The Danfoss DST X510 rotary position sensors with shaft are designed for use in mobile hydraulic applications.

Danfoss DST X510 series uses contactless Hall technology with measurement ranges up to 360°. All sensors are E1 approved and are designed for off-highway applications and resistant to shock and vibrations and with high electromagnetic compatibility, and comes with either analogue, CANopen or SAE J1939 output.

Single and redundant sensor types are available and are produced according to PL d (EN ISO 13849-1:2015), making the complete portfolio suitable for safety-critical applications.

### Features
- Contactless Hall technology for almost infinite sensor life time
- Single or Redundant ranges up to 360° (±180°)
- Output: Analogue, CANopen and SAE J1939
- Linearity: < ± 0.5 FS
- Resolution:
  - 12 bit (analog)
  - 14 bit (CANopen/SAE J1939)
- IP protection level IP67 - IP69K with female mating connector

### Approvals and Conformity
- CE
- RoHS
- E1 approved
# Measuring range
360° (±180°)

# Linearity
≤ ± 0.5% FS

# Resolution and speed of rotation
- 12 bit (analog output): 120 rpm max.
- 14 bit (CANopen/SAE J1939 output)

# Durability (stroke ±75°)
35 M operations

## Technical data

<table>
<thead>
<tr>
<th>Performance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>360° (±180°)</td>
</tr>
<tr>
<td>Linearity</td>
<td>≤ ± 0.5% FS</td>
</tr>
<tr>
<td>Resolution and speed of rotation</td>
<td>12 bit (analog output)</td>
</tr>
<tr>
<td></td>
<td>14 bit (CANopen/SAE J1939 output)</td>
</tr>
<tr>
<td>Durability (stroke ±75°)</td>
<td>35 M operations</td>
</tr>
</tbody>
</table>

## Electrical specifications

<table>
<thead>
<tr>
<th>Electrical connections</th>
<th>Deutsch 6P DT04-6p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>0.5-4.5 V Ratiometric, CANopen / SAE J1939</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>Ratiometric + 5 Vdc, CANopen/J1939: +9 – +36 Vdc</td>
</tr>
</tbody>
</table>

## Environmental conditions

<table>
<thead>
<tr>
<th>Operating temperature range</th>
<th>-40 – 85 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal drift temperature</td>
<td>&lt; 50 ppm/°C</td>
</tr>
<tr>
<td>EMC</td>
<td></td>
</tr>
<tr>
<td>Emission</td>
<td>EN 55011 and CISPR 25</td>
</tr>
<tr>
<td>Immunity</td>
<td>EN 61236-3-2 and ISO 11452-2</td>
</tr>
<tr>
<td>Transient on supply lines</td>
<td>ISO 7637-2</td>
</tr>
<tr>
<td>Bulk current injection</td>
<td>ISO 11452-4</td>
</tr>
<tr>
<td>Vibration stability</td>
<td>Sinusoidal</td>
</tr>
<tr>
<td></td>
<td>20 g, 10 Hz – 2,000 kHz</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>Impulsive on 3 axes</td>
</tr>
<tr>
<td></td>
<td>50 g, 11 ms</td>
</tr>
<tr>
<td>IP protection</td>
<td>IP67 - IP69 (with mating connector)</td>
</tr>
</tbody>
</table>

## Mechanical characteristics

<table>
<thead>
<tr>
<th>Materials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure</td>
<td>PBT</td>
</tr>
<tr>
<td>Shaft</td>
<td>AISI 316L</td>
</tr>
<tr>
<td>Net weight</td>
<td>0.07 kg</td>
</tr>
</tbody>
</table>
Load conditions
+0.5 Vdc - +4.5 Vdc output with power + 5Vdc: It is recommended a load resistance > 10 KΩ
## Ordering standard

<table>
<thead>
<tr>
<th>Type</th>
<th>Output signal</th>
<th>Configurations</th>
<th>Code no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DST X 510</td>
<td>5V Ratiometric</td>
<td>±180° Clockwise CW</td>
<td>098G1000</td>
</tr>
<tr>
<td></td>
<td>5V Ratiometric</td>
<td>±180° Counterclockwise CW/CH2 clockwise CW</td>
<td>098G1001</td>
</tr>
<tr>
<td></td>
<td>36 V CANopen</td>
<td>±180° Clockwise CW</td>
<td>098G1002</td>
</tr>
<tr>
<td></td>
<td>36 V SAE J1939</td>
<td>±180° Clockwise CW</td>
<td>098G1003</td>
</tr>
</tbody>
</table>

### Electrical connections
- AMP Superseal 6P connector: A
- Deutsch 6P connector: D

### Circuit type
- Single Analog or CAN/J1939: S
- Redundant Analog: R

### Angle/Channel 1 (output for single channel)
- (Analog output A1-A2-A3 programmable in steps of ±15°) (CAN/J1939 = 180°) xxx

### Angle/Channel 2 (redundant versions)
- (Analog output A1-A2-A3 programmable in steps of ±15°) (CAN/J1939 = 180°) xxx

### Supply voltage
- +5Vdc (only for A1 output): L
- +9...+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 +9...36Vdc): A3
- CANopen output (powered at +9...36Vdc) (available in single version with +/-180° measurement range): C1
- SAE J1939 (powered at +9...36Vdc) (available in single version with +/-180° measurement range): C2

### Rotation direction
- Clockwise CW (single) both clockwise CW (redundant or CAN/J1939) 1
- Counterclockwise CCW (single) both counterclockwise CCW (redundant or CAN/J1939) 2
- CHANNEL 1 clockwise CW and CHANNEL 2 counterclockwise CCW (only for redundant version and CAN/J1939) 3
- CHANNEL 1 counterclockwise CCW and CHANNEL 2 clockwise CW (only for redundant version and CAN/J1939) 4

### Actuator
- Shaft: A

### Certificate
- No certificate attached: 0
- Linearity curve to be attached: L

### Accessories
- No accessories: X

### Example of ordering:
DST X510-DS180000HC14A00 0033X00

### Electrical connections
- Deutsch 6p: D
- Single Analog or CAN/J1939: S
- 180° ±180° 000 000
- +9 - +36 Vdc: H
- CANopen: C1
- Channel 1: Counterclockwise CCW Channel 2: Clockwise CW
- Shaft: A
- 00 Reserved
- No certificate: 0
- Standard: 033
- No accessories: X
- Reserved: 00

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Shaft in stainless steel AISI 316L
Position Zero 0° when the planar face of the shaft is parallel to the axis of the mounting holes
Electrical connections

The output increases for versions CCW

The output increases for versions CW

Metal insert
Max. torque: 2.5 Nm

<table>
<thead>
<tr>
<th>Ref.</th>
<th>CW output</th>
<th>CWW output</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.5 Vdc</td>
<td>4.5 Vdc</td>
</tr>
<tr>
<td>B</td>
<td>Zero angular position of 0°</td>
<td>Zero angular position of 0°</td>
</tr>
<tr>
<td>C</td>
<td>4.5 Vdc</td>
<td>0.5 Vdc</td>
</tr>
</tbody>
</table>

Connections
1. Ground 1
2. + Supply 1
3. Output 1
4. Ground 2
5. + Supply 2
6. Output 2

Connections - CAN/J 1939
1. OV (GND)
2. + Vs (+9 - 36 Vdc)
3. NC
4. NC
5. CAN-L
6. CAN-H