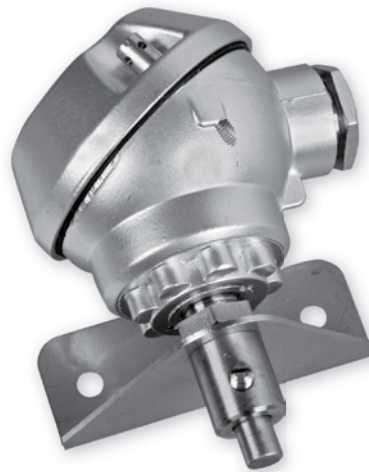


## DESCRIPTION AND APPLICATION

These resistance-type sensors are intended for contact temperature measurement of gaseous substances. They consist of a metal measuring stem and a metal connection head, inside which a terminal board is encased. The measuring stem is made of the stainless steel EN X5CrNi18-10 (DIN 1.4301), the connection head of aluminum alloy. The metal connection head is provided with a cable outlet ending. The sensors meet the IP 54 ingress protection requirements according to the EN 60 529 standard.

They are suitable for temperature measurement in industrial areas or outdoors. The K 110 metal side holder can be delivered together with the device as accessory. The sensors can be utilised in any control system compatible with sensing elements or active outputs listed in the table of specifications.

The standard operating temperature range is -30 to 100 °C. The sensors are meant to be utilised in chemically non-aggressive environment.



## SPECIFICATIONS

### BASIC DATA

Sensor type	NK 110	NK 111	NK 112	NK 310	NK 311
Type of sensing element	Ni 1000/5000	Ni 1000/6180	Ni 891	Ni 10000/5000	Ni 10000/6180
Measuring range	-30 to 100 °C				
Maximum measuring DC current	1 mA	1 mA	1 mA	0,3 mA	0,3 mA

Sensor type	NK 113	PTK 110	PTK 210	PTK 310	HK 110
Type of sensing element	Ni 2226	PT 100/3850	PT 500/3850	PT 1000/3850	thermistor NTC 20 kΩ
Measuring range	-30 to 100 °C				
Maximum measuring DC current	0,7 mA	3 mA	1,5 mA	1 mA	1 mW *)

\*) maximum power consumption

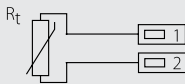
Sensor type	NK 510	Note
Type of sensing element	Pt 1000/3850	
Output signal	4 to 20 mA	
Measuring ranges	-30 to 60 °C	Connection head ambient temperature -30 to 80 °C
	0 to 35 °C	
	0 to 100 °C	
	0 to 150 °C	
Measuring error	< 0,6 % of the range	0,5 °C at least
Power supply ( $U_{NAP}$ )	10 to 30 V DC	Recommended value 24 V DC
Maximum voltage ripple $U_{NAP}$	0,5 %	
Load resistance	$50(U_{NAP}-9) \Omega$	
Output signal	> 24 mA	
- sensing element break		
Output signal	< 3,5 mA	
- sensing element short		

## OTHER PARAMETERS:

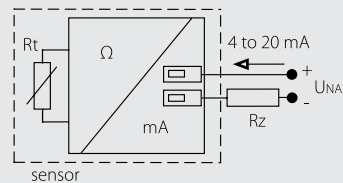
Accuracy class	Ni sensing elements: B class, $\Delta t = \pm (0,4 + 0,007t)$ , for $t \geq 0$ ; $\Delta t = \pm (0,4 + 0,028 t )$ , for $t \leq 0$ in °C; Pt sensing elements: B class according to IEC 751, $\Delta t = \pm (0,3 + 0,005 t )$ in °C NTC 20 k $\Omega$ : $\pm 1$ °C for the range 0 to 70 °C
Sensing element connection	according to the wiring diagram
Standard stem length	25 mm
Time response	$\tau_{0,5} < 9$ s (in air streaming at $1 \text{ m s}^{-1}$ )
Recommended wire cross section	0,35 to 1,5 mm <sup>2</sup>
Insulation resistance	> 200 M $\Omega$ at 500 V DC, 25° $\pm$ 3 °C; humidity < 85 %
Ingress protection	IP 54 according to 60 529
Material of the stem	stainless steel EN X5CrNi18-10 (DIN 1.4301)
Type of connection head	LIMATHERM MA
Material of the 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 0,2 kg

## WIRING DIAGRAM

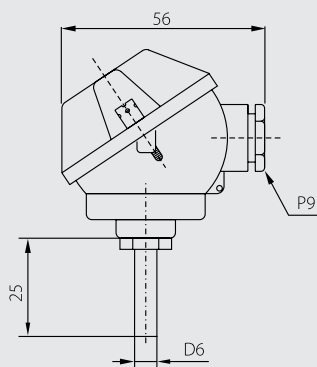
### With a resistance-type output



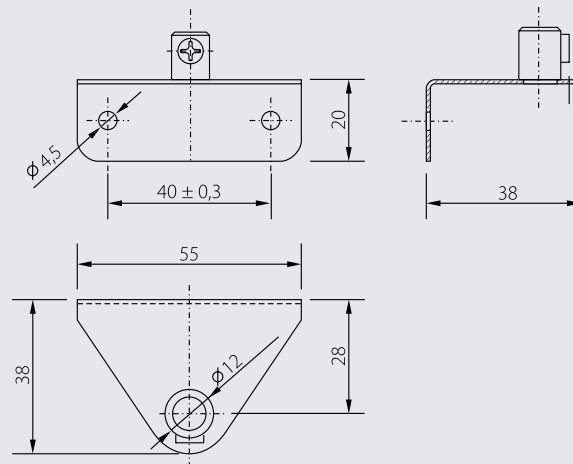
### With a converter 4 to 20 mA



## DIMENSIONAL DRAFT



### Holder K 110



## SENSOR INSTALLATION AND SERVICING

Prior to connecting the lead-in cable unscrew the lid of the metal connection head. The lead-in cable is then connected to the corresponding terminals through the loosened grommet according to the wiring diagram. 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. 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.

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.

The openings for installation of stainless steel holder are drilled according to the dimensional draft, where hole diameters and distances between hole centers can be found.

After installing and connecting the sensor to the appropriate electrical equipment, the sensor is ready to use. The sensor does not require any special servicing or maintenance. The sensors can be placed in any operating 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:

- 3- or 4-wire connection available
- Accuracy class A (except for Ni 10000/5000, Ni 10000/6180, Ni 2226 and thermistor NTC 20 kΩ sensing elements)
- Encasing of other resistance-type units for temperature measurement KTY, SMT 160 - 30 etc.

## HOW TO ORDER

Temp. sensors featuring a stem and a metal conn. head	1	2	1	C	C	D	D	0	0	0	0	0	0
output 4-20 mA				0	A								
Ni 1000/5000 (N1), class B				0	1								
Ni 1000/5000 (N1), class A				0	2								
Ni 1000/6180 (N1A), class B				0	3								
Ni 1000/6180 (N1A), class A				0	4								
Pt 100/3850, class B				0	6								
Pt 100/3850, class A				0	7								
Pt 500/3850, class B				0	9								
Pt 500/3850, class A				1	0								
Pt 1000/3850, class B				1	1								
Pt 1000/3850, class A				1	2								
Ni 891				1	4								
NTC 20 kΩ				1	5								
Ni 2226				1	6								
Ni 10000/5000 (N10), class B				1	7								
Ni 10000/6180 (N10A), class B				1	8								
with resistive output						0	0						
-30 to 60 °C						0	1						
0 to 35 °C						0	2						
0 to 100 °C						0	3						
0 to 150 °C						0	4						

WHEN ORDERING GOODS, THE FOLLOWING DATA ARE REQUIRED:

Data required	Example
Product type	NK 110
Resistance-type / 4 to 20 mA	resistance output (Ni 1000/5000)
Temperature range	
Accessory - side metal holder	NO

The accuracy class is the B class if not stated otherwise.

## DELIVERY

The sensors are packed in the box by 1 piece.

In addition, the following may be provided together with the product:

- the EU Declaration of Conformity (for the NK 510 sensors)
- the side metal holder, stainless steel, K 110
- a calibration sheet.