

Temperature sensor suitable for measurement in hard-to-reach places and in applications requiring the use of flexible sensors with small diameters, and low thermal inertia.

## Specification

### Temperature range / sensing element

-40÷700°C	1 or 2x	<b>J</b>	class 2
-40÷1200°C	1 or 2x	<b>K</b>	class 2
	2x (only diameter ø3; 4,5; 6mm)		

### Sheath

- material: steel 1.4541 for J, Inconel 600 for K
- diameter d [mm]: 1; 1,5; 2; 3; 4,5; 6; 8
- length L[mm]: acc. to requirements
- min. bending radius [mm]: 3xd

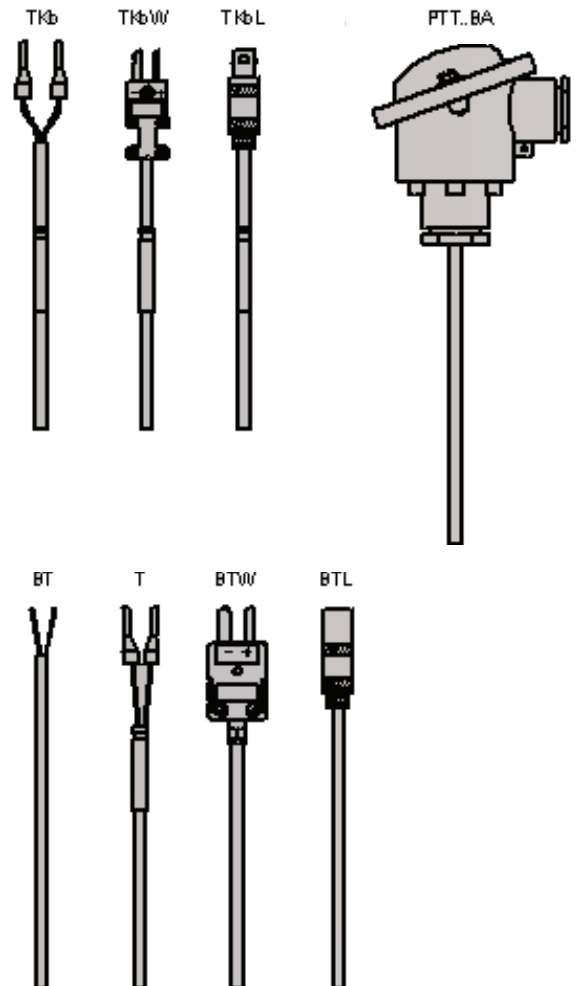
### Constructional version

- |   |                           |
|---|---------------------------|
| - with head mounted transmitter           | AP type                   |
| - with connection head                    | BA type (IP55, -40÷100°C) |
| - with exposed wire ends 20mm             | BT type                   |
| - with sleeve                             | T type                    |
| - with plug type M (miniature)*           | BTWM type                 |
| - with plug type S (standard)*            | BTWM type                 |
| - with LEMO socket                        | BTWS type                 |
| - with compensation cable                 | TKb type                  |
| - with compensation cable and plug type M | TKbWM type                |
| - with compensation cable and plug type S | TKbWS type                |
| - with compensation cable and LEMO plug   | TKbL type                 |

### Lead wire

- stranded wire 2x0,22mm<sup>2</sup> with double silicone insulation
- stranded wire 2x0,22mm<sup>2</sup> with double fiberglass insulation and metal overbraid
- length L<sub>p</sub> [m]: acc. to requirements

Other parameters acc. to requirements



## Options

### Temperature transmitter application

Temperature transmitter with standard 4÷20mA, 0÷10V output signals and with the HART or PROFIBUS communication protocols can be mounted in the connection head, in place of a terminal block, or in the control cabinet.

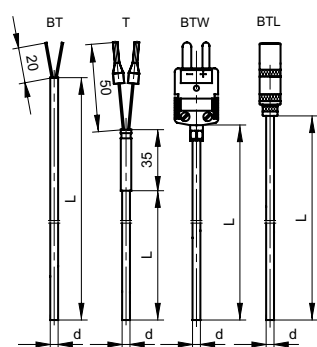
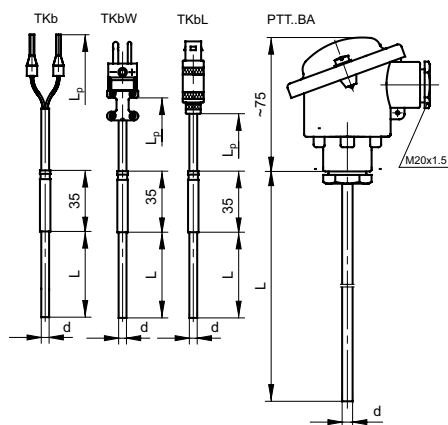
### Local display application

The temperature sensor can be equipped with the connection head enabling the local LED display installation. The local display operates in current loop 4÷20mA. This version makes the local temperature reading and transmission of the analogue signal possible.

### Non-standard design

Immersion length and other parameters can be customized per client request.

**Calibrations performed by Limatherm Sensor Sp. z o.o. are confirmed with the Calibration Certificate of the Accredited Laboratory for Temperature Measurements.**

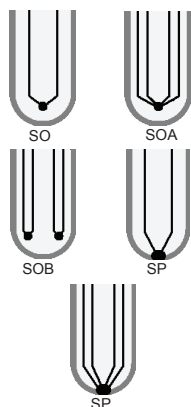


### Compensation / thermocouple wire insulations

Insulation material	Operating temperature range [°C]	Properties
PCW (PCV)	-10÷105	Applied in mild environmental conditions. Waterproof and flexible.
Yc- polyvinyl chloride	-10÷105	Applied in mild environmental conditions. Waterproof and flexible.
FEP-teflon	-50÷200	Resistant to oils, acids and other aggressive liquids. Good flexibility.
Si-silicone	-50÷180	Waterproof, flexible. Applied in high humidity conditions.
Ws-fiberglass	-60÷400	Good resistance to high temperature Low resistance to liquid penetration.

**Notes:** Additionally, copper or steel braids/shields are used on wires to prevent electrical noises, increasing, at the same time, wire insulation resistance to mechanical damages. In case of longer wire lengths grounding may be needed to minimize the noise in measurement circuit

### Thermocouple hot junction types



Thermocouple class 2	Sheath diameter d [mm]						
	ø1	ø1,5	ø2	ø3	ø4,5	ø6	ø8
J	315°C	315°C	400°C	450°C	550°C	700°C	–
K	760°C	760°C	800°C	900°C	1000°C	1200°C	1200°C

### Measurement circuit

1 x Pt100			2 x Pt100			1 x TC	2 x TC
2-wire	3-wire	4-wire	2-wire	3-wire	4-wire	2-wire	2-wire
x	x	x	x	x	x	✓	✓

### Tolerance for thermocouple classes acc. to PN-EN 60584

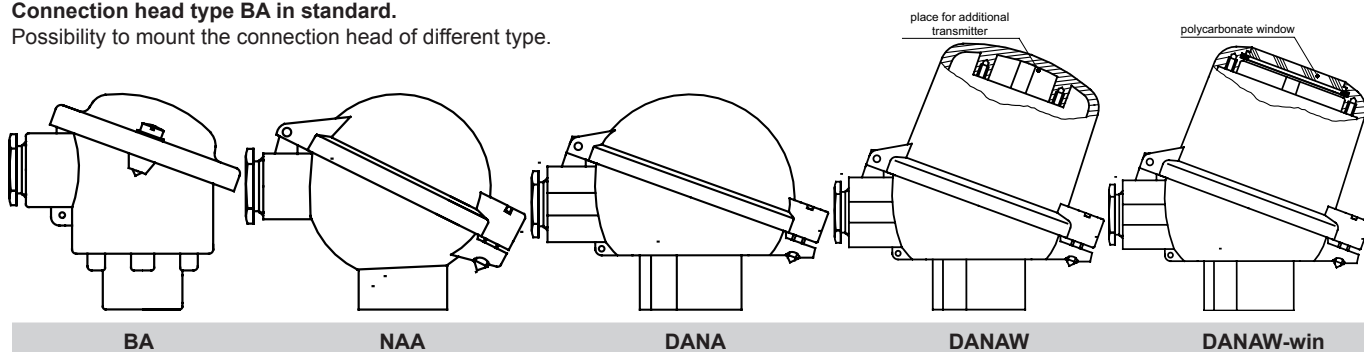
Thermocouple type	Class 1		Class 2	
	Range of application [°C]	Tolerance [°C]	Range of application [°C]	Tolerance [°C]
<b>J</b> Fe-CuNi	from -40 to +375 from +375 to +750	±1,5 ±0,004  t	from -40 to +333 from +333 to +750	±2,5 ±0,0075  t
<b>K</b> NiCr-NiAl	from -40 to +375 from +375 to +1000	±1,5 ±0,004  t	from -40 to +333 from +333 to +1200	±2,5 ±0,0075  t

|t|- absolute value of temperature

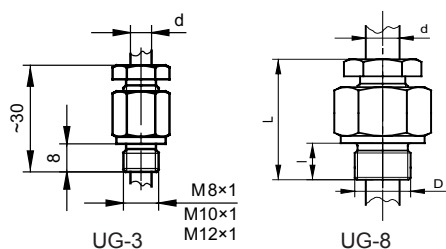
## Connection head types

Connection head type BA in standard.

Possibility to mount the connection head of different type.

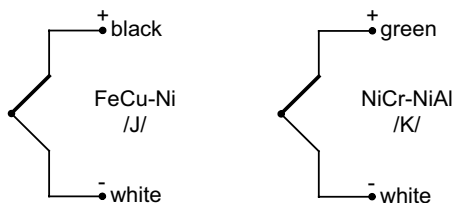


## Mounting fittings



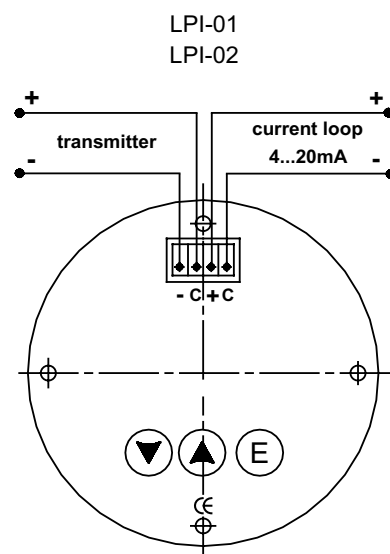
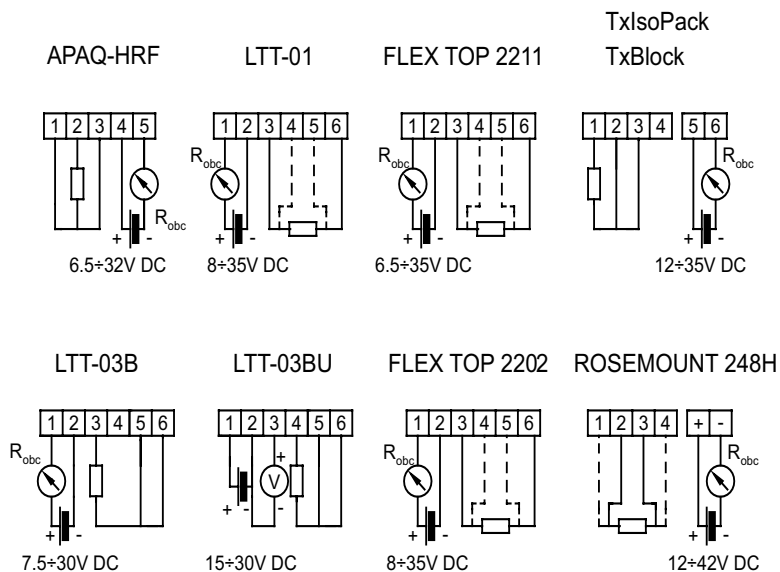
## Connection schemes

### TC (thermocouple)

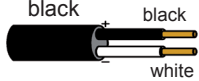
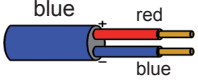
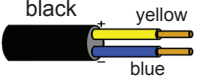
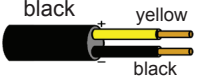
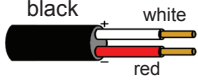
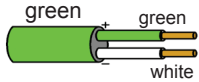
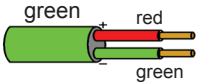
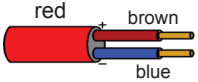
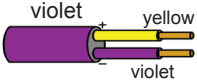
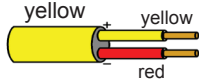


### Transmitters (only Pt)

### Local LED display



## Cable types and colours acc. to the norm

EU	D	GB	F	USA
<b>Thermocouple J type</b>				
				
<b>Thermocouple K type</b>				
				

## Product code

<b>Sensor version</b>	
AP	with transmitter (only single version BA)
APW	with display (only single with DANAW-win connection head)
no designation	single
1 <input type="text"/>	2 double
<b>Sensing element</b>	
J	Fe-CuNi /J/
2 <input type="text"/>	K NiCr-NiAl /K/
<b>Constructional version</b>	
BA	with BA connection head
BT	bez tulei, z wolnymi końcami
T	with sleeve
BTWM	with mini plug installed on the sheath (only ø3mm)
BTWS	with standard plug installed on the sheath (only ø3mm)
BTL	with LEMO socket installed on the sheath
TKb	with compensation cable
TKbL	with cable and LEMO plug
TKbW	with compensation cable and mini plug
3 <input type="text"/>	other parameters acc. to requirements
<b>Sheath diameter</b>	
dx10	dx10
4 <input type="text"/>	other parameters acc. to requirements
<b>Thermocouple hot junction type</b>	
SO	insulated hot junction
SP	grounded hot junction
SOA	one hot junction for two thermocouples insulated from the sheath
5 <input type="text"/>	SOB hot junctions insulated from each other and from the sheath
<b>Length L</b>	
300	300mm
6 <input type="text"/>	other parameters acc. to requirements
<b>Lead wire length L<sub>p</sub></b>	
3	3m
7 <input type="text"/>	other parameters acc. to requirements

8	<input type="text"/>	<b>Lead wire insulation</b>	
		<b>Si</b>	silicone
		<b>Ws</b>	fiberglass
9	<input type="text"/>	<b>Additional accessories</b>	
		<b>G</b>	socket for cable sensors
		<b>TxBLOCK</b>	TxBLOCK transmitter (0÷100°C ) for head sensors

1            2            3            4            5            6            7            8            9  
 **PTT**  -  -  -  -  -  -  -  -

Ordering example:                    **TTPJ-TKb-45-1-SO-500-3m-Si**