

# TEMPERATURE SENSORS WITH A STEM AND PLASTIC CONNECTION HEAD

038.17en

## 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 board is placed in the connection head) or a connector. The sensor-central holder combination is suitable for temperature measurements in air condition ducts. The sensor-thermowell combination is suitable for temperature measurements in tubing. The sensor variant with welded thread is ideal for direct measuring of mediums in ducts. The standard operating temperature range is -30 to 150 °C. By using a sensor with a longer stem the upper limit of allowable temperature can be extended up to 250 °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

- central plastic holder (part of the packaging)
- stainless steel thermowell JS 130
- metal central holder K 120
- lead-in connector CONEC 43-00092
- connection cable with the straight-type RKT connector or with the rectangular - type RKWT connector
- screw with collet or cutting rings – if different lengths of stem immersion of the temperature sensor are set

## DECLARATION, CERTIFICATES, CALIBRATION

Manufacturer provides **EU Declaration of Conformity**.

**Calibration** – The final metrological inspection – comparison with standards or working instruments – is carried out for all the products. Continuity of the standards and working measuring instruments is ensured within the meaning of the Section 5 of Act no.505/1990 on metrology. The manufacturer offers a possibility to supply the sensors calibrated in SENSIT s.r.o.'s laboratory (according to requirements of the EN ISO/IEC 17025 standard, as amended) or in an Accredited laboratory.

## SPECIFICATIONS

Sensor type (K – with connector)	NS 120 NS 120K	NS 121 NS 121K	NS 122 NS 122K	NS 320 NS 320K	NS 321 NS 321K
Type of sensing element	Ni 1000/5000	Ni 1000/6180	Ni 891	Ni 10000/5000	Ni 10000/6180
Measuring range	-30 to 150 °C				
Maximum measuring DC current	1 mA	1 mA	1 mA	0.3 mA	0.3 mA

Sensor type (K – with connector)	NS 123 NS 123K	PTS 120 PTS 120K	PTS 220 PTS 220K	PTS 320 PTS 320K	HS 120 HS 120K
Type of sensing element	T1 = Ni 2226	Pt 100/3850	Pt 500/3850	Pt 1000/3850	thermistor NTC 20 kΩ
Measuring range	-30 to 150 °C	-50 to 150 °C (connection head ambient temperature -30 to 100 °C)			-30 to 150 °C
Maximum measuring DC current	0.7 mA	3 mA	1.5 mA	1 mA	10 mW *)

\*) maximum power consumption

## OTHER PARAMETERS ↓

Sensor type (K – with connector)	NS 520 NS 520K	NS 720 NS 720K	Note
Type of sensing element	Pt 1000/3850	Pt 1000/3850	
Output signal	4 to 20 mA	0 to 10 V	
Measuring ranges**)	-50 to 50 °C -30 to 60 °C 0 to 35 °C 0 to 100 °C 0 to 150 °C 0 to 200 °C 0 to 250 °C	-30 to 60 °C 0 to 35 °C 0 to 100 °C 0 to 150 °C 0 to 200 °C 0 to 250 °C	ambient temperature around the connection head -30 to 70 °C
Power supply (U)	11 to 30 V <sub>DC</sub>	15 to 30 V <sub>DC</sub>	recommended value 24 V <sub>DC</sub>
Load resistance	150 Ω for power supply 12 V 700 Ω for power supply 24 V	> 10 kΩ	
Output signal - sensing element break	> 24 mA	> 10.5 V	
Output signal - sensing element short circuit	< 3.5 mA	~ 0 V	

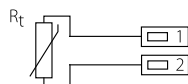
\*\*\*) According to the customer's requirement, it is possible to provide a customized measuring range from -40 to 150 °C; the minimum span of the range must be 35 °C (e.g. -20 to 15 °C; -30 to 80 °C)

Accuracy class	Ni sensing elements: class B, $t = \pm (0.4 + 0.007t)$ , for $t \geq 0$ ; $t = \pm (0.4 + 0.028 t )$ , for $t \leq 0$ in °C; Pt sensing elements: class B according to EN 60751, $t = \pm (0.3 + 0.005 t )$ in °C NTC 20 kΩ: $\pm 1$ °C for the range 0 to 70 °C
Measuring error for NS 520(K), NS 720(K)	< 0.6 % of the measuring range, minimum 0.5 °C
Sensor connection	according to the wiring diagram
Standard length of stem L1	70, 120, 180, 240, 300, 360, 420 mm
Time response	$\tau_{0.5} < 9$ s (in flowing 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
Insulation resistance	> 200 MΩ at 500 V <sub>DC</sub> , 25° ± 3 °C; humidity < 85 %
Ingress protection	IP 65 in accordance with EN 60529, as amended
Material of the sensor stem	stainless steel DIN 1.4301
Material of the connection head	POLYAMIDE
Operating conditions	ambient temperature: -30 to 100 °C; -30 to 70 °C with a converter relative humidity: max. 100 % (at the ambient temperature 25 °C) atmospheric pressure: 70 to 107 kPa
Weight approximately	0.15 kg

## WIRING DIAGRAM

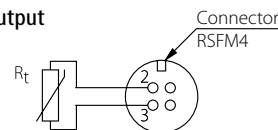
### SENSOR WITH THE GROMMET:

With resistance-type output



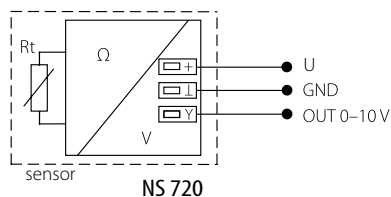
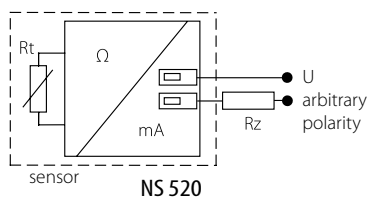
### SENSOR WITH THE CONNECTOR:

With resistance-type output



### SENSOR WITH THE GROMMET:

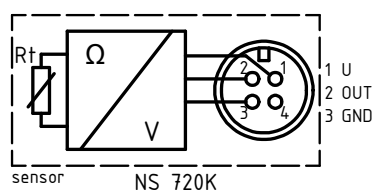
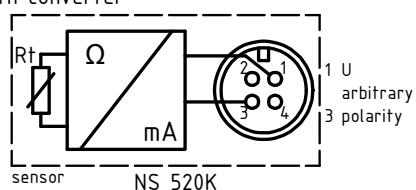
With the converter



## WIRING DIAGRAM

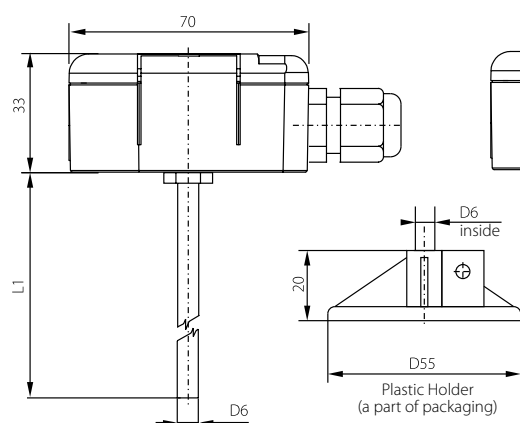
### SENSOR WITH THE CONNECTOR:

With converter

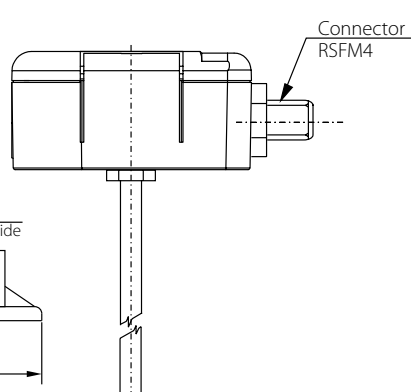


## DIMENSIONAL DRAFT

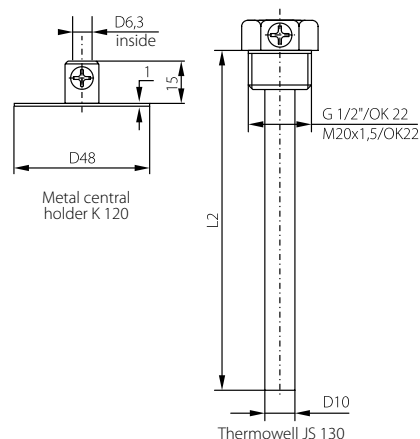
With the grommet



With the connector



Accessories



## MODIFICATION AND CUSTOMIZATION

- option of encasing two sensing elements
- option of encasing non-standard temperature sensors (DALLAS, TSic, KTY, SMT, etc.)
- accuracy class A (with the exception of sensors Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, termistor NTC 20 kΩ)
- option of three- or four-wire connection
- variable stem design – L1 length, materials, diameters, option of thread design
- thermowell thread type options
- possibility to provide custom temperature ranges for temperature sensors with converter

