

Tilt sensor N4

The robustly designed N4 tilt sensor has a high impact and vibration resistance so is frequently used for tilt measurement in construction machinery, industrial trucks and adverse industrial environments. The dual-axis sensor 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
- The analogue output signals can be combined with additional switching points
- Tilt range up to $\pm 60^\circ$
- IP67 protection class
- Operating range from -40°C to $+70^\circ\text{C}$
- Analogue current or voltage output, or volt free switching output via relay
- Depending on the angle, resolution up to 0.04°
- Adjustment of the neutral position with remote control
- Selectable switch-on and switch-off delay at the switching output

Technical drawing

IMAGE 1/6

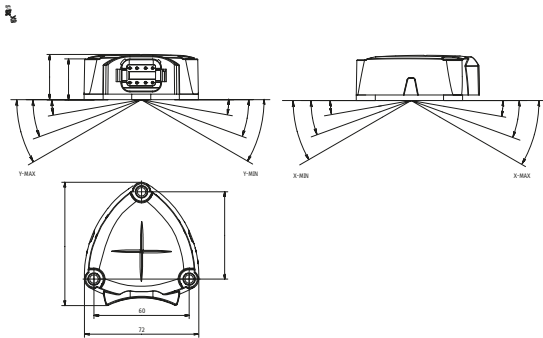


IMAGE 2/6

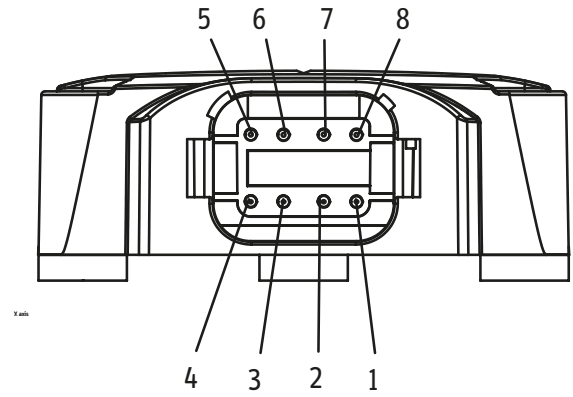


IMAGE 3/6: THE BLOCK CIRCUIT DIAGRAM DEPICTS THE SENSOR WITH THE SWITCHED-ON OPERATING VOLTAGE IN THE ZERO POSITION.

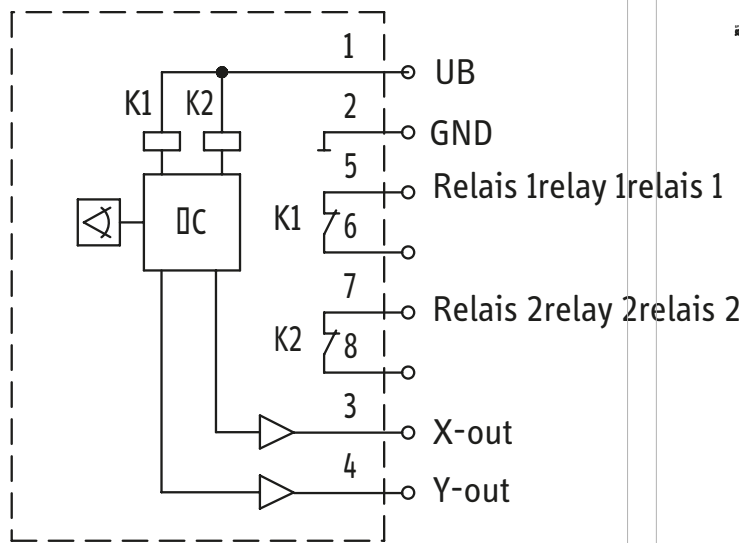


IMAGE 4/6

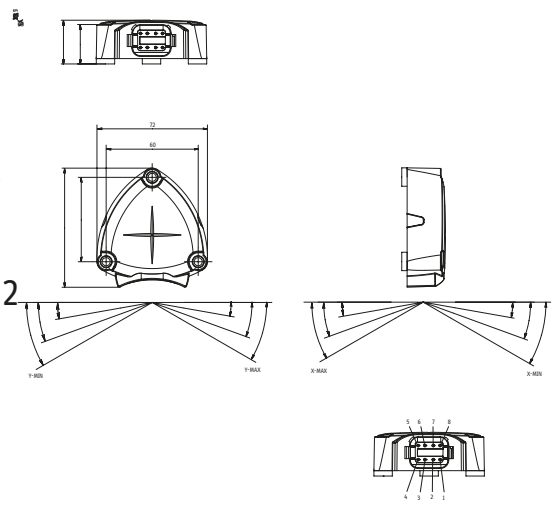


IMAGE 5/6

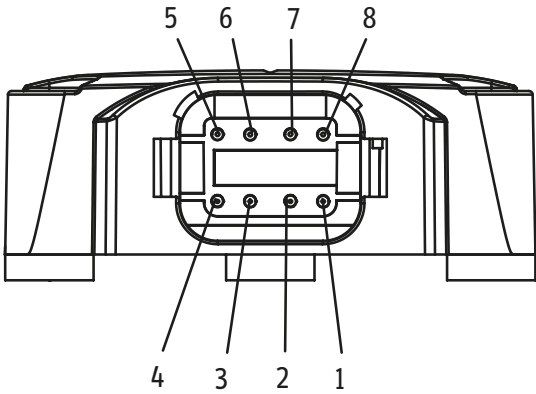
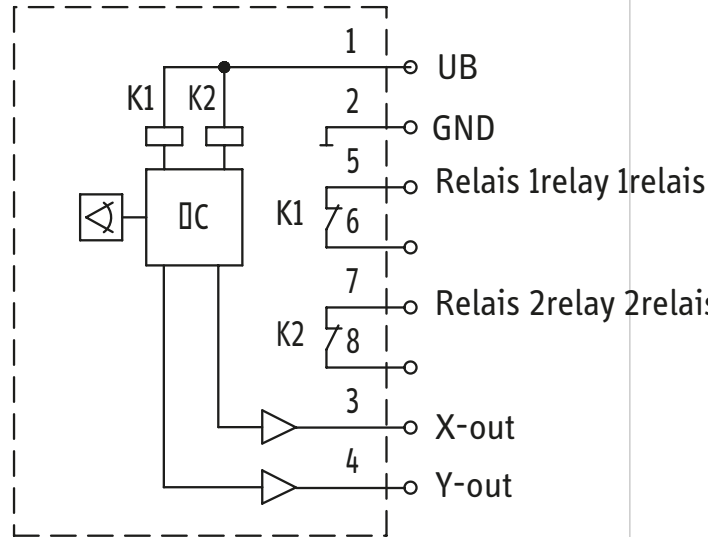


IMAGE 6/6: THE BLOCK CIRCUIT DIAGRAM DEPICTS THE SENSOR WITH THE SWITCHED-ON OPERATING VOLTAGE IN THE ZERO POSITION.



Product options

IMAGE 1/3

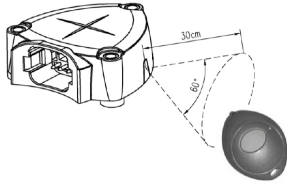
ORDERING KEY				TMR sensor 120°, dual-axis	Note
A				Housing/installation	
B				Horizontal (Deutsch, 6-pin)	
				Vertical (Deutsch, 9-pin)	
				Outputs	
A				Analogue	
D				Switching output	
K				Combined (analogue + switching output)	
				Analogue output signal	
	0			no signal	
	1			4 ... 20mA	
	2			0.5 ... 4.5mA	
				Relay (switching output) *	* Omitted if "analogue" is selected for output
		B		2x relay (N.C.)	
				Connection type relay (switching output) *	* Omitted if "analogue" is selected for output
			3	Relay 1 = X1/X3 Y1/Y3	
				Relay 2 = X2/X4 Y2/Y4	
				Switch-on delay time (switching output) *	* Omitted if "analogue" is selected for output
		A		No delay	
		B		0.5s	
				Switch-off delay time (switching output) *	* Omitted if "analogue" is selected for output
		A		No delay	
		B		0.5s	
				Angle rate* for analogue output signal	* please specify when ordering
				= 5°, ± 10°, ± 15°, ± 20°, ± 25°, ± 30°, ± 40°, ± 45°, ± 50°	
				Other angle rates on request (Within ± 1.5° ... ± 60°)	
				Switching points for the switching outputs (standard)	
				+X1 = 5°	
				+X2 = 10°	
				-X3 = 5°	
				-X4 = 10°	
				+Y1 = 5°	
				+Y2 = 10°	
				-Y3 = 5°	
				-Y4 = 10°	
				More switching points on request (Within ± 1.5° ... ± 60°)	

IMAGE 2/3

Optional
Housing/installation
Horizontal (cable connection with a length of 1m, 3m, 5m, 10m)
Vertical (cable connection with a length of 1m, 3m, 5m, 10m)
Relay (switching output)
1x relay (N.C.)
1x relay (N.O.)
2x relay (N.O.)
Connection type relay (switching output)
Relay 1 = X1/X3 Y1/Y3
Relay 1 = X1/X3, relay 2 = Y1/Y3
Relay 1 = X1/X3, relay 2 = X2/Y4
Switch-on delay time (switching output)
1.5s
2s
Switch-off delay time (switching output)
1.5s
2s
More output signals, cable lengths, delay times on request

IMAGE 3/3

Infrared remote control for neutral position adjustment IR-NG501



All tilt sensors are preprogrammed with a neutral position. If required, the neutral position can be adjusted using an infrared remote control. During this adjustment, the current inclination angle is defined as the neutral position.

Electrical data

Attribute	N4.A1...	N4.A2...	N4.D0B...	N4.K1B...	N4.K2B...
Max. switching voltage	-			48 V DC	
Max. switching current	-			1 A	
Max. switching power	-			30 W	
Polarity reversal protection	yes				
Output signal min.	-	0.5 V DC	-		0.5 V DC
Output signal max.	-	4.5 V DC	-		4.5 V DC
Output signal min.	4 mA	-		4 mA	-
Output signal max.	20 mA	-		20 mA	-
Output signal - centre position/zero position	-	2.5 V DC	-		2.5 V DC
Output signal - centre position/zero position	12 mA	-		12 mA	-
EMC immunity (Norm)	ISO 11452-5:2000 ISO7637-2:2004				
EMC emission (Norm)	DIN EN 55025:2003				
Operating voltage min.	10 V DC				
Operating voltage max.	30 V DC				
Current consumption	24 mA		56 mA		
Load resistance min.	-	10000 Ohm	-		10000 Ohm
MTTF	29.6 a	29.3 a	29.6 a		29.3 a
Load resistance max.	200 Ohm	-		200 Ohm	-
Short-circuit resistance to GND	no				
Short-circuit resistance to supply	no				
Linearity error	typ. +-1 %				
Repeating accuracy	<= 25°: 0,2°, >25°: 0,5 °				
Signal update rate	100 Hz				
Technology	MEMS				

Electrical data

Attribute	N4.A1...	N4.A2...	N4.D0B...	N4.K1B...	N4.K2B...
Number of measurement axes (Number)	2				
Angle measuring range	(Selectable in 5° increments) $\pm 5^\circ \dots \pm 60^\circ$				
Initialisation time after power on/start-up time	500 ms				
Switching points	-		(Selectable in 0.5° increments) $\pm 1.5^\circ \dots \pm 60^\circ$		
Zero justification	$\pm 5^\circ$				
Vibration filter	40 Hz				
Switching output	-		2x NO		
Connection type (switching output)	-		Selectable		
Outputs	4...20mA	0,5...4,5V	Relay	4...20mA + relay	0,5...4,5V + relay
Temperature coefficient	0.008°/K				

Material information

Attribute	N4.A1...	N4.A2...	N4.D0B...	N4.K1B...	N4.K2B...
Housing material	Housing top: PBT; Housing cover: PC				

Environmental conditions

Attribute	N4.A1...	N4.A2...	N4.D0B...	N4.K1B...	N4.K2B...
Protection class	IP67 DIN EN 60529				
Operating temperature min.	-40 °C				
Max. operating temperature	70 °C				
Min. storage temperature	-40 °C				
Max. storage temperature	85 °C				
Min. cable temperature range, moving	-5 °C			-40 °C	
Max. cable temperature range, moving	80 °C				
Min. cable temperature range, fixed installation	-40 °C				
Max. cable temperature range, fixed installation	80 °C				
Shock resistance (Norm)	DIN IEC 68 Teil 2-27				
Vibration resistance (Norm)	DIN IEC 68 Teil 2-6 DIN IEC68-2-64				
Impact resistance (Norm)	max. 50 g				
ESD insulation resistance (Norm)	ISO 10605:2008				

Installation

Attribute	N4.A1...	N4.A2...	N4.D0B...	N4.K1B...	N4.K2B...
Torque for fastening screws	6 N m				
Weight	100 g				

Connection

Attribute	N4.A1...	N4.A2...	N4.D0B...	N4.K1B...	N4.K2B...
Connector type	Deutsch 8 pol.				
Cable length	Variable (1m, 3m, 5m, 10m)				
Connection	Deutsch, 8-pin / cable outlet				

Approvals

Attribute	N4.A1...	N4.A2...	N4.D0B...	N4.K1B...	N4.K2B...
CE label	yes				