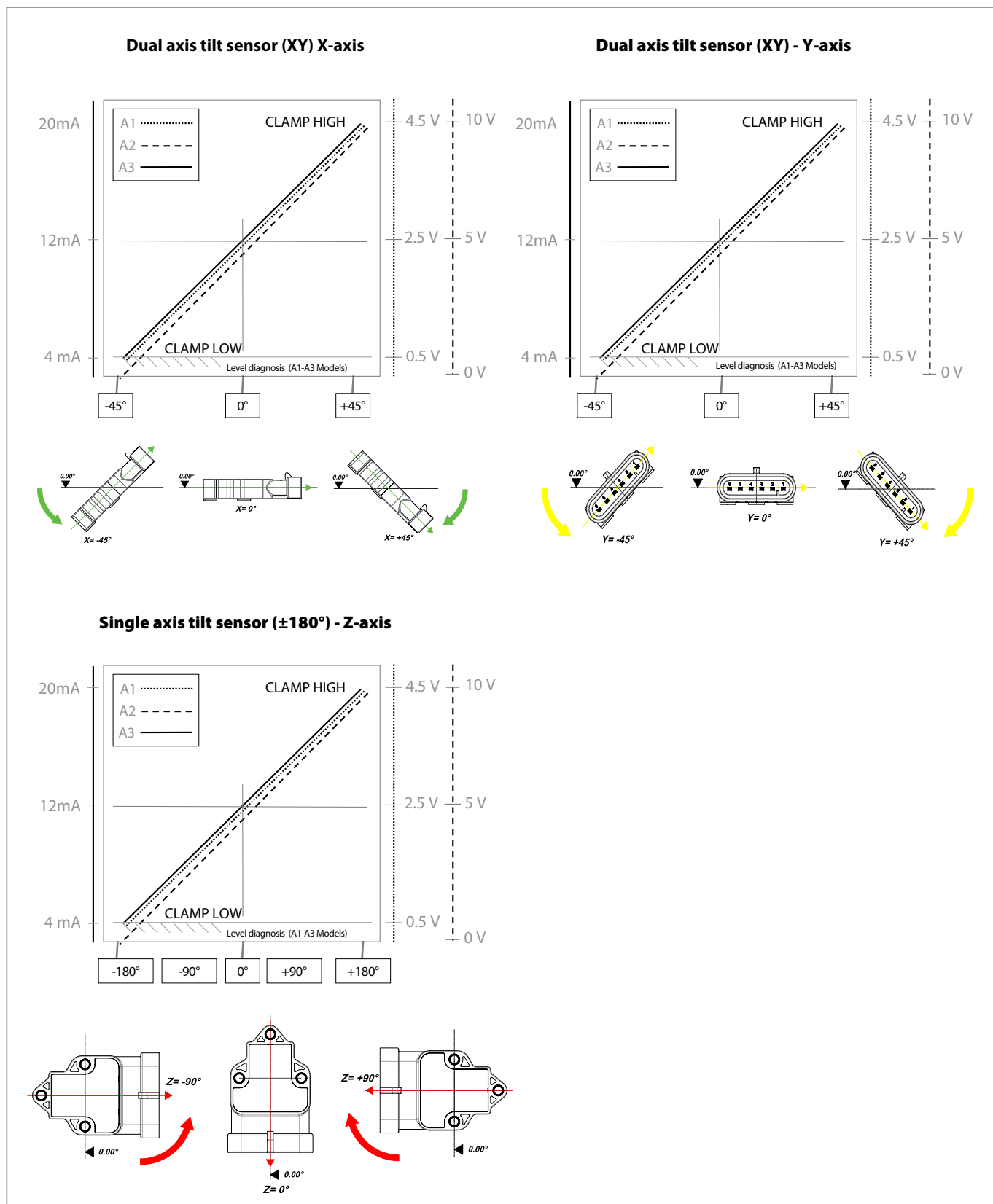
Environmental conditions

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 with female mating connector

Mechanical characteristics

Materials	Enclosure	PBT (Polybutylene terephthalate)
Net weight		0.036 kg (without cable)

Sensor output graph



Load conditions

+0.5 Vdc - +4.5 Vdc output with power + 5Vdc: It is recommended a load resistance > 10 K Ω

Data sheet | Entry level Inclination sensor DST X710
Ordering

Type	Output signal	Cofigurations	Code no.
	CANopen	Single axis; $\pm 180^\circ$; 36V	098G2500
	CANopen	Dual axis; $\pm 85^\circ$; 36V	098G2501

Others on request

Ordering code - on request

Electrical connections	
AMP Superseal 6P connector	A
Cable (specify cabel length)	F

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

Measuring range	
(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

Measuring range (Not available)	
(Redundant option not available)	000

Supply voltage	
+5Vdc (only for A1 output)	L
+10...+36Vdc (see output signal for right supply voltage)	H

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

Cable	
Cable without connector (always "0" in case of DST X710 A MP Superseal)	0
Cable (100 mm) + M12, 5-pin male overprinted connector	1

Certificate	
No certificate attached	0
Linearity curve to be attached	L

Version	
Standard	033

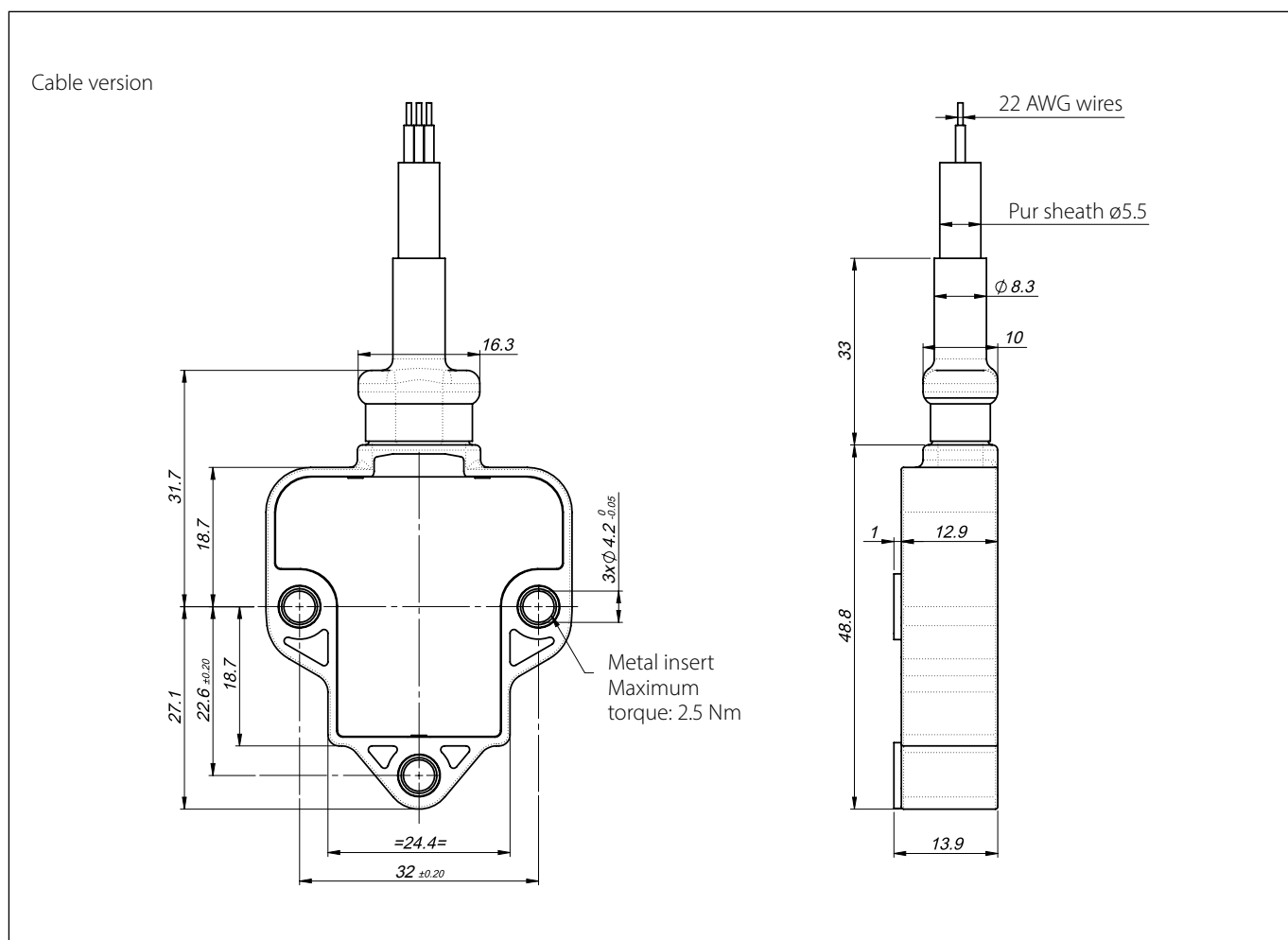
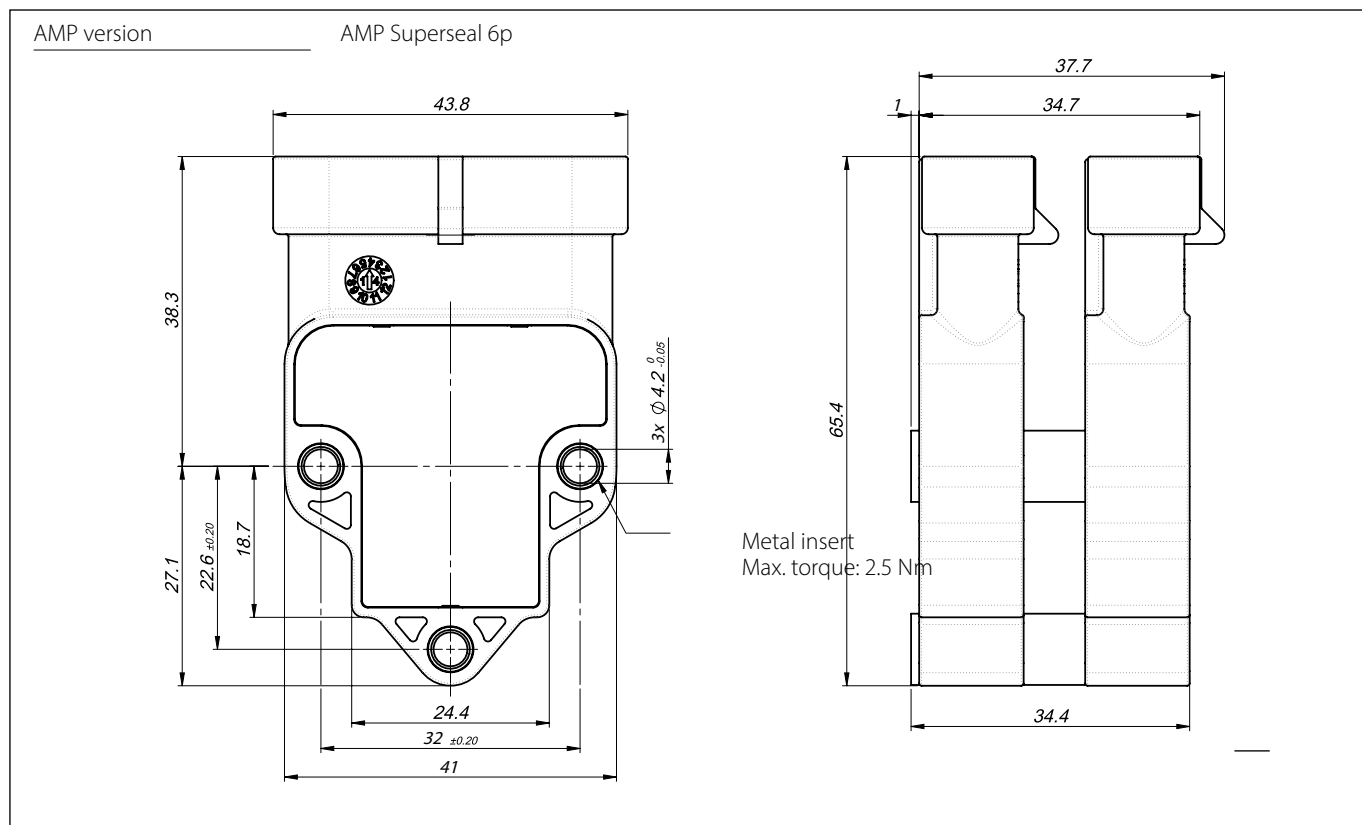
Accessories	
No accessories	X
Magnetic pen (PKIT 312)	Y
3 x spacers for redundant version (BUS027)	A

Cable length	
100 mm	01
200 mm	02
500 mm	05
1 m	10
2 m	20
Other length on request

 Example of ordering:
 DST X710-A0045000HC10 0033X00

A	AMP Superseal 6p
0	Dual Axis (XY axis)
045	$\pm 45^\circ$
000	NA
H	+9 - +36 Vdc
C1	CANopen
0	AMP version
0	No certificate
033	Standard
X	No accessories
00	Not defined (only cable version)

Dimensions



Electrical connections

AMP version

AMP Superseal 6 pole 282108-1 connector
Mated with connector AMP 282090-1

Connections

1.	Ground
2.	± Supply
3.	Output X (dual axis)/Z (single axis)
4.	Output Y (dual axis)/n.c. (single axis)
5.	n.c.
6.	n.c.

CAN Connections

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

CAN Connections

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

Items marked n.c. should not be connected

Single axis

Dual axis

Cable version

Connections

Black	Ground
Red	± Supply
Yellow	Output X
Green	Output Y
Blue	n.c.
White	n.c.

CAN Connections

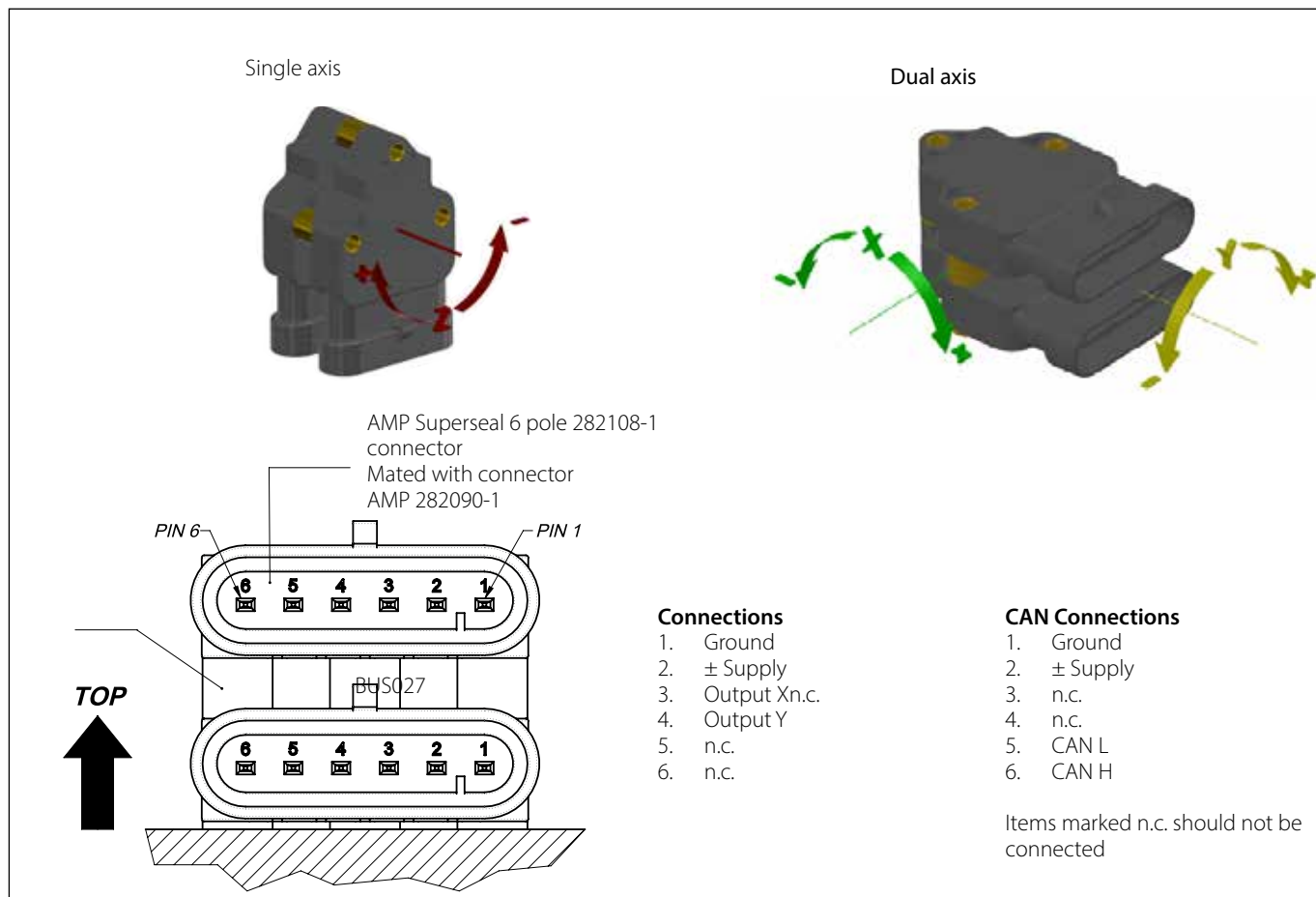
Black	Ground
Red	± Supply
Blue	CAN L
White	CAN H.

Single axis

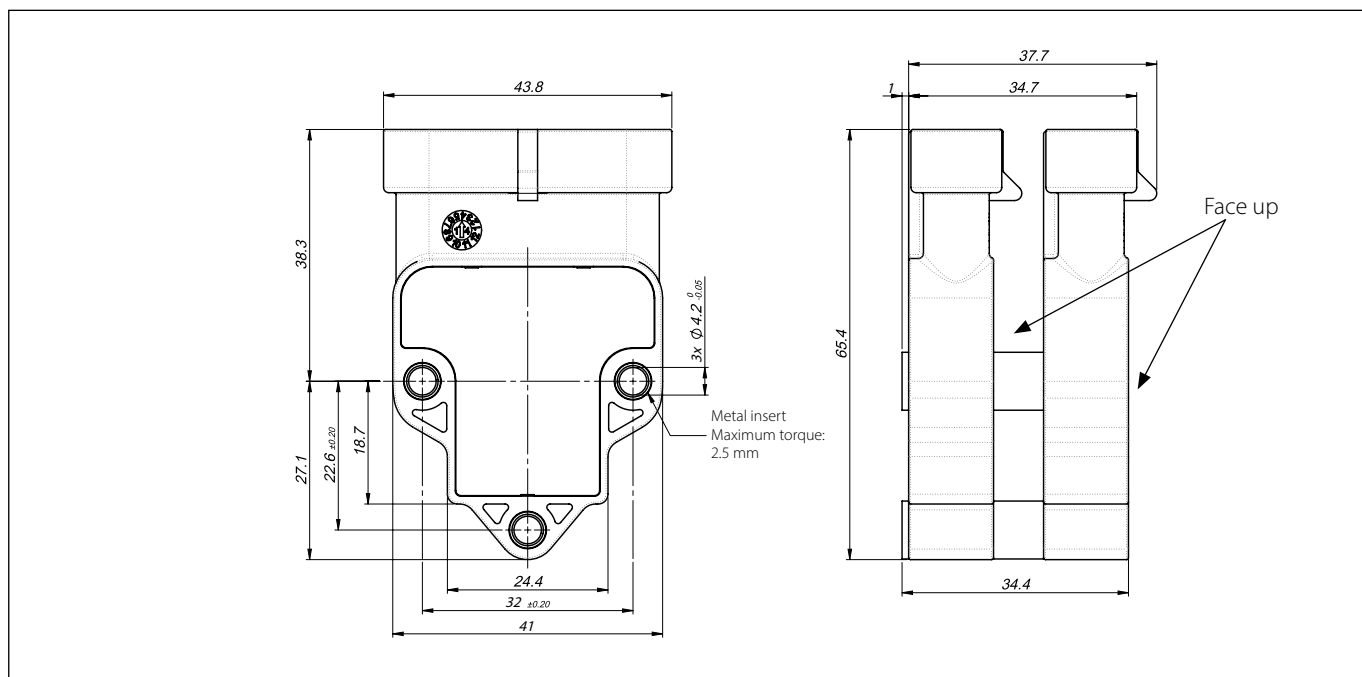
Dual axis

AMP full redundant version

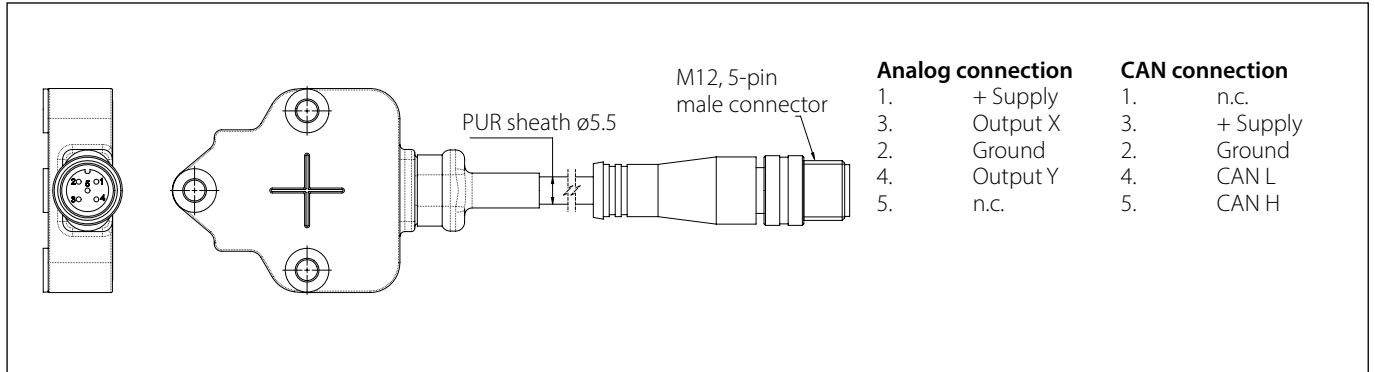
Danfoss DST X710 tilt sensor is designed to be double mounted with specific spacers (BUS027) in order to have a full redundant space-saving version. Please pay attention how to install the two DST X710 sensors:
Please position them both always face up or both face down.



Dimensions

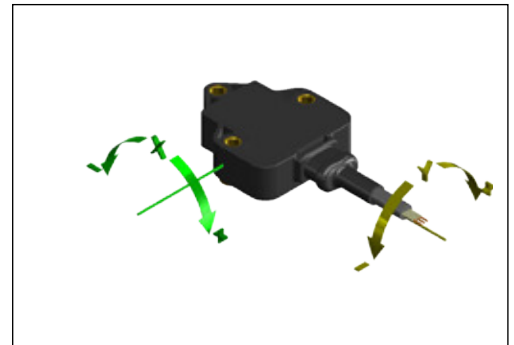
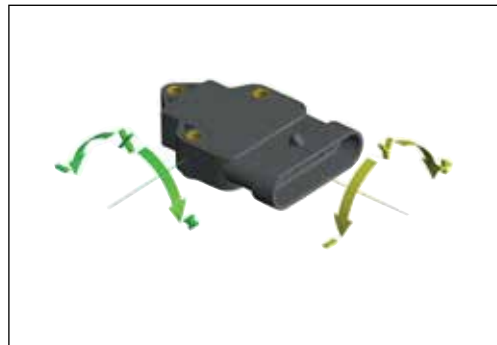


Cable + M12 version



Zero function

Available for analog single circuit versions in DST X710 XY configuration (dual axis)



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.

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