

# FAST RESPONSE TEMPERATURE SENSORS WITH A PLASTIC CONNECTION HEAD



## DESCRIPTION AND APPLICATION

These resistance-type sensors are intended for contact temperature measurements of liquid or gaseous substances. The plastic connection head is provided with a cable outlet ending (the terminal box in the connection head) or a connector. The structure of the sensor's stem enables the sensor to be used for direct measuring of the temperature in ducts and also ensures quick response of the sensor to changes in temperature. The standard operating temperature range is -30 to 130 °C. The sensors can be utilised for any 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 invented by Sensit s.r.o. The sensors are designed to be operated in a chemically non-aggressive environment.



## 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.

### MAXIMUM STREAM VELOCITY OF THE MEASURED MEDIUM - AIR AND WATER VAPOUR / WATER [m.s<sup>-1</sup>]

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	-50 to 130 °C (Connection head ambient temperature -30 to 100 °C)			-30 to 130 °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	NS 860 NS 860K	Note
Type of sensing element	Pt 1000/3850	Pt 1000/3850	Pt 1000/3850	
Output signal	4 to 20 mA	0 to 10 V	1 to 5 kHz 2 to 10 kHz 3 to 15 kHz	
Measuring ranges	-50 to 50 °C -30 to 60 °C 0 to 35 °C 0 to 100 °C 0 to 150 °C	-30 to 60 °C 0 to 35 °C 0 to 100 °C 0 to 150 °C	Any measuring range, minimum span 50 °C	Connection head ambient temperature -30 to 80 °C; for NS 820(K) -30 to 70 °C
Power supply (V <sub>CC</sub> )	11 to 30 V DC	15 to 30 V DC	8 to 30 V DC	Recommended value 24 V DC; Recommended power supply for NS 820(K) 12 V DC Aximia AXSP3P02012
Maximum voltage ripple V <sub>CC</sub>	0,5 %	0,5 %	0,5 %	
Load resistance	50(V <sub>CC</sub> -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		

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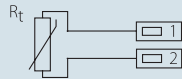
## OTHER PARAMETERS

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 $\Omega$ : $\pm 1$ °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	$t_{0.5} < 4$ s (in streaming water at 0.4 m.s <sup>-1</sup> )
Recommended wire cross section - sensors with the grommet	0.35 to 1.5 mm <sup>2</sup>
Type of connector in the head - sensors with connector	RSFM4 – Lumberg, M12
Insulation resistance	> 200 M $\Omega$ 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 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

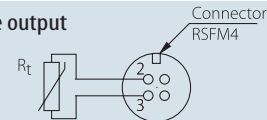
### SENSOR WITH THE GROMMET:

With resistance-type output



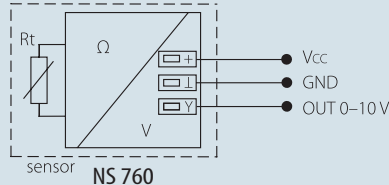
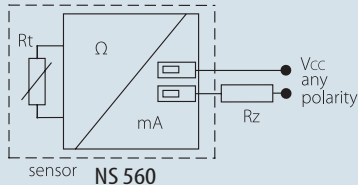
### SENSOR WITH THE CONNECTOR:

With resistance-type output

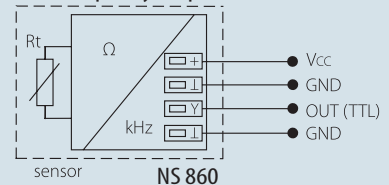


### SENSOR WITH THE GROMMET:

With the converter

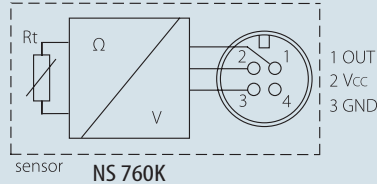
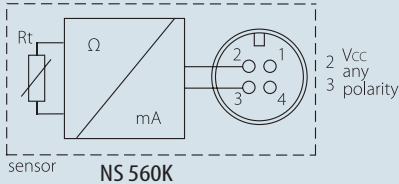


With frequency output

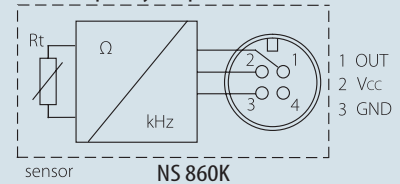


### SENSOR WITH THE CONNECTOR:

With the converter

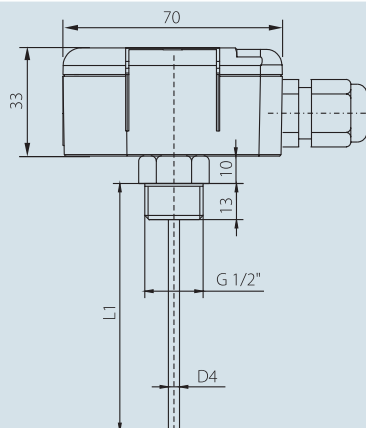


With frequency output

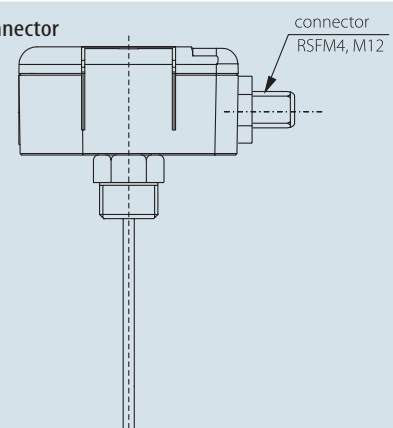


## DIMENSIONAL DRAFT

Sensors with the grommet



Sensors with the connector



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### ■ 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 mm<sup>2</sup>, 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 ELKA 4012, 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:

- A class precision (with the exception of sensor termistor NTC 20 kΩ)
- option of three- or four-wire connection
- variable stem design – L1 length, materials, diameters, option of thread design