TEMPERATURE SENSORS FOR OUTDOOR PURPOSES WITH A PLASTIC ENCLOSURE

DESCRIPTION AND APPLICATION

These resistance-type sensors are intended for contact temperature measurement of gaseous substances. The plastic enclosure is provided with a cable outlet bushing (terminal board is located in the head) or a connector. The standard temperature range in which the sensors are allowed to be utilised is -30 to +100 °C. The sensors can be utilised for control systems that are compatible with sensing element output signals or output signals quoted in the table of sensing element types. Easy mounting of the temperature sensor is ensured by the unique "**S head**" design. The sensors are designed to be operated in a chemically non-aggressive environment.

version A

version B

ACCESSORIES

- For the version with connector:
  - led-in connector ELKA 4012 or RKCS 4/9
  - connection cable with the straight-type RKT connector
  - connection cable with the rectangular-type RKWT connector.

DECLARATION, CERTIFICATES, CALIBRATION

Declaration of Conformity – in accordance with EN ISO/IEC 17050-1 standard as amended for sensors with resistance output.
EC Declaration of Conformity – in accordance with Act No. 22/1997 Coll. as amended for sensors with an output of 4 to 20 mA, 0 to 10 V and frequency.
Calibration – we perform standard calibration of resistance temperature sensors in accordance with EN ISO/IEC 17025 standard in the temperature range of the stated type of sensor.

Caution: The temperature sensors with the output 4–20 mA and frequency output can be delivered with the new enclosure only in the version A.

We also offer these sensors in the design for explosive environments – see catalogue data sheet no. 13.4.

SPECIFICATIONS

BASIC DATA

Sensor type (K – with connector)	NS 110x NS 110xK	NS 111x NS 111xK	NS 112x NS 112xK	NS 310x NS 310xK	NS 311x NS 311xK
Type of sensing element	Ni 1000/5000	Ni 1000/6180	Ni 891	Ni 10000/5000	Ni 10000/6180
Measuring range	-30 to 100 °C				
Maximum measuring DC current	1 mA	1 mA	1 mA	0.3 mA	0.3 mA

Sensor type (K – with connector)	NS 113x NS 113xK	PTS 110x PTS 110xK	PTS 210x PTS 210xK	PTS 310x PTS 310xK	HS 110x HS 110xK
Type of sensing element	T1 = Ni 2226	PT 100/3850	PT 500/3850	PT 1000/3850	thermistor NTC 20 kΩ
Measuring range	-30 to 100 °C				
Maximum measuring DC current	0.7 mA	3 mA	1.5 mA	1 mA	1 mW *)

*) maximum power consumption

Sensor type (K – with connector)	NS 510A NS 510AK	NS 710x NS 710xK	NS 810A NS 810AK	Note
Type of sensing element	Pt 1000/3850	Pt 1000/3850	Pt 1000/3850	
Output	4 to 20 mA	0 to 10 V	1 to 5 kHz 2 to 10 kHz 3 to 15kHz	
Measuring ranges	-30 to 60 °C	-30 to 60 °C	Any measuring range, minimum span 50 °C	Enclosure ambient temperature -30 to 80 °C; for NS 810AK -30 to 70 °C
	0 to 35 °C	0 to 35 °C		
	0 to 100 °C	0 to 100 °C		
	0 to 150 °C	0 to 150 °C		
Voltage supply (V_{CC})	11 to 30 V DC	15 to 30 V DC	8 to 30 Vss	Recommended value 24 V DC; Recommended power supply for NS 820(K) 12 V DC Axima AXSP3P02012
Maximum ripple V_{CC}	0.5 %	0.5 %	0.5 %	
Load resistance Rz	$50(V_{CC}-10)$ Ω	> 50 kΩ	> 1 kΩ	
Output signal - sensing element break	> 24 mA	> 10.5 V	Adjustable (< low range or high range>)	
Output signal - sensing element short	< 3.5 mA	~ 0 V		

Note: x = version A or version B

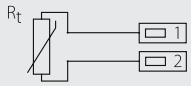
OTHER PARAMETERS

Accuracy class	Ni sensing elements: B class, $\Delta t = \pm (0.4 + 0.007t)$, for $t \geq 0$; $\Delta t = \pm (0.4 + 0.028\|t\|)$, for $t \leq 0$ in °C; Pt sensing elements: B class according to IEC 751, $\Delta t = \pm (0.3 + 0.005\|t\|)$ in °C NTC 20 kΩ: ± 1 °C for the range 0 to 70 °C
Measuring error	< 0.6 % of the measuring range, minimum 0.5 °C NS 820(K) 0.5 °C for range with a span < 100 °C, < 0.6% of the range with a span > 100 °C
Sensor connection	according to the wiring diagram
Standard length of the stem (version A)	for resistance output and for output 0 to 10 V - 25 mm for output 4 to 20 mA - 50 mm
Response time	$\tau_{0.5}$ < 9 s (in streaming air at 1m s^{-1}) – version A $\tau_{0.5}$ ≤ 30 s (in streaming air at 1m s^{-1}) – version B
Recommended wire cross section – sensors with grommet	0.35 to 1.5 mm^2
Type of connector in the head – sensors with connector	RSFM4 - Lumberg
Insulation resistance	> 200 MΩ at 500 V DC, 25° ± 3 °C; humidity < 85 %
Ingress protection	IP 65 according to EN 60 529
Material of the sensor stem	stainless steel 1.4301 – version A
Material of the enclosure	POLYAMID
Operating conditions	ambient temperature: -30 to 100 °C; -30 to 80 °C with a converter; -30 to 70 °C with frequency output relative humidity: max. 85 % ((at the ambient temperature 25 °C) atmospheric pressure: 87 to 107 kPa
Weight	approximately 0.15 kg

WIRING DIAGRAM

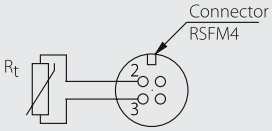
SENSOR WITH THE GROMMET:

With a resistance output



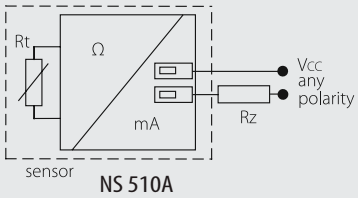
SENSOR WITH CONNECTOR:

With a resistance output

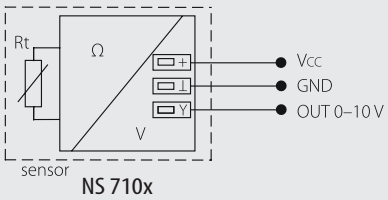


SENSOR WITH THE GROMMET:

With a converter

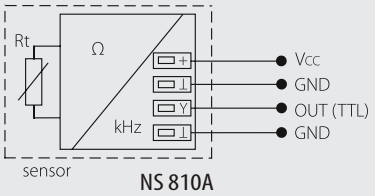


NS 510A



NS 710x

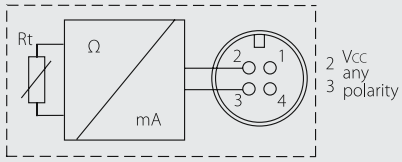
With frequency output



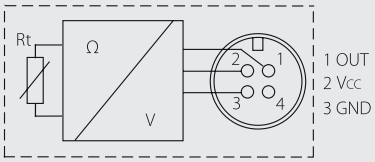
NS 810A

SENSOR WITH CONNECTOR:

With a converter

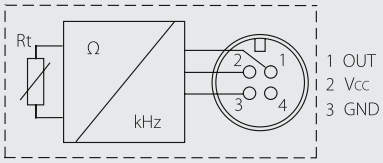


NS 510AK



NS 710xK

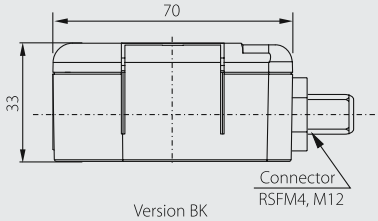
With frequency output



NS 810AK

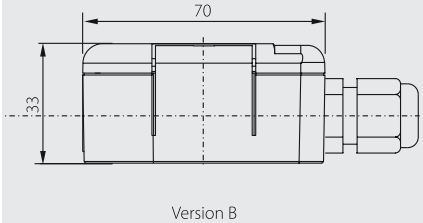
DIMENSIONAL DRAFT

Sensors with connector

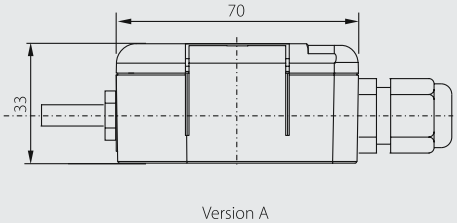


Version BK

Sensors with the grommet:



Version B



Version A

SENSOR INSTALLATION AND SERVICING

SENSORS WITH GROMMET:

Before connecting the supply lead-in cable, lift off the lid of the plastic enclosure by means of a flat screwdriver. The lead-in cable is connected to the terminals according to the wiring diagram through the loosened grommet. The recommended wire cross section is 0.35 to 1.5 mm^2, the outer diameter of the circular cross-section cable can range between 4 and 8 mm. To ensure the ingress protection value of IP 65, the grommet has to be tightened and the lid has to be put on after connecting the lead-in cable.

SENSORS WITH CONNECTOR:

The lead-in cable with connector is connected to the connector RSFM4, which is the part of the sensor head. Optionally the stand-alone connector ELKA 4012, or a lead-in cable of the length of 5 m equipped with a straight-type RKT connector, or with a rectangular-type RKWT connector may be delivered. To ensure the ingress protection value of IP 65 the connectors and the lid of sensor have to be tightened and checked. In case the lead-in cable is laid in the vicinity of high voltage conductors or those supplying equipment creating disturbing electromagnetic field (e.g. inductive load equipment), a shielded cable should be used. The openings for the plastic clip installation have to be drilled according to the dimensioned sketch on which the opening diameters and the distances of their centres are illustrated. After installing and connecting the sensor to the sequential evaluating electrical equipment the sensor is ready to use. The sensor does not require any special servicing or maintenance. The device can be operated in any working position, but the grommet must not be directed upwards. Sensors are mounted by means of two methods: a)directly on flat surface by means of two screws ∅ 4.5 mm in the openings placed in head corners. The 13 mm (distance to the barrier in the enclosure) must be added to the necessary length for fastening to a basis; b) by means of the side holder which should be fastened for example on a wall by means of two screws ∅ 4.5 mm. To ensure the tightness it is necessary to tighten the grommet carefully. During closing of the head by means of the lid the clips should be snapped in original position.

CUSTOMER SPECIFIC MODIFICATIONS

REGARDING TO SENSORS MANUFACTURED IN A STANDARD VERSION THE FOLLOWING PARAMETERS CAN BE MODIFIED:

- option enclosing two sensors
- option enclosing non-standard temperature sensors (DALLAS, TSic, KTY, SMT, etc.)
- class A precision type of temperature element (with the exception of sensors Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, thermistor NTC 20 kΩ)
- option of three- or four-wire connection