NORDIC TRANSDUCER

NM2-05i, NM2-10i, NM3-30i, NM4-45i, NM4-80i

Inclinometers of high accuracy with integrated 4...20mA signal conditioner inside a robust stainless steel housing for measurement ranges between ±5 and ±80 degrees

Features

- **integrated sensor electronics including signal conditioner**
- **temperature-compensated normalized 4...20mA current-output**
- **2-wire connection, sensor powered by current loop**
- **linear output characteristic**
- **high accuracy**
- **high linearity**
- **high long-term stability**
- **hysteresis-free output**
- **very robust stainless steel housing**
- **no interference of ambient electromagnetic fields**
- **shock-proof since without moving mechanical parts**
- **hermetically sealed (IP67)**
- **sensor electrically isolated from point of measurement - no ground connection**
- **zero point adjustable through 360° using clamping ring**
- **loop current limitation**
- **EMC certified**
- **small size, light weight**

Description

NM2i, NM3i and NM4i contain the sensor electronics within a very solid housing. These are made up of a highly stable, laser-trimmed signal conditioner with electronic compensation for temperature drift, highly stable supply voltage regulation circuitry and low-pass filtering of the measurement signal to eliminate unwanted noise.

The sensor electronics require minimal power and, together with the capacitive primary transformer, are characterised by low errors, high signal-to-noise ratio and high long-term stability. The power is obtained from the current loop of the signal output, thereby eliminating the need for a separate power supply and enabling operation with a two wire connection.

The capacitive fluid-based inclinometers feature a very stable, linear relationship between the inclination measured and the normalized current output signal. Unlike spring-mass systems like MEMS sensors, they are not influenced by differences of gravity depending on the place of measurement. Thus, the exactly same accurate inclination will be measured in Europe, Australia, on Mount Everest or even the Moon.

Application

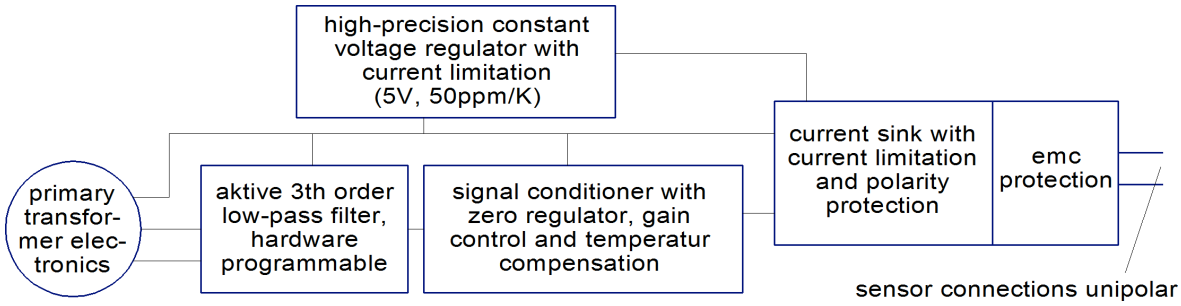
NM2i, NM3i and NM4i are suitable for applications requiring high measurement accuracy, high linearity and high temperature-stability as well as high long-term stability and measurement of wide inclination ranges in rough environments for which power is to be supplied via a 4...20mA current-loop without the need for a separate supply voltage. They are used in construction, mining, vehicles, ships, aircraft, transportation, conveyor systems, fabrication and safety monitoring.

Specification

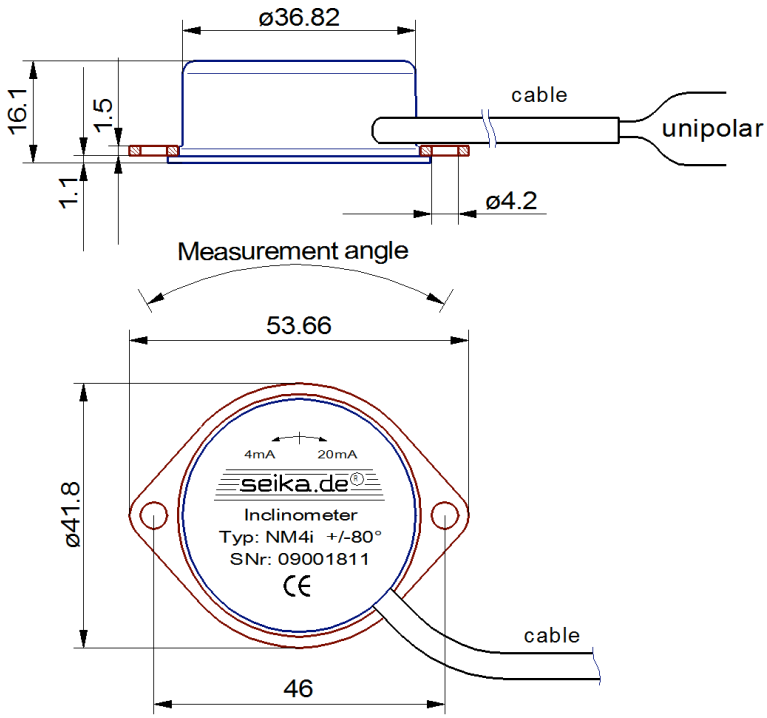
Model	NM2-05i	NM2-10i	NM3-30i	NM4-45i	NM4-80i
Measuring ranges[1] (other range on request)	±5°	±10°	±30°	±45°	±80°
Resolution[2]	<0.001°	<0.001°	<0.004°	<0.01°	<0.01°
Normalized sensitivity (other normalization on request)[3]	1.6mA/°	0.8mA/°	0.266mA/°	0.1777mA/°	0.1mA/°
Deviation from linearity[3]	<0.15% F.S.				
Transverse sensitivity	<1% at 45° tilt				
Settling time	approx. 0.3 seconds				
Temperature drift of sensitivity	<approx. ±0.01% / K				
Temperature drift of zero point	<Approx. ±0.001 degrees / K				
Terminal voltage	10V ... 30V with either polarity!				
Current-output in zero position	12mA				
Minimum current loop	1.5mA … 3.5mA				
Maximum current loop	22mA … 26mA				
Housing	Stainless steel (V4A)				
Degree of protection	IP67				
Operating temperature	-40°C ... +85°C				
Lagertemperatur	-45°C ... +90°C				
Weight (without clamping ring and cable)	approx. 70 grams				
Standard electrical connection (any cable on request)	Standard cable: 0.5m long, Ø4.6 mm, 2 wires				

[1] Any measuring range between +/-5º and +/-80º can be choosen.
[2] Measured with KEITHLEY Multimeter 2000.
[3] Each individual sensor is measured before shipment. Accuracy, linearity, zero-point current output and sensitivity are specified in its datasheet which is shipped together with the sensor.

Block diagram



Dimensions (in mm)

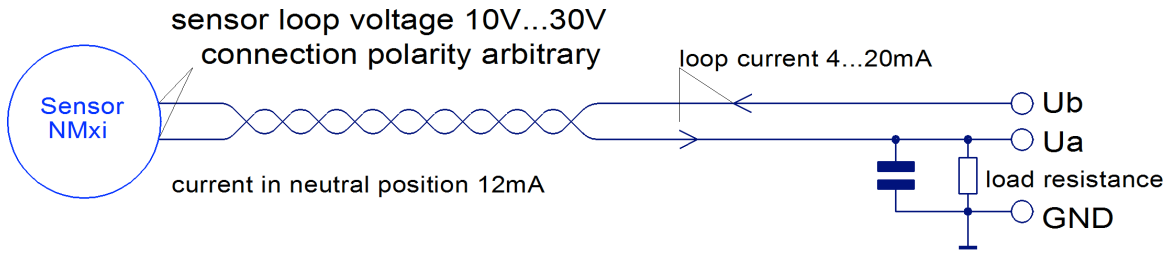


Housing completely is stainless steel

Adjust zero offset by turning housing
and fixing with the mounting ring

Max. torque for fixing ring is 1,3 Nm.

Connections



minimum loop current: 2,5mA ...3,5mA maximum loop current: 22mA ... 26mA

Ubmin = 10V + voltage drop along cable + voltage drop across load at 20mA

Ubmin = 10V + (20mA*R(cable)) + (20mA*R(load))

e.g.: (100m transmission wire 2x0,14mm^2 :)0,6V + (100 Ohm load:)2V + 10V = Ubmin = 12,6V

e.g.: (2km transmission cable 2x0,5mm^2 :)3,2V + (500 Ohm load:)10V + 10V = Ubmin = 23,2V