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.

The sensors are produced according to PL d (EN ISO 13849-1:2015), making the complete portfolio suitable for safety-critical applications.

Features

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

Conformity

- CE
- RoHS
### Technical data

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

<table>
<thead>
<tr>
<th>Electrical specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical connections</td>
<td>AMP Superseal 6P.282108-1, cable or cable +M12 5Pin</td>
</tr>
<tr>
<td>Output signal</td>
<td>CANopen, Ratiometric 10-90% of Vs, 0.5 - 4.5 Vdc, 0-10 Vdc or 4-20mA</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>+10 – +36 Vdc or 5 Vdc Ratiometric output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental conditions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>-40 – 85 °C</td>
</tr>
<tr>
<td>EMC</td>
<td>Emission EN 55011</td>
</tr>
<tr>
<td></td>
<td>Immunity EN 61236-3-2</td>
</tr>
<tr>
<td>Vibration stability</td>
<td>Sinusoidal 20 g, 10 Hz – 2,000 kHz IEC 60068-2-6</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>Impulsive on 3 axes 50 g, 11 ms IEC 60068-2-27</td>
</tr>
<tr>
<td>IP rating</td>
<td>IP67 - IPX9K with female mating connector</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Enclosure</td>
</tr>
<tr>
<td>Net weight</td>
<td>0.036 kg (without cable)</td>
</tr>
</tbody>
</table>
Sensor output graph

**Dual axis tilt sensor (XY) X-axis**

- **CLAMP HIGH**
  - 4.5 V
  - 10 V
- **CLAMP LOW**
  - 0.5 V
- Level diagnosis (A1-A3 Models)
- **Load conditions**
  - +0.5 Vdc - +4.5 Vdc output with power + 5Vdc: It is recommended a load resistance > 10 KΩ

**Dual axis tilt sensor (XY) Y-axis**

- **CLAMP HIGH**
  - 4.5 V
  - 10 V
- **CLAMP LOW**
  - 0.5 V
- Level diagnosis (A1-A3 Models)

**Single axis tilt sensor (±180°) Z-axis**

- **CLAMP HIGH**
  - 4.5 V
  - 10 V
- **CLAMP LOW**
  - 0.5 V
- Level diagnosis (A1-A3 Models)

**Load conditions**
- +0.5 Vdc - +4.5 Vdc output with power + 5Vdc: It is recommended a load resistance > 10 KΩ
### Ordering

<table>
<thead>
<tr>
<th>Type</th>
<th>Output signal</th>
<th>Configurations</th>
<th>Code no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CANopen</td>
<td>Single axis; ±180°, 36V</td>
<td></td>
<td>098G2500</td>
</tr>
<tr>
<td>CANopen</td>
<td>Dual axis; ±85°, 36V</td>
<td></td>
<td>098G2501</td>
</tr>
</tbody>
</table>

### Electrical connections

- **AMP Superseal 6P connector**: A
- **Cable (specify cable length)**: F

### Axis type

- **Dual axis (XY axis)**: O
- **Single axis (Z axe)**: V

### Measuring range

- **(Measuring range (indicate)) ±10° ±15° ±20° ±30° ±45° ±60° ±85° ±180° for single Z axis only**: XXX
- **(Single axis Z for analogue output-dual axis XY)**: 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

### Certificate

- **No certificate attached**: 0
- **Linearity curve to be attached**: L

### Accessories

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

### 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

### Example of ordering:

DST X710-A0045000HC10 0033X00

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**Dimensions**

AMP Superseal 6p

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.8</td>
<td></td>
</tr>
<tr>
<td>36.3</td>
<td></td>
</tr>
<tr>
<td>22.6</td>
<td></td>
</tr>
<tr>
<td>14.7</td>
<td></td>
</tr>
<tr>
<td>24.4</td>
<td></td>
</tr>
<tr>
<td>32 ±0.25</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td></td>
</tr>
</tbody>
</table>

Metal insert

Max. torque: 2.5 Nm

**Electrical connections**

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

**Connections**

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

**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