

**Properties:**

- ✓ Measuring range +/-90°
- ✓ Average resolution and accuracy
- ✓ Areas of application:
  - Housing protection class: IP67
  - CE marking



**Areas of application:**

- ✓ Lifting platforms and access equipment
- ✓ Agricultural and forestry machinery
- ✓ Commercial vehicles, tail lifts
- ✓ Crane and lifting technology

**Function:** The **tilt protection** version of the HNSC-C series monitors rotationally symmetric tilt deviations from the vertical (Z-axis). If a tilt deviation occurs on the Z-axis that is greater than the switching angle, a switching operation takes place. The tilt switch will only return to its previous operating state once the tilt deviation falls below the defined switching angle again. The switching angles of 45° or 90° can be selected (see order key). The switching hysteresis between the turn-on and turn-off angles is approximately 3° of tilt. The measurement limit frequency is approximately 5 Hz.

**Special Advantages:** The design of the tilt switches in the HNSC-C series is implemented exclusively based on analog electronic components. This allows the switch to achieve very high values regarding its safety-relevant data (MTTFd) for calculating the Performance Level (PL) in a machine or system – for example, using the software tool SISTEMA. The avoidance of programmable components in the HNSC-C series offers additional advantages when using the switch in safety-relevant applications, as the influence of software errors can be eliminated when considering potential sources of failure.

**Customer specific variants:** Customized Variants: The switching hysteresis and cut-off frequency of the switch are based on many years of experience but can be customized according to the specific application.

**Mechanical data:**

Housing material: Plastic  
Dimensions (L x W x H): 40 x 20 x 24 mm

**Measuring Range<sup>1)</sup>:**

Measuring range X-axis: -90°...+90°  
Switching point X-axis: 45° or 90° selectable

**Accuracy:**

Accuracy: +/- 3°  
Hysteresis: 3° +/- 0.5°  
Cut-off frequency: 5 Hz  
Measuring principle: MEMS

	Min.	Typ.	Max.	
Temperature drift (relative):	0.02	0.06	0.12	[°/K]
Temperature drift at 0 °C:	0.50	1.50	3.00	[°]
Temperature drift at 50 °C:	0.50	1.50	3.00	[°]
Temperature drift at -25 °C:	1.00	3.00	6.00	[°]
Temperature drift at 70 °C:	0.95	2.70	5.40	[°]

<sup>1)</sup>The properties specified here refer to a switching point of 5° tilt. For a different switching point, the values may vary slightly.

**Electrical data:**

Operating voltage UB: 9-30 VDC  
Rated voltage: 24 VDC  
Ripple: < 15%  
Rated current: 250 mA  
Quiescent current: < 5 mA

**Environmental Conditions:**

Temperature range: -25 °C ... 70 °C  
Protection class: DIN IP 67

**EMC:**

EU Directives: 2014/30/EU EMC Directive, 2011/65/EU RoHS Directive  
Applied standards: EN 61000-6-3:2007 + A1:2011/ AC:2012 (Emissions for residential, commercial, and light industrial areas), EN 61000-6-2:2005 + AC:2005-09 (Immunity for industrial areas)

**Functional safety:**

MTTFd: 2,237 years (Normally Open/Normally Close)  
2,194 years (Changeover)

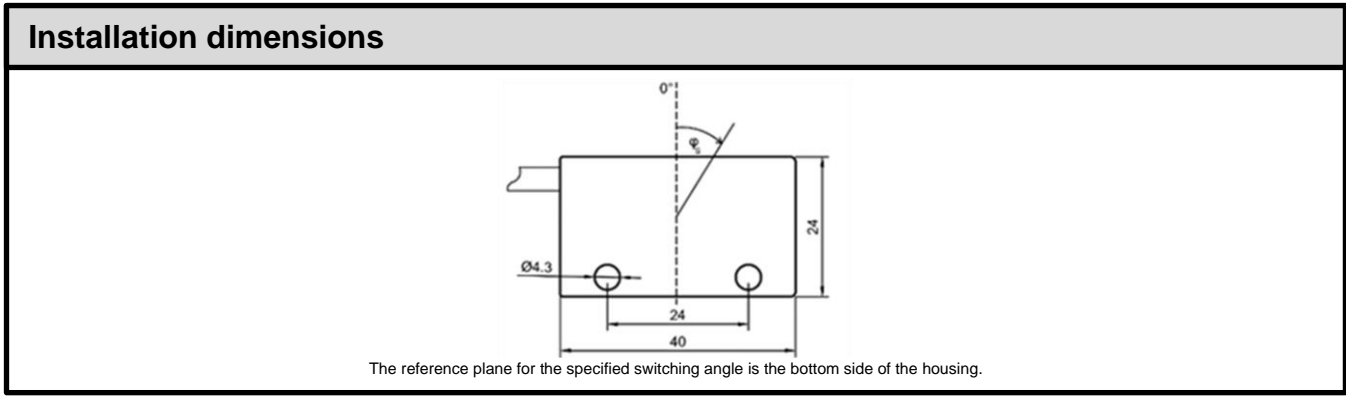
Service life: 20 years

The specification of the MTTF / service life value does not constitute binding quality and/or durability commitments; these are merely empirical values without binding character.

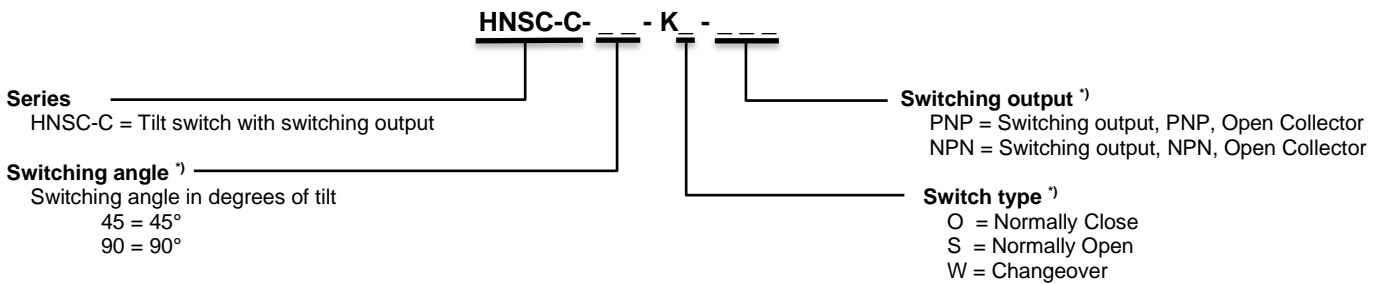
These value specifications do not extend or otherwise influence the limitation period for warranty claims.

Output Variants:

<p><b>Normally Close (NC) PNP</b></p> <p><u>Output/ Interface:</u> Switch type: Normally Close (NC)</p> <p><u>Connections:</u> Connections: Cable, 3-wire, length 0.5 m (alternatively upon request up to a maximum of 3 m)</p> <p>Connection assignment: brown: Supply + white: Supply – green: Switching output (PNP)</p> <p><u>Connection diagram:</u></p>	<p><b>Normally Close (NC) PNP</b></p> <p><u>Output/ Interface:</u> Switch type: Normally Open (NO)</p> <p><u>Connections:</u> Connections: Cable, 3-wire, length 0.5 m (alternatively upon request up to a maximum of 3 m)</p> <p>Connection assignment: brown: Supply + white: Supply – green: Switching output (NPN)</p> <p><u>Connection diagram:</u></p>
<p><b>Normally Open (NO) PNP</b></p> <p><u>Output/ Interface:</u> Switch type: Normally Open (NO)</p> <p><u>Connections:</u> Connections: Cable, 3-wire, length 0.5 m (alternatively upon request up to a maximum of 3 m)</p> <p>Connection assignment: brown: Supply + white: Supply – green: Switching output 1 (PNP) yellow: Switching output 2 (PNP)</p> <p><u>Connection diagram:</u></p>	<p><b>Normally Open (NO) NPN</b></p> <p><u>Output/ Interface:</u> Switch type: Normally Open</p> <p><u>Connections:</u> Connections: Cable, 3-wire, length 0.5 m (alternatively upon request up to a maximum of 3 m)</p> <p>Connection assignment: brown: Supply + white: Supply – green: Switching output 1 (NPN) yellow: Switching output 2 (NPN)</p> <p><u>Connection diagram:</u></p>
<p><b>Changeover PNP</b></p> <p><u>Output/ Interface:</u> Switch type: Changeover Switch output 1 Normally Close (NC) Switch output 2 Normally Open (NO)</p> <p><u>Connections:</u> Connections: Cable, 4-wire, length 0.5 m (alternatively upon request up to a maximum of 3 m)</p> <p>Connection assignment: brown: Supply + white: Supply – green: Switching output 1 (PNP) yellow: Switching output 2 (PNP)</p> <p><u>Connection diagram:</u></p>	<p><b>Changeover NPN</b></p> <p><u>Output/ Interface:</u> Switch type: Changeover Switch output 1 Normally Close (NC) Switch output 2 Normally Open (NO)</p> <p><u>Connections:</u> Connections: Cable, 4-wire, length 0.5 m (alternatively upon request up to a maximum of 3 m)</p> <p>Connection assignment: brown: Supply + white: Supply – green: Switching output 1 (NPN) yellow: Switching output 2 (NPN)</p> <p><u>Connection diagram:</u></p>



**Order Key:**



**\*) Please specify the desired characteristics of the switch when ordering:**

**Example:** HNSC-C-45-KO-PNP, order designation for a tilt protection switching angle of 45° tilt, switch type Normally Close, and switching output PNP. Please include the desired cable length (max. 3 m) when ordering.