TEMPERATURE SENSORS WITH A STEM, MINI SERIES

DESCRIPTION AND APPLICATION

These resistance-type temperature sensors of serie MINI are designed for temperature measurements of liquid or gaseous substances in the temperature range -30 °C to 150 °C. The plastic enclosure 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 various media in ducts. 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 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 central plastic holder – it is part of the sensor
- The thermowell JS 130
- The metal central holder K120
- 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.
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)	MINI N 120 MINI N 120K	MINI N 121 MINI N 121K	MINI N 122 MINI N 122K	MINI N 320 MINI N 320K	MINI N 321 MINI N 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 (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)	MINI N 123 MINI N 123K	MINI P 120 MINI P 120K	MINI P 220 MINI P 220K	MINI P 320 MINI P 320K	MINI H 120 MINI H 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

Sensor type	MINI N 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	
Power supply (V_{CC})	10 to 30 V DC	Recommended value 24 V DC
Maximum voltage ripple V_{CC}	0.5 %	
Load resistance Rz	50(V_{CC}-9) Ω	
Output signal - sensing element break	> 24 mA	
Output signal - sensing element short	< 3 mA	

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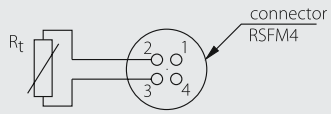
OTHER PARAMETERS

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
Measuring error (MINI N 520)	< 0.6 % of the range, minimum 0.5 °C
Sensor connection	according to the wiring diagram
Standard length of the stem L1	70, 120, 180, 240, 300, 360, 420 mm
Response time	$\tau_{0.5}$ < 9 s (in streaming water at 0.4 $m.s^{-1}$)
Type of terminal board - sensors with grommet	Weco 951-A-LFDS, maximum wire cross section 1.5 mm^2
Type of connector - sensors with connector	RSFM4 – Lumberg, M12
Type of lead-in cable - sensors with the output 4 to 20 mA	2 x 0.25 mm^2, PVC shielded, up to 80 °C
Insulation resistance	> 200 MΩ at 500 V DC, 25° ± 3 °C; humidity < 85 %
Ingress protection	IP 65 according to EN 60 529
Material of the stem	stainless steel 1.4301
Material of the connection head	POLYAMID
Operating conditions	ambient temperature: -30 to 100 °C; -30 to 80 °C with a converter or PVC cable relative humidity: max. 85 % (at the ambient temperature 25 °C) atmospheric pressure: 87 to 107 kPa
Weight	MINI approximately 60 g, MINI K 35 g

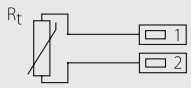
WIRING DIAGRAM

SENSORS WITH A CONNECTOR:

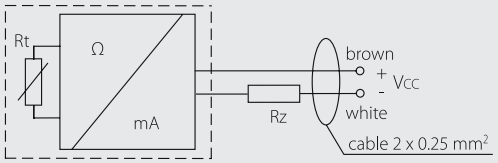


SENSORS WITH A GROMMET:

With resistant output



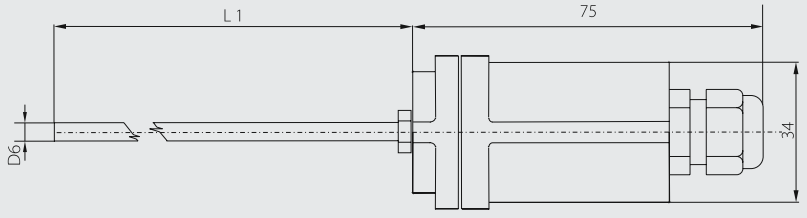
With the converter 4 to 20 mA



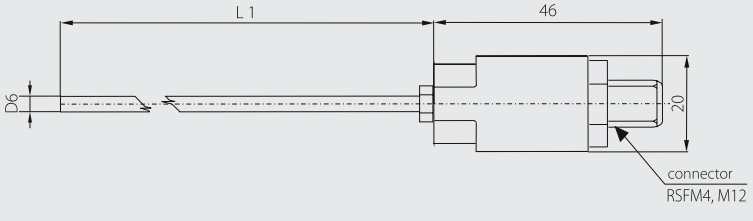
MINI N 520

DIMENSIONAL DRAFT

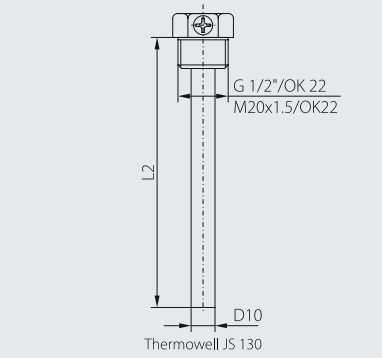
With a grommet



With a connector



Accessory



SENSOR INSTALLATION AND SERVICING

SENSORS WITH GROMMET:

Before connecting the supply lead-in cable the lid of plastic head has to be screwed off. The lead-in cable is connected according to the wiring diagram by pushing it through the loosened grommet. The recommended wire cross section is 0.35 to 1.5 mm^2 and outside diameter of circular-section-cable can be 4 to 8 mm. To ensure the ingress protection value of IP 65 the grommet has to be tightened and the lid has to be screwed on after connecting the lead-in cable.

SENSORS WITH CONNECTOR:

According to the wiring diagram the lead-in cable is connected to the connector RSFM4 which is part of the head of sensor. If required, separate lead-in connector ELKA 4012 or lead-in cable of the length of 5 m with direct connector RKT or lead-in cable with rectangular connector RKWT can be delivered. To ensure the ingress protection value of IP 65 is necessary to check the right fastening of connectors and sensor-lid.

In case the lead-in cable is laid close the 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 plastic clip installation or for stainless steel holder instalation have to be drilled according to the enclosed pattern, on which the opening diameters are marked.

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 service 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 enclosing two sensors
- option enclosing non-standard temperature sensors (DALLAS, TSic, KTY, SMT, etc.)
- class A precision type of temperature element (with the exception of sensors Ni 10000/5000, Ni 10000/6180, T1 = Ni 2226, thermistor 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