

## Tilt sensor N5

The N5 tilt sensor with CAN-Bus interface is available as a CANopen or SAEJ1939 variant. It has a high impact and vibration resistance so is frequently used for tilt measurement in construction machinery, industrial trucks and adverse industrial environments. The N5 can be easily programmed and the neutral position adjusted with the corresponding infrared remote control.

### Product characteristics

- Long service life and reliability thanks to the mechanics-free MEMS technology
- Tilt range: single-axis 360°, or dual-axis 180°
- Up to 4 additional, freely configurable switching points
- Switch-on/-off delay selectable for each switching point
- Adjustment of neutral position via CAN bus or IR remote control
- IP67 protection class
- Operating range -40 °C to +85 °C
- Deutsch or M12 connector
- Compact, flat and robust housing

**Technical drawing**

IMAGE 1/4: N5AC... / N5EC...

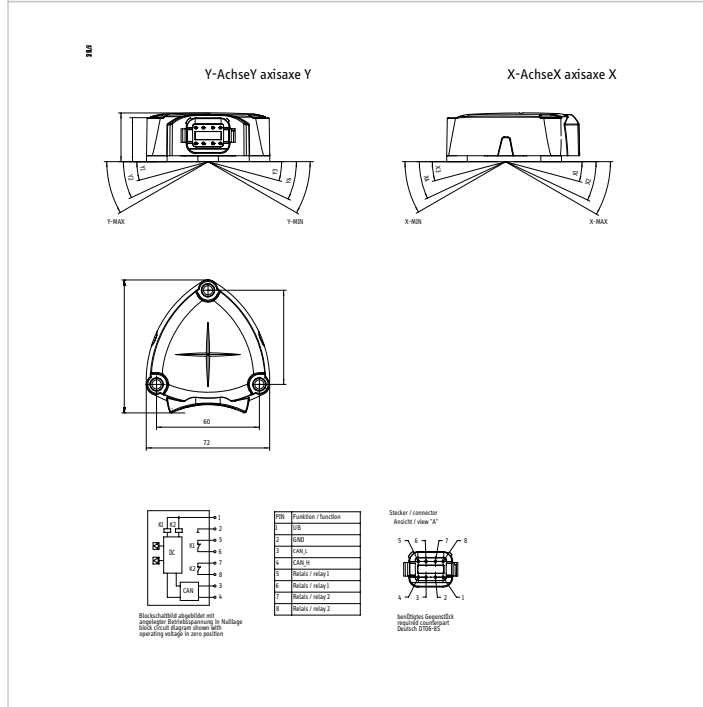


IMAGE 2/4: N5GC... / N5IC...

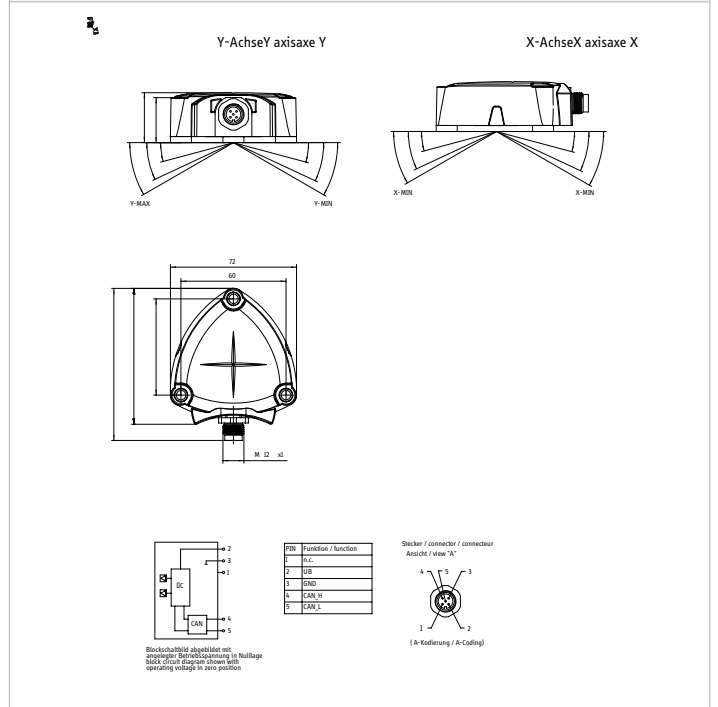


IMAGE 3/4

IMAGE 4/4

## Electrical data

Attribute	N5ACJ...	N5ACJB...	N5ACO...	N5ACOB...	N5ECJ...	N5ECJB... ▶
Max. switching voltage	-	48 V DC	-	48 V DC	-	48 V DC
Max. switching current	-	1 A	-	1 A	-	1 A
Max. switching power	-	30 W	-	30 W	-	30 W
Polarity reversal protection	yes					
Resolution	0.014 °					
Operating voltage min.	9 V DC					
Operating voltage max.	32 V DC					
Current consumption	100 mA					
Short-circuit resistance to GND	yes	no	yes	no	yes	no
Short-circuit resistance to supply	yes	no	yes	no	yes	no
Repeating accuracy	< 0,3 °					
Signal update rate	200 Hz					
Technology	MEMS					
Number of measurement axes (Number)	2		2 (X, Y) Z-Achse zur Signalisierung der Einbaulage		2	
Angle measuring range	180 °				360/120 °	
Initialisation time after power on/start-up time	500 ms					
Switching points	-	wählbar innerhalb $\pm 1,5^\circ \dots \pm 90^\circ$	-	wählbar innerhalb $\pm 1,5^\circ \dots \pm 90^\circ$	-	wählbar innerhalb $\pm 1,5^\circ \dots \pm 180^\circ$
Zero justification	$\pm 60^\circ$					
Vibration filter	25 Hz					
Fieldbus system	CAN					
Protocol	J1939		CANopen		J1939	
Node ID / Source Address	0xE2		0x70		0xE2	
Transmitting cycle	10 ms					
Baud rate	250 kBit/s					

## Electrical data

Attribute	N5ACJ...	N5ACJB...	N5ACO...	N5ACOB...	N5ECJ...	N5ECJB... ▶
Bus terminating resistor	no					
MTTF	18.6 a					
Switching output	-	2x NO	-	2x NO	-	2x NO
Outputs	CAN J1939	CAN J1939 + Relay	CANopen	CANopen + Relay	CAN J1939	CAN J1939 + Relay
Turn-on delay	-	wählbar (0...2s in 0,5s Schritten)	-	wählbar (0...2s in 0,5s Schritten)	-	wählbar (0...2s in 0,5s Schritten)
Turn-off delay	-	wählbar (0...2s in 0,5s Schritten)	-	wählbar (0...2s in 0,5s Schritten)	-	wählbar (0...2s in 0,5s Schritten)
Connection type (switching output)	-	Selectable	-	Selectable	-	Selectable
Temperature coefficient	± 0,2°/K					
Linearity error	< ± 0,4°					

## Electrical data

Attribute	N5ECO...	N5ECOB...	N5GCJ...	N5GCO...	N5ICJ...	N5ICO...
Max. switching voltage	-	48 V DC			-	
Max. switching current	-	1 A			-	
Max. switching power	-	30 W			-	
Polarity reversal protection	yes					
Resolution	0.014 °					
Operating voltage min.	9 V DC					
Operating voltage max.	32 V DC					
Current consumption	100 mA					
Short-circuit resistance to GND	yes	no			yes	
Short-circuit resistance to supply	yes	no			yes	
Repeating accuracy	< 0,3 °					
Signal update rate	200 Hz					
Technology	MEMS					
Number of measurement axes (Number)	2			2 (X, Y) Z-Achse zur Signalisierung der Einbaulage	2	
Angle measuring range	360/120 °		180 °		360/120 °	
Initialisation time after power on/start-up time	500 ms					
Switching points	-	wählbar innerhalb $\pm 1,5^\circ \dots \pm 180^\circ$			-	
Zero justification	$\pm 60^\circ$					
Vibration filter	25 Hz					
Fieldbus system	CAN					
Protocol	CANopen		J1939	CANopen	J1939	CANopen
Node ID / Source Address	0x70		0xE2	0x70	0xE2	0x70
Transmitting cycle	10 ms					

## Electrical data

Attribute	N5ECO...	N5ECOB...	N5GCJ...	N5GCO...	N5ICJ...	N5ICO...
Baud rate	250 kBit/s					
Bus terminating resistor	no					
MTTF	18.6 a					
Switching output	-	2x NO	-			
Outputs	CANopen	CANopen + Relay	CAN J1939	CANopen	CAN J1939	CANopen
Turn-on delay	-	wählbar (0...2s in 0,5s Schritten)	-			
Turn-off delay	-	wählbar (0...2s in 0,5s Schritten)	-			
Connection type (switching output)	-	Selectable	-			
Temperature coefficient	$\pm 0,2^\circ/\text{K}$					
Linearity error	$< \pm 0,4^\circ$					

## Material information

Attribute	N5ACJ...	N5ACJB...	N5ACO...	N5ACOB...	N5ECJ...	N5ECJB... ▶
Housing material	Gehäuseoberteil:PBT; Gehäusedeckel: PC					

## Material information

Attribute	N5ECO...	N5ECOB...	N5GCJ...	N5GCO...	N5ICJ...	N5ICO...
Housing material	Gehäuseoberteil:PBT; Gehäusedeckel: PC					

## Environmental conditions

Attribute	N5ACJ...	N5ACJB...	N5ACO...	N5ACOB...	N5ECJ...	N5ECJB... ▶
<b>Protection class</b>	IP67 DIN EN 60529					
<b>Operating temperature min.</b>	-40 °C					
<b>Max. operating temperature</b>	85 °C					
<b>Min. storage temperature</b>	-40 °C					
<b>Max. storage temperature</b>	105 °C					
<b>Shock resistance (Norm)</b>	500 m/s <sup>2</sup> , 100 Shocks pro Achse, DIN EN 60068-2-27					
<b>Vibration resistance (Norm)</b>	Sine Vibration: 100 m/s <sup>2</sup> , 19h, DIN EN 60068-2-6 Random Vibration: 80,1 m/s <sup>2</sup> , 24h, DIN EN 60068-2-64					
<b>Impact resistance (Norm)</b>	max. 5000 g					
<b>ESD insulation resistance (Norm)</b>	ISO 10605:2001 DIN EN 61000-4-2:2001					
<b>EMC immunity (Norm)</b>	DIN EN 13309 DIN EN ISO 14982 ISO 13766 DIN EN 12895					
<b>EMC emission (Norm)</b>	DIN EN 13309 DIN EN ISO 14982 ISO 13766 DIN EN 12895					

## Environmental conditions

Attribute	N5ECO...	N5ECOB...	N5GCJ...	N5GCO...	N5ICJ...	N5ICO...
<b>Protection class</b>	IP67 DIN EN 60529					
<b>Operating temperature min.</b>	-40 °C					
<b>Max. operating temperature</b>	85 °C					
<b>Min. storage temperature</b>	-40 °C					
<b>Max. storage temperature</b>	105 °C					
<b>Shock resistance (Norm)</b>	500 m/s <sup>2</sup> , 100 Shocks pro Achse, DIN EN 60068-2-27					
<b>Vibration resistance (Norm)</b>	Sine Vibration: 100 m/s <sup>2</sup> , 19h, DIN EN 60068-2-6 Random Vibration: 80,1 m/s <sup>2</sup> , 24h, DIN EN 60068-2-64					
<b>Impact resistance (Norm)</b>	max. 5000 g					
<b>ESD insulation resistance (Norm)</b>	ISO 10605:2001 DIN EN 61000-4-2:2001					
<b>EMC immunity (Norm)</b>	DIN EN 13309 DIN EN ISO 14982 ISO 13766 DIN EN 12895					
<b>EMC emission (Norm)</b>	DIN EN 13309 DIN EN ISO 14982 ISO 13766 DIN EN 12895					

## Installation

Attribute	N5ACJ...	N5ACJB...	N5ACO...	N5ACOB...	N5ECJ...	N5ECJB... ▶
Torque for fastening screws	6 N m					
Weight	100 g					

## Installation

Attribute	N5ECO...	N5ECOB...	N5GCJ...	N5GCO...	N5ICJ...	N5ICO...
Torque for fastening screws	6 N m					
Weight	100 g					

## Connection

Attribute	N5ACJ...	N5ACJB...	N5ACO...	N5ACOB...	N5ECJ...	N5ECJB... ▶
Connector type	Deutsch 8 pol.					
Connection	Deutsch 8-pol.					

## Connection

Attribute	N5ECO...	N5ECOB...	N5GCJ...	N5GCO...	N5ICJ...	N5ICO...
Connector type	Deutsch 8 pol.		M12x1 5pol.			
Connection	Deutsch 8-pol.		M12x1 5-pol.			

## Approvals

Attribute	N5ACJ...	N5ACJB...	N5ACO...	N5ACOB...	N5ECJ...	N5ECJB... ▶
CE label	yes					

## Approvals

Attribute	N5ECO...	N5ECOB...	N5GCJ...	N5GCO...	N5ICJ...	N5ICO...
CE label	yes					