

## CONTACT TEMPERATURE SENSORS WITH A PLASTIC CONNECTION HEAD



### DESCRIPTION AND APPLICATION

These resistance-type sensors are intended for contact surface temperature measurement. The sensors, which are available including the fastening strap and a closing device are suitable for temperature measurements on piping. The plastic connection head is provided with a cable outlet ending (the terminal board is placed in the connection head) or a connector. The standard operating temperature range is -30 to 130 °C. The proper sensing element is constructed to be isolated from the ambient influence. 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
- The thermal conductive paste up to 200 °C, 5g



### 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.

### SPECIFICATIONS

#### BASIC DATA

Sensor type (K – with connector)	NS 140 NS 140K	NS 141 NS 141K	NS 142 NS 142K	NS 340 NS 340K	NS 341 NS 341K
Type of sensing element	Ni 1000/5000	Ni 1000/6180	Ni 891	Ni 10000/5000	Ni 10000/6180
Measuring range	-30 to 130 °C (connection head ambient temperature -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 143 NS 143K	PTS 140 PTS 140K	PTS 240 PTS 240K	PTS 340 PTS 340K	HS 140 HS 140K
Type of sensing element	T1 = Ni 2226	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	0.7 mA	3 mA	1.5 mA	1 mA	1 mW *)

\*) maximum power consumption

Sensor type (K – with connector)	NS 540 NS 540K	NS 740 NS 740K	NS 840 NS 840K	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 840(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 Axima 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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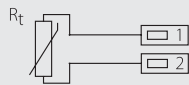
### OTHER PARAMETERS

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 540 and NS 740	< 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
Time response	$\tau_{0.5} < 3$ 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
Insulation resistance	> 200 M $\Omega$ at 500 V DC, 25° ± 3 °C; humidity < 85 %
Ingress protection	IP 65 according to EN 60 529
Material of the case	brass
Material of connection head	POLYAMID
Standard strap length	40 cm
Minimum pipe diameter	20 mm
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
Mass	approximately 0.15 kg

### WIRING DIAGRAM

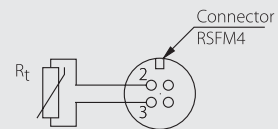
#### SENSORS WITH THE GROMMET:

With resistance output



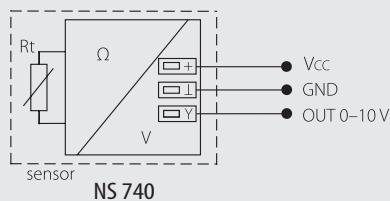
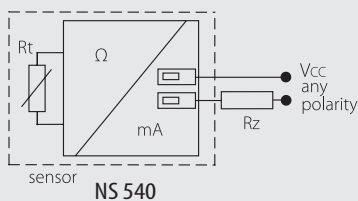
#### SENSORS WITH THE CONNECTOR:

With resistance output

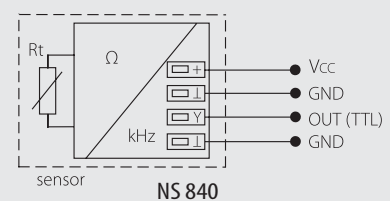


#### SENSORS WITH THE GROMMET:

With the converter

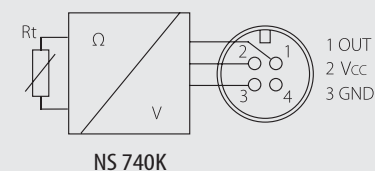
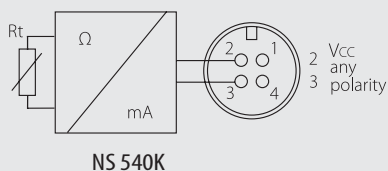


With frequency output

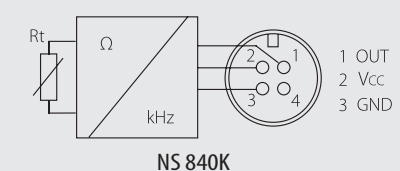


#### SENSORS WITH THE CONNECTOR:

With the converter

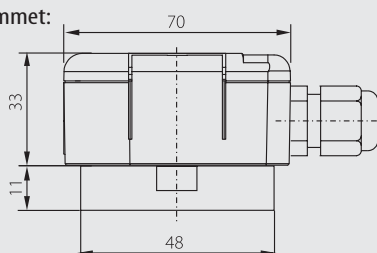


With frequency output

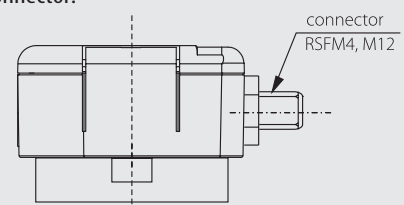


### DIMENSIONAL DRAFT

Sensors with the grommet:



Sensors with the connector:



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### ■ SENSOR INSTALLATION AND SERVICING

Before connecting the supply lead-in cable fasten the sensor on the pipe by means of the fastening strap.

#### 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:

The lead-in cable with connector is connected to the connector RSFM4, which is part of the sensor head according to the wiring diagram. Optionally the stand-alone connector ELKA 4012, or a lead-in cable 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 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:

- option of encasing two sensors
- option of encasing non-standard temperature sensors (DALLAS, TSic, KTY, SMT, etc.)
- A class precision (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
- various length of the fastening strap