

DESCRIPTION AND APPLICATION

These resistance-type sensors are intended for contact temperature measurements of liquid and gaseous substances. The sensor consists of a plastic connection head and a metal measuring stem with a diameter of 4 mm the part of which is a G 1/2" screwed joint. The sensor stem is made of the stainless steel EN X5CrNi18-10 (DIN 1.4301). The basic lengths of the measuring stems are 50, 100, 160 and 220 mm. The plastic connection head is provided with a cable outlet ending (the terminal board is placed inside the connection head) or with a connector. All these sensor types meet the IP 65 ingress protection requirements according to the EN 60 529 standard. Connector ELKA4012 or lead-in cables with the straight RKT connector or the rectangular-type RKWT connector can be delivered as accessories for the version with connector.

The structure of the sensor stem makes it possible to utilise the sensor for direct temperature measurements in tubing, and provides for a fast sensor response to temperature changes. The sensors can be utilised for any control system that is compatible with sensing elements or active output signals quoted in the sensing element specification table.

The standard temperature range in which the sensors are allowed to be utilised is -30 to +130 °C. The sensors are designed to be operated in a chemically non-aggressive environment



MAXIMUM STREAM VELOCITY OF THE MEASURED MEDIUM - AIR AND WATER VAPOUR / WATER [m.s⁻¹]

Length of the stem	up to 60 mm	> 60 to 100 mm	> 100 to 160 mm	> 160 to 220 mm
Values for diameter of the stem 4 mm	8 / 0,8	6 / 0,6	3,2 / 0,4	1,0 / 0,25

SPECIFICATIONS

BASIC DATA

Sensor type (K – with connector)	NS 160 NS 160K	NS 161 NS 161K	NS 162 NS 162K
Type of sensing element	Ni 1000/5000	Ni 1000/6180	Ni 891
Measuring range	-30 to 130 °C (Connection head ambient temperature -30 to 100 °C)		
Maximum measuring DC current	1 mA	1 mA	1 mA

Sensor type (K – with connector)	PTS 160 PTS 160K	PTS 260 PTS 260K	PTS 360 PTS 360K	HS 160 HS 160K
Type of sensing element	PT 100/3850	PT 500/3850	PT 1000/3850	thermistor NTC 20 kΩ
Measuring range	-30 to 130 °C (Connection head ambient temperature -30 to 100 °C)			
Maximum measuring DC current	3 mA	1,5 mA	1 mA	10 mW *)

*) maximum power consumption

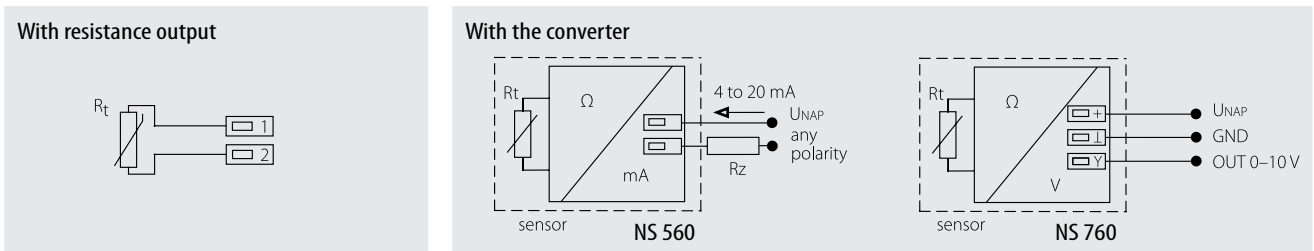
Sensor type (K – with connector)	NS 560 NS 560K	NS 760 NS 760K	Note
Type of sensing element	Pt 1000/3850	Pt 1000/3850	
Output signal	4 to 20 mA	0 to 10 V	
Measuring ranges	-30 to 60 °C	-30 to 60 °C	Connection head ambient temperature -30 to 80 °C
	0 to 35 °C	0 to 35 °C	
	0 to 100 °C	0 to 100 °C	
	0 to 150 °C	0 to 150 °C	
Power supply (U _{NAP})	11 to 30 V DC	15 to 30 V DC	Recommended value 24 V DC
Maximum voltage ripple U _{NAP}	0,5 %	0,5 %	
Load resistance	50(U _{NAP} -10) Ω	> 50 kΩ	
Output signal - sensing element break	> 24 mA	> 10,5 V	
Output signal - sensing element short	< 3,5 mA	~ 0 V	

OTHER PARAMETERS:

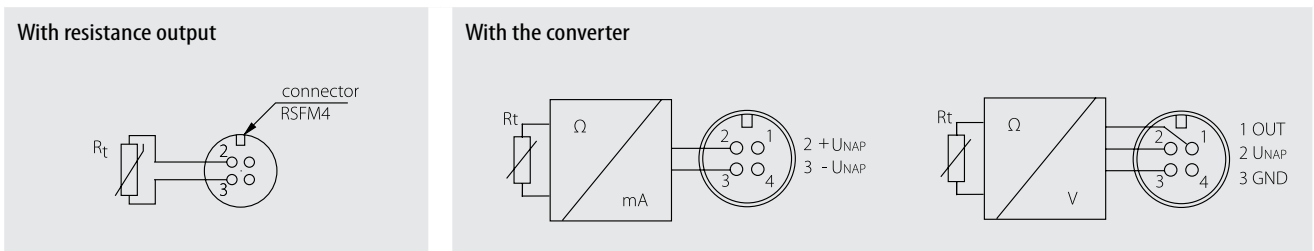
Accuracy class	Ni sensing elements: class B, $\Delta t = \pm (0,4 + 0,007t)$, for $t \geq 0$; $\Delta t = \pm (0,4 + 0,028 t)$, for $t \leq 0$ in °C; Pt sensing elements: class B according to IEC 751, $\Delta t = \pm (0,3 + 0,005 t)$ in °C NTC 20 k Ω : ± 1 °C for the range 0 to 70 °C
Measuring error for NS 560 and NS 760	< 0,6 % of the measuring range, minimum 0,5 °C
Sensor connection	according to the wiring diagram
Standard length of stem L1	50, 100, 160, 220 mm
Diameter of the stem	4 \pm 0,1 mm
Standard thread	G 1/2"
Nominal pressure of the stem	PN 25
Time response	$\tau_{0,5} < 4$ s (in streaming water at 0,4 m.s ⁻¹)
Recommended wire cross section - sensors with the grommet	0,35 to 1,5 mm ²
Type of connector in the head - sensors with connector	RSFM4 – Lumberg, M12
Insulation resistance	> 200 M Ω at 500 V DC, 25° \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)
Material of 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

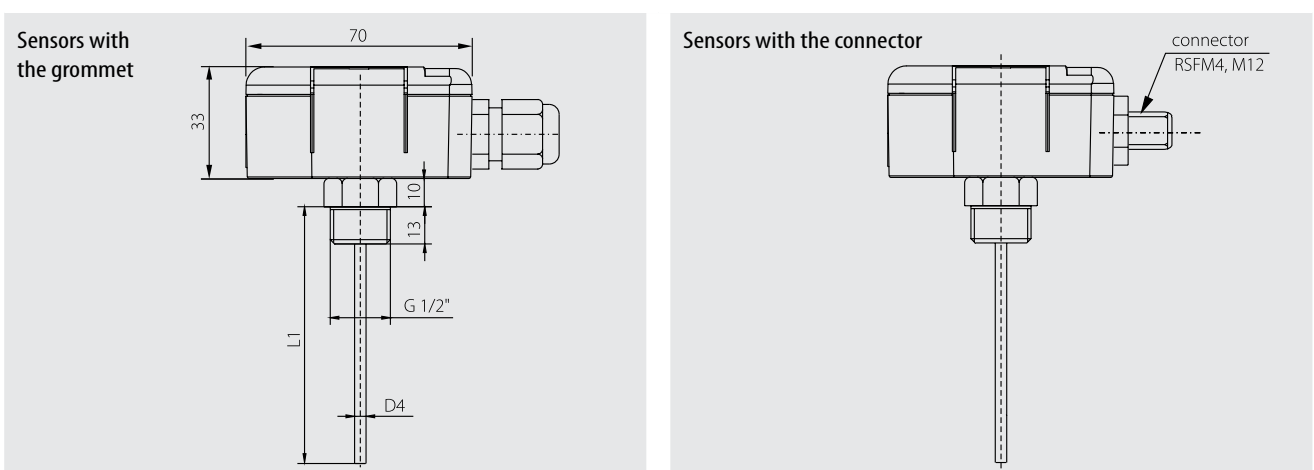
SENSORS WITH THE GROMMET:



SENSORS WITH THE CONNECTOR:



DIMENSIONAL DRAFT



SENSOR INSTALLATION AND SERVICING

Before connecting the supply lead-in cable, position the sensor in the location of temperature measurement.

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: According to the wiring diagram, the lead-in cable with connector is connected to the connector RSFM4, which is 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 connector of RKT type, or with a rectangular connector of RKWT type 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. After installing and connecting the sensor to the appropriate evaluating electrical equipment the sensor is ready to use. The sensor does not require any special attendance or maintenance. The device can be operated in any working position, but the grommet must not be directed upwards.

CUSTOMER SPECIFIC MODIFICATIONS

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

- possibility to use a 3 wire or a 4 wire connection (internal sensor wiring as far as the terminal board using two wires)
- A class of accuracy (except for the Ni 10000/5000, Ni 10000/6180, Ni 2226, and the thermistor NTC 20 kΩ sensing elements)
- changing the stem version: another thread type, another stem diameter (may influence the response time)

HOW TO ORDER

Fast response temperature sensors

	1	A	4	C	C	D	D	0	1	0	G	G	G
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 kΩ				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						
Stem length L1													
								50 mm	0	5	0		
								100 mm	1	0	0		
								160 mm	1	6	0		
								220 mm	2	2	0		

WHEN ORDERING GOODS, THE FOLLOWING DATA ARE REQUIRED:

Required data	Example	Required data	Example
Product type	NS 161	Product type	NS 560K
Stem length	160 mm	Temperature range	-30 to 60 °C
Resistance type / 4 to 20 mA / 0 to 10 V	resistance-type output (Ni 1000/6180)	Stem length	160 mm
Temperature range	–	Link connector	NO
		Lead-in cable with connector	YES

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

DELIVERY

The sensors are packed in the box by 1 or 2 pieces.

Each delivery contains, if not agreed with the customer otherwise: a pasteboard box designated by a name plate
In addition, the following may be provided together with the product:

- a calibration sheet; the EU Declaration of Conformity (for the NS 560, NS 560K, NS 760 and NS 760K sensors).