

TEMPERATURE SENSORS WITH A STEM AND METAL CONNECTION HEAD



DESCRIPTION AND APPLICATION

These resistance-type sensors are intended for contact temperature measurements of liquid or gaseous substances. 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 200 °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. The sensors are designed to be operated in a chemically non-aggressive environment.

ACCESSORIES

- The metal central holder K120
- The thermowell JS 130

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.

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 | NK 120 | NK 121 | NK 122 | NK 320 | NK 321 |
|------------------------------|---|--------------|--------|---------------|---------------|
| Type of sensing element | Ni 1000/5000 | Ni 1000/6180 | Ni 891 | Ni 10000/5000 | Ni 10000/6180 |
| Measuring range | -30 to 200 °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 | NK 123 | PTK 120 | PTK 220 | PTK 320 | HK 120 |
|------------------------------|---------------|---|-------------|--------------|----------------------|
| 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 200 °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

| Sensor type | NK 520 | Note |
|--|--------------------------|--|
| Type of sensing element | Pt 1000/3850 | |
| Output signal | 4 to 20 mA | |
| Measuring ranges | -50 to 50 °C | connection head ambient temperature -30 to 80 °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 | | |
| Error of the measurement | < 0.6 % of the range | no less than 0.5 °C |
| Power supply (V _{CC}) | 10 to 30 V DC | recommended value 24 V DC |
| Maximum voltage ripple V _{CC} | 0.5 % | |
| Load resistance R _Z | 50(V _{CC} -9) Ω | |
| Output signal | > 24 mA | |
| - sensor element break | | |
| Output signal | < 3.5 mA | |
| - sensor element short | | |

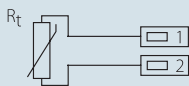
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OTHER PARAMETERS

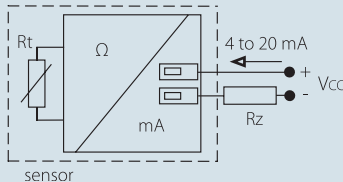
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|--------------------------------|--|
| Accuracy class | Ni sensing elements: B class, $\Delta t = \pm (0.4 + 0.007t)$, for $t \geq 0$; $\Delta t = \pm (0.4 + 0.028 t)$, for $t \leq 0$ in °C; Pt sensing elements: B class according to IEC 751, $\Delta t = \pm (0.3 + 0.005 t)$ in °C NTC 20 kΩ: ± 1 °C for the range 0 to 70 °C |
| Sensor connection | according to the wiring diagram |
| Standard length of the st | 70, 120, 180, 240, 300, 360, 420 mm |
| Time response | $\tau_{0.5} < 9$ s (in streaming water at 0.4 m.s ⁻¹) |
| Recommended wire cross section | 0.35 to 1.5 mm ² |
| Insulation resistance | > 200 MΩ at 500 V DC, 25° ± 3 °C; humidity < 85 % |
| Ingress protection | IP 54 according to EN 60 529 |
| Material of the stem | stainless steel 1.4301 |
| Type of connection head | LIMATHERM MA |
| Material of connection head | aluminium alloy |
| 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

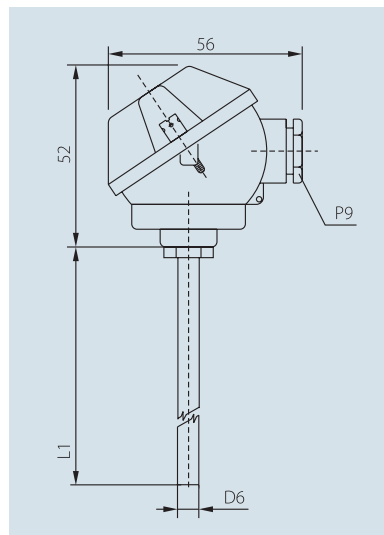
With the resistance output



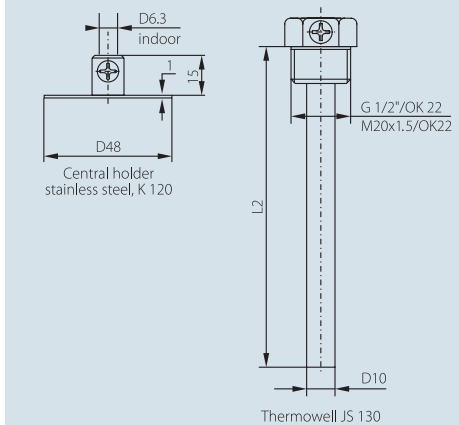
With a converter 4 to 20 mA



DIMENSIONAL DRAFT



Accessory



SENSOR INSTALLATION AND SERVICING

Before connecting the supply lead-in cable screw off the lid of the metal connection head. 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 54 the grommet has to be tightened and the lid has to be screwed on after connecting the lead-in cable.

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. In case of using a stainless steel thermowell or a stainless steel holder these accessories should be placed first in the location where the temperature will be measured. Then the sensor is inserted into the holder, or pushed as far as the thermowell bottom, and tightened with a screw. The openings for the stainless steel holder installation have to be drilled according to the attached template, on which the opening diameters are depicted, too. 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
- variable stem design – L1 length, materials, diameters, option of thread design
- thermowell thread type options