

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 version with the integrated time element of the HNSC-C series monitors tilt deviations from the horizontal around a tilt axis (X-axis). If a tilt deviation occurs on the X-axis that is greater than the switching angle and lasts longer than the time specified by the time element, 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. This happens without delay.

A display LED on the switch indicates the status of the switching output (switching output 1 for changeover switches). The switching point and time element are preset according to customer specifications within a range of 3° to 45° tilt and 1 to 10 seconds (see order key).

The switching hysteresis between the turn-on and turn-off angles is approximately 2° 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 20 mm

Measuring Range¹⁾:

Measuring range X-axis: -90°...+90°
Switching point X-axis: According to customer specifications in the range between 3° and 45° tilt

Accuracy:

Accuracy: +/- 0.5°
Hysteresis: 2° +/- 0.5°
Cut-off frequency: 5 Hz
Time delay²⁾: 1s, 2s, 3s, 5s, 7s or 10s
Measuring principle: MEMS

	Min.	Typ.	Max.
Temperature drift (relative):	0.002	0.010	0.020 [°/K]
Temperature drift at 0 °C:	0.050	0.250	0.500 [°]
Temperature drift at 50 °C:	0.050	0.250	0.500 [°]
Temperature drift at -25 °C:	0.100	0.500	1.000 [°]
Temperature drift at 70 °C:	0.090	0.450	0.900 [°]

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

²⁾ The time delay has a tolerance of about 20%.

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:

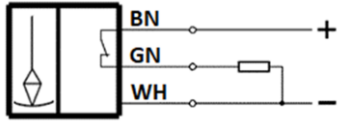
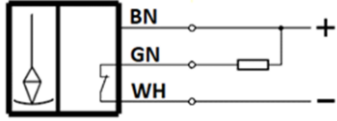
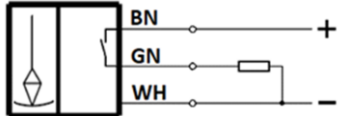
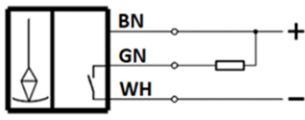
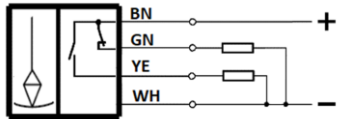
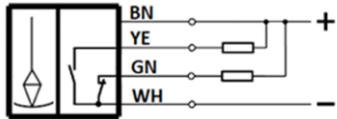
EU Directives: 2014/30/EU EMC Directive, 2011/65/EU RoHS Directive
Applied standards: EN 61000-6-3:2007 + A1:2011 / AC:2012 (Emissions for residential, commercial, and light industrial areas), EN 61000-6-2:2005 + AC:2005-09 (Immunity for industrial areas)

Functional safety:

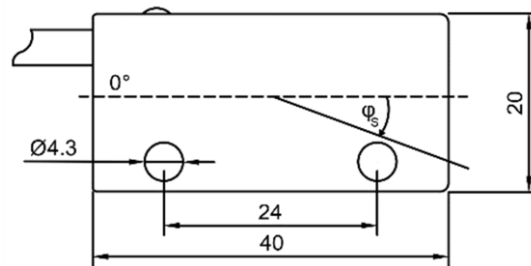
MTTFd: 2,237 years (Normally Open/Normally Close)
2,194 years (Changeover)
Service life: 20 years

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:

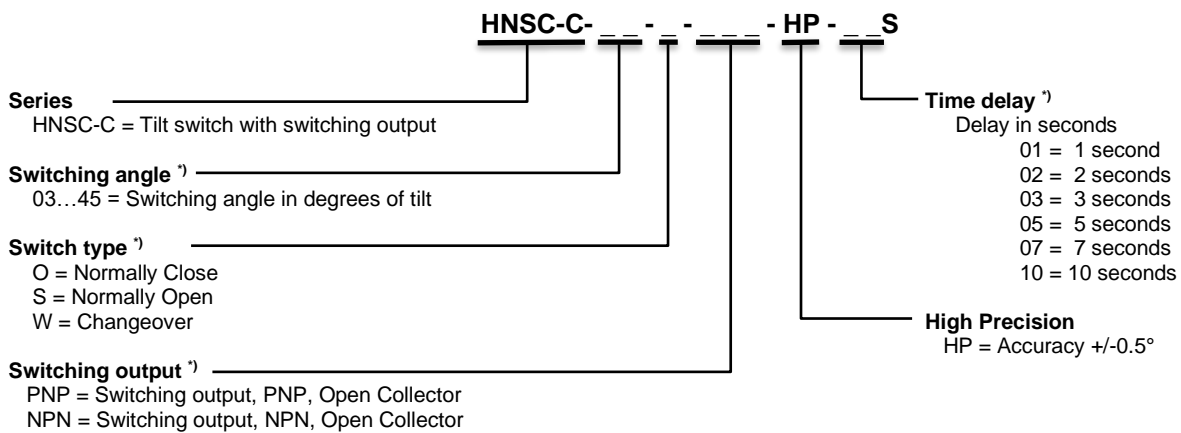
<p>Normally Close (NC) PNP</p> <p><u>Output/ Interface:</u> Switch type: Normally Close (NC)</p> <p><u>Connections:</u> Connections: Cable, 3-wire, length 0.5 m (alternatively upon request up to a maximum of 3 m)</p> <p>Connection assignment: brown: Supply + white: Supply – green: Switching output (PNP)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

Installation dimensions



The reference plane for the specified switching angle is the bottom side of the housing.

Order Key:



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

Example: HNSC-C-08-O-PNP-HP-03S, order designation for a switching angle of 8° tilt, switch type Normally Open, switching output PNP and 3 seconds of time delay. Please include the desired cable length (max. 3 m) when ordering.