

DESCRIPTION AND APPLICATION

These resistance-type sensors are intended for contact temperature measurement of gaseous substances. The sensor consists of a metal measuring stem and a plastic connection head. The sensor stem is made of the stainless steel EN X5CrNi18-10 (DIN 1.4301), the stem length is 25 mm. The plastic connection head is provided with a cable outlet bushing (terminal board is located in the head) or a connector. All these sensor types meet the IP 65 ingress protection requirements according to the EN 60 529 standard. The connector ELKA 4012 or connecting cables with the straight-type RKT connector or the rectangular-type RKWT connector can be delivered for the version with connector as accessories.

The sensor types can be utilised for outdoors temperature measurement or in industrial areas. The sensors can be utilised for any control system that is compatible with sensing element output signals or active output signals quoted in the table of specifications.

The standard temperature range in which the sensors are allowed to be utilised is -30 to +100°C. The sensors are designed to be operated in a chemically non-aggressive environment.

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



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	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	Note
Type of sensing element	Pt 1000/3850	Pt 1000/3850	
Output	4 to 20 mA	0 to 10 V	
Measuring ranges	-30 to 60 °C	-30 to 60 °C	Connection head ambient temperature -30 to 80 °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 (U_{NAP})	11 to 30 V DC	15 to 30 V DC	Recommended value 24 V DC
Maximum ripple U_{NAP}	0,5 %	0,5 %	
Load resistance R_z	$50(U_{NAP}-10) \Omega$	> 50 kΩ	
Output signal - sensing element break	> 24 mA	> 10,5 V	
Output signal - sensing element short	< 3,5 mA	~ 0 V	

Note: x = version A or version B

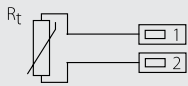
OTHER PARAMETERS:

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
Sensor connection	according to the wiring diagram
Standard length of the stem	25 mm
Time response	$\tau_{0,5} < 9$ s (in streaming air at 1 m s^{-1}) – version A $\tau_{0,5} \leq 30$ s (in streaming air at 1 m 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, $25^\circ \pm 3$ °C; humidity < 85 %
Ingress protection	IP 65 according to EN 60 529
Material of the sensor stem	stainless steel EN X5CrNi18-10 (DIN 1.4301) – version
Material of the connection head	POLYAMID
Operating conditions	ambient temperature: -30 to 100 °C; -30 to 80 °C with a converter relative humidity: max. 85 % ((at the ambient temperature 25 °C) atmospheric pressure: 87 to 107 kPa
Mass	approximately 0,15 kg

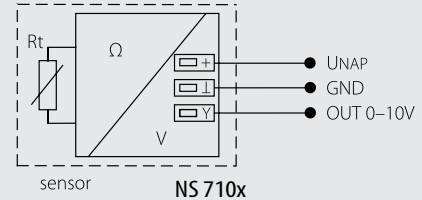
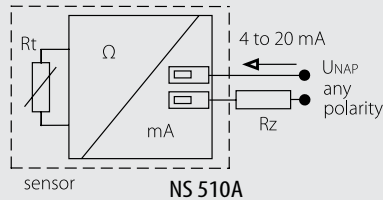
WIRING DIAGRAM

TEMPERATURE SENSOR WITH BUSHING:

With a resistance output

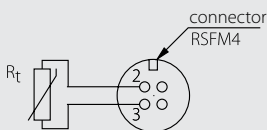


With a converter

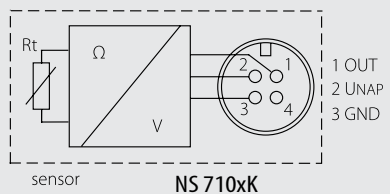
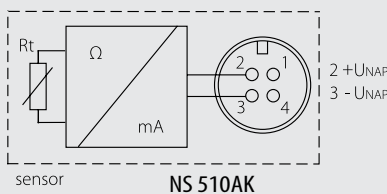


TEMPERATURE SENSOR WITH CONNECTOR:

With a resistance output

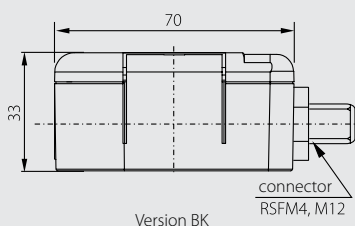


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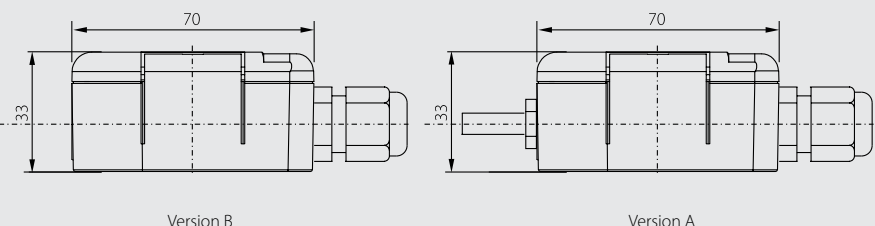


DIMENSIONAL DRAFT

Temperature sensors with connector



Temperature sensors with bushing:



SENSOR INSTALLATION AND SERVICING

SENSORS WITH GROMMET: Before connecting the supply lead-in cable, lift off the lid of the plastic connection head 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 mm², the outer diameter of the circular cross-section cable can range between 4 and 8 mm. To insure 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 ELKA4012, 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 insure 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 \varnothing 4,5 mm in the openings placed in head corners. The dimension 13 mm (distance to the barrier in the connection head) 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 \varnothing 4,5 mm. To insure 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 origin position.

CUSTOMER SPECIFIC MODIFICATIONS

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

- possibility to encapsulate two sensing elements
- A class of accuracy (except for the sensing elements
Ni 10000/5000, Ni 10000/6180, Ni 2226, thermistor NTC 20 k Ω)
- possibility to use a 3-wire or a 4-wire connection
- possibility to encapsulate other resistance-type elements for temperature measurements: KTY, SMT 160 - 30 etc.

HOW TO ORDER

Temperature sensors for outdoor usage	1	A	1	C	C	D	D	0	0	0	0	0	0	0	E
plastic connection head		0													
plastic connection head with connector		3													
output 4–20 mA				0	A										
output 0–10 V				0	V										
Ni 1000/5000 (N1), class B				0	1										
Ni 1000/5000 (N1), class A				0	2										
Ni 1000/6180 (N1A), class B				0	3										
Ni 1000/6180 (N1A), class A				0	4										
Pt 100/3850, class B				0	6										
Pt 100/3850, class A				0	7										
Pt 500/3850, class B				0	9										
Pt 500/3850, class A				1	0										
Pt 1000/3850, class B				1	1										
Pt 1000/3850, class A				1	2										
Ni 891				1	4										
NTC 20 k Ω				1	5										
Ni 2226				1	6										
Ni 10000/5000 (N10), class B				1	7										
Ni 10000/6180 (N10A), class B				1	8										
with resistive output						0	0								
-30 to 60 °C						0	1								
0 to 35 °C						0	2								
0 to 100 °C						0	3								
0 to 150 °C						0	4								
version A															A
version B															B

WHEN ORDERING GOODS, THE FOLLOWING DATA ARE REQUIRED:

Required data	Example	Required data	Example
Product type	NS 111A	Product type	NS 510AK
Resistance type/4 to 20 mA/0 to 10 V	Resistance-type out. (Ni 1000/6180)	Temperature range	-30 to 60 °C
Temperature range		Lead-in connector	NO

The accuracy class is the B class if not stated otherwise.

DELIVERY

The sensors are packed in the box by 1 piece.

Each delivery contains, if not agreed with the customer otherwise: a plastic side holder.

In addition, the following may be provided together with the product: the link connector ELKA4012, the lead-in cable provided by the straight-type RKT connector, the lead-in cable provided by the rectangular-type RKWT connector, a calibration sheet, the EU Declaration of Conformity (for the NS 510A, NS 510AK, NS 710x and NS 710xK).