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 designed for off-highway applications and resistant to shock and vibrations and with high electromagnetic compatibility, and come with both Ratiometric, CANopen and 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: Ratiometric, CANopen and SAE J1939

- Linearity: < ± 0.5 F5
- Resolution:
  - 12 bit (analog)
  - 14 bit (CANopen/SAE J1939)
- IP protection level IP67 - IP69K with female mating connector

**Conformity**

- CE
- RoHS
## Technical data

### 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

### 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>
</tbody>
</table>

#### EMC
- **Emission**
  - EN 55011 and CISPR 25
- **Immunity**
  - EN 61236-3-2 and ISO 11452-2
- **Transient on supply lines**
  - ISO 7637-2
- **Bulk current injection**
  - ISO 11452-4

#### 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

### Mechanical characteristics

<table>
<thead>
<tr>
<th>Materials</th>
<th>Enclosure</th>
<th>PBT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shaft</td>
<td>AISI 316L</td>
</tr>
<tr>
<td>Net weight</td>
<td></td>
<td>0.07 kg</td>
</tr>
</tbody>
</table>

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Sensor output graph

Clockwise CW single
Direction of rotation 1

[Graph showing sensor output with CLAMP LOW and CLAMP HIGH configurations for clockwise rotation]

Counterclockwise CCW single
Direction of rotation 2

[Graph showing sensor output with CLAMP LOW and CLAMP HIGH configurations for counterclockwise rotation]

Redundant direction of rotation 1

[Graph showing redundant sensor output configuration for clockwise rotation]

Redundant direction of rotation 2

[Graph showing redundant sensor output configuration for counterclockwise rotation]

Redundant direction of rotation 3

[Graph showing redundant sensor output configuration for third rotation]

Redundant direction of rotation 4

[Graph showing redundant sensor output configuration for fourth rotation]

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 CCW/CH2 clockwise CW</td>
<td>098G1001</td>
</tr>
<tr>
<td></td>
<td>36V CANopen</td>
<td>±180° Clockwise CW</td>
<td>098G1002</td>
</tr>
<tr>
<td></td>
<td>36V SAE J1939</td>
<td>±180° Clockwise CW</td>
<td>098G1003</td>
</tr>
</tbody>
</table>

## Ordering code - on request

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

### Actuator
- Shaft: A

### Circuit type
- Single Analog or CAN/J 1939: S
- Redundant Analog: R

### Angle/Channel 1 (output for single channel)
- Analog output A1-A2-A3 programmable in steps of ±15° (CAN/J 1939 = 180)

### Angle/Channel 2 (redundant versions)
- Analog output A1-A2-A3 programmable in steps of ±15° (CAN/J 1939 = 180)

### 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

Example of ordering:
DST X510-DS180000HC14A00 0033X00

- D: Deutsch 6p
- S: Single Analog or CAN/J 1939
- 180: ±180°
- 000: 000
- H: +9 - +36Vdc
- C1: CANopen
- 4: Channel 1: Counterclockwise CCW
- Channel 2: Clockwise CW
- A: Shaft
- 00: Reserved
- 0: No certificate
- 033: Standard
- X: No accessories
- 00: Reserved

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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