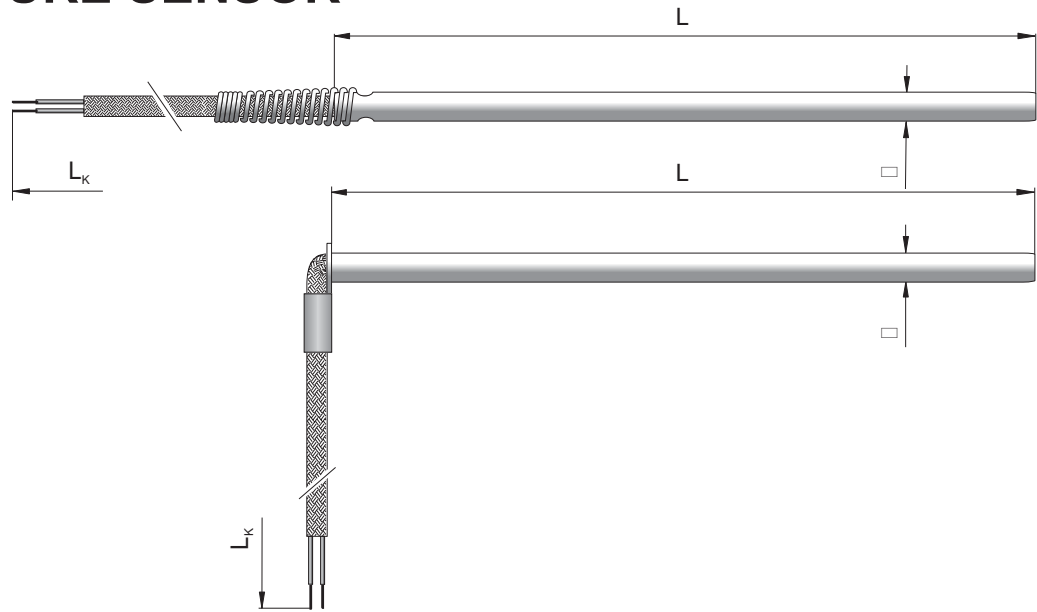


## TEMPERATURE SENSOR

type 361

type 362



### SPECIFICATION

• Temperature range	-100°C...+400°C	
• Measuring element	platinum resistor	<b>(Pt100)*</b>
	thermocouple Cu-CuNi	<b>(T)</b>
	thermocouple Fe-CuNi	<b>(J)</b>
	thermocouple NiCr-NiAl	<b>(K)</b>
• Class of processing element	2	
• Measuring junction	insulated*	
• Sheath material	steel 1.4541	
• Cable insulation	fibre glass and steel braid*	

\*) Other parameters according to customer's requirements

\*) Pt500, Pt1000, Ni100, Ni1000 on demand

\*) Other insulation of the cable: PCV, silicon, teflon on demand

\*) Protection by stainless steel armoured sheath available on demand

### ADDITIONAL ACCESSORIES

- Compression gland type **KP** (page 150)

Option	W1	W2	W3	W4	W5	W6	W7
Sensor length L(mm)*	50	100	200	300	400	600	800
Length of the cable L <sub>k</sub> (m)*	0,5	1	1	1	1,5	1,5	1,5

### ORDERING CODE



Sensor type **361, 362**

Measuring element **Pt100, T, J or K**

Sheath outer diameter □ = **2,5, 3, 4, 5, 6, or 8 mm**

Option **W1...W7**

Additional accessories **compression gland type KPM8x1, KPM10x1, KPM12x1,5\***

**Example for order:**

TP-361J-5-W5 thermocouple sensor Fe-CuNi (J) of diameter □ = 5 mm, length and length of the cable L<sub>k</sub> = 1,5 m.

L = 400 mm

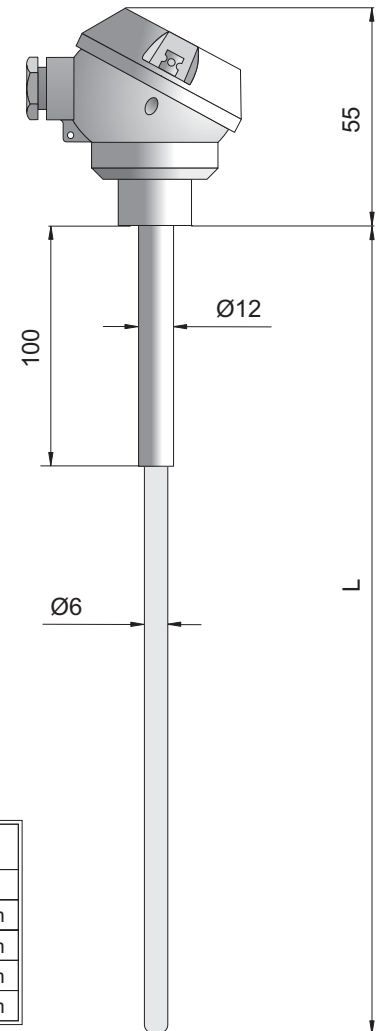
# TEMPERATURE SENSOR

type 821, 822, 823, 824, 825

## SPECIFICATION

- Measuring element
  - thermocouple NiCr-NiAl (K)
  - thermocouple PtRh90/10%-Pt (S)
  - thermocouple PtRh70/30%-PtRh94/6% (B)
- Class of thermocouple 2
- Spacer diameter  $\varnothing$  12 mm
- Ceramic sheath diameter  $\varnothing$  6 mm
- Sheath material
  - ceramic C610 ( $Al_2O_3$ 60%)
  - ceramic C799 ( $Al_2O_3$ 99,7%)
- Connection head type MA or B\*)
- Head operating temperature  $-40^{\circ}C \dots +100^{\circ}C$

\*) Other parameters according to customer's requirements  
 \*) PtRh87/13%-Pt (R) or NiCrSi-NiSi (N) on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



## ADDITIONAL ACCESSORIES

- Compression gland type KP (page 150)

Sensor type	Sheath material	Max. temperature ( $^{\circ}C$ )	Type of thermocouple
TP-821	ceramic C610	1200	NiCr-NiAl
TP-822	ceramic C610	1300	PtRh90/10%-Pt 0,35 mm
TP-823	ceramic C610	1400	PtRh90/10%-Pt 0,50 mm
TP-824	ceramic C799	1500	PtRh90/10%-Pt 0,50 mm
TP-825	ceramic C799	1600	PtRh70/30%-PtRh94/6% 0,50 mm

## ORDERING CODE

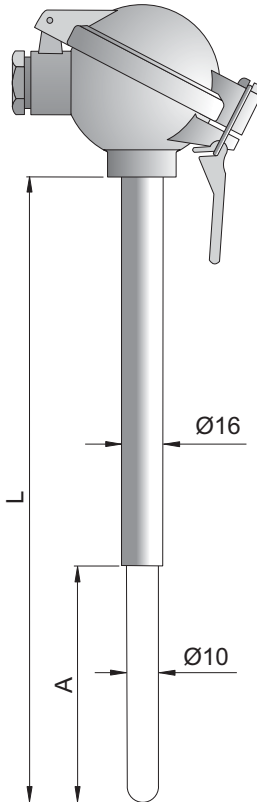


Sensor type **821, 822, 823, 824, 825**  
 Single (1) or double (2) measuring element  
 Sensor length L = **300, 500 or 700 mm**\*)  
 Additional accessories **compression gland type KPM20x1,5, KPG1/2**\*\*)\*)  
 Option with the head-mount transmitter **T**

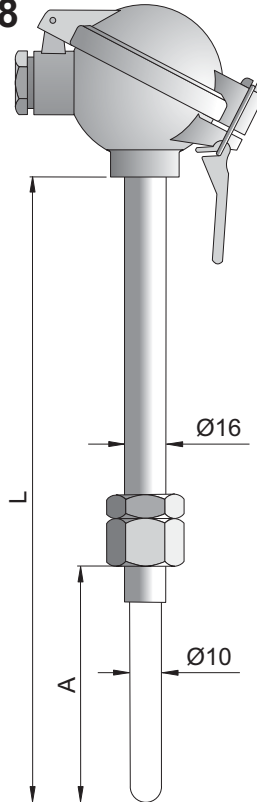
**Example for order:** TP-821-1-500 sensor with thermocouple NiCr-NiAl (K) in ceramic sheath C610 of outer diameter  $\varnothing = 6$  mm and length L= 500 mm.  
 TP-821-1-500-T; TCH-2170-K sensor with connection head type B, option with the head-mount transmitter type TCH-2170-K.

## TEMPERATURE SENSOR

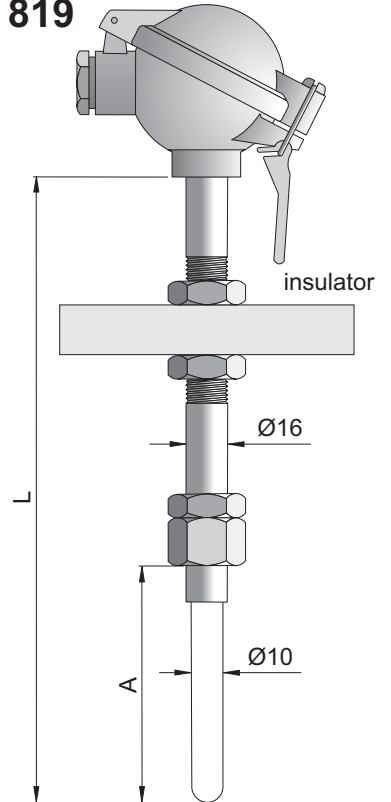
type 817



type 818



type 819



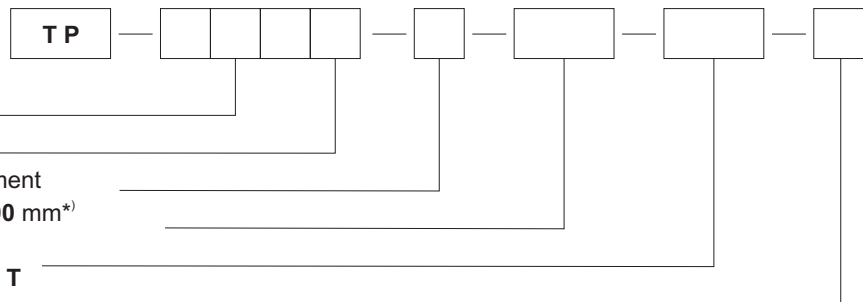
### SPECIFICATION

- Application: measurement of very high temperatures in difficult of severe industrial conditions. Construction of the sensor type TP-818 and TP-819 enables installation of external platinum-rhodium protection tube on the ceramic pipe. These sensors are designed mainly for temperature measurement in furnaces for glass heat treatment.
- Measuring element: thermocouple PtRh90/10%-Pt (S) wire Ø0,5 mm; thermocouple PtRh70/30%-PtRh94/6% (B) wire Ø0,5 mm
- Temperature range: 600°C...+1600°C
- Class of thermocouple: 2
- Outer sheath: ceramic C799 Ø10 mm<sup>\*)</sup>
- Spacer material: steel 1.4541 Ø16 mm<sup>\*)</sup>
- Connection head type: NA<sup>\*)</sup>
- Head operating temperature: -40°C...+100°C

<sup>\*)</sup> Other parameters according to customer's requirements

<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand

### ORDERING CODE



- Sensor type 817, 818, 819
- Measuring element S or B
- Single (1) or double (2) measuring element
- Length of ceramic sheath A = 100 ... 300 mm<sup>\*)</sup>
- Sensor length L = 300 ... 1400 mm<sup>\*)</sup>
- Option with the head-mount transmitter T

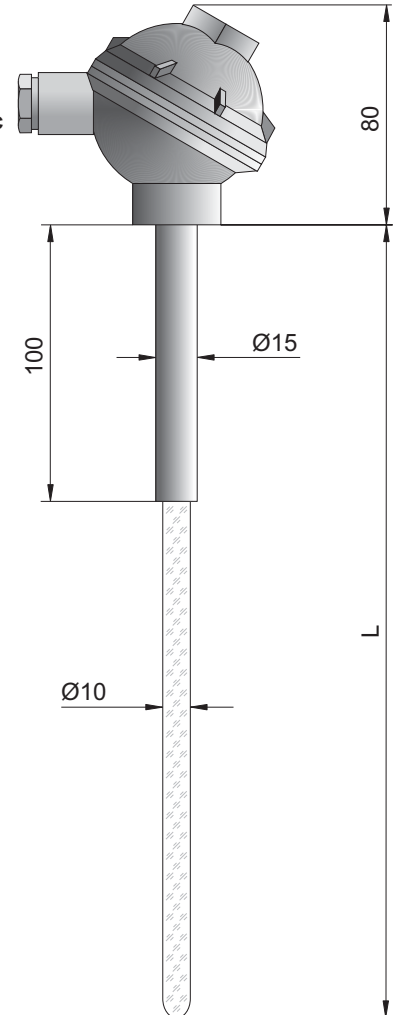
**Example for order:** TP-818S-1-250-1000 sensor with thermocouple PtRh-Pt (S) with ceramic sheath of length A= 250 mm and sensor length L = 1000 mm.

# TEMPERATURE SENSOR

## type 816

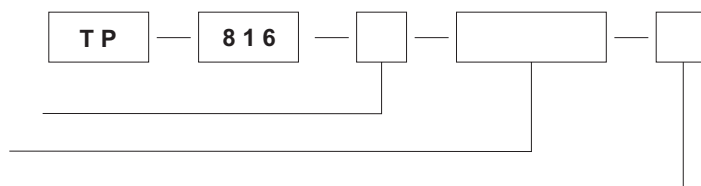
### SPECIFICATION

- Application temperature measurement in **strongly caustic and aggressive** environments e.g. in alkali, salt, organic and mineral acids **with the exception of phosphoric and hydrofluoric acids.**
- Temperature range 0°C...+500°C
- Measuring element platinum resistor(**Pt100**)<sup>\*)</sup>
- Class of processing element B<sup>\*)</sup>
- Conductor material wire Cu/Ni
- Assembly 2, 3 or 4 wires
- Spacer diameter □ 15 mm
- Glass sheath diameter □ 10 mm
- Sensor length L 300, 500, 700 mm<sup>\*)</sup>
- Connection head type NS
- Connection head material plastics NORYL
- Sheath material **glass SiO<sub>2</sub> 99,98%**
- Spacer material plastics ERTALON
- Operating temperature head and spacer -40°C...+100°C



<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Acid resistant connection head on demand

### ORDERING CODE



Single (1) or double (2) measuring element  
 Sensor length L= 300, 500 or 700 mm<sup>\*)</sup>  
 Option with the head-mount transmitter T

**Example for order:** TP-816-1-300 sensor in glass sheath of outer diameter Ø10 mm and length L = 300 mm.  
 TP-816-1-300-T; TCH-2120-Pt100 sensor with the head-mount transmitter type TCH-2120-Pt100.

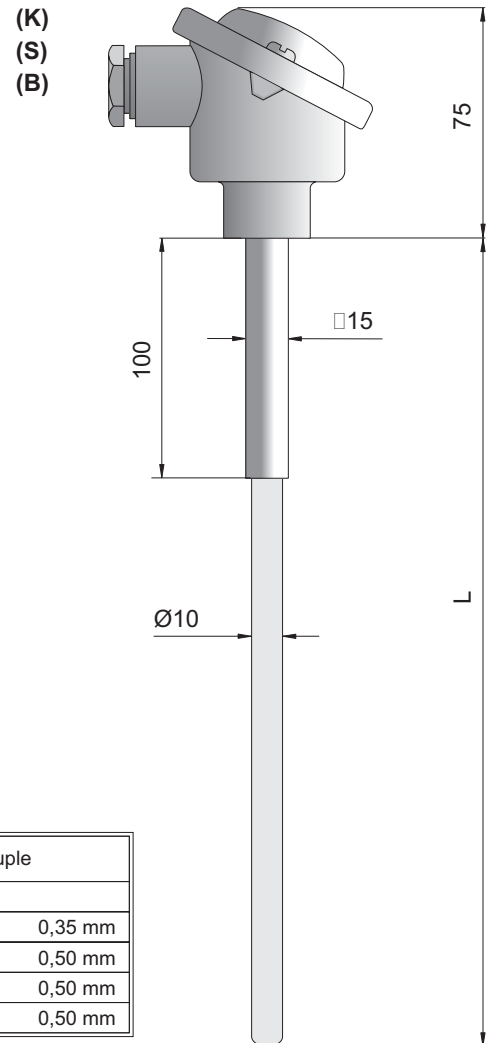
# TEMPERATURE SENSOR

type 811, 812, 813, 814, 815

## SPECIFICATION

- Measuring element
  - thermocouple NiCr-NiAl
  - thermocouple PtRh90/10%-Pt
  - thermocouple PtRh70/30%-PtRh94/6%
- Class of thermocouple 2
- Spacer diameter Ø15 mm
- Ceramic sheath diameter Ø10 mm
- Sheath material
  - ceramic C610 (Al<sub>2</sub>O<sub>3</sub>60%)
  - ceramic C799 (Al<sub>2</sub>O<sub>3</sub>99,7%)
- Connection head type B or NA<sup>\*)</sup>
- Head operating temperature -40°C...+100°C

<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> PtRh87/13%-Pt (R) or NiCrSi-NiSi (N) on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand

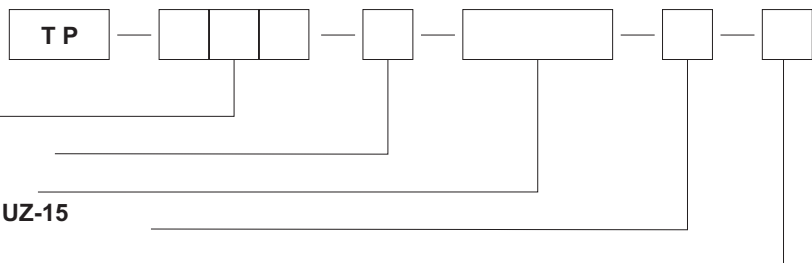


## ADDITIONAL ACCESSORIES

- Clamping plate type **UZ** (page 150)

Sensor type	Sheath material	Max. temperature (°C)	Type of thermocouple
<b>TP-811</b>	ceramic C610	1200	NiCr-NiAl
<b>TP-812</b>	ceramic C610	1300	PtRh90/10%-Pt 0,35 mm
<b>TP-813</b>	ceramic C610	1400	PtRh90/10%-Pt 0,50 mm
<b>TP-814</b>	ceramic C799	1500	PtRh90/10%-Pt 0,50 mm
<b>TP-815</b>	ceramic C799	1600	PtRh70/30%-PtRh94/6% 0,50 mm

## ORDERING CODE



Sensor type **811, 812, 813, 814, 815**  
 Single (1) or double (2) measuring element  
 Sensor length L = **300, 500, or 700 mm**<sup>\*)</sup>  
 Additional accessories **clamping plate type UZ-15**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-811-1-500 sensor with thermocouple NiCr-NiAl (K) in ceramic sheath C610 of outer Diameter Ø= 10 mm and length L= 500 mm.  
 TP-811-1-500-T; TCH-2170-K sensor with the head-mount transmitter TCH-2170-K.

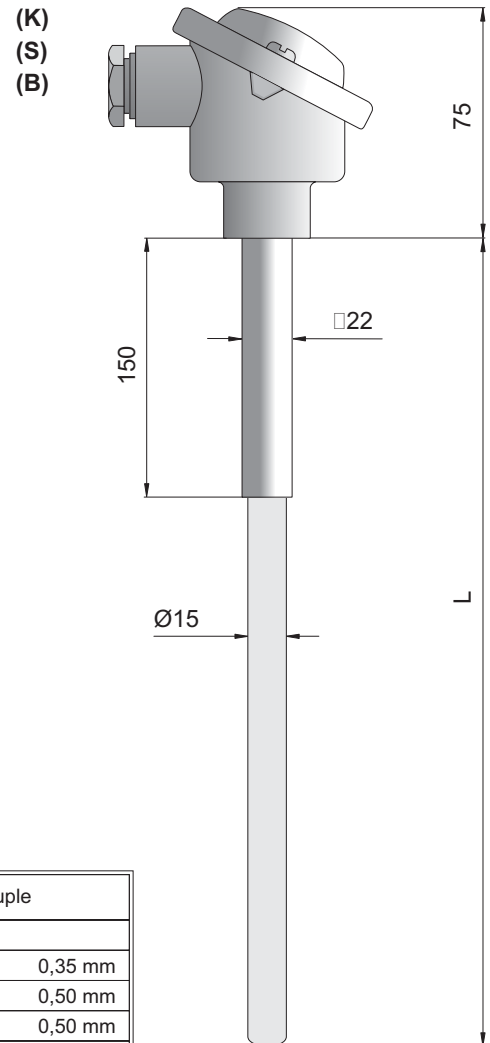
# TEMPERATURE SENSOR

type 801, 802, 803, 804, 805

## SPECIFICATION

- Measuring element
  - thermocouple NiCr-NiAl
  - thermocouple PtRh90/10%-Pt
  - thermocouple PtRh70/30%-PtRh94/6%
- Class of thermocouple 2
- Spacer diameter Ø22 mm
- Ceramic sheath diameter Ø15 mm
- Sheath material
  - ceramic C610 (Al<sub>2</sub>O<sub>3</sub>60%)
  - ceramic C799 (Al<sub>2</sub>O<sub>3</sub>99,7%)
- Connection head type B or NA<sup>\*)</sup>
- Head operating temperature -40°C...+100°C

<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> PtRh87/13%-Pt (R) or NiCrSi-NiSi (N) on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand



## ADDITIONAL ACCESSORIES

- Clamping plate type **UZ** (page 150)

Sensor type	Sheath material	Max. temperature (°C)	Type of thermocouple
<b>TP-801</b>	ceramic C610	1200	NiCr-NiAl
<b>TP-802</b>	ceramic C610	1300	PtRh90/10%-Pt 0,35 mm
<b>TP-803</b>	ceramic C610	1400	PtRh90/10%-Pt 0,50 mm
<b>TP-804</b>	ceramic C799	1500	PtRh90/10%-Pt 0,50 mm
<b>TP-805</b>	ceramic C799	1600	PtRh70/30%-PtRh94/6% 0,50 mm

## ORDERING CODE



Sensor type **801, 802, 803, 804, 805**  
 Single (1) or double (2) measuring element  
 Sensor length L = **500, 700, 1000** or **1400** mm<sup>\*)</sup>  
 Additional accessories **clamping plate type UZ-22**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-801-1-500 sensor with thermocouple NiCr-NiAl (K) in ceramic sheath C610 of outer Diameter Ø = 15 mm and length L= 500 mm.  
 TP-801-1-500-T; TCH-2170-K sensor with the head-mount transmitter type TCH-2170-K.

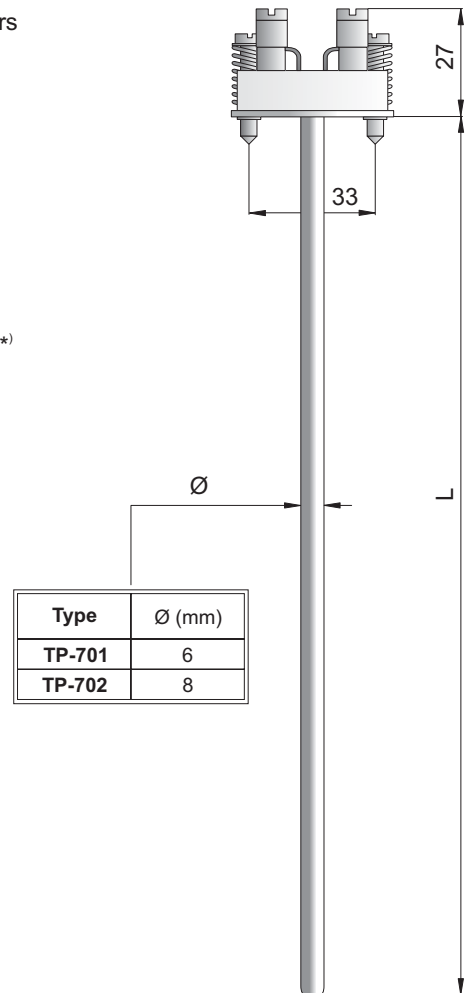
# TEMPERATURE SENSOR

type 701, 702

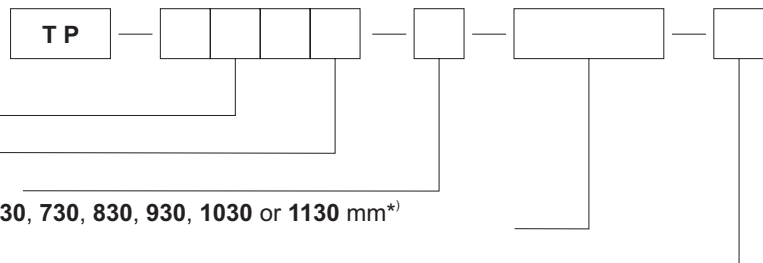
## SPECIFICATION

• Application	measuring insert for temperature sensors	
• Temperature range		
<b>TP-701</b>	-200°C...+550°C	<b>(Pt100)</b>
	-200°C...+400°C	<b>(T)</b>
	-200°C...+400°C	<b>(J)</b>
	-200°C...+600°C	<b>(K)</b>
<b>TP-702</b>	-200°C...+550°C	<b>(Pt100)</b>
	-200°C...+400°C	<b>(T)</b>
	-200°C...+600°C	<b>(J)</b>
	-200°C...+900°C	<b>(K)</b>
• Measuring element	platinum resistor	<b>(Pt100)*</b>
	thermocouple Cu-CuNi	<b>(T)</b>
	thermocouple Fe-CuNi	<b>(J)</b>
	thermocouple NiCr-NiAl	<b>(K)</b>
• Class of processing element	2*)	
• Conductor material	wire Cu/Ni (for Pt100)	
• Assembly	2, 3 or 4 wires (for Pt100)	
• Measuring junction	insulated*)	
• Sheath material	steel 1.4541	

\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Sheathed thermocouples □ 1.5, 2, 3, 4.5, 6, 8 mm on demand  
 \*) Mineral insulated cable for Pt100 □ 3, 5, 6 mm on demand



## ORDERING CODE



Sensor type **701, 702**  
 Measuring element **Pt100, T, J or K**  
 Single **(1)** or double **(2)** measuring element  
 Sensor length L = **80, 130, 230, 330, 430, 530, 630, 730, 830, 930, 1030 or 1130 mm\***  
 Option with the head-mount transmitter **T**

**Example for order:** TP-701K-1-430 sensor with thermocouple NiCr-NiAl (K) of outer diameter Ø= 6 mm and length L = 430 mm.  
 TP-701K-1-430-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.

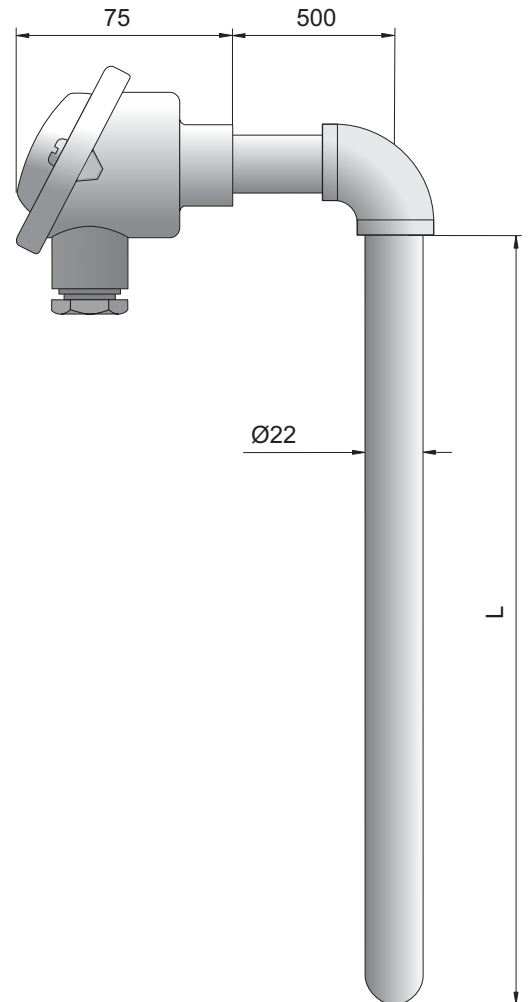
# TEMPERATURE SENSOR

type 695

## SPECIFICATION

• Temperature range	-200°C...+400°C -200°C...+700°C -200°C...+1100°C	(T) (J) (K)
• Measuring element	thermocouple Cu-CuNi thermocouple Fe-CuNi thermocouple NiCr-NiAl	(T) (J) (K)
• Class of processing element	2 <sup>*)</sup>	
• Measuring junction	insulated <sup>*)</sup>	
• Sheath material	steel 1.4828	
• Outer sheath diameter	□ 22mm	
• Connection head type	B or DA <sup>*)</sup>	
• Head operating temperature	-40°C...+100°C	

<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand



## ADDITIONAL ACCESSORIES

- Clamping plate type **UZ** (page 150)

## ORDERING CODE



Measuring element **T, J or K**  
 Single (1) or double (2) measuring element  
 Sensor length L = **400, 600, 800, 1000, 1200, 1600 or 2000 mm**<sup>\*)</sup>  
 Additional accessories **clamping plate type UZ-22**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-695K-1-800 sensor with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 22 mm and length L = 800 mm.  
 TP-695K-1-800-T; TCH-2170-K sensor with the head-mount transmitter type TCH-2170-K.



# TEMPERATURE SENSOR

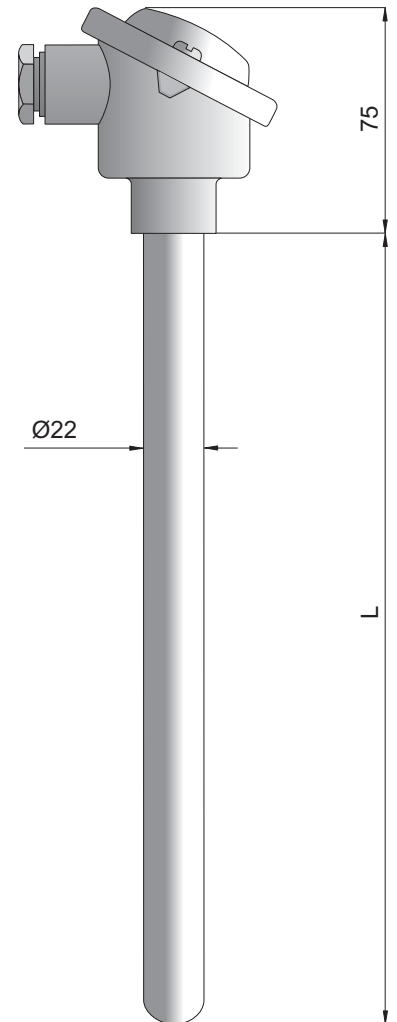
type **691**

## SPECIFICATION

- |                               |  |                   |
|-------------------------------|--|-------------------|
| • Temperature range           | -200°C...+400°C<br>-200°C...+700°C<br>-200°C...+1100°C                 | (T)<br>(J)<br>(K) |
| • Measuring element           | thermocouple Cu-CuNi<br>thermocouple Fe-CuNi<br>thermocouple NiCr-NiAl | (T)<br>(J)<br>(K) |
| • Class of processing element | 2 <sup>*)</sup>  |                   |
| • Measuring junction          | insulated <sup>*)</sup>  |                   |
| • Sheath material             | steel 1.4828   |                   |
| • Outer sheath diameter       | Ø 22mm   |                   |
| • Connection head type        | B or DA <sup>*)</sup>  |                   |
| • Head operating temperature  | -40°C...+100°C   |                   |

<sup>\*)</sup> Other parameters according to customer's requirements

<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand



## ADDITIONAL ACCESSORIES

- Clamping plate type **UZ** (page 150)

## ORDERING CODE



Measuring element **T, J or K**

Single (1) or double (2) measuring element

Sensor length L = 400, 600, 800, 1000, 1200, 1600 or 2000 mm<sup>\*)</sup>

Additional accessories **clamping plate type UZ-22**

Option with the head-mount transmitter **T**

### Example for order:

TP-691K-1-800 sensor with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 22 mm and length L = 800 mm.

TP-691K-1-800-T; TCH-2170-K sensor with the head-mount transmitter type TCH-2170-K.

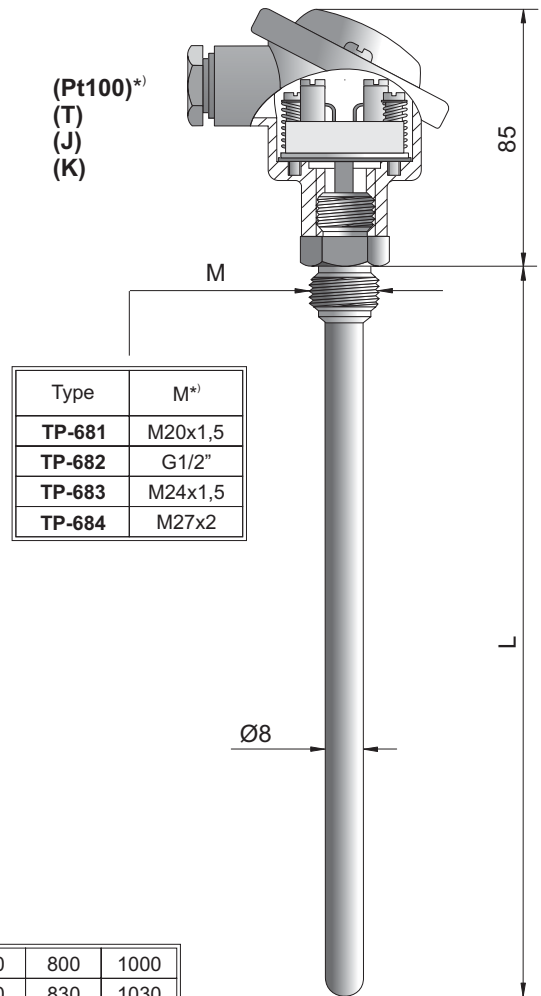
# TEMPERATURE SENSOR

type 681, 682, 683, 684

## SPECIFICATION

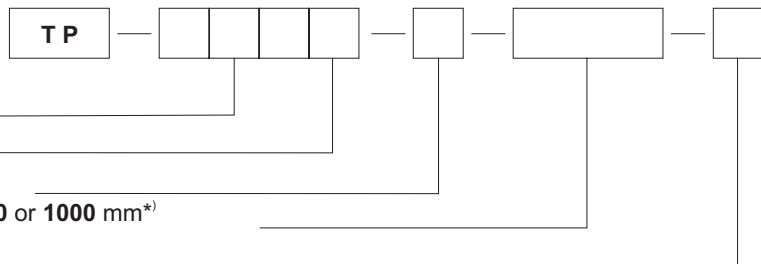
- Temperature range -50°C...+150°C
- Measuring element  
insert type TP-701  
  
platinum resistor  
thermocouple Cu-CuNi  
thermocouple Fe-CuNi  
thermocouple NiCr-NiAl  
2<sup>\*)</sup>
- Class of processing element  
wire Cu/Ag (for Pt100)
- Conductor material  
2, 3 or 4 wires (for Pt100)
- Assembly  
insulated<sup>\*)</sup>
- Measuring junction  
steel 1.4541
- Sheath material  
1,6 MPa
- Maximum operating pressure  
B or NA<sup>\*)</sup>
- Connection head type  
-40°C...+100°C
- Head operating temperature

<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand  
<sup>\*)</sup> Other inch and metric threads on demand



Sensor length L (mm)	100	200	300	400	600	800	1000
Length of insert TP-701 (mm)	130	230	330	430	630	830	1030

## ORDERING CODE



Sensor type **681, 682, 683, 684**  
 Measuring element **Pt100, T, J or K**  
 Single (1) or double (2) measuring element  
 Sensor length L = **100, 200, 300, 400, 600, 800 or 1000 mm<sup>\*)</sup>**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-681Pt100-1-400 sensor (with measuring insert type TP-701Pt100-1-430) of outer diameter Ø = 8 mm and length L = 400 mm with thread M20x1,5.  
 TP-681Pt100-1-400-T; TCH-2120-Pt100 sensor with the head-mount transmitter type TCH-2120-Pt100.

# TEMPERATURE SENSOR

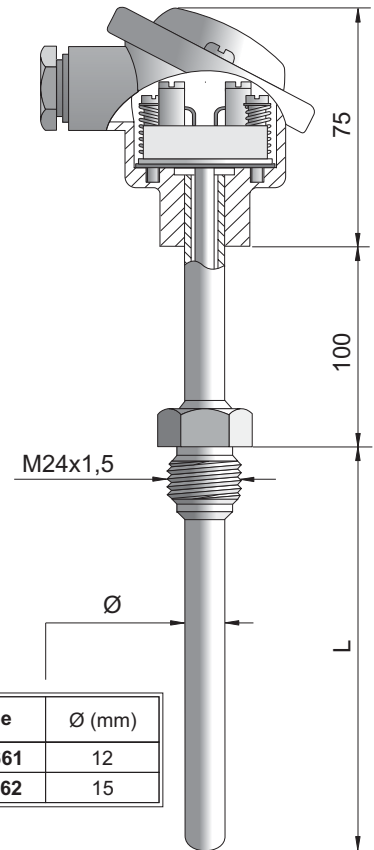
type **661, 662**

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+600°C
  - 200°C...+900°C
- Measuring element insert type TP-702
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated<sup>\*)</sup>
- Sheath material
  - steel 1.4541
- Maximum operating pressure
  - page 160
- Connection head type
  - B or NA<sup>\*)</sup>
- Head operating temperature
  - 40°C...+100°C

(Pt100)  
(T)  
(J)  
(K)

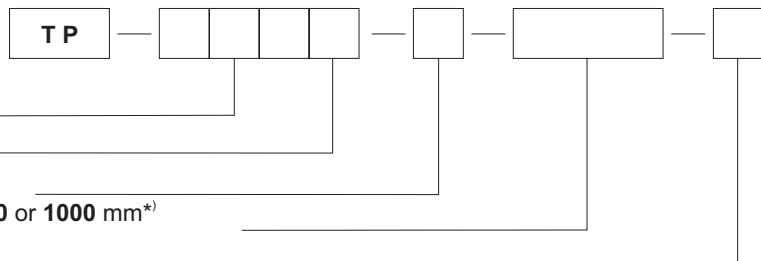
(Pt100)<sup>\*)</sup>  
(T)  
(J)  
(K)



<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand  
<sup>\*)</sup> Other inch and metric threads on demand

Sensor length L (mm)	100	200	300	400	600	800	1000
Length of insert TP-702 (mm)	230	330	430	530	730	930	1130

## ORDERING CODE



Sensor type **661, 662**  
 Measuring element **Pt100, T, J or K**  
 Single (**1**) or double (**2**) measuring element  
 Sensor length L = **100, 200, 300, 400, 600, 800** or **1000** mm<sup>\*)</sup>  
 Option with the head-mount transmitter **T**

**Example for order:** TP-661K-1-400 sensor (with measuring insert type TP-702K-1-530) with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 12 mm and length L = 400 mm with thread M24x1,5.  
 TP-661K-1-400-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.

# TEMPERATURE SENSOR

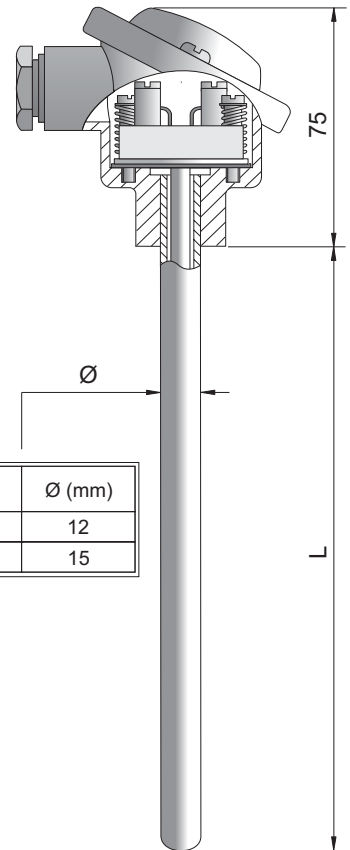
type **651, 652**

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+600°C
  - 200°C...+900°C
- Measuring element insert type TP-702
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl 2<sup>\*)</sup>
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated<sup>\*)</sup>
- Sheath material
  - steel 1.4541
- Connection head type
  - B or NA<sup>\*)</sup>
- Head operating temperature
  - 40°C...+100°C

(Pt100)  
(T)  
(J)  
(K)

(Pt100)<sup>\*)</sup>  
(T)  
(J)  
(K)



Type	Ø (mm)
TP-651	12
TP-652	15

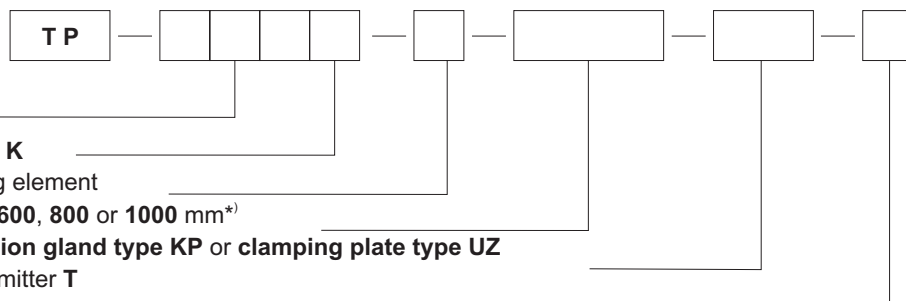
<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand

## ADDITIONAL ACCESSORIES

- Compression gland type **KP** (page 150)
- Clamping plate type **UZ** (page 150)

Sensor length L (mm)	200	300	400	600	800	1000
Length of insert TP-702 (mm)	230	330	430	630	830	1030

## ORDERING CODE



Sensor type **651, 652**  
 Measuring element **Pt100, T, J or K**  
 Single (**1**) or double (**2**) measuring element  
 Sensor length L = **200, 300, 400, 600, 800 or 1000** mm<sup>\*)</sup>  
 Additional accessories **compression gland type KP or clamping plate type UZ**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-651K-1-400 sensor (with measuring insert type TP-702K-1-430) with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 12 mm and length L = 400 mm.  
 TP-651K-1-400-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.

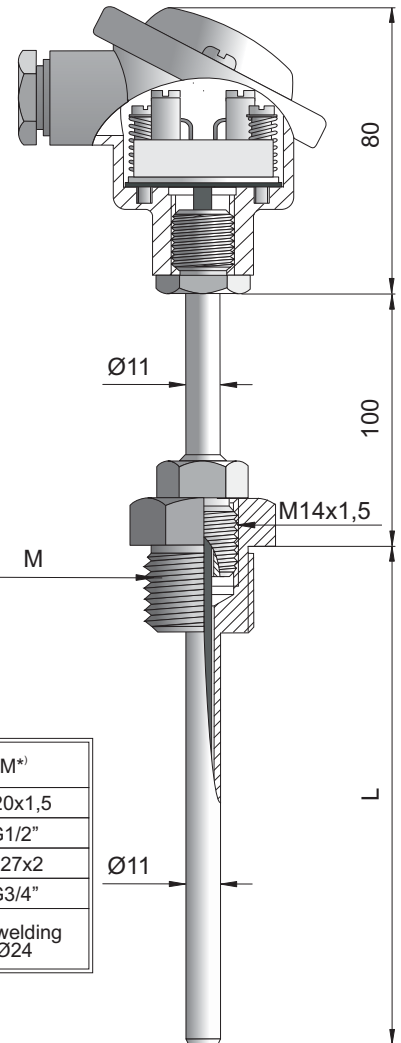
# TEMPERATURE SENSOR

type 641, 642, 643, 644, 645

## SPECIFICATION

- Application: Temperature sensor equipped with measuring insert, designed especially for measurement in pressure receptacles and pipelines.
- Temperature range:
  - 50°C...+500°C (Pt100)
  - 50°C...+300°C (T)
  - 50°C...+600°C (J)
  - 50°C...+900°C (K)
- Measuring element:
  - platinum resistor (Pt100)\*)
  - thermocouple Cu-CuNi (T)
  - thermocouple Fe-CuNi (J)
  - thermocouple NiCr-NiAl (K)
- Class of processing element: 2 (B)\*)
- Material of conductor: wire Cu/Ni (for Pt100)
- Assembly: 2, 3 or 4 wires (for Pt100)
- Measuring junction: insulated\*)
- Sheath material: steel 1.4541
- Maximum operating pressure: page 133
- Connection head type: B or NA\*)
- Head operating temperature: -40°C...+100°C

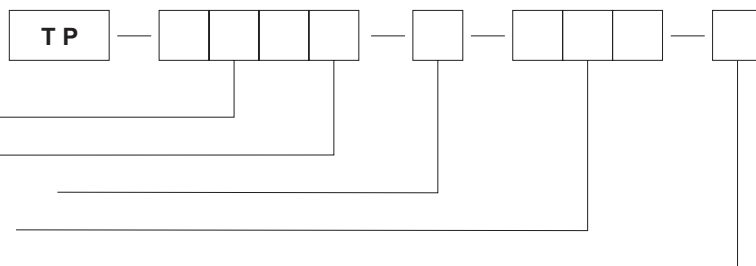
\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Other inch and metric threads on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



Type	M*)
TP-641	M20x1,5
TP-642	G1/2"
TP-643	M27x2
TP-644	G3/4"
TP-645	for welding Ø24

Sensor length L (mm)	50	100	200	300	400	600	800	1000
Length of insert TP-701 (mm)	180	230	330	430	530	730	930	1130

## ORDERING CODE



Sensor type 641, 642, 643, 644, 645  
 Measuring element Pt100, T, J or K  
 Single (1) or double (2) measuring element  
 Immersion length L = 100...1000 mm\*)  
 Option with the head-mount transmitter T

**Example for order:** TP-641Pt100-1-50 sensor (with measuring insert TP-701Pt100-1-180) with single resistor Pt100 of outer diameter Ø11 mm and length L= 50 mm.  
 TP-641Pt100-1-50-T; TCHF-2120 sensor with the head-mount transmitter type TCHF-2120.

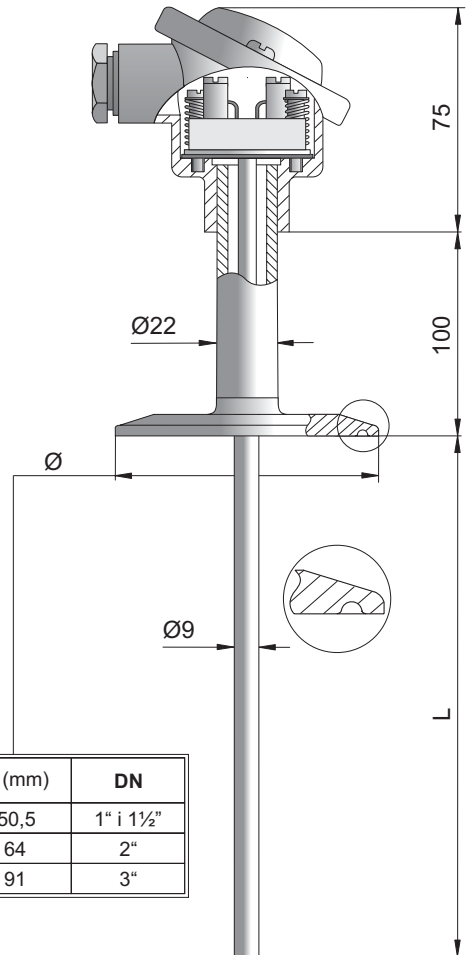
# TEMPERATURE SENSOR

type **631, 632, 633**

## SPECIFICATION

- Application: temperature measurement in pharmaceutical and food industry. The sensor is equipped with a special hygienic leak-proof joint. 0°C...+150°C
- Temperature range: platinum resistor **(Pt100)\*)**
- Measuring element: 2, 3 or 4 wires (for Pt100)
- Assembly: B\*)
- Class of processing element: steel 1.4541
- Sheath material: B or NA\*)
- Connection head type: -40°C...+100°C
- Head operating temperature: acc. ISO 2852
- Process connection: 1,6 MPa
- Maximum operating pressure:

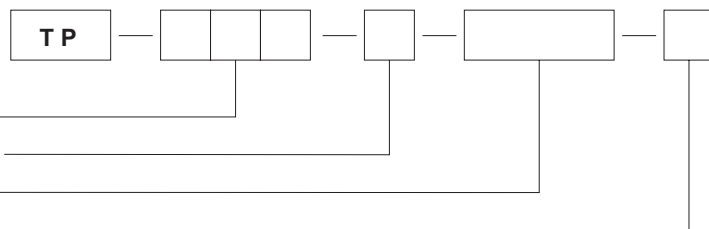
\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



Type	Ø (mm)	DN
TP-631	50,5	1" i 1½"
TP-632	64	2"
TP-633	91	3"

Sensor length L (mm)	50	100	200
Length of insert TP-701 (mm)	180	230	330

## ORDERING CODE



Sensor type **631, 632, 633**  
 Single (1) or double (2) measuring element  
 Sensor length L= **50, 100 or 200 mm**\*)  
 Option with the head -mount transmitter **T**

**Example for order:** TP-632-1-200 sensor(with measuring insert type TP-701Pt100-1-330) with flange of outer diameter Ø = 64 mm, and length L = 200 mm.  
 TP-632-1-200-T; TCH-2120-Pt100 sensor with the head-mount transmitter type TCH-2120-Pt100.

# TEMPERATURE SENSOR

type **611, 612, 613, 614**  
type **621, 622, 623, 624**

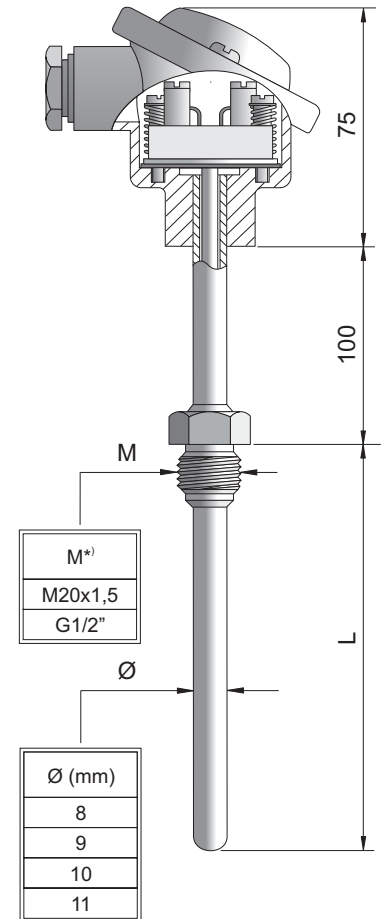
## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+400°C
  - 200°C...+600°C
- Measuring element insert type TP-701
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl
- Class of processing element
- Conductor material
- Assembly
- Measuring junction
- Sheath material
- Maximum operating pressure
- Connection head type
- Head operating temperature

2\*)  
wire Cu/Ni (for Pt100)  
2, 3 or 4 wires (for Pt100)  
insulated\*)  
steel 1.4541  
page 160  
B or NA\*)  
–40°C...+100°C

(Pt100)  
(T)  
(J)  
(K)

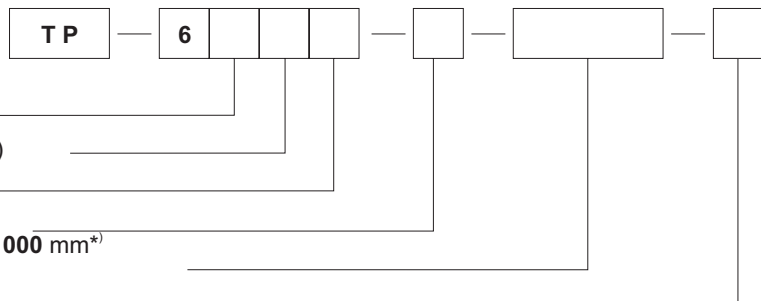
(Pt100)\*  
(T)  
(J)  
(K)



\*) Other parameters according to customer's requirements  
\*) Pt500, Pt1000, Ni100, Ni1000 on demand  
\*) Connection head with protection class IP65 or acid resistant on demand  
\*) Other inch and metric threads on demand

Sensor length L (mm)	100	200	300	400	600	800	1000
Length of insert TP-701 (mm)	230	330	430	530	730	930	1130

## SPECIFICATION



Thread M20x1,5 (1) lub G1/2" (2)  
Outer diameter Ø8 (1), Ø9 (2), Ø10 (3), Ø11 (4)  
Measuring element **Pt100, T, J or K**  
Single (1) or double (2) measuring element  
Sensor length L = **200, 300, 400, 600, 800 or 1000 mm\***  
Option with the head-mount transmitter **T**

**Example for order:** TP-611K-1-400 sensor (with measuring insert TP-701K-1-530) with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 8 mm, length L = 400 mm with thread M20x1,5.  
TP-611K-1-400-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.

# TEMPERATURE SENSOR

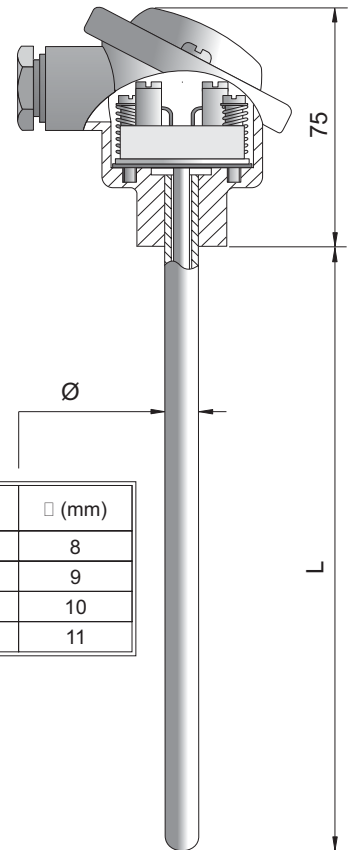
type 601, 602, 603, 604

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+400°C
  - 200°C...+600°C
- Measuring element insert type TP-701
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl 2\*)
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated\*)
- Sheath material
  - steel 1.4541
- Connection head type
  - B or NA\*)
- Head operating temperature
  - 40°C...+100°C

(Pt100)  
(T)  
(J)  
(K)

(Pt100)\*  
(T)  
(J)  
(K)



Type	Ø (mm)
TP-601	8
TP-602	9
TP-603	10
TP-604	11

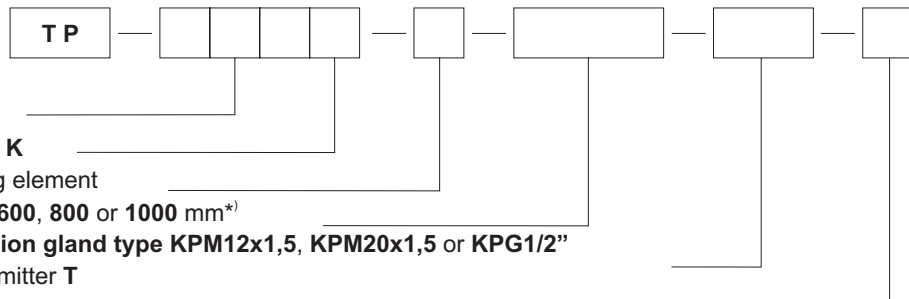
\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand

## ADDITIONAL ACCESSORIES

- Compression gland type **KP** (page 150)

Sensor length L (mm)	200	300	400	600	800	1000
Length of insert TP-701 (mm)	230	330	430	630	830	1030

## ORDERING CODE



Sensor type **601, 602, 603, 604**  
 Measuring element **Pt100, T, J or K**  
 Single (1) or double (2) measuring element  
 Sensor length L = **200, 300, 400, 600, 800 or 1000 mm**\*)  
 Additional accessories **compression gland type KPM12x1,5, KPM20x1,5 or KPG1/2"**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-601K-1-400 sensor (with measuring insert type TP-701K-1-430) with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 8 mm and length L = 400 mm.  
 TP-601K-1-400-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.



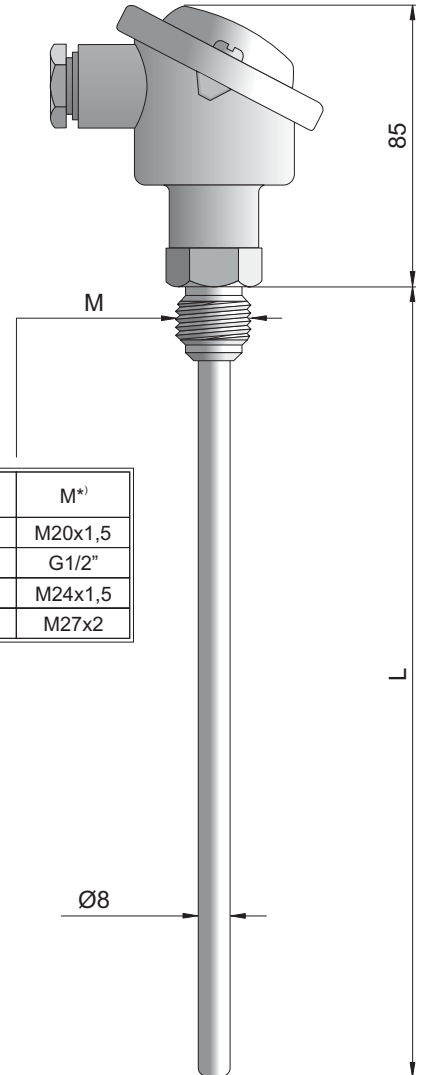
# TEMPERATURE SENSOR

type **581, 582, 583, 584**

## SPECIFICATION

- Temperature range -50°C...+150°C
- Measuring element platinum resistor  
thermocouple Cu-CuNi  
thermocouple Fe-CuNi  
thermocouple NiCr-NiAl
- Class of processing element 2<sup>\*)</sup>
- Conductor material wire Cu/Ag (for Pt100)
- Assembly 2, 3 or 4 wires (for Pt100)
- Measuring junction insulated<sup>\*)</sup>
- Sheath material steel 1.4541
- Maximum operating pressure 1,6 MPa
- Outer sheath diameter Ø 8 mm<sup>\*)</sup>
- Connection head type B<sup>\*)</sup>
- Head operating temperature -40°C...+100°C

(Pt100)  
(Pt100)<sup>\*)</sup>  
(T)  
(J)  
(K)



Type	M <sup>*)</sup>
TP-581	M20x1,5
TP-582	G1/2"
TP-583	M24x1,5
TP-584	M27x2

<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Other inch and metric threads on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand

## ORDERING CODE



Sensor type **581, 582, 583, 584**  
 Measuring element **Pt100, T, J or K**  
 Single (1) or double (2) measuring element  
 Sensor length L = **100, 200, 400, 600, 800 or 1000 mm<sup>\*)</sup>**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-582Pt100-1-400 sensor of outer diameter Ø = 8 mm and length L= 400 mm with welded stationary fitting with thread G 1/2".  
 TP-582Pt100-1-400; TCH-2120-Pt100 sensor with the head-mount transmitter TCH-2120-Pt100.

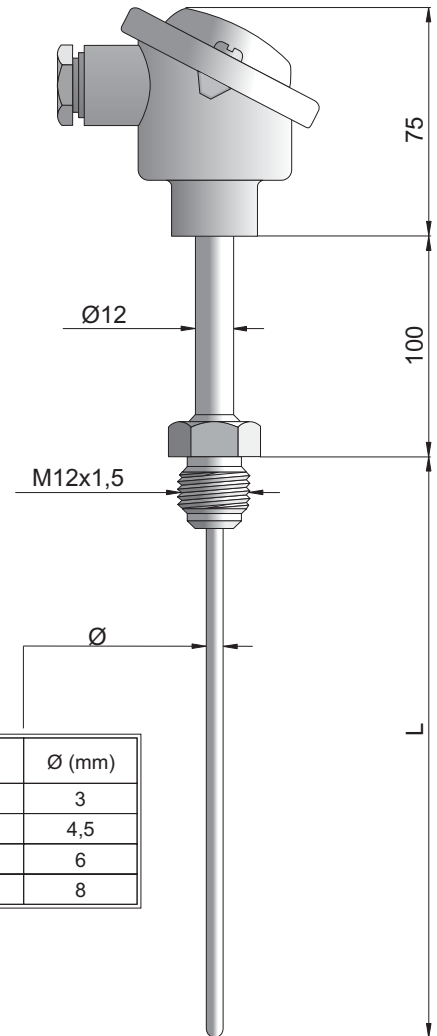
# TEMPERATURE SENSOR

type 551, 552, 553, 554

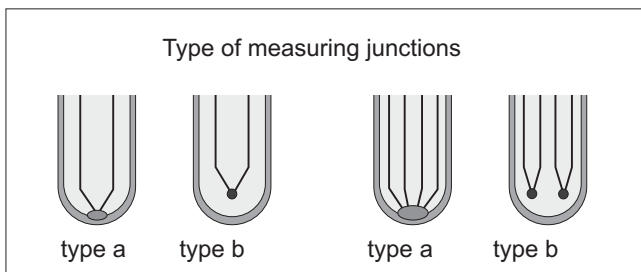
## SPECIFICATION

- Temperature range
  - 200°C...+800°C (J)
  - 200°C...+1100°C (K)
  - 200°C...+1250°C (N)
- Sheathed thermocouple
  - Fe-CuNi (J)
  - NiCr-NiAl (K)
  - NiCrSi-NiSi (N)
- Measuring junction
  - joint penetration (type a) or insulated (type b)
- Class of thermocouple
  - 2\*)
- Sheath material
  - Inconel (J, K), Microbell (N)
- Maximum operating pressure
  - 10 MPa
- Connection head type
  - B\*)
- Head operating temperature
  - 40°C...+100°C

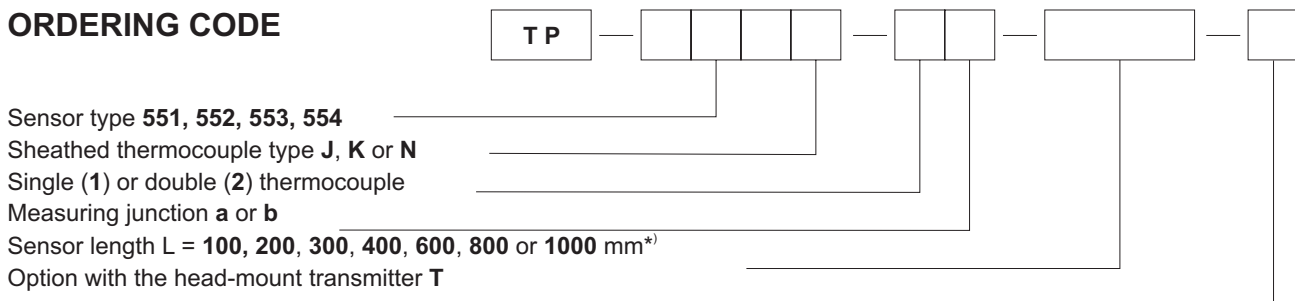
\*) Other parameters according to customer's requirements  
 \*) Thermocouples of outer diameter  $\varnothing = 1, 1,5$  or 2 mm on demand  
 \*) Other inch and metric threads on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand  
 \*) Pt100 on demand



Type	Ø (mm)
TP-551	3
TP-552	4,5
TP-553	6
TP-554	8



## ORDERING CODE



**Example for order:** TP-551K-1b-200 sensor with single sheathed thermocouple NiCr-NiAl (K) of outer diameter  $\varnothing = 3$  mm, measuring junction galvanically insulated from the sheath (type b) and length L = 200 mm.  
 TP-551K-1b-200-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.

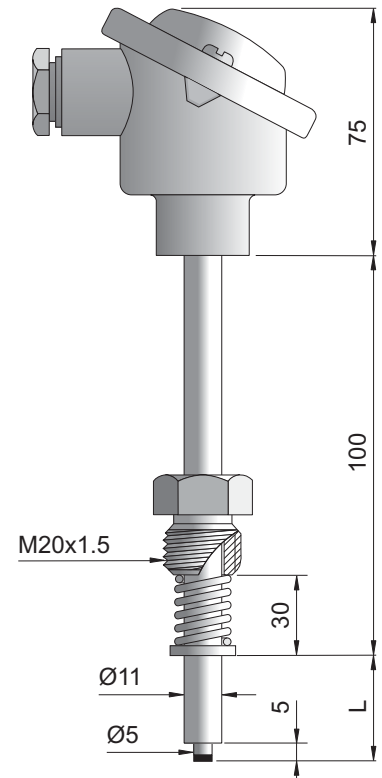
# TEMPERATURE SENSOR

type **535**

## SPECIFICATION

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Application</li> <li>• Temperature range</li> <li>• Measuring element</li> <li>• Class of processing element</li> <li>• Conductor material</li> <li>• Assembly</li> <li>• Measuring junction</li> <li>• Sheath material</li> <li>• Connection head type</li> <li>• Head operating temperature</li> <li>• Fitting</li> </ul> | <p>temperature measurement of surfaces<br/>bearings, cylinders, bushes, receptacles<br/>-50°C...+250°C</p> <p>platinum resistor<br/>thermocouple Cu-CuNi<br/>thermocouple Fe-CuNi<br/>thermocouple NiCr-NiAl<br/>2<sup>*)</sup></p> <p>wire Cu/Ni (for Pt100)<br/>2, 3 or 4 wires (for Pt100)<br/>joint penetration<sup>*)</sup></p> <p>steel 1.4541<br/>B<sup>*)</sup></p> <p>-40°C...+100°C<br/>mobile with thread M20x1,5<sup>*)</sup></p> |
|--|---|

(Pt100)<sup>\*)</sup>  
(T)  
(J)  
(K)



- <sup>\*)</sup> Other parameters according to customer's requirements
- <sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand
- <sup>\*)</sup> Other inch and metric threads on demand
- <sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand

## ORDERING CODE



Measuring element **Pt100, T, J or K**  
 Single (1) or (2) double measuring element  
 Sensor length L= **10 ... 500** mm  
 Option with the head-mount transmitter **T**

**Example for order:** TP-535Pt100-1-15 sensor of length L= 15 mm.  
 TP-535Pt100-1-15-T; TCHF-2120 sensor with the head-mount transmitter type TCHF-2120.

# TEMPERATURE SENSOR

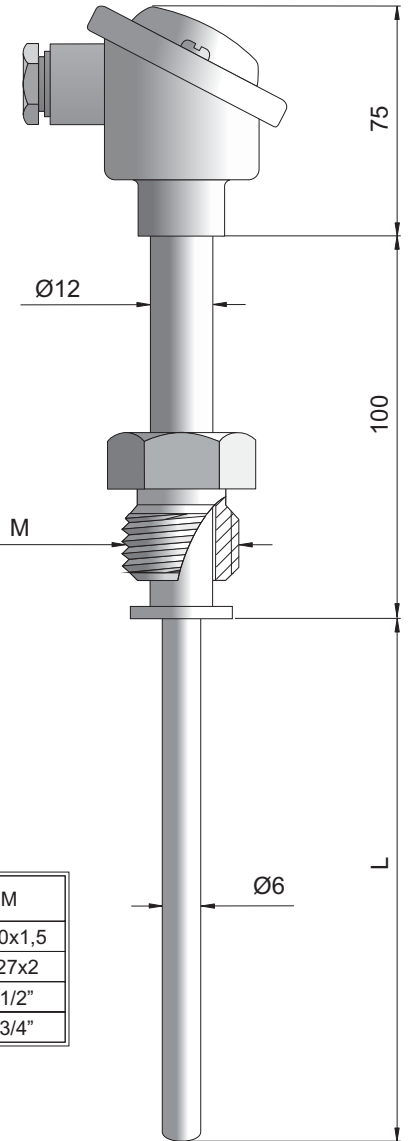
type: 531, 532, 533, 534

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+800°C
  - 200°C...+1100°C
  - 200°C...+1250°C
- Measuring element
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl
  - thermocouple NiCrSi-NiSi
- Class of processing element
- Conductor material
- Assembly
- Measuring junction
- Sheath material Ø6
  - 2\*)
  - wire Cu/Ni (for Pt100)
  - 2, 3 or 4 wires (for Pt100)
  - insulated\*)
  - steel 1.4541 (Pt100)
  - Inconel (T, J, K) Microbell (N)
- Maximum operating pressure
- Connection head type
- Head operating temperature
- Hexagon nut
  - 1,6 MPa
  - B\*)
  - 40°C...+100°C
  - mobile with external thread
  - M20x1,5, M27x2, G1/2", G3/4"\*\*)

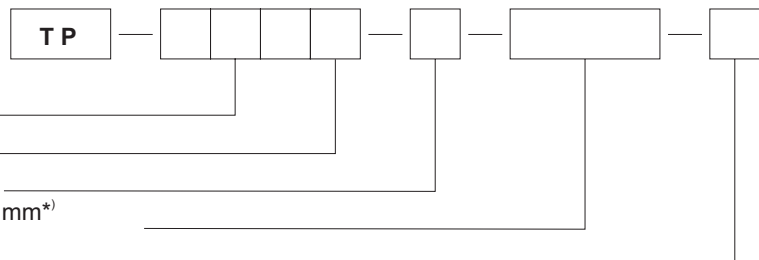
\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Other inch and metric threads on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand

(Pt100)  
(T)  
(J)  
(K)  
(N)  
(Pt100)\*  
(T)  
(J)  
(K)  
(N)



Type	M
TP-531	M20x1,5
TP-532	M27x2
TP-533	G1/2"
TP-534	G3/4"

## ORDERING CODE



Sensor type 531, 532, 533, 534  
 Measuring element Pt100, T, J, K or N  
 Single (1) or double (2) measuring element  
 Sensor length L=100, 200, 400, 600, 800 or 1000 mm\*)  
 Option with the head-mount transmitter T

**Example for order:** TP-533Pt100-1-200 sensor with mobile nut, external thread G1/2" and length L= 200 mm.  
 TP-533Pt100-1-200-T; TCH-2120-Pt100 sensor with the head-mount transmitter type TCH-2120-Pt100.

# TEMPERATURE SENSOR

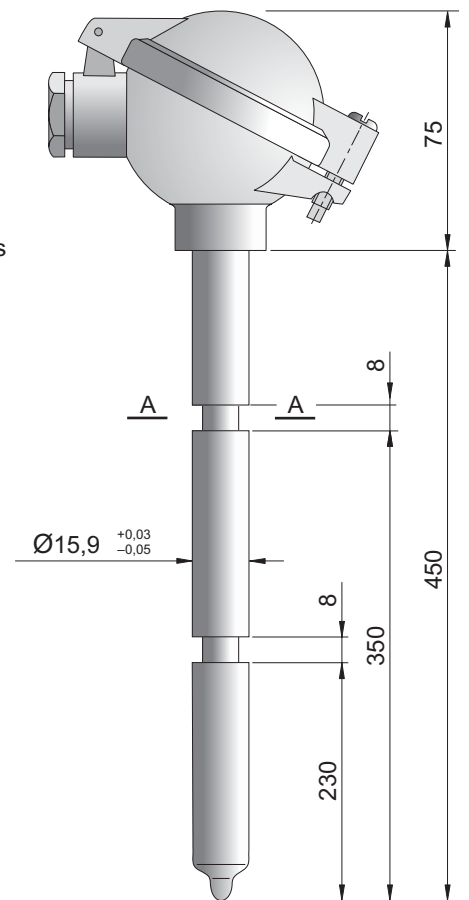
type 529

## SPECIFICATION

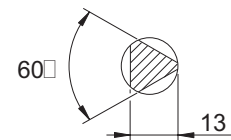
• Application	temperature measurement of rubber granules in crushing and grinding equipment.
• Temperature range	-50°C...+400 °C
• Measuring element	NiCr-NiAl (K) Fe-CuNi (J)
• Class of thermocouple	2 <sup>*)</sup>
• Measuring junction	joint penetration
• Sheath material	steel 1.4541
• Sheath outer diameter	Ø 15,9 <sup>+0,03</sup> <sub>-0,05</sub> mm
• Connection head type	DAN <sup>*)</sup>
• Head operating temperature	-40°C...+100°C

<sup>\*)</sup> Other parameters according to customer's requirements

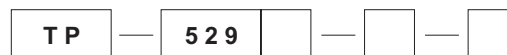
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand



A-A



## ORDERING CODE



Measuring element J or K  
Single (1) or double (2) thermocouple  
Option with the head-mount transmitter T

**Example for order:** TP-529J-1 thermocouple sensor Fe-CuNi (J).  
TP-529J-1-T; TCH-2140-J sensor with the head-mount transmitter TCH-2140-J.

## TEMPERATURE SENSOR

type 528

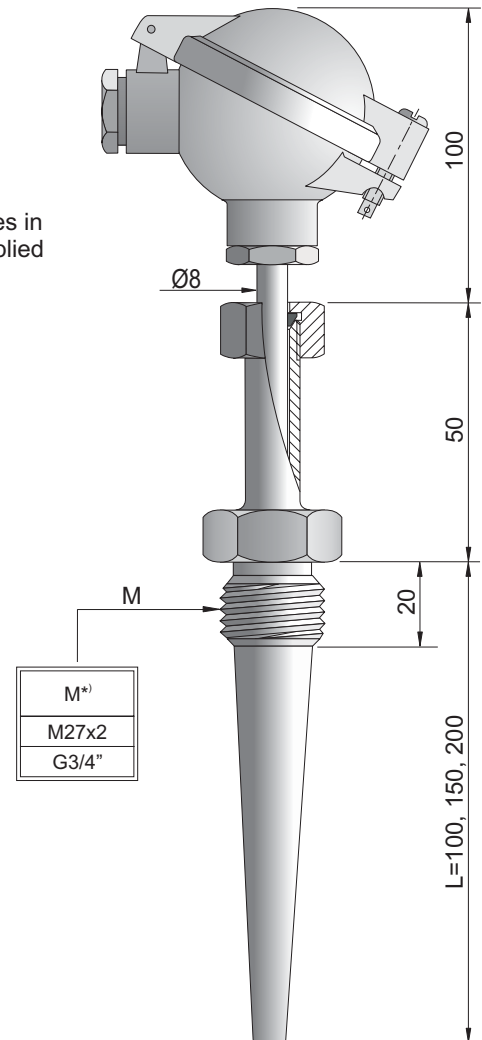
### SPECIFICATION

- Application temperature measurement exhaust gases in exhaust manifolds of diesel engines, applied mainly for marine engines
- Temperature range  $-50\text{ }^{\circ}\text{C} \dots +800\text{ }^{\circ}\text{C}$
- Measuring element thermocouple NiCr-NiAl (K)<sup>\*</sup> cl.1 acc. EN 60584 insulated<sup>\*</sup>
- Measuring junction steel 1.4541, drilled bar
- Thermowell material 12MPa
- Maximum operating pressure M27x2, G3/4"<sup>\*\*</sup>
- Process connection (M) 100, 150, 200 mm<sup>\*</sup>
- Immersion length (L) 80Hz, 5g
- Maximum vibration level gas 70m/s
- Maximum speed flow of medium liquid 5m/s
- Connection head type NA, IP54, 100 °C

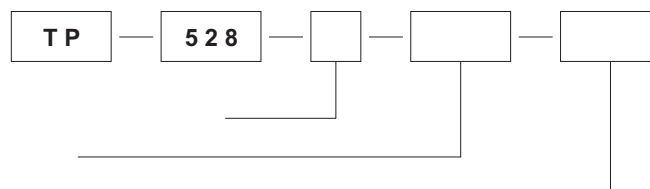
<sup>\*</sup> Other parameters according to customer's requirements

<sup>\*\*</sup> Other inch or metric threads on demand

<sup>\*</sup> Connection head with protection class IP65 or acid resistant on demand



### ORDERING CODE



Single (1) or double (2) measuring element  
 Sensor length: L = 100, 150 or 200 mm<sup>\*</sup>  
 Sensor thread M = M27x2, G3/4"<sup>\*\*</sup>

**Example for order:** TP-528-1-100-M27x2 sensor with single thermocouple NiCr-NiAl (K), length L=100mm with thread M27x2.

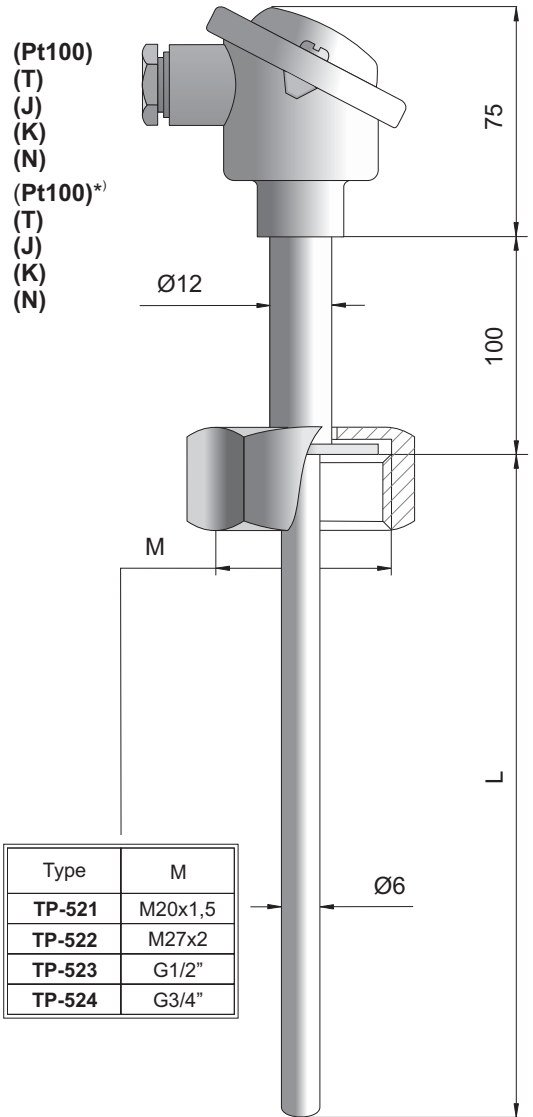
# TEMPERATURE SENSOR

type **521, 522, 523, 524**

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+800°C
  - 200°C...+1100°C
  - 200°C...+1250°C
- Measuring element
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl
  - thermocouple NiCrSi-NiSi
- Class of processing element
- Conductor material
- Assembly
- Measuring junction
- Sheath material Ø6
  - 2\*)
- Maximum operating pressure
- Connection head type
- Head operating temperature
- Hexagon nut
  - steel 1.4541 (Pt100)
  - Inconel (T, J, K) Microbell (N)
- Maximum operating pressure
- Connection head type
- Head operating temperature
- Hexagon nut
  - 1,6 MPa
  - B\*)
  - 40°C...+100°C
  - mobile with internal thread
  - M20x1,5, M27x2, G1/2", G3/4"\*\*) (welded hexagon nut on demand)

\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Other inch and metric threads on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



## ORDERING CODE



Sensor type **521, 522, 523, 524**  
 Measuring element **Pt100, T, J, K or N**  
 Single (**1**) or double (**2**) measuring element  
 Sensor length L=**100, 200, 400, 600, 800 or 1000** mm\*)  
 Option with the head-mount transmitter **T**

**Example for order:** TP-523Pt100-1-200 sensor with mobile hexagon nut, internal thread G1/2" and length L= 200 mm.  
 TP-523Pt100-1-200-T; TCH-2120-Pt100 sensor with the head-mount transmitter type TCH-2120-Pt100.

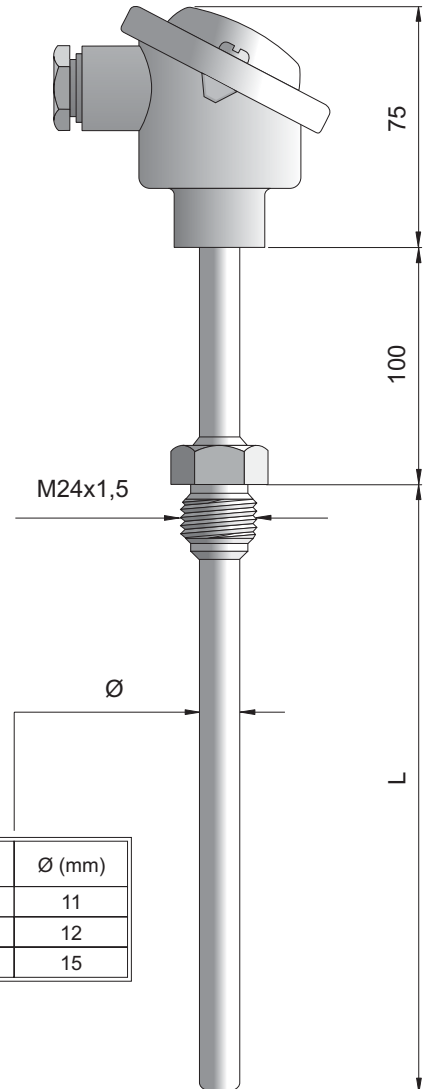
# TEMPERATURE SENSOR

type 511, 512, 513

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+600°C
  - 200°C...+900°C
- Measuring element
  - (Pt100)
  - (T)
  - (J)
  - (K)
  - (Pt100)\*)
  - (T)
  - (J)
  - (K)
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl 2\*)
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated\*)
- Sheath material
  - steel 1.4541
- Maximum operating pressure
  - page 160
- Connection head type
  - B\*)
- Head operating temperature
  - 40°C...+100°C

\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Other inch and metric threads on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



## ORDERING CODE



Sensor type **511, 512, 513**  
 Measuring element **Pt100, T, J or K**  
 Single **(1)** or double **(2)** measuring element  
 Sensor length L = **100, 200, 400, 600, 800 or 1000 mm**\*)  
 Option with the head-mount transmitter **T**

**Example for order:** TP-511K-1-400 thermocouple sensor NiCr-NiAl (K) of outer diameter Ø = 12 mm, length L = 400 mm with thread M24x1,5.  
 TP-511K-1-400-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.



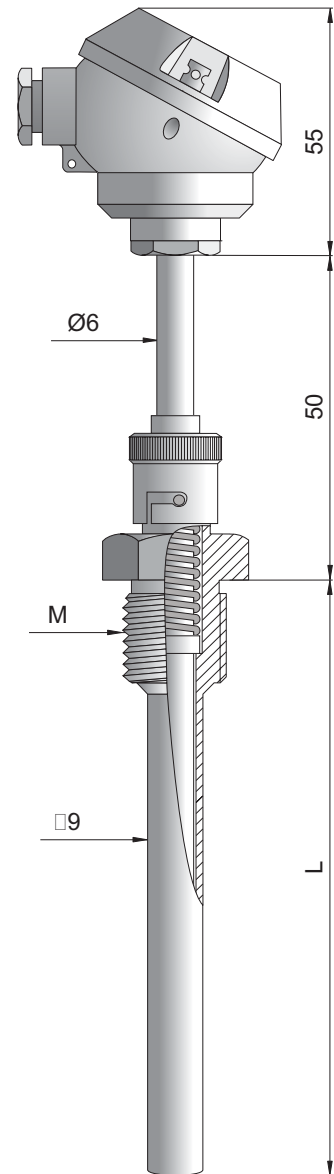
# TEMPERATURE SENSOR

## type 496

### SPECIFICATION

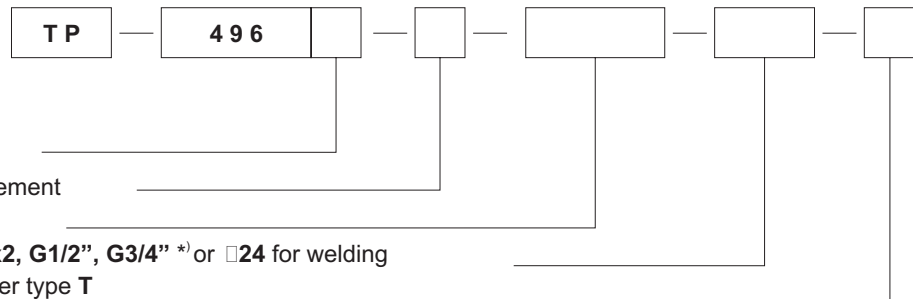
- Application: temperature measurement in receptacles and pipelines.
- Temperature range: -200°C...+400°C
- Measuring element: platinum resistor (Pt100)\*, thermocouple Cu-CuNi (T), thermocouple Fe-CuNi (J), thermocouple NiCr-NiAl (K), 2 (B)\*
- Class of processing element: wire Cu/Ni (for Pt100)
- Material of conductor: 2, 3 or 4 wires (for Pt100) insulated\*
- Assembly: steel 1.4541
- Measuring junction: page 133
- Sheath material: MA or B\*
- Maximum operating pressure: -40°C...+100°C
- Connection head type: M20x1,5, M27x2, G1/2", G3/4"\*) or Ø24 for welding
- Head operating temperature:
- Process connection thread (M):

(Pt100)\*  
(T)  
(J)  
(K)



\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Other inch and metric threads on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand

### ORDERING CODE



Measuring element **Pt100, T, J or K**

Single (1) or double (2) measuring element

Sensor length L = 50...1000 mm\*)

Thread of sensor (M) **M20x1,5, M27x2, G1/2", G3/4"\*)** or **Ø24** for welding

Option with the head-mount transmitter type **T**

#### Example for order:

TP-496Pt100-1-50-G1/2" sensor with connection head type MA, with single resistor Pt100 with sheath length L= 50 mm and thread G1/2".  
 TP-496Pt100-1-50-G1/2"-T; TCHF-2120 sensor with connection head type B, option with the head mount transmitter type TCHF-2120.

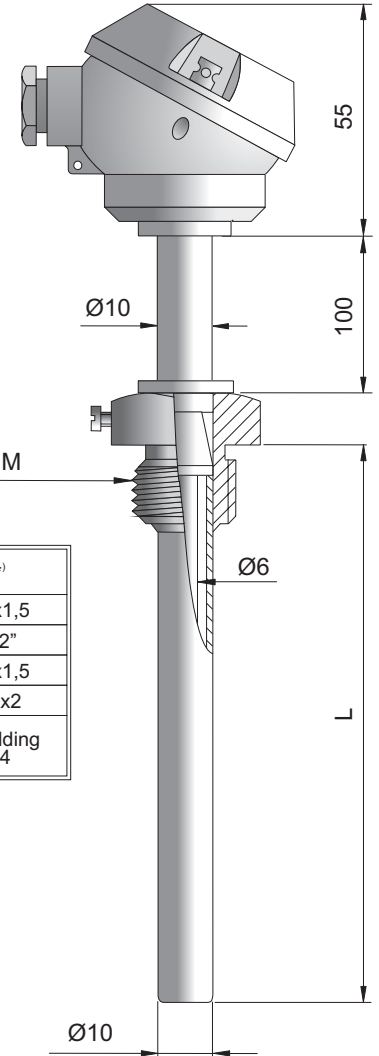
# TEMPERATURE SENSOR

type 491, 492, 493, 494, 495

## SPECIFICATION

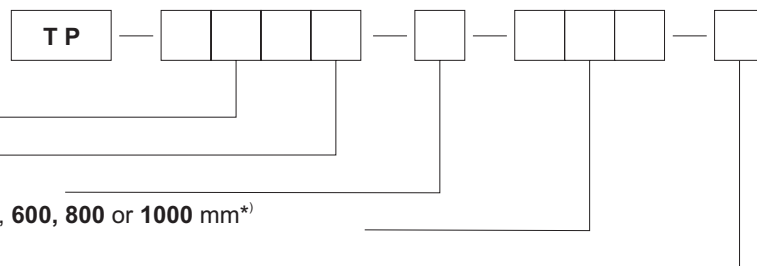
- Application temperature measurement in receptacles and pipelines.
- Temperature range
  - 200°C...+550°C (Pt100)
  - 200°C...+400°C (T)
  - 200°C...+400°C (J)
  - 200°C...+600°C (K)
- Measuring element
  - platinum resistor (Pt100)<sup>\*)</sup>
  - thermocouple Cu-CuNi (T)
  - thermocouple Fe-CuNi (J)
  - thermocouple NiCr-NiAl (K)
- Class of processing element 2<sup>\*)</sup>
- Conductor material wire Cu/Ni (for Pt100)
- Assembly 2, 3 or 4 wires (for Pt100)
- Measuring junction insulated<sup>\*)</sup>
- Sheath material steel 1.4541
- Maximum operating pressure page 160
- Connection head type MA or B<sup>\*)</sup>
- Head operating temperature –40°C...+100°C

<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Other inch and metric threads on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand



Type	M <sup>*)</sup>
TP-491	M20x1,5
TP-492	G1/2"
TP-493	M24x1,5
TP-494	M27x2
TP-495	for welding Ø24

## ORDERING CODE



Sensor type 491, 492, 493, 494, 495  
 Measuring element Pt100, T, J or K  
 Single (1) or double (2) measuring element  
 Immersion length L = 50, 100, 200, 300, 400, 600, 800 or 1000 mm<sup>\*)</sup>  
 Option with the head-mount transmitter T

**Example for order:** TP-491K-1-100 thermocouple sensor NiCr-NiAl (K) with sheath immersion length L= 100 mm and thread M20x1,5.  
 TP-491K-1-100-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

## TEMPERATURE SENSOR

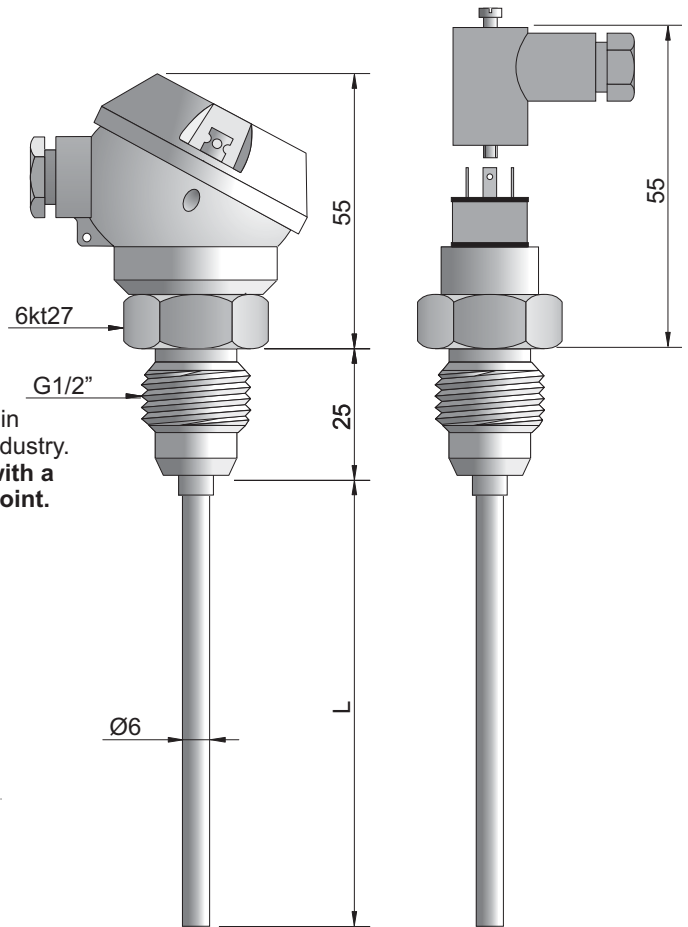
type 488, 489

type 488

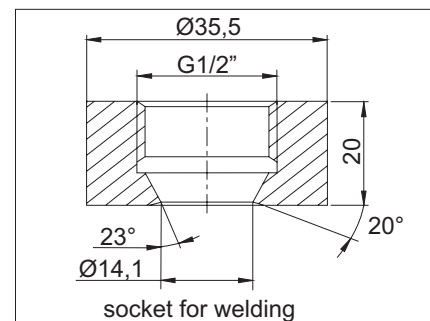
type 489

### SPECIFICATION

- |  |   |
|--|---|
| • Application                              | temperature measurement in pharmaceutical and food industry. <b>The sensor is equipped with a special hygienic conical joint.</b> |
| • Temperature range                        | 0°C...+150°C  |
| • Measuring element                        | platinum resistor (Pt100) <sup>*)</sup>   |
| • Class of processing element              | (B) <sup>*)</sup>   |
| • Material of conductor                    | wire Cu/Ni  |
| • Assembly                                 | 2, 3 or 4 wires   |
| • Sheath and joint material                | steel 1.4541  |
| • Maximum operating pressure               | 1,6 MPa   |
| • Connection head type (for 488)           | MA lub B <sup>*)</sup>  |
| • Connector type (for 489)                 | Hirschmann serie GDS  |
| • Head and connector operating temperature | -40°C...+100°C  |



- <sup>\*)</sup> Other parameters according to customer's requirements
- <sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand
- <sup>\*)</sup> Connection head with protection class IP65 or a cid resistant on demand



### ORDERING CODE



Sensor type **488, 489**  
 Single (1) or double (2) measuring element  
 Sensor length: **L=20...200 mm<sup>\*)</sup>**  
 Option with the head-mount transmitter (for 488) **T**

**Example for order:** TP-488-1-50, sensor with connection head type MA, with single resistor Pt100 and length L=50 mm.  
 TP-488-1-50-T; TCHF-2120 sensor with connection head type B, option with the head-mount transmitter type TCHF-2120.

# TEMPERATURE SENSOR

type 481, 482, 483, 484, 485

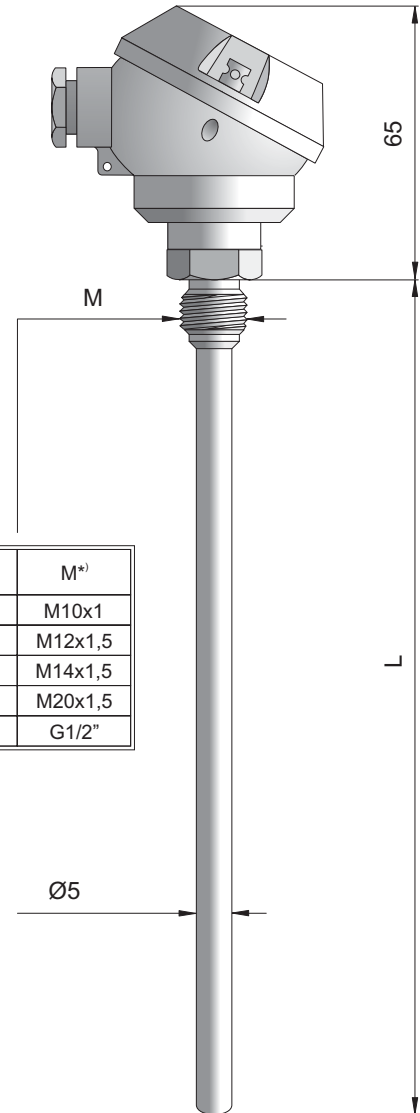
## SPECIFICATION

- Temperature range –50°C...+150°C
- Measuring element platinum resistor (Pt100)<sup>\*)</sup>  
thermocouple Cu-CuNi (T)  
thermocouple Fe-CuNi (J)  
thermocouple NiCr-NiAl (K)
- Class of processing element 2<sup>\*)</sup>
- Conductor material wire Cu/Ag (for Pt100)
- Assembly 2, 3 or 4 wires (for Pt100)
- Measuring junction insulated<sup>\*)</sup>
- Sheath material steel 1.4541
- Maximum operating pressure 1,6 MPa
- Outer sheath diameter Ø 5 mm<sup>\*)</sup>
- Connection head type MA or B<sup>\*)</sup>
- Head operating temperature –40°C...+100°C

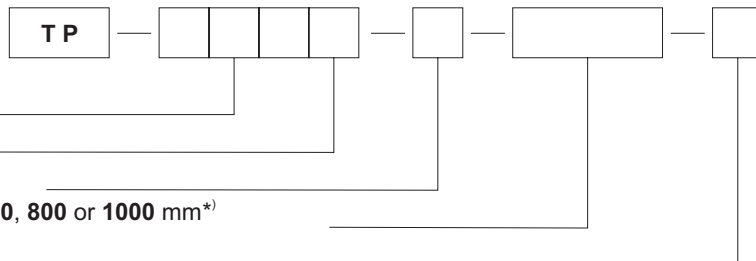
<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Other inch and metric threads on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand

(Pt100)  
(Pt100)<sup>\*)</sup>  
(T)  
(J)  
(K)

Type	M <sup>*)</sup>
TP-481	M10x1
TP-482	M12x1,5
TP-483	M14x1,5
TP-484	M20x1,5
TP-485	G1/2"



## ORDERING CODE



Sensor type 481, 482, 483, 484, 485  
 Measuring element Pt100, T, J or K  
 Single (1) or double (2) measuring element  
 Sensor length L = 50, 100, 200, 300, 400, 600, 800 or 1000 mm<sup>\*)</sup>  
 Option with the head-mount transmitter T

**Example for order:** TP-482Pt100-1-400 sensor of outer diameter Ø = 5 mm and length L= 400 mm with welded stationary fitting with thread M12x1,5.  
 TP-482Pt100-1-400-T; TCHF-2120 sensor with connection head type B,  
 option with the head-mount transmitter type TCHF-2120.

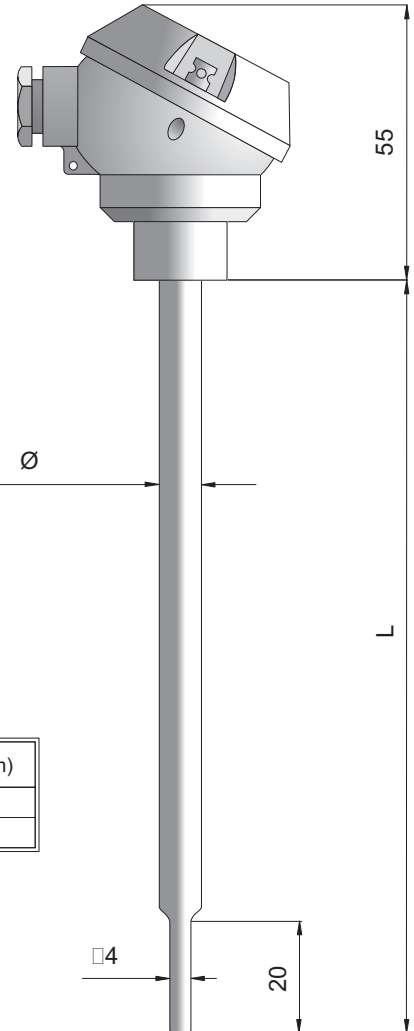
# TEMPERATURE SENSOR

type 471, 472

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+400°C
  - 200°C...+600°C
- Measuring element
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated<sup>\*)</sup>
- Sheath material
  - steel 1.4541
- Connection head type
  - MA or B<sup>\*)</sup>
- Head operating temperature
  - 40°C...+100°C

(Pt100)  
(T)  
(J)  
(K)  
(Pt100)<sup>\*)</sup>  
(T)  
(J)  
(K)



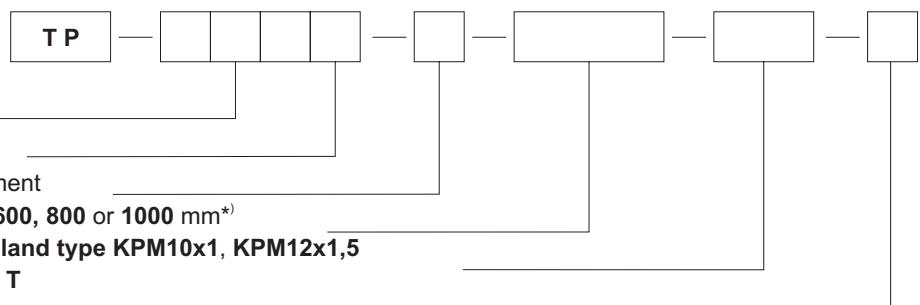
Type	Ø (mm)
TP-471	6
TP-472	8

<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand

## ADDITIONAL ACCESSORIES

- Compression gland type **KP** (page 150)

## ORDERING CODE



Sensor type **471, 472**  
 Measuring element **Pt100, T, J or K**  
 Single (**1**) or double (**2**) measuring element  
 Sensor length L = **100, 200, 300, 400, 600, 800 or 1000 mm<sup>\*)</sup>**  
 Additional accessories **compression gland type KPM10x1, KPM12x1,5**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-471K-1-400 sensor with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 6 mm and length L = 400 mm.  
 TP-471K-1-400-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

# TEMPERATURE SENSOR

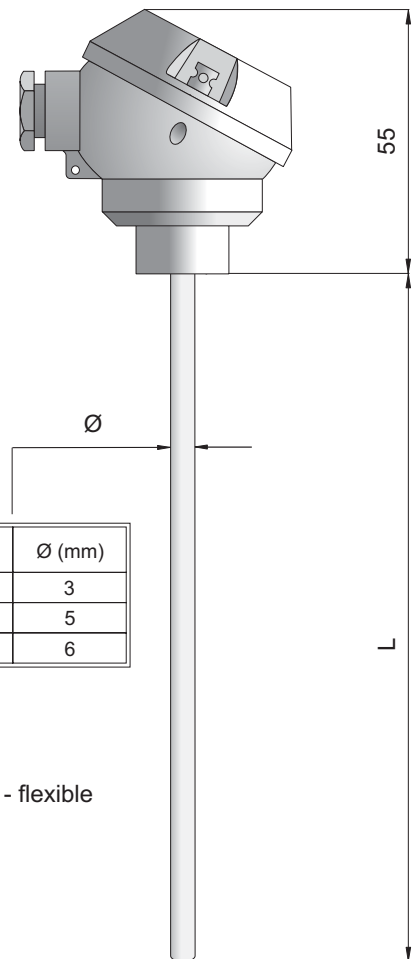
type 461, 462, 463

These sensors are made using mineral insulated cable. The outer sheath is from acid resistant steel and conductors are from copper with added zirconium. Lead insulation is magnesium oxide. The addition of zirconium to the copper ensures constant conductor resistance over a wide range of operating temperature. A platinum resistor is employed as the measuring element. This sensor construction combines the advantages of high resolution found in platinum resistance thermometers together with the **elastic properties** of mineral insulation which gives a **high degree of resistance to shock and vibration** in difficult industrial applications.

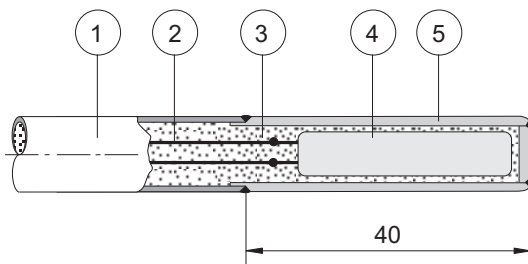
## SPECIFICATION

- Temperature range -200°C...+550°C
- Measuring element platinum resistor **(Pt100)\***
- Class of processing element B\*
- Conductor resistance wire CuZr 0,15 Ω/m (TP-461)  
0,07 Ω/m (TP-462)  
0,04 Ω/m (TP-463)
- Assembly 2, 3 or 4 wires
- Sheath material steel 1.4541
- Connection head type MA or B\*
- Head operating temperature -40°C...+100°C

\* Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand

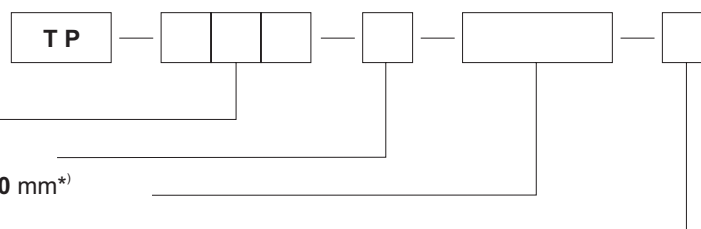


Type	Ø (mm)
TP-461	3
TP-462	5
TP-463	6



- 1 – mineral insulated cable - flexible
- 2 – wire CuZr
- 3 – insulation – MgO
- 4 – platinum resistor
- 5 – sheath material - rigid

## ORDERING CODE



Sensor type **461, 462, 463**  
 Single (1) or double (2) measuring element  
 Sensor length L = **200, 400, 600, 800 or 1000 mm\***  
 Option with the head-mount transmitter **T**

**Example for order:** TP-461-1-800 sensor of outer diameter Ø = 3 mm and length L = 800 mm  
 TP-461-1-800-T; TCH-2140-Pt100 sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

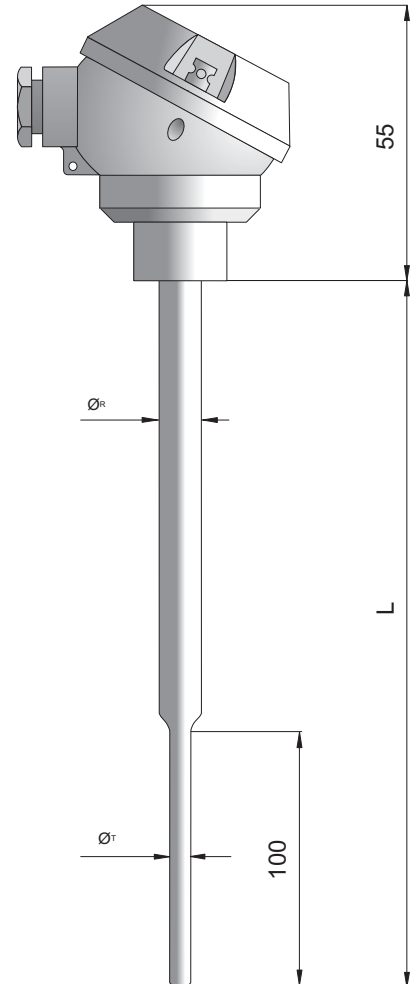
# TEMPERATURE SENSOR

type 451, 452, 453

## SPECIFICATION

- Temperature range
  - 200°C...+800°C (J)
  - 200°C...+1100°C (K)
  - 200°C...+1250°C (N)
- Sheathed thermocouple
  - Fe-CuNi (J)
  - NiCr-NiAl (K)
  - NiCrSi-NiSi (N)
- Class of thermocouple 2\*)
- Measuring junction
  - joint penetration (type a) or insulated (type b)
- Sheath material Inconel (J, K) Microbell (N)
- Connection head type MA or B\*)
- Head operating temperature -40°C...+100°C

\*) Other parameters according to customer's requirements  
 \*) Connection head with protection class IP65 or acid resistant on demand

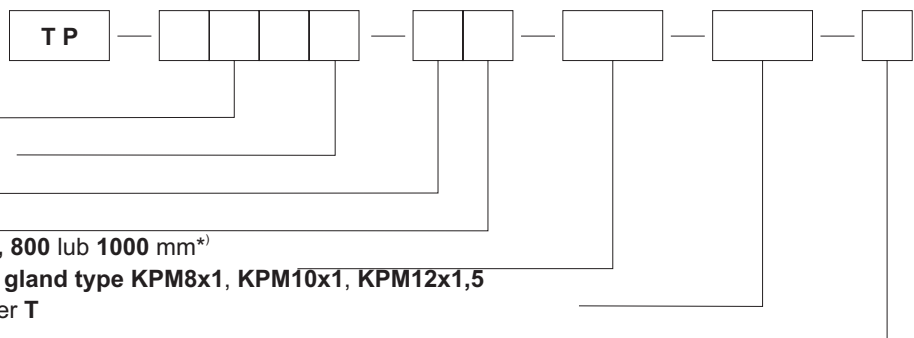


Sensor type	Sheathed thermocouple diameter $\varnothing_r$	Outer sheath diameter $\varnothing_s$
TP-451	3,0 mm	4,0 mm
TP-452	4,5 mm	6,0 mm
TP-453	6,0 mm	8,0 mm

## ADDITIONAL ACCESSORIES

- Compression gland type KP (page 150)

## ORDERING CODE



Sensor type 451, 452, 453  
 Sheathed thermocouple J, K or N  
 Single (1) or (2) thermocouple  
 Measuring junction a or b  
 Sensor length L = 200, 300, 400, 600, 800 lub 1000 mm\*)  
 Additional accessories compression gland type KPM8x1, KPM10x1, KPM12x1,5  
 Option with the head-mount transmitter T

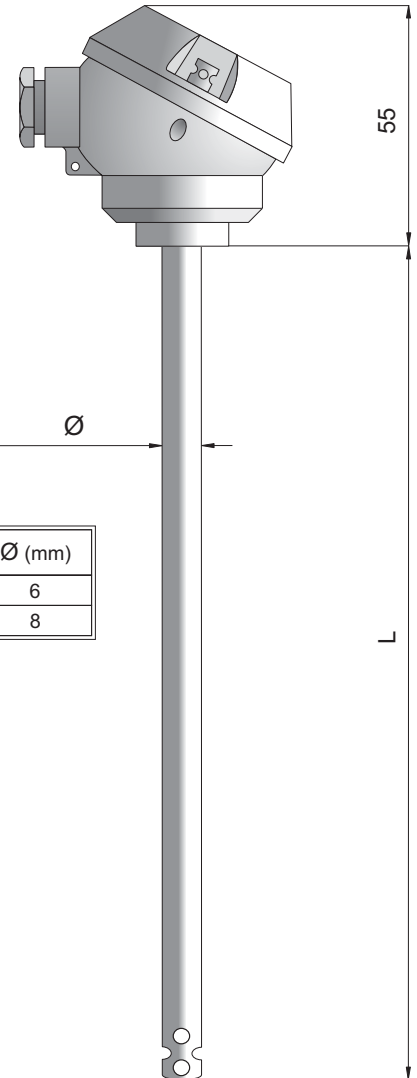
**Example for order:** TP-451K-1b-200 sensor with single sheathed thermocouple NiCr-NiAl (K) of diameter  $\varnothing_r = 3$  mm with measuring junction galvanically insulated from the sheath (type b) and length L = 200 mm.  
 TP-451K-1b-200-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

# TEMPERATURE SENSOR

type 441, 442

## SPECIFICATION

- Application temperature measurement of gases
- Temperature range
  - 200°C...+400°C (Pt100)
  - 200°C...+400°C (T)
  - 200°C...+400°C (J)
  - 200°C...+600°C (K)
- Measuring element
  - platinum resistor (Pt100)\*)
  - thermocouple Cu-CuNi (T)
  - thermocouple Fe-CuNi (J)
  - thermocouple NiCr-NiAl (K)
- Class of processing element 1
- Conductor material wire Cu/Ni (for Pt100)
- Assembly 3-wire (for Pt100)
- Measuring junction insulated\*)
- Sheath material steel 1.4541
- Connection head type MA or B\*)
- Head operating temperature -40°C...+100°C



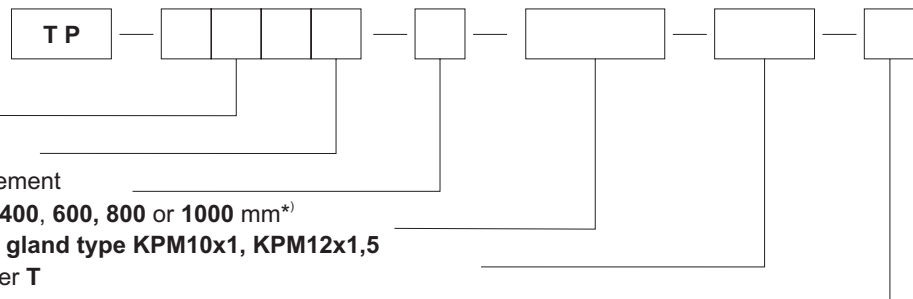
Type	Ø (mm)
TP-441	6
TP-442	8

\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand

## ADDITIONAL ACCESSORIES

- Compression gland type KP (page 150)

## ORDERING CODE



Sensor type 441, 442  
 Measuring element Pt100, T, J or K  
 Single (1) or double (2) measuring element  
 Sensor length L = 50, 100, 200, 300, 400, 600, 800 or 1000 mm\*)  
 Additional accessories compression gland type KPM10x1, KPM12x1,5  
 Option with the head-mount transmitter T

**Example for order:** TP-441K-1-400 sensor with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 6 mm and length L = 400 mm.  
 TP-441K-1-400-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.



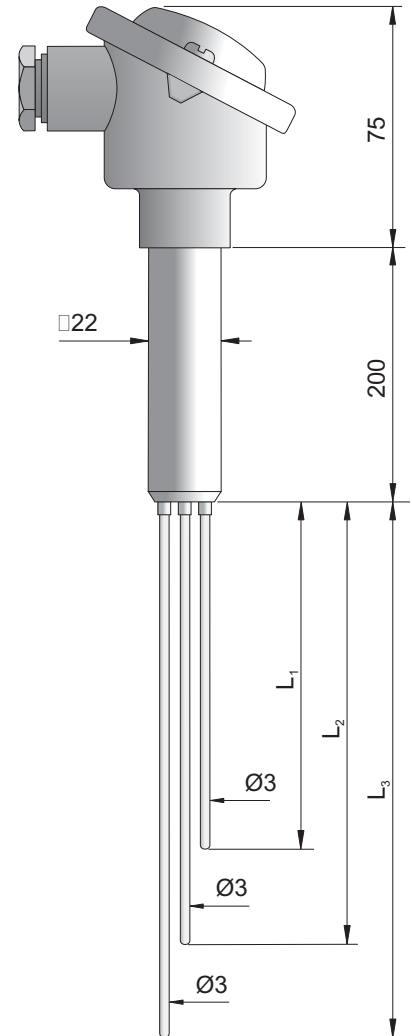
# TEMPERATURE SENSOR

## type 439

### SPECIFICATION

- Application: multisensor for measuring of liquids and gases at different immersion depth.
- Sheathed thermocouples:
  - Cu-CuNi (T)
  - Fe-CuNi (J)
  - NiCr-NiAl (K)
  - NiCrSi-NiSi (N)
- Temperature range:
  - 200°C...+400 °C (T)
  - 200°C...+700 °C (J)
  - 200°C...+1100°C (K)
  - 200°C...+1250°C (N)
- Measuring junctions: insulated
- Class of thermocouples: 1\*)
- Sheath material: Inconel (T, J, K), Microbell (N)
- Outer diameter of thermocouples: diam. 3 mm\*)
- Spacer material: steel 1.4828 □ 22\*)
- Connection head type: B or DA\*)
- Head operating temperature: -40°C...+100°C\*)

\*) Other parameters according to customer's requirements  
 \*) Double measuring elements on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



### ADDITIONAL ACCESSORIES

- Clamping plate type **UZ-22** (page 150)

### ORDERING CODE



Measuring elements **T, J, K** or **N** \_\_\_\_\_  
 Number of sheathed thermocouples **(2)** or **(3)** \_\_\_\_\_  
 Immersion length **L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>** in mm \_\_\_\_\_  
 Additional accessories **clamping plate type UZ-22** \_\_\_\_\_

**Example for order:** TP-439K-3-500/100/1500 sensor with three sheathed thermocouples NiCr-NiAl (K) Ø = 3mm, lengths L<sub>1</sub> = 500 mm, L<sub>2</sub> = 1000 mm, L<sub>3</sub> = 1500 mm

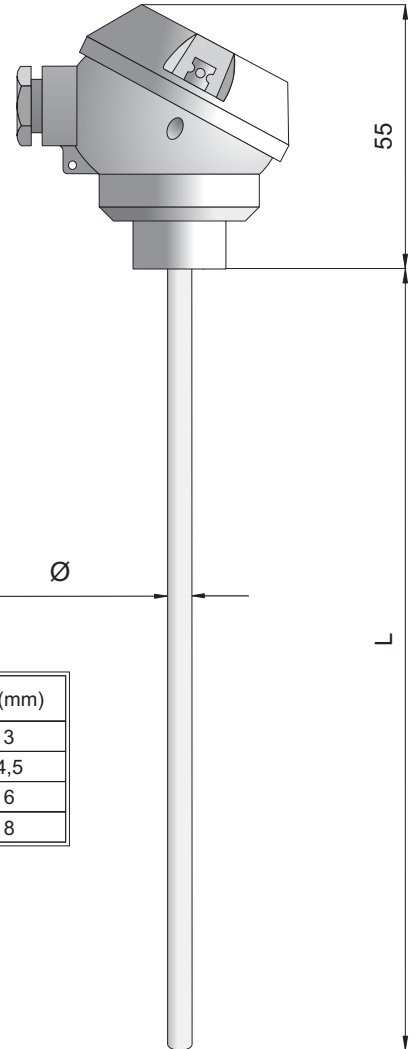
# TEMPERATURE SENSOR

type 431, 432, 433, 434

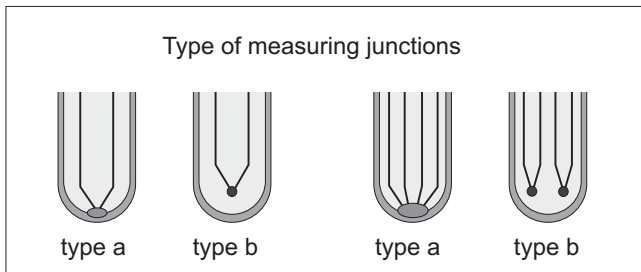
## SPECIFICATION

- Temperature range
  - 200°C...+800°C (J)
  - 200°C...+1100°C (K)
  - 200°C...+1250°C (N)
- Sheathed thermocouple
  - Fe-CuNi (J)
  - NiCr-NiAl (K)
  - NiCrSi-NiSi (N)
- Measuring junction
  - joint penetration (type a) or insulated (type b)
- Class of thermocouple
  - 2<sup>\*)</sup>
- Sheath material
  - Inconel (J, K), Microbell (N)
- Connection head type
  - MA or B<sup>\*)</sup>
- Head operating temperature
  - 40°C...+100°C

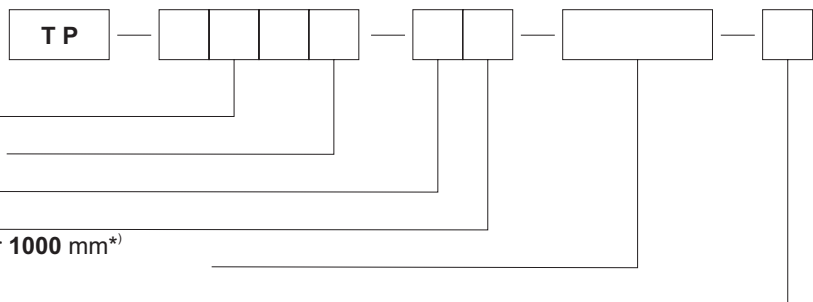
<sup>\*)</sup> Other parameters according to customer's requirements  
<sup>\*)</sup> Thermocouples of outer diameter  $\varnothing = 1, 1,5$  or 2 mm on demand  
<sup>\*)</sup> Connection head with protection class IP65 or acid resistant on demand



Type	Ø (mm)
TP-431	3
TP-432	4,5
TP-433	6
TP-434	8



## ORDERING CODE



Sensor type **431, 432, 433, 434**  
 Sheathed thermocouple type **J, K or N**  
 Single (1) or double (2) thermocouple  
 Measuring junction **a** or **b**  
 Sensor length L = **200, 300, 400, 600, 800** or **1000 mm<sup>\*)</sup>**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-431K-1b-200 sensor with single sheathed thermocouple NiCr-NiAl (K) of outer diameter  $\varnothing = 3$  mm, measuring junction galvanically insulated from the sheath (type b) and length L = 200 mm.  
 TP-431K-1b-200-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

## TEMPERATURE SENSOR

type 411, 412, 413, 414, 415  
type 421, 422, 423, 424, 425

### SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+600°C
  - 200°C...+900°C
- Measuring element
  - (Pt100)
  - (T)
  - (J)
  - (K)
  - (Pt100)\*
  - (T)
  - (J)
  - (K)
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated\*)
- Sheath material
  - steel 1.4541
- Maximum operating pressure
  - page 160
- Connection head type
  - MA or B\*)
- Head operating temperature
  - 40°C...+100°C
- Fitting
  - welded stationary with thread
  - M20x1,5 or G1/2"\*)

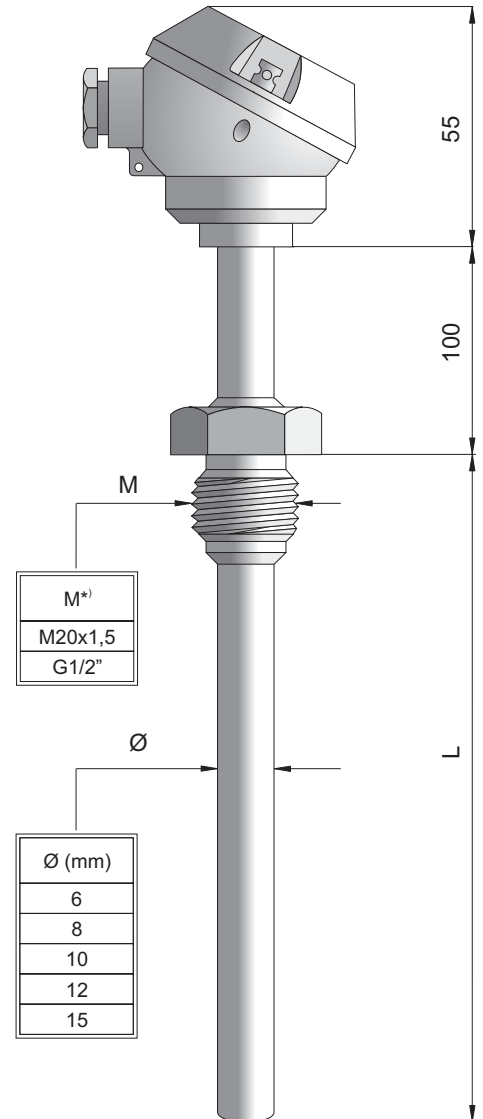
\*) Other parameters according to customer's requirements

\*) Pt500, Pt1000, Ni100, Ni1000 on demand

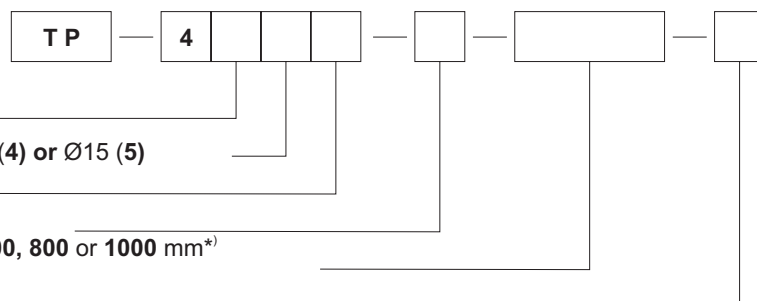
\*) Other inch and metric threads on demand

\*) Connection head with protection class IP65 or acid resistant on demand

\*) Protection tube of outer diameter Ø9 and Ø11 mm on demand



### ORDERING CODE



Thread: M 20x1,5 (1) or G 1/2" (2)

Outer diameter: Ø6 (1), Ø8 (2), Ø10 (3), Ø12 (4) or Ø15 (5)

Measuring element Pt100, T, J or K

Single (1) or double (2) measuring element

Sensor length L = 50, 100, 200, 300, 400, 600, 800 or 1000 mm\*)

Option with the head-mount transmitter T

### Example for order:

TP-411K-1-400 sensor with single thermocouple NiCr-NiAl (K) of outer diameter Ø= 6 mm and length L = 400 mm with welded stationary fitting with thread M20x1,5.

TP-411K-1-400-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

# TEMPERATURE SENSOR

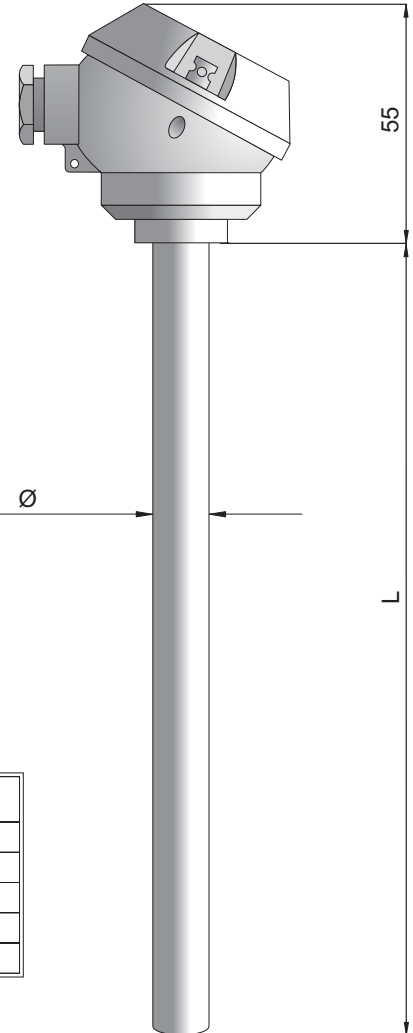
type 401, 402, 403, 404, 405

## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+600°C
  - 200°C...+900°C
- Measuring element
  - (Pt100)
  - (T)
  - (J)
  - (K)
  - (Pt100)\*)
  - (T)
  - (J)
  - (K)
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated\*)
- Sheath material
  - steel 1.4541
- Connection head type
  - MA or B\*)
- Head operating temperature
  - 40°C...+100°C

\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand  
 \*) Protection tube of outer diameter Ø9 and Ø11 mm on demand

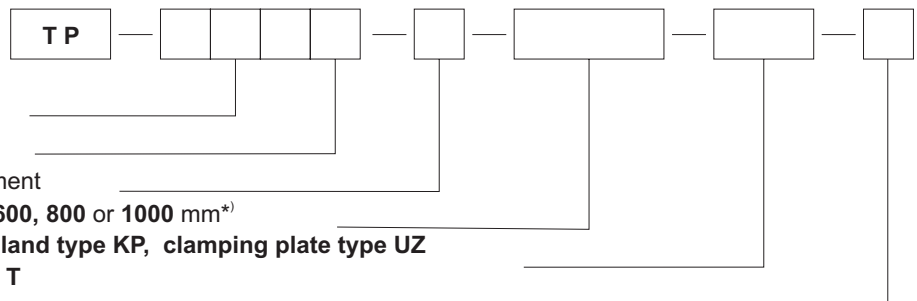
Type	Ø (mm)
TP-401	6
TP-402	8
TP-403	10
TP-404	12
TP-405	15



## ADDITIONAL ACCESSORIES

- Compression gland type **KP** (page 150)
- Clamping plate type **UZ** (page 150)

## ORDERING CODE

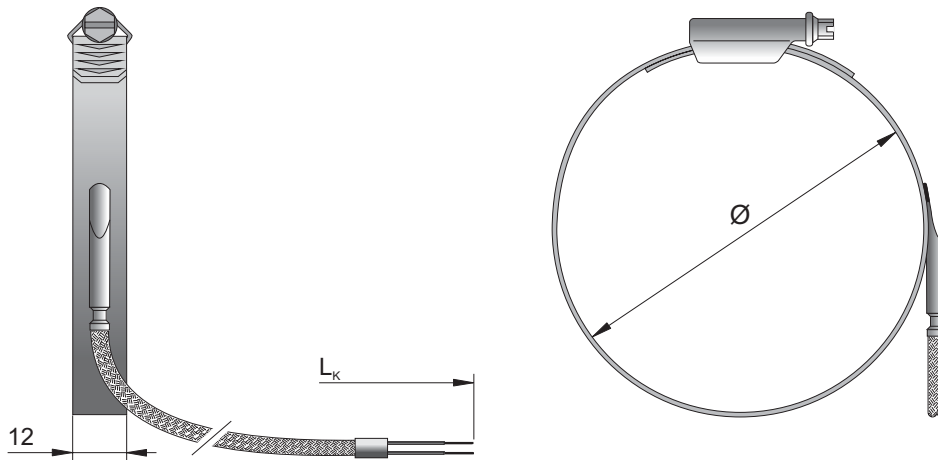


Sensor type **401, 402, 403, 404, 405**  
 Measuring element **Pt100, T, J or K**  
 Single (**1**) or double (**2**) measuring element  
 Sensor length L = **100, 200, 300, 400, 600, 800 or 1000 mm**\*)  
 Additional accessories **compression gland type KP, clamping plate type UZ**  
 Option with the head-mount transmitter **T**

**Example for order:** TP-401K-1-400 sensor with single thermocouple NiCr-NiAl (K) of outer diameter Ø = 6 mm and length L = 400 mm.  
 TP-401K-1-400-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

# TEMPERATURE SENSOR

type 397



## SPECIFICATION

• Application	temperature measurement on pipelines and other cylindrical elements.
• Temperature range	-50°C...+250°C
• Measuring element	Cu-CuNi (T) Fe-CuNi (J) NiCr-NiAl (K)
• Class of thermocouple	2
• Hose-clip material	stainless steel 1.4016
• Hose-clip opening diameter Ø	32 – 50 mm 50 – 70 mm 70 – 90 mm 90 – 110 mm 110 – 130 mm
• Length of the compensation cable L <sub>K</sub>	0,5 – 2,5 m <sup>*)</sup>
• Cable insulation	fibre glass and steel braid <sup>*)</sup>

<sup>\*)</sup> Other parameters according to customer's requirements

<sup>\*)</sup> Other insulation of the cable: PCV, silicon, teflon on demand

<sup>\*)</sup> Protection by stainless steel armoured sheath available on demand

## ORDERING CODE



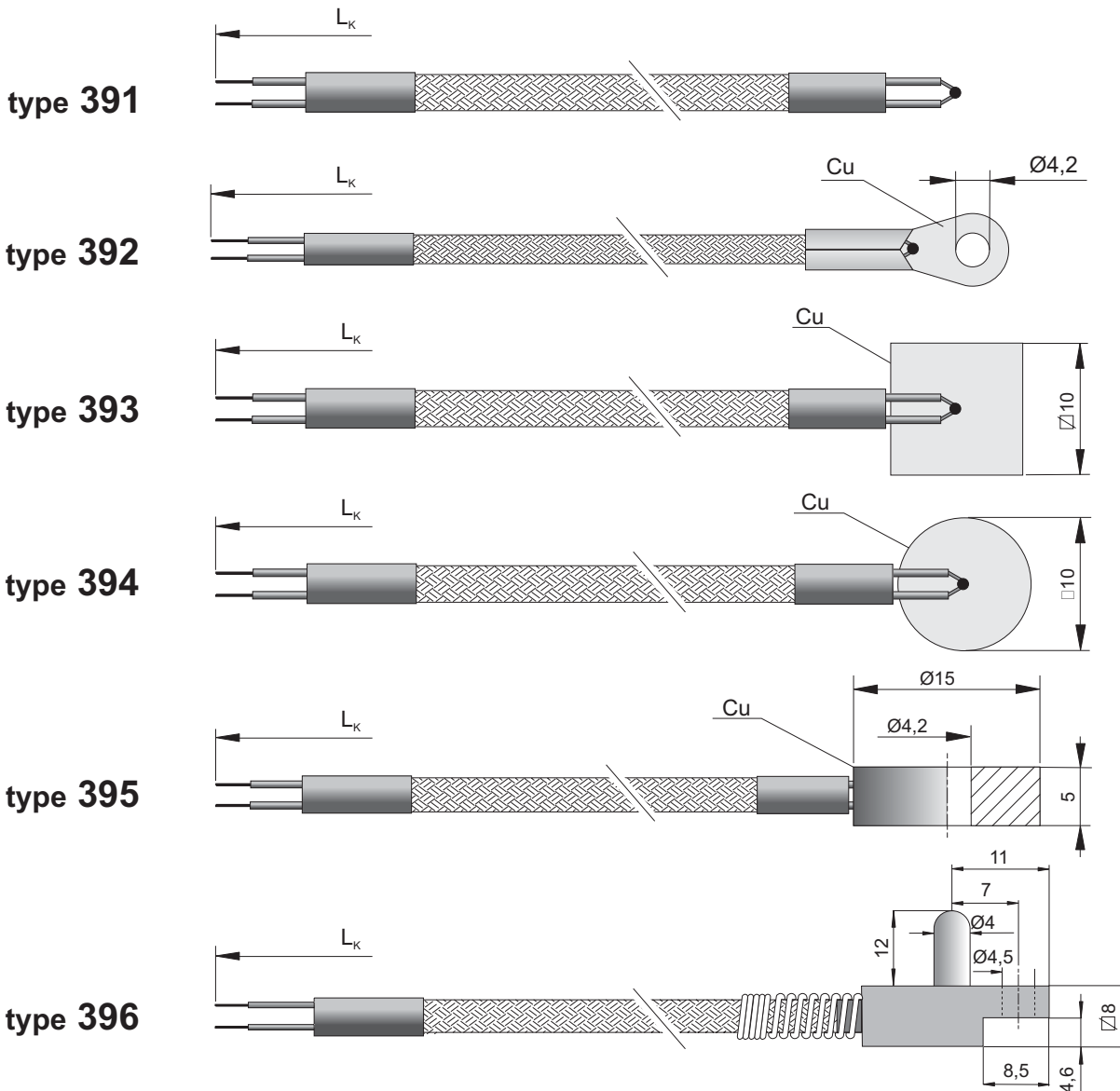
Measuring element T, J or K

Hose-clip opening diameter Ø 32–50, 50–70, 70–90, 90–110, 110–130 mm<sup>\*)</sup>

Length of the compensation cable L<sub>K</sub> = 0,5 ... 2,5 m<sup>\*)</sup>

**Example for order:** TP-397K-50-70-1,5 thermocouple sensor NiCr-NiAl (K) with hose-clip of opening diameter Ø 50-70 mm, length of the compensation cable L<sub>K</sub> = 1,5 m.

## TEMPERATURE SENSOR

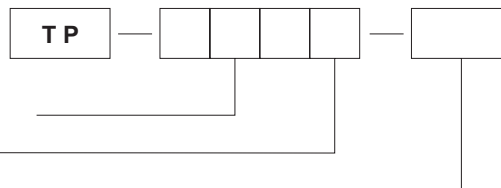


### SPECIFICATION

- Application: surface temperature measurement of blocks or machinery parts.
- Temperature range:  $-100^{\circ}\text{C} \dots +400^{\circ}\text{C}$
- Measuring element: Cu-CuNi (T), Fe-CuNi (J), NiCr-NiAl (K)
- Class of thermocouple: 2

\*) Other parameters according to customer's requirements

### ORDERING CODE



Sensor type **391, 392, 393, 394, 395, 396**  
 Measuring element **T, J or K**  
 Length of the cable  $L_K = 0,5, 1,5$  or  $2,5 \text{ m}^*$

**Example for order:** TP-392J-0,5 thermocouple sensor Fe-CuNi (J) of opening diameter  $\varnothing = 4,2 \text{ mm}$  and length of compensation cable  $L_K = 0,5 \text{ m}$ .

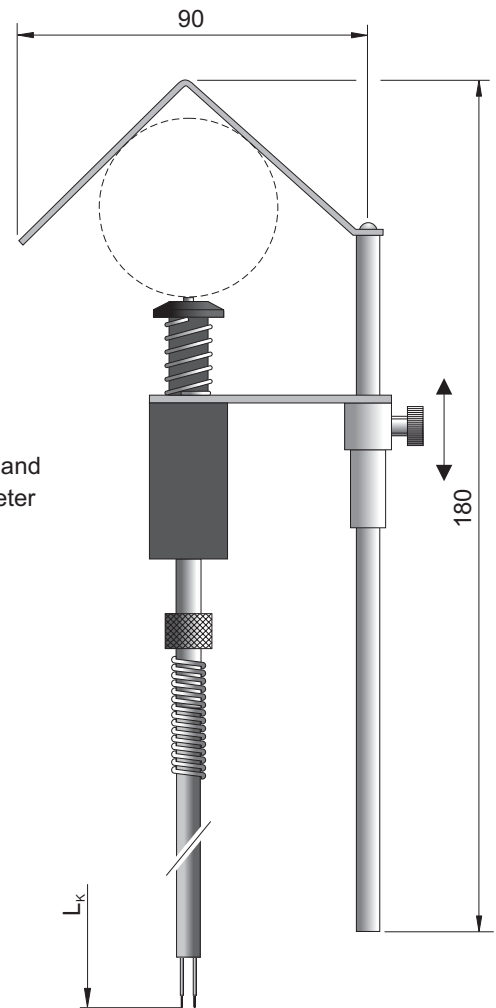
# TEMPERATURE SENSOR

type 387

## SPECIFICATION

- |                               |   |
|-------------------------------|---|
| • Application                 | temperature measurement on pipelines and other cylindrical elements of outer diameter in range <b>from 25 mm to 80 mm</b> |
| • Temperature range           | -30°C...+150°C  |
| • Measuring element           | Cu-CuNi (T)<br>Fe-CuNi (J)<br>NiCr-NiAl (K)   |
| • Class of thermocouple       | 2*)   |
| • Measuring junction          | joint penetration*)   |
| • Response time $T_{0,9}$     | 25 sec.   |
| • Cable operating temperature | -30°C...+80°C   |

\*) Other parameters according to customer's requirements



## ORDERING CODE



Measuring element T, J or K

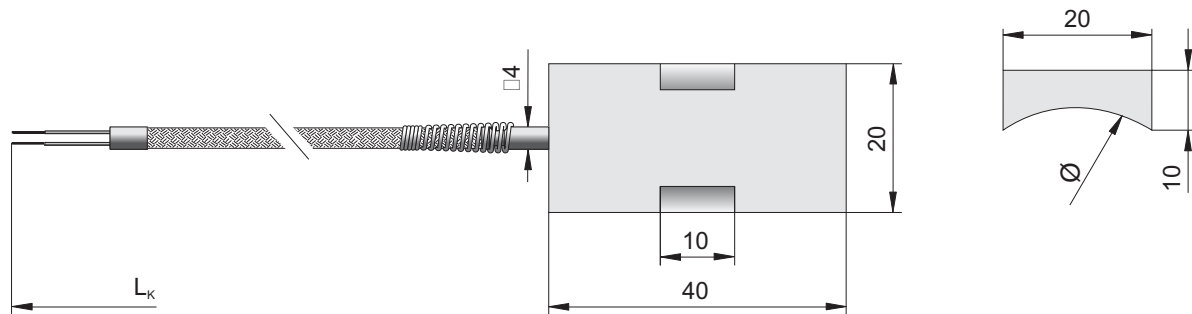
Length of the cable  $L_k = 0,5, 1,5$  or  $2,5$  m\*)

Additional accessories **plug type MT-T, MT-J or MT-K**

**Example for order:** TP-387J-1,5 thermocouple sensor Fe-CuNi (J), length of compensation cable  $L_k = 1,5$  m.

# TEMPERATURE SENSOR

type 386



## SPECIFICATION

- |                               |   |
|-------------------------------|---|
| • Application                 | temperature measurement on pipelines and other cylindrical elements.  |
| • Temperature range           | Sensor is fastened by hose-clip.<br>-50 °C...+400 °C  |
| • Measuring element           | platinum resistor <b>(Pt100)*</b><br>thermocouple Cu-CuNi <b>(T)</b><br>thermocouple Fe-CuNi <b>(J)</b><br>thermocouple NiCr-NiAl <b>(K)</b><br>2*) |
| • Class of processing element | insulated*)   |
| • Measuring junction          | brass   |
| • Radiator material           | brass   |
| • Cable insulation            | fibre glass and steel braid*)   |

\*) Other parameters according to customer's requirements

\*) Pt500, Pt1000, Ni100, Ni1000 on demand

\*) Other insulation of the cable: PCV, silicon, teflon on demand

\*) Protection by stainless steel armoured sheath available on demand

## ORDERING CODE



Measuring element **Pt100, T, J or K**

Pipeline diameter (cylindrical element) Ø (mm)

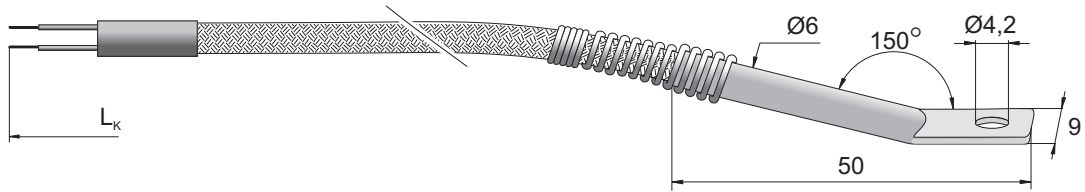
Length of the cable  $L_k = 0,5, 1,5$  or  $2,5$  m\*)

**Example for order:** TP-386Pt100-50-2,5 sensor for pipeline of outer diameter Ø= 50 mm and length of cable  $L_k = 2,5$  m.

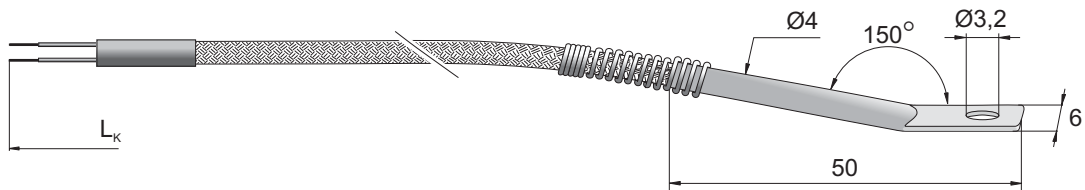


## TEMPERATURE SENSOR

type 381



type 382



### SPECIFICATION

- |                               |  |
|-------------------------------|--|
| • Application                 | surface temperature measurement of blocks, parts of machinery or other construction elements   |
| • Temperature range           | -100°C...+400°C  |
| • Measuring element           | platinum resistor <b>(Pt100)*</b><br>thermocouple Cu-CuNi <b>(T)</b><br>thermocouple Fe-CuNi <b>(J)</b><br>thermocouple NiCr-NiAl <b>(K)</b> |
| • Class of processing element | 2  |
| • Measuring junction          | insulated*)  |
| • Sheath material             | steel 1.4541   |
| • Cable insulation            | fibre glass and steel braid*)  |

\*) Pt500, Pt1000, Ni100, Ni1000 on demand

\*) Double version on demand

\*) Other insulation of the cable: PCV, silicon, teflon on demand

\*) Protection by stainless steel armoured sheath available on demand

\*) Angle 90° instead of 150°

### ORDERING CODE



Sensor type **381, 382**

Measuring element **Pt100, T, J or K**

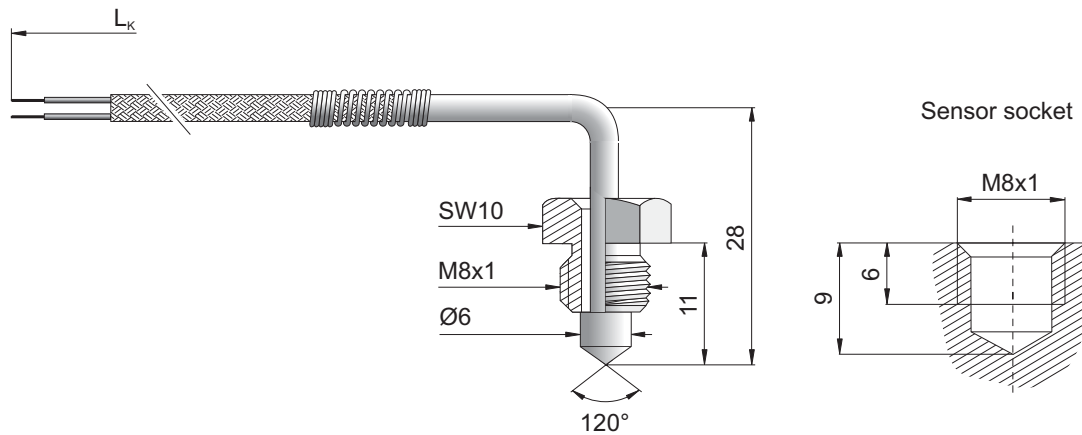
Sensor length  $L_K = 0,5, 1$  or  $1,5$  m\*)

**Example for order:**

TP-381J-0,5 thermocouple sensor Fe-CuNi (J) of opening diameter  $\varnothing = 4,2$  mm and cable length  $L_K = 0,5$  m.

## TEMPERATURE SENSOR

type 376



### SPECIFICATION

- |                               |  |
|-------------------------------|--|
| • Application                 | temperature measurement of feed cylinders extruding presses and injection moulds.          |
| • Temperature range           | -100°C...+500°C  |
| • Measuring element           | thermocouple Fe-CuNi (J)<br>thermocouple NiCr-NiAl (K)<br>platinum resistor (Pt100)<br>2*) |
| • Class of processing element | insulated*)  |
| • Measuring junction          |  |
| • Cable insulation            | fibre glass and steel braid*)  |

\*) Other parameters according to customer's requirements

\*) Other insulation of the cable: PCV, silicon, teflon on demand

\*) Protection by stainless steel armoured sheath available on demand

### ORDERING CODE



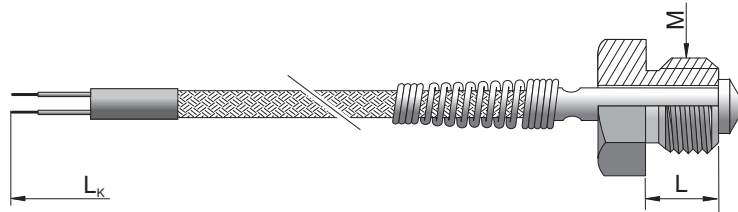
Measuring element J, K or Pt100

Length of the cable  $L_k = 0,5, 1,5$  or  $2,5$  m\*)

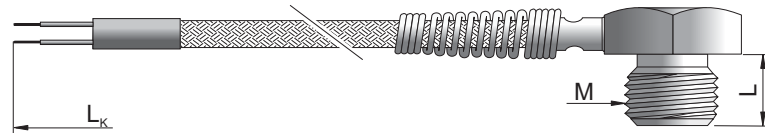
**Example for order:** TP-376J-1,5 thermocouple sensor Fe-CuNi (J) with cable of length  $L_k = 1,5$  m.

## TEMPERATURE SENSOR

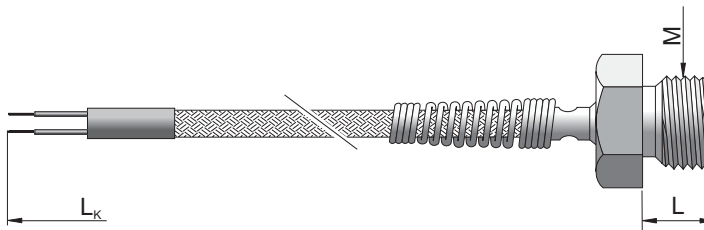
type 373



type 374



type 375



M <sup>*)</sup>	L <sup>*)</sup>
M6	10
M8x1	12
M10x1	15
M12x1,5	20
M20x1,5	30
G1/2"	30
1/4"-20	15

### SPECIFICATION

- Temperature range: -100°C...+400°C
- Measuring element: platinum resistor (Pt100)<sup>\*)</sup>, thermocouple Cu-CuNi (T), thermocouple Fe-CuNi (J), thermocouple NiCr-NiAl (K)
- Class of processing element: 2
- Measuring junction: insulated<sup>\*)</sup>
- Sheath material: steel 1.4541
- Cable insulation: fibre glass and steel braid<sup>\*)</sup>

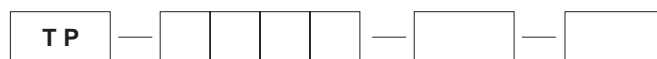
<sup>\*)</sup> Other parameters according to customer's requirements

<sup>\*)</sup> Pt500, Pt1000, Ni100, Ni1000 on demand

<sup>\*)</sup> Other insulation of the cable: PCV, silicon, teflon on demand

<sup>\*)</sup> Protection by stainless steel armoured sheath available on demand

### ORDERING CODE



Sensor type **373, 374, 375**

Measuring element **Pt100, T, J or K**

Length of the cable  $L_k = 0,5, 1,5$  lub  $2,5$  m<sup>\*)</sup>

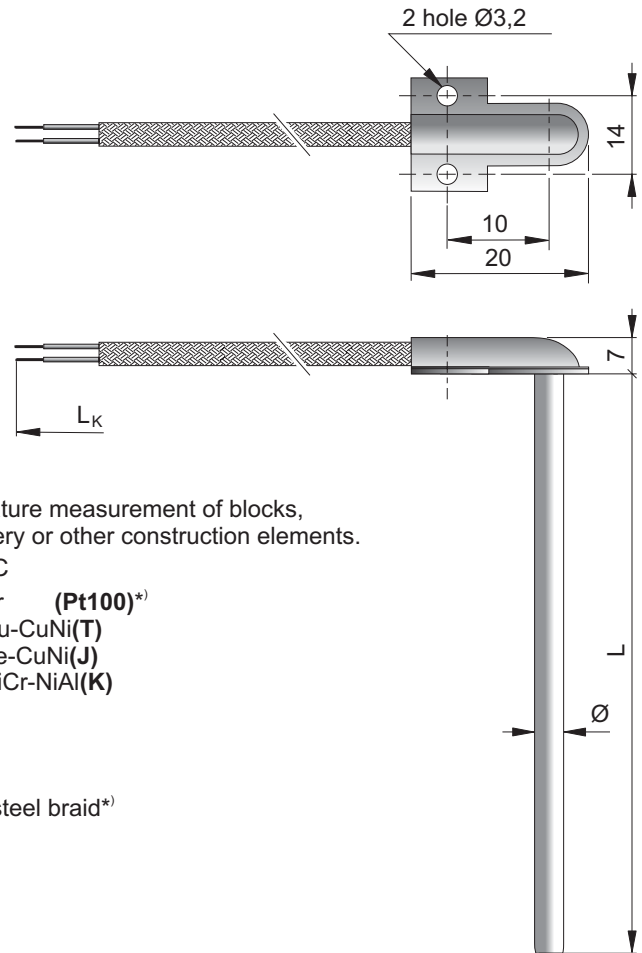
Thread of sensor **M6, M8x1, M10x1, M12x1,5, M20x1,5, G1/2", 1/4"-20**

### Example for order:

TP-375J-1,5-M10x1 thermocouple sensor Fe-CuNi (J), length L = 15 mm, length of the cable  $L_k = 1,5$  m with thread M10x1.

# TEMPERATURE SENSOR

type 366



## SPECIFICATION

- Application: surface temperature measurement of blocks, parts of machinery or other construction elements.
- Temperature range:  $-100^{\circ}\text{C} \dots +400^{\circ}\text{C}$
- Measuring element: platinum resistor (Pt100)\*, thermocouple Cu-CuNi(T), thermocouple Fe-CuNi(J), thermocouple NiCr-NiAl(K)
- Class of processing element: 2
- Measuring junction: insulated\*
- Sheath material: steel 1.4541
- Cable insulation: fibre glass and steel braid\*

\*Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Other insulation of the cable: PCV, silicon, teflon on demand  
 \*) Protection by stainless steel armoured sheath available on demand

## ADDITIONAL ACCESSORIES

- Compression gland type KP (page 150)

## ORDERING CODE



- Measuring element Pt100, T, J or K\*)
- Sheath outer diameter  $\varnothing = 2,5, 3, 4, 5$  or  $6 \text{ mm}^*$
- Sensor length  $L = 20 \dots 1000 \text{ mm}^*$
- Length of the cable  $L_K = 0,5 \dots 2,5 \text{ m}^*$
- Additional accessories compression gland type KPM8x1, KPM10x1, KPM12x1,5\*

**Example for order:** TP-366J-5-50-1,5 thermocouple sensor Fe-CuNi (J) of outer diameter  $\varnothing = 5 \text{ mm}$ , length  $L = 50 \text{ mm}$  and length of the cable  $L_K = 1,5 \text{ m}$ .

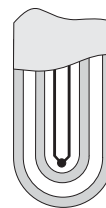
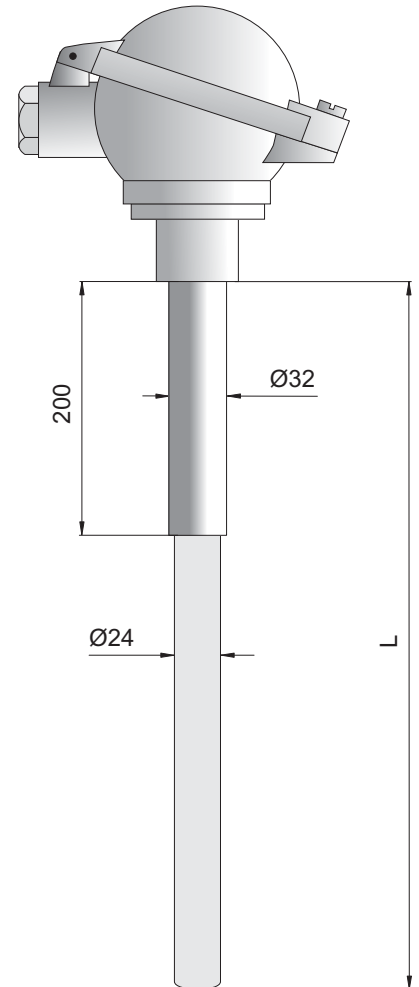
# TEMPERATURE SENSOR

type **831, 832, 833**

## SPECIFICATION

- Application: measurement of very high temperatures. Uses a **double ceramic protector tube** to increase sensor life in difficult or severe industrial conditions.
- Measuring element: PtRh90/10%-Pt (S)  
PtRh70/30%-PtRh94/6% (B)
- Class of thermocouple: 2
- Spacer diameter: Ø 32 mm
- Outer sheath: ceramic C610; Ø 24x2,5  
ceramic C799; Ø 24x3,0
- Inner sheath: ceramic C610; Ø 15x2,0  
ceramic C799; Ø 15x2,5
- Connection head type: A or DA\*)
- Head operating temperature: -40°C...+100°C

\*) Other parameters according to customer's requirements  
 \*) PtRh87/13%-Pt (R), NiCr-NiAl (K) or NiCrSi-NiSi (N) on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



## ADDITIONAL ACCESSORIES

- Clamping plate type **UZ** (page 126)

Sensor type	Sheath material		Max. temperature (°C)	Type of thermocouple	
	outer	inner			
<b>TP-831</b>	ceramic C610	ceramic C610	1400	PtRh90/10%-Pt (S)	0,50 mm
<b>TP-832</b>	ceramic C799	ceramic C799	1500	PtRh90/10%-Pt (S)	0,50 mm
<b>TP-833</b>	ceramic C799	ceramic C799	1600	PtRh70/30%-PtRh94/6% (B)	0,50 mm

## ORDERING CODE



- Sensor type **831, 832, 833**
- Single (1) or double (2) measuring element
- Sensor length L = **500, 700, 1000** or **1400** mm\*)
- Additional accessories **clamping plate type UZ-32**
- Option with the head-mount transmitter **T**

**Example for order:** TP-832-1-700 sensor with thermocouple PtRh90/10%-Pt (S) with outer and inner ceramic sheath type C799 and length L= 700 mm.  
 TP-832-1-700-T; TCH-2170-S sensor with the head-mount transmitter type TCH-2170-S.

# TEMPERATURE CONTROLLER

## type R-720



- selectable characteristics of controller: P, PI, PD, PID or threshold with hysteresis
- autotuning**
- for use with wide assortment of sensors:
  - Cu-CuNi (T), Fe-CuNi (J), NiCr-NiAl (K)
  - NiCrSi-NiSi (N), PtRh10-Pt (S), PtRh13-Pt (R)
  - PtRh30-PtRh6 (B), Pt100, Ni100
- overload range and open circuit sensor alarm
- programmable multifunction alarm
- access control function
- programming by a computer or by keypad
- real time clock enables temperature profile programming
- 
- 

R-720 is an universal one-channel **microprocessor** temperature controller designed for use with RTDs and thermoelectric sensors. The software enables easy choice of control characteristics P, PI, PID or threshold with hysteresis. The controller is equipped with a special self tuning function - **autotuning**. It allows identification and dynamic estimation of process control parameters. Value of separate parameters are calculated automatically.

The operating commands and process parameters are set from the front keypad or with a serial input RS232 by a computer and are also displayed on the dual 4-digit LEDs. This makes it very easy and helpful for the operator. The special access control function gives protection from un-authorized operators. The wide range of process parameters which can be set enables control of most typical systems. It allows direct control of low power objects and equipments.

The R-720 type controller is equipped with a universal output relay which works in normally-closed or normally-open mode. Optionally is equipped with special voltage output for external solid state relays (SSRs). It is also equipped with a programmable multifunction alarm circuit. If the set temperature or interval is exceeded this indicated on the display and by the control output relay circuit. The R-720 type temperature controllers are widely used in many industrial process.

### SPECIFICATION

- Input sensor type acc. to table
- Temperature control range acc. to table
- Accuracy  
( $T_a = 23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ )  $0.2\% \times T + 0.3^{\circ}\text{C} \pm 1$  digit
- Bias current of RTD 0.2 mA
- Output relay 5 A, max 250 V (N/O and N/C contacts)
- Power supply 230V +10% -15%, 50 Hz, 3 VA
- Ambient temperature  $0^{\circ}\text{C} \dots +45^{\circ}\text{C}$
- Mounting window dimensions (mm) 42 x 91
- Dimensions (mm) 48 x 96 x 138
- Weight ca. 400 g

Sensor type	Range ( $^{\circ}\text{C}$ )
<b>B</b> PtRh30-PtRh6	400...1800
<b>R</b> PtRh13-Pt	200...1600
<b>S</b> PtRh10-Pt	200...1600
<b>N</b> NiCrSi-NiSi	-100...1300
<b>K</b> NiCr-NiAl	-100...1200
<b>J</b> Fe-CuNi	-100...1000
<b>T</b> Cu-CuNi	-100...230
<b>Pt100*</b>	-100...850
<b>Ni100*</b>	-60...180

\*) 2 or 3-wire system

## COMPUTER INTERFACE FOR TRANSMITTERS

type IF232



- interface for transmitter **programming**
- galvanic insulation** between computer and transmitter
- no additional power supply is required**

IF232 interface is dedicated to communication between a personal computer and programmable transmitters that are offered by Czaki Thermo-Product. This accessory fits logical levels of RS-232C signals to levels used in the transmitters. The relevant advantage of this interface is galvanic insulation between a PC and a transmitter. IF232 interface doesn't require additional power supply. The electronic circuit of the interface is placed inside a standard DB-9 plug.

### SPECIFICATION

• PC connector type	female plug DB-9
• PC standard for logical signals	RS232C
• Transmitter connector type	jack plug Ø 2.5 mm
• Transmitter output type	open collector
• Transmitter input	diode 1.1 V
• Galvanic insulation between connectors	500 V AC
• Maximum speed transmission	2400 bps
• Length of cable	2 m
• Ambient temperature	0 ...+60 °C
• Weight	ca. 55 g

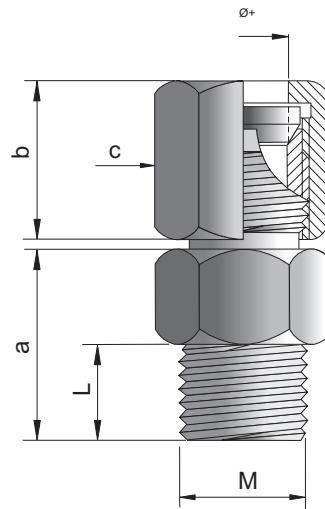
# COMPRESSION GLAND

## type KP

Type KP compression gland provides an efficient way of securing temperature sensors into tanks, chambers and pipes. The sensor may be secured at any point along its length to adjust the immersion depth. This eliminates the need to stock a variety of fixed depth immersion sensors. Pressure-tight to 0,1 MPa.

**Material:** acid resistant steel 1.4541.

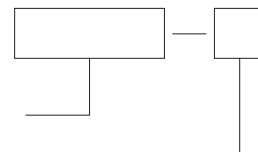
\*) Other threads inch and metric on demand



Type	M	L	a	b	c
KPM8x1	M8x1	8	13	10	SW10
KPM10x1	M10x1	10	17	15	SW14
KPM12x1,5	M12x1,5	12	20	15	SW17
KPM20x1,5	M20x1,5	18	28	23	SW24
KPG1/2"	G1/2"	18	28	23	SW24

## ORDERING CODE

Compression gland type **KPM8x1, KPM10x1, KPM12x1,5, KPM20x1,5, KPG1/2"**\*)  
 Outer diameter of sensor Ø \_\_\_\_\_



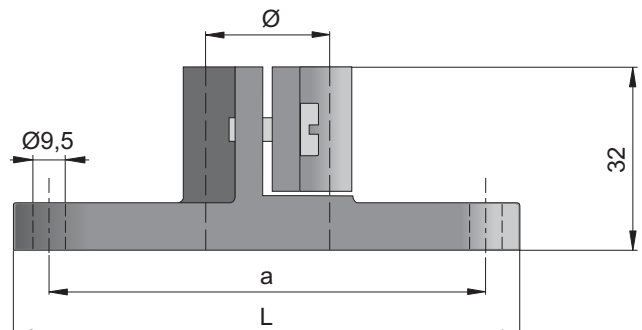
**Example for order:** KPM12x1,5-8 compression gland with thread M12x1,5 outer diameter of sensor Ø = 8 mm.

# CLAMPING PLATE

## type UZ

Type UZ clamping plate provides an efficient way of securing temperature sensors into tanks, chambers and pipes. The sensor may be clamped at any point along its length to adjust the immersion depth. This eliminates the need to stock a variety of fixed depth immersions sensors.

**Material:** cast steel.



Type	Ø	a	L
UZ-15	Ø16	55	75
UZ-22	Ø23	70	90
UZ-32	Ø33	70	90



## COMPENSATING CABLES

Compensating cable is necessary to connect thermocouple sensor with measurement instruments. These are special cables with identical thermometric characteristic as thermocouples

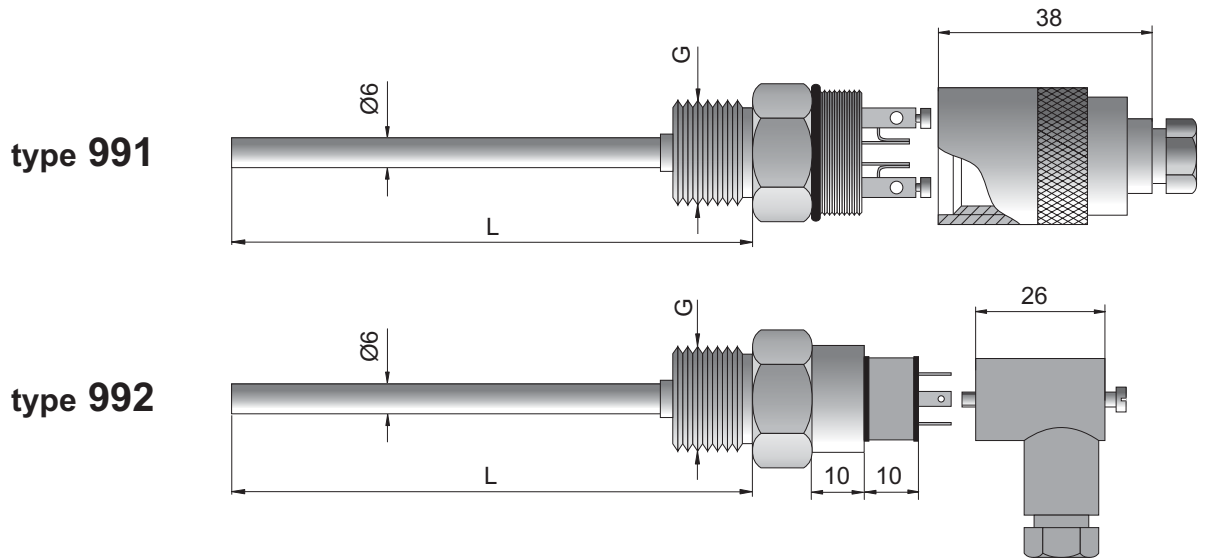
Typ		Conductor cross-section (mm <sup>2</sup> )	Dimensions (mm)	Operating temperature (°C)
L2 <sup>*)</sup>		0,25	Ø4	-20 ...+80
L3 <sup>*)</sup>		1,5	7x5	
L4 <sup>*)</sup>		0,25	Ø6	-20 ...+80
L5 <sup>*)</sup>		1,5	Ø8	
L2P <sup>*)</sup>		0,25	Ø4,6	-20 ...+80
L3P <sup>*)</sup>		1,5	8x6	
L4P <sup>*)</sup>		0,25	Ø6,5	-20 ...+80
L5P <sup>*)</sup>		1,5	Ø8,5	
S3 <sup>*)</sup>		1,5	Ø8	-50 ...+180
S5 <sup>*)</sup>		1,5	Ø9	-50 ...+180
S3P <sup>*)</sup>		1,5	Ø8,5	-50 ...+180
S5P <sup>*)</sup>		1,5	Ø10	-50 ...+180

<sup>\*)</sup> Last letter means type of thermocouple:  
**T** - CuCuNi, **J** - Fe-CuNi, **K** - NiCr-NiAl, **N** - NiCrSi-NiSi, **S** - PtRh-Pt

Type of thermocouple	Colour of the cable	Colour of positive core	Colour of negative core
Cu-CuNi ( <b>T</b> )	brown	brown	white
Fe-CuNi ( <b>J</b> )	black	black	white
NiCr-NiAl ( <b>K</b> )	green	Green	white
NiCrSi-NiSi ( <b>N</b> )	pink	pink	white
PtRh-Pt ( <b>S</b> )	orange	orange	white

**Example for order:** L2PK compensating cable for NiCr-NiAl (K) 2x0,25 mm<sup>2</sup> with PCV insulation and steel braid

# TEMPERATURE SENSOR



## SPECIFICATION

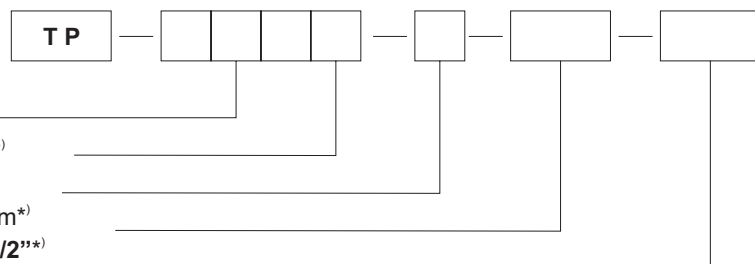
- Application: temperature measurement of liquid, gases and solids in receptacles, ducts and pipelines.  
Sensor type **991** with ceramic terminal block and cap with cable gland P7.  
Sensor type **992** with industrial connector (socket-plug).
- Temperature range:  $-50^{\circ}\text{C} \dots +200^{\circ}\text{C}$
- Measuring element: platinum resistor (**Pt100**), (**Pt500**), (**Pt1000**)<sup>\*</sup>
- Class of processing element: B<sup>\*</sup>
- Assembly: 2, 3 or 4 wires
- Sheath and body material: steel 1.4541
- Maximum operating pressure: 1,6 MPa
- Connector operating temperature:  $-40^{\circ}\text{C} \dots +125^{\circ}\text{C}$
- Protection class: **IP65**
- Thread G: M14x1,5; M20x1,5; G3/8"; G1/2"<sup>\*\*</sup>)

<sup>\*</sup>) Other parameters according to customer's requirements

<sup>\*</sup>) Ni100, Ni1000 on demand

<sup>\*</sup>) Other inch and metric threads on demand

## ORDERING CODE



Sensor type **991, 992**

Measuring element **Pt100, Pt500 or Pt1000**<sup>\*</sup>)

Single (**1**) or double (**2**) measuring element

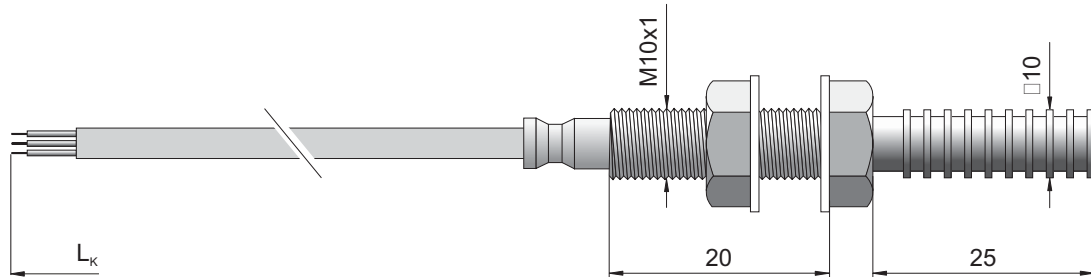
Sensor length L = **50, 85, 100, 150 or 200** mm<sup>\*</sup>)

Thread G = **M14x1,5; M20x1,5; G3/8" or G1/2"**<sup>\*\*</sup>)

Example for order: TP-992Pt100-1-100-M20x1,5 sensor with industrial connector, of length L = 100 mm with thread (G) M20x1,5.

# TEMPERATURE SENSOR

type **963**



## SPECIFICATION

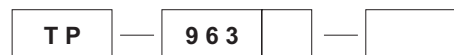
- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Application</li> <li>• Temperature range</li> <li>• Measuring element</li> <li>• Class of processing element</li> <li>• Connecting cable in teflon insulation</li> <li>• Sheath material</li> <li>• Response time <math>T_{09}</math> (in air 2 m/s)</li> </ul> | <p>temperature measurement of industrial areas, warehouses, shops and offices.</p> <p>-50°C...+150°C</p> <p>platinum resistor <b>(Pt100), (Pt500), (Pt1000)*)</b></p> <p>B*)</p> <p>3x0,22 mm<sup>2</sup>, cord</p> <p>nickel plated brass</p> <p>&lt; 30 s</p> |
|--|---|

\*) Other parameters according to customer's requirements

\*) Double version on demand

\*) Ni100, Ni1000 on demand

## ORDERING CODE



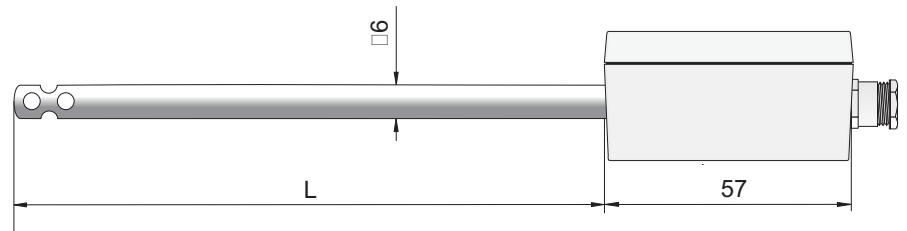
Measuring element **Pt100, Pt500, Pt1000**

Length of cable  $L_K = 0,15$  m ... **2,5** m\*)

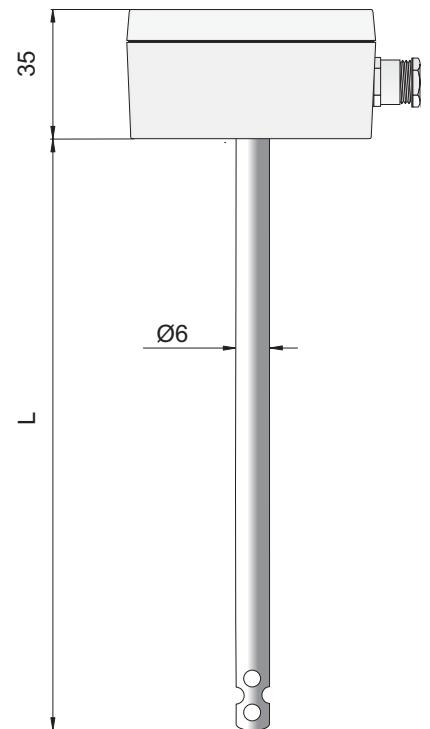
**Example for order:** TP-963Pt100-0,5 sensor with cable of length  $L_K = 0,5$  m.

## TEMPERATURE SENSOR

type 961



type 962



### SPECIFICATION

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Application</li> <li>• Temperature range</li> <li>• Measuring element</li> <li>• Class of processing element</li> <li>• Conductor material</li> <li>• Sheath material</li> <li>• Case material</li> <li>• Dimensions</li> <li>• Case operating temperature</li> </ul> | <p>temperature measurement of the air in ventilation ducts and systems.</p> <p>–100°C...+400°C</p> <p>platinum resistor (<b>Pt100</b>)<sup>*</sup></p> <p>A</p> <p>wire Cu/Ag</p> <p>steel 1.4541</p> <p>ABS</p> <p>55 x 62 x 33 mm</p> <p>–20°C...+80°C</p> |
|--|--|

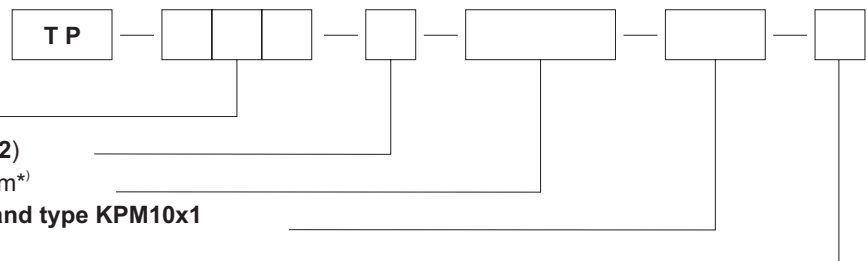
<sup>\*</sup> Other parameters according to customer's requirements

<sup>\*</sup> Pt500, Pt1000, Ni100, Ni1000 on demand

### ADDITIONAL ACCESSORIES

- Compression gland type **KP** (page 150)

### ORDERING CODE



Sensor type **961, 962**

Measuring element single (1) or double (2)

Sensor length L = 50, 100, 150 or 200 mm<sup>\*</sup>

Additional accessories **compression gland type KPM10x1**

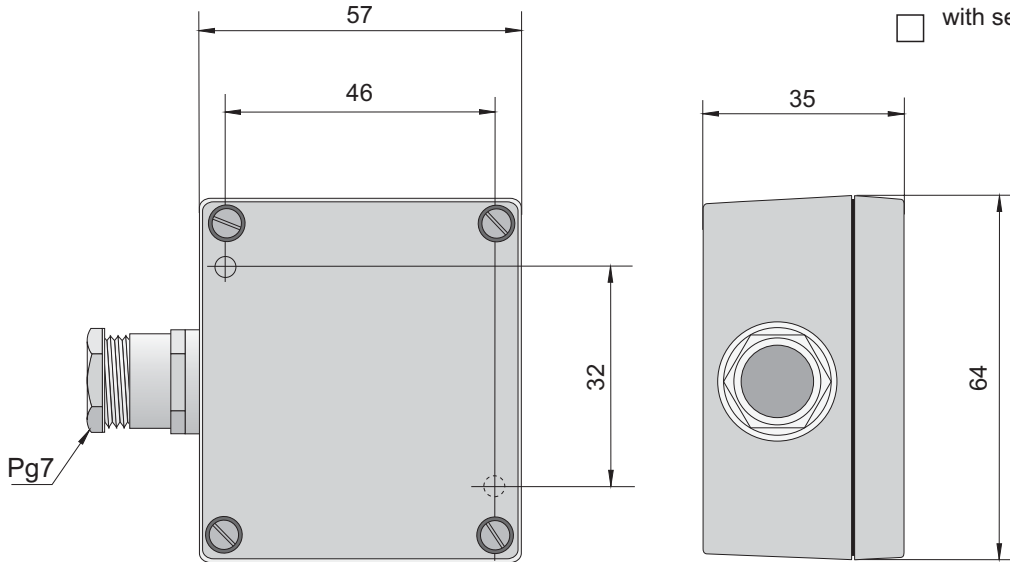
Option with head-mount transmitter **T**

**Example for order:** TP-961-1-100 Pt100 resistance sensor of outer diameter  $\varnothing = 6$  mm and length L = 100 mm.  
TP-961-1-100-T; TCHF-2120 sensor with head-mount transmitter type TCHF-2120.

# TEMPERATURE SENSOR WITH TRANSMITTER

type 959

- output signal 4...20 mA
- with sensor linearisation



Sensor-transmitter designed for outdoor temperature measurement. The transmitter converts the Pt100 sensor resistance into a 4...20mA (2-wire) output current signal. The electronic circuit of the transmitter offers high accuracy conversion with low temperature drift and very good resistance to noise. Hermetically sealed housing permits installation outdoors in all weather.

## SPECIFICATION

• Temperature range	-30°C...+70°C*)
• Measuring element	platinum resistor (Pt100)
• Class of processing element	A
• Output signal	4...20 mA*)
• Power supply	12...36 V DC
• Accuracy	0,5% + 0,01% / °C
• Case material	ABS
• Max. relatively humidity	up 80%
• Weight	150 g

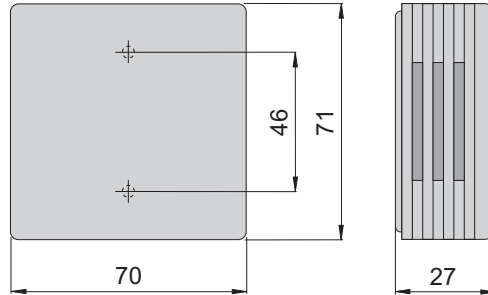
\*) Other temperature ranges on demand

\*) Output signal 0...20 mA or 0...10 V on demand

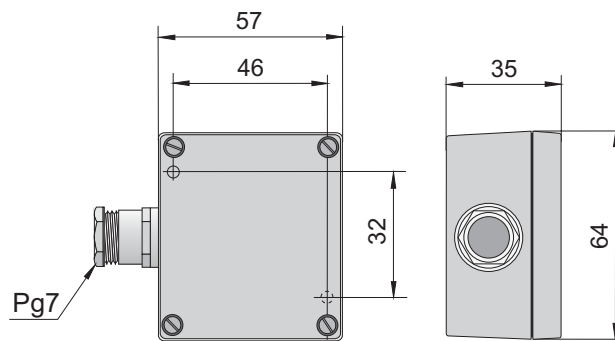
**Example for order:** TP-959 sensor with transmitter of measuring range -30°C...+70°C, with sensor linearisation and output signal 4...20 mA.

# TEMPERATURE SENSOR

type 951



type 952

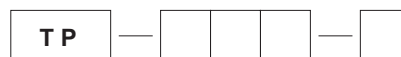


## SPECIFICATION

• Application	room temperature sensor	(TP-951)
	outdoor temperature sensor	(TP-952)
• Temperature range	-30°C...+70°C	
• Measuring element	platinum resistor	(Pt100)*)
• Class of processing element	A	
• Max. measuring current	1 mA	
• Max. relatively humidity	up to 80%	(TP-951)
	up to 95%	(TP-952)
• Case material	ABS	

\* Pt500, Pt1000, Ni100, Ni1000 on demand

## ORDERING CODE



Sensor type **951, 952**  
**Single (1)** or double **(2)** measuring element

**Example for order:** TP-952-1 sensor for outdoor temperature measurement.

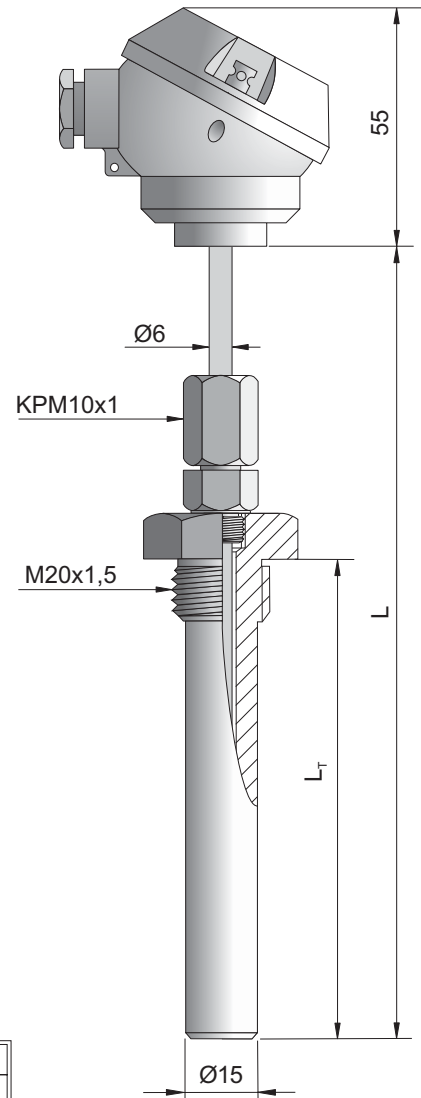
# TEMPERATURE SENSOR

type **921, 922, 923, 924, 925**

## SPECIFICATION

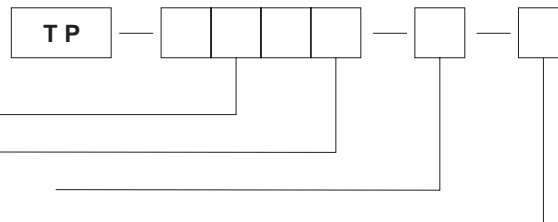
- Application: temperature measurement in pressure receptacles and pipelines.
- Maximal operating pressure: **10 MPa**
- Temperature range:
  - 200°C...+550°C (Pt100)
  - 200°C...+400°C (T)
  - 200°C...+400°C (J)
  - 200°C...+600°C (K)
- Measuring element:
  - platinum resistor (Pt100)\*
  - thermocouple Cu-NiAl (T)
  - thermocouple Fe-CuNi (J)
  - thermocouple NiCr-NiAl (K)
- Class of processing element: 2\*)
- Conductor material: wire Cu/Ni (for Pt100)
- Assembly: 2, 3 or 4 wires (for Pt100)
- Measuring junction: insulated\*)
- Sheath material:  $\square 6$  steel 1.4541
- Pressure sheath material: **toughened steel\***
- Connection head type: MA or B\*)
- Head operating temperature: –40°C...+100°C

\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Other threads, sheathes or sheath for welding on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand



Sensor type	TP-921	TP-922	TP-923	TP-924	TP-925
Sheath length $L_T$ (mm)*)	45	75	100	150	250
Sensor length L(mm)*)	100	150	200	250	300

## ORDERING CODE



Sensor type **921, 922, 923, 924, 925**  
 Measuring element **Pt100, T, J or K**  
 Single (1) or double (2) measuring element  
 Option with the head-mount transmitter **T**

**Example for order:** TP-921K-1 sensor with thermocouple NiCr-NiAl (K) of length L = 100 mm with pressure sheath of length  $L_T = 45$  mm.  
 TP-921K-1-T; TCH-2140-K sensor with connection head type B, option with the head-mount transmitter type TCH-2140-K.

# TEMPERATURE SENSOR

type **911, 912**

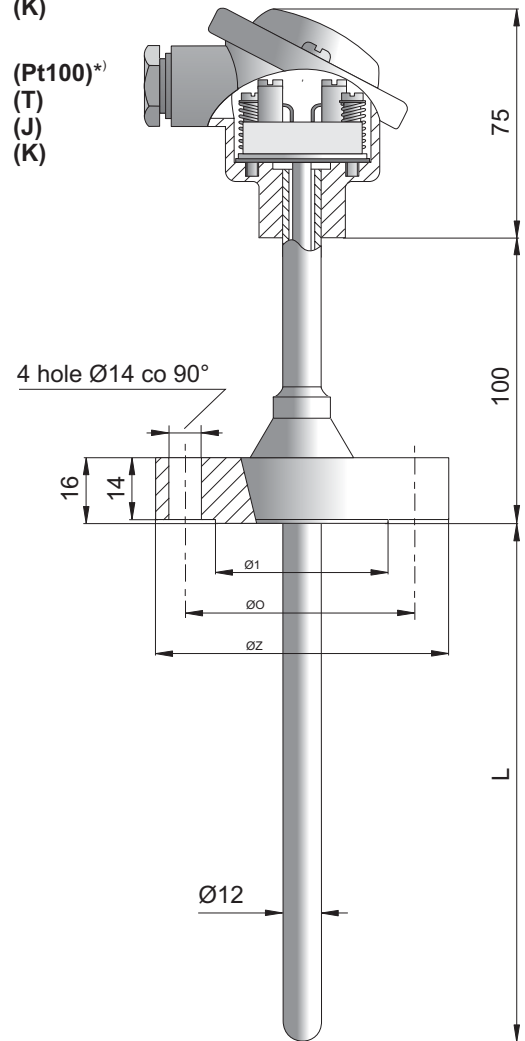
## SPECIFICATION

- Temperature range
  - 200°C...+550°C
  - 200°C...+400°C
  - 200°C...+400°C
  - 200°C...+600°C
- Measuring element insert type TP-701
  - platinum resistor
  - thermocouple Cu-CuNi
  - thermocouple Fe-CuNi
  - thermocouple NiCr-NiAl 2\*)
- Class of processing element
- Conductor material
  - wire Cu/Ni (for Pt100)
- Assembly
  - 2, 3 or 4 wires (for Pt100)
- Measuring junction
  - insulated\*)
- Sheath material
  - steel 1.4541
- Flange
  - DN 20 or DN 25\*)
  - ISO 7005-1
- Connection head type
  - B or NA\*)
- Head operating temperature
  - 40°C...+100°C

\*) Other parameters according to customer's requirements  
 \*) Pt500, Pt1000, Ni100, Ni1000 on demand  
 \*) Connection head with protection class IP65 or acid resistant on demand  
 \*) Other outer sheath diameters on demand  
 \*) Other flanges on demand

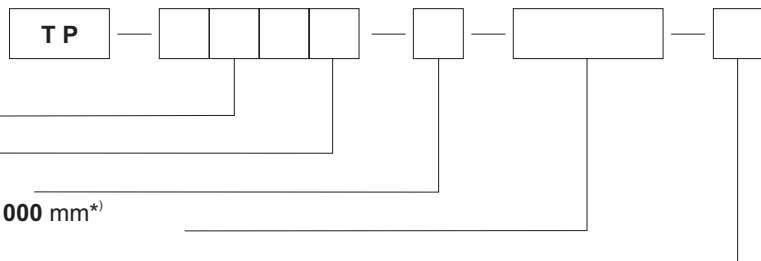
(Pt100)  
(T)  
(J)  
(K)

(Pt100)\*  
(T)  
(J)  
(K)



Sensor type	Flange	Ø <sub>1</sub> (mm)	Ø <sub>0</sub> (mm)	Ø <sub>2</sub> (mm)
TP-911	DN20	56	75	105
TP-912	DN25	65	85	115

## ORDERING CODE



Sensor type **911, 912**  
 Measuring element **Pt100, T, J or K**  
 Single (1) or double (2) measuring element  
 Sensor length L = **200, 300, 400, 600, 800 or 1000 mm**\*)  
 Option with the head-mount transmitter **T**

**Example for order:** TP-911K-1-400 sensor (with measuring insert TP-701K-1-530) with single thermocouple NiCr-NiAl (K) of outer diameter Ø= 12 mm, length L = 400 mm with welded flange DN20.  
 TP-911K-1-400-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.



# TEMPERATURE SENSOR

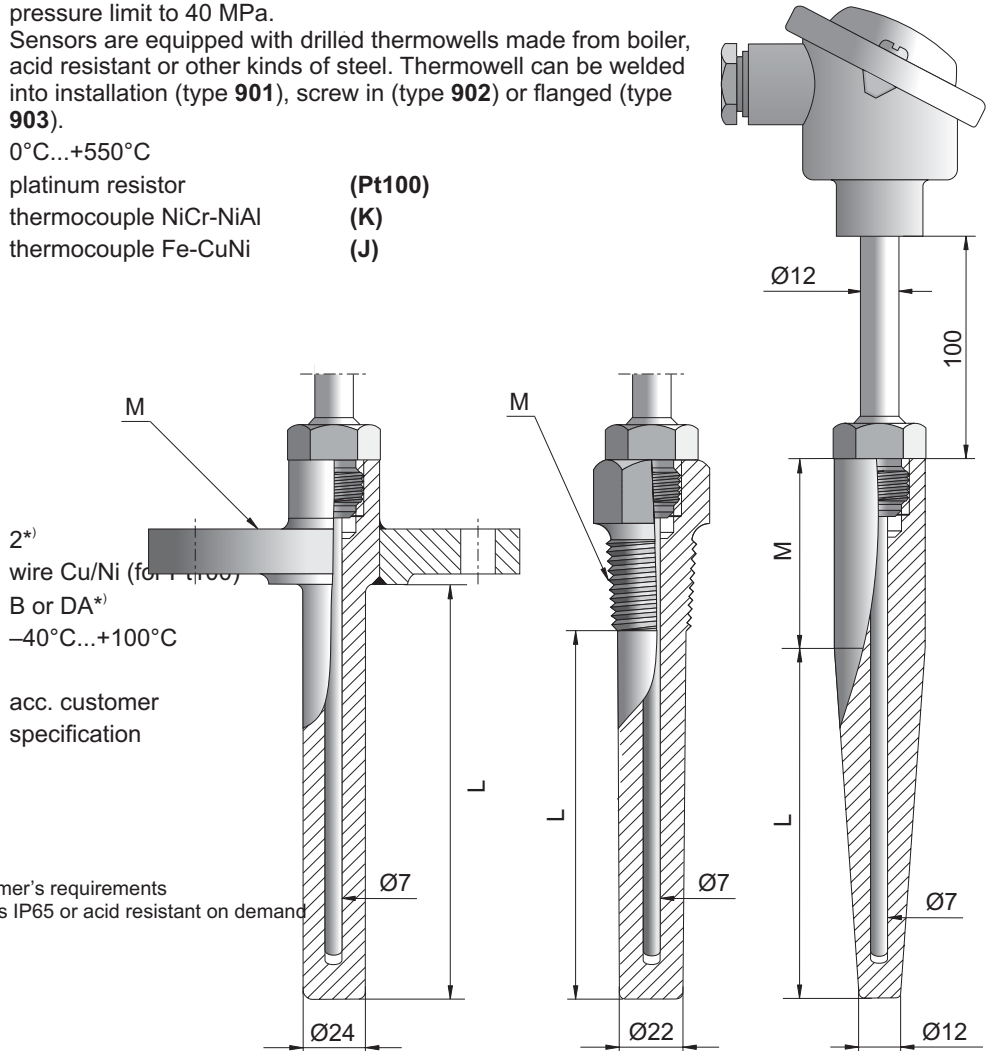
type 901, 902, 903

## SPECIFICATION

- Application: temperature measurement in receptacles and pipelines, pressure limit to 40 MPa. Sensors are equipped with drilled thermowells made from boiler, acid resistant or other kinds of steel. Thermowell can be welded into installation (type 901), screw in (type 902) or flanged (type 903).
- Temperature range: 0°C...+550°C
- Measuring element: platinum resistor (Pt100), thermocouple NiCr-NiAl (K), thermocouple Fe-CuNi (J)

- Class of processing element
- Conductor material: wire Cu/Ni (for Pt100)
- Connection head type: B or DA\*)
- Head operating temperature: -40°C...+100°C
- Thermowell dimensions and material: acc. customer specification

\* Other parameters according to customer's requirements  
 \*) Connection head with protection class IP65 or acid resistant on demand

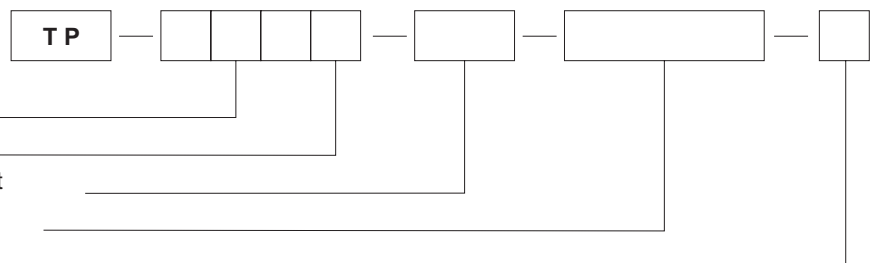


type 903

type 902

type 901

## ORDERING CODE



Sensor type 901, 902, 903  
 Measuring element Pt100, J or K  
 Single (1) or double (2) measuring element  
 Thermowell parameters: L, M, material  
 Option with the head-mount transmitter T

### Example for order:

TP-901K-1-L= 200 mm, M = 50 mm, material 1.4541 sensor with thermocouples NiCr-NiAl(K) with thermowell for welding into installation.  
 TP-901K-1-L= 200 mm, M = 50 mm, material 1.4541-T; TCH-2140-K sensor with the head-mount transmitter type TCH-2140-K.

## RTD's REFERENCE DATA

IEC 751

Resistor Pt100					
Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)	Temperature (°C)	Resistance (Ω)
-200	18,52	160	161,06	520	287,62
-180	27,10	180	168,48	540	294,21
-160	35,55	200	175,86	560	300,75
-140	43,88	220	183,19	580	307,26
-120	52,12	240	190,47	600	313,71
-100	60,26	260	197,72	620	320,11
-80	68,34	280	204,91	640	326,48
-60	76,34	300	212,05	660	332,79
-40	84,27	320	219,15	680	339,06
-20	92,16	340	226,21	700	345,28
0	100,00	360	233,21	720	351,45
20	107,79	380	240,17	740	357,58
40	115,54	400	247,09	760	363,67
60	123,25	420	253,95	780	369,71
80	130,90	440	260,78	800	375,70
100	138,51	460	267,55	820	381,64
120	146,07	480	274,29	840	387,54
140	153,59	500	280,98	850	390,48

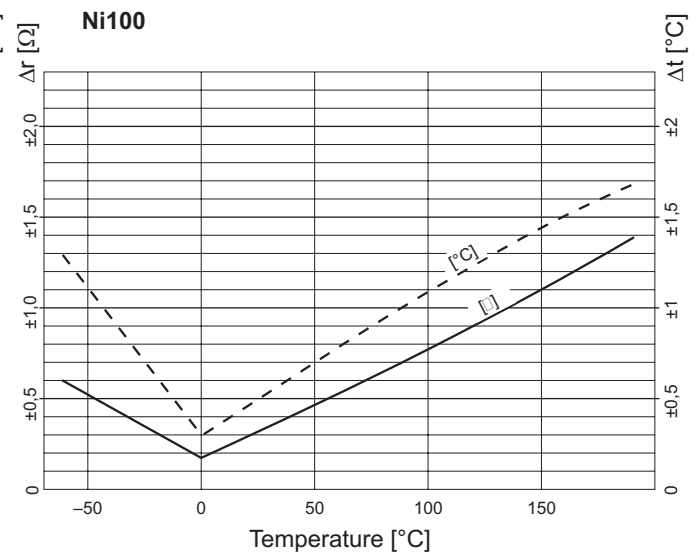
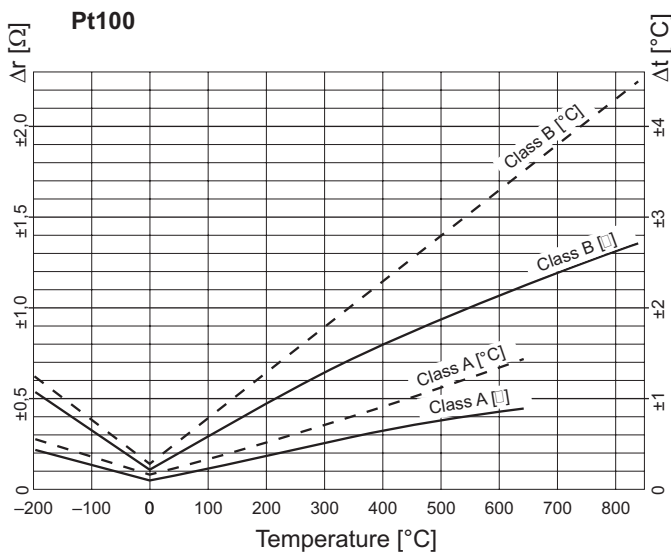
Resistor Ni100	
Temperature (°C)	Resistance (Ω)
-60	69,51
-40	79,06
-20	89,26
0	100,00
20	111,25
40	123,01
60	135,30
80	148,19
100	161,71
120	175,94
140	190,93
160	206,70
180	223,10

Pt500 = 5xPt100  
Pt1000 = 10xPt100

### Max. error of resistance $\Delta r$ and temperature $\Delta t$

Class of accuracy	Accuracy
A	$0,15 + 0,002 [t]^*$
B	$0,3 + 0,005 [t]^*$

\*[t] = absolute value in Celsius degree



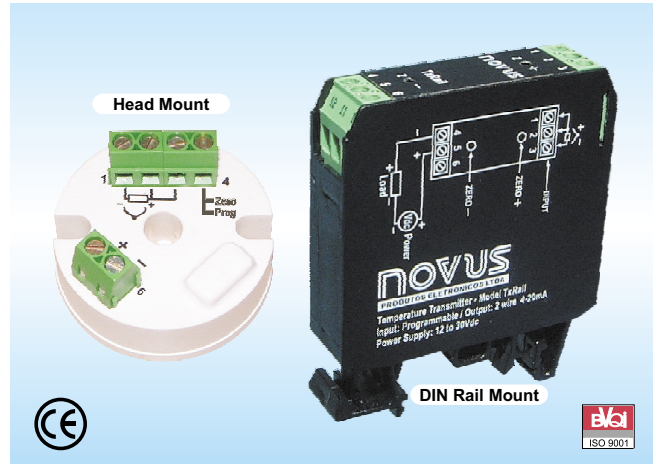
**INTRODUCTION**

TxBLOCK is a fully customer programmable head mount temperature transmitter.

In-the-field configuration of input type and working range can be achieved by means of a cable and an RS232 port from a PC or, optionally, from a Palm PDA infrared port.

TxRail represents the utmost technology in DIN rail mount temperature transmitters.

Input type, working range and output calibration can be achieved by means of a cable and an RS232 port from a PC or, optionally, from a Palm PDA infrared port.



**FEATURES**

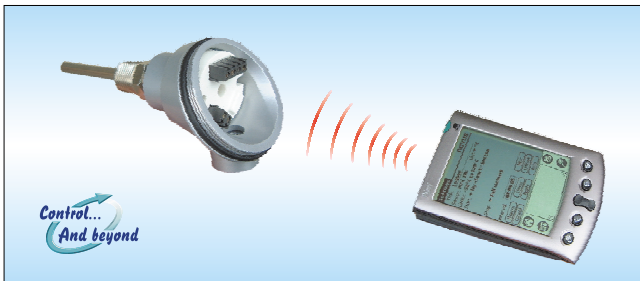
TxBLOCK and TxRail comprehends a family of head mount and DIN rail mount 4-20mA temperature transmitters for the most common temperature applications.

One single model can be configured to accept several thermocouple types and Pt100 RTDs.

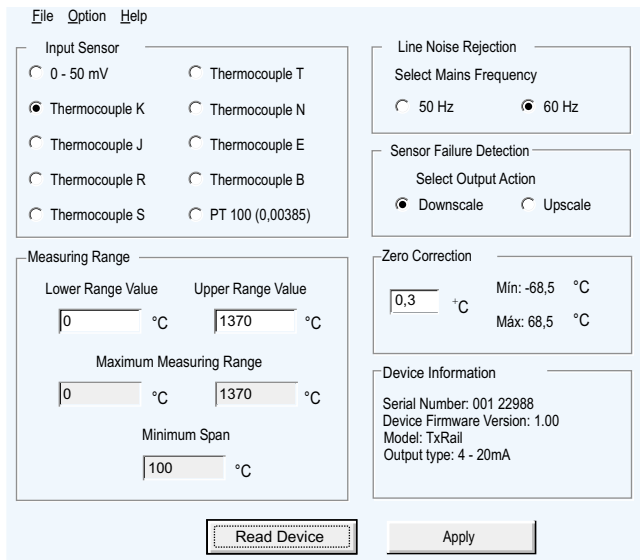
**CONFIGURATION**

Configuration is achieved by means of an RS232 cable connected to a PC with the convenient configurator software and optionally via an infrared link from a Palm PDA.

**CONFIGURATION from a Palm**



**CONFIGURATION from the PC**



**SPECIFICATIONS**

- ✎ Programmable input:: thermocouples type J, K, T, E, N, R, S, and Pt100 RTD with programmable working range.
- ✎ 2-wire loop powered 4-20mA output.
- ✎ Linearized 4 to 20mA or 20 to 4mA output for t/c and Pt100.
- ✎ Cold junction compensation for thermocouples.
- ✎ Optional 0 to 10Vdc or frequency output for TxRail only.
- ✎ 2 or 3-wire Pt100 with linearization.
- ✎ Windows configurator or Palm (optional).
- ✎ Configuration with a PC via an RS232 cable.
- ✎ Configuration with a Palm via infrared port is optional.
- ✎ Manual zero (offset) adjustment can be done by means of a wire jumper simulating a keyboard for the TxBLOCK or with 2 front keys in the TxRail.
- ✎ Digital filter can be set for best 50 or 60Hz performance.
- ✎ Power supply: 12 to 30Vdc.
- ✎ Accuracy: Pt100 and 0 to 50mV ±0.2% full scale. Thermocouples ± 0.3% max. of full scale
- ✎ Temperature effect: 0.003% SPAN/°C.
- ✎ Working temperature: -40 to +85°C (-40 to 185°F).
- ✎ Sensor failure protection: programmable burnout upscale or downscale.
- ✎ Dimensions:
- ✎ TxBLOCK: 44mm (Diam.) x 25mm (H including bornes)

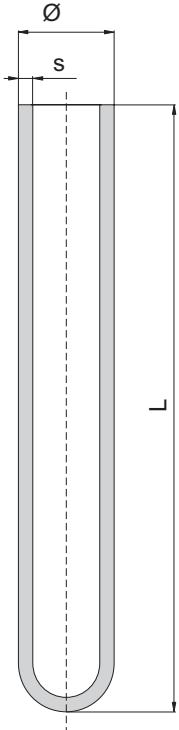
**INPUT TYPES AND RANGES**

User can easily program input type and temperature range as below:

INPUT	RANGE	MIN SPAN
✎ Thermocouple K	0 to 1370°C / 32 to 2500°F	100°C
✎ Thermocouple J	0 to 760°C / 32 to 1400°F	100°C
✎ Thermocouple R	0 to 1760°C / 32 to 3200°F	400°C
✎ Thermocouple S	0 to 1760°C / 32 to 3200°F	400°C
✎ Thermocouple T	0 to 400°C / 32 to 752°F 0 to	100°C
✎ Thermocouple N	1300°C / 32 to 2372°F	100°C
✎ Thermocouple E	0 to 720°C / 32 to 1328°F	100°C
✎ Pt100	-200 to 650°C / -328 to 1202°F	40°C
✎ Voltage	0 to 50mV	5mV

## PROTECTION TUBES

type OC

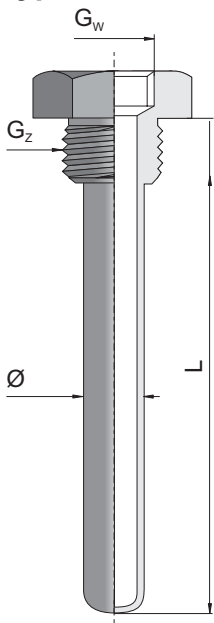


	Material	Max. temperature (°C) (in air)	Diameter Øxs (mm)	Length L (mm)
STEEL	Acid resistant steel <b>1.4541</b>	900	2,5x0,3 3x0,3 4x0,4 5x0,4 6x0,5 6x1,0 8x0,6 9x1,0 10x1,5 11x2,0 12x1,5 15x3,0	50 ... 3000
	<b>1.4828</b>	1150	22x2,0	300 ... 3000
CERAMICS	Al <sub>2</sub> O <sub>3</sub> (60%) <b>C610</b>	1400	6x1,0 10x1,5	300, 500, 700
			15x2,0	500, 700, 1000, 1400
	Al <sub>2</sub> O <sub>3</sub> (99,7%) <b>C799</b>	1800	6x1,0 10x2,0	300, 500, 700
				15x2,5

**Example for order:** OC-1.4541-10-250 acid resistant steel of outer diameter Ø= 10x1,5 mm and length L = 250 mm.

## THERMOWELLS

type PC

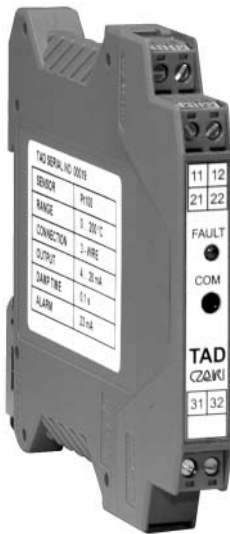


Material	Diameter Ø (mm)	External thread G <sub>z</sub> <sup>*)</sup>	Internal thread G <sub>w</sub> <sup>*)</sup>	Length L (mm)
Acid resistant steel <b>1.4541</b>	6x0,5 6x1,0 8x0,6 9x1,0 10x1,5 11x2,0 12x1,5 15x3,0	M10x1 M12x1,5 M20x1,5 G1/2"	M10x1 M12x1,5 M20x1,5 G1/2"	50 ... 1000

<sup>\*)</sup> Other parameters according to customer's requirements

**Example for order:** PC-1H18N9T-10x1,5-250-M20x1,5/M10x1 acid resistant steel thermowell of outer diameter Ø= 10 mm and length L = 250 mm with external thread G<sub>z</sub> M20x1,5 and internal thread G<sub>w</sub> M10x1.

## type TAD



- programmable sensor type: Pt100, Ni100, J, K, N, S, R, B, T
- programmable range of input signal
- galvanic insulation
- output signal 4...20 mA
- internal or external compensation of thermocouple cold junction
- rail-mounting system acc. DIN EN 50022-35
- easy programming by PC
- 

The TAD is a microprocessor programmable rail-mount temperature transmitter designed for use with RTD and thermocouples. Electronic circuit converts sensor resistance or voltage from thermocouple to a current standard signal 4...20 mA. The output signal is a linear function of measured temperature or sensor resistance or its voltage.

Most of parameters such as: sensor type, input signal range or mode of cold junction compensation may be adapted by user for specific requirements of his measuring system. The TAD transmitter may be programmed using a personal computer with a software terminal via serial port RS232C. The transmitter should be connected to PC using IF232 interface which is offered by Czaki Thermo-Product. It has galvanic insulation between a PC and a transmitter and it does not require additional power supply.

## SPECIFICATION

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Input sensor type and temperature range</li> <li>• Maximum range, transmitting error, thermal drift</li> <li>• Connection of RTD</li> <li>• Maximum resistance for 2 or 3-wire</li> <li>• Maximum resistance of 2-wire (can be corrected with software)</li> <li>• Bias current of RTD</li> <li>• Compensation of thermocouple cold junction</li> <li>• Max. error of internal compensation of thermocouple cold junction</li> <li>• Range of temperature of external cold junction of thermocouple</li> <li>• Range of temperature offset</li> <li>• Galvanic insulation between input and output terminals</li> <li>• Output signal</li> <li>• Linear range of output signal</li> <li>• Time constant of digital filter</li> <li>• Sensor failure indication</li> </ul> | <p>programmable, see Table 1<br/>see Table 1<br/>2, 3 or 4-wire connection, programmable<br/>10 Ω (each wire)</p> <p>0.00 ...20.00 Ω (sum of both wires)<br/>&lt;= 0.2 mA<br/>internal or external, programmable<br/>±1 °C<br/>-50.0 ... 100.0 °C<br/>±10.0 °C<br/>500 V AC<br/>4 ... 20 mA or 20 ... 4 mA, programmable<br/>3.8 ... 20.5 mA<br/>programmable, 0.00 ... 100.00 seconds<br/>3.5 or 23 mA, programmable<br/>(if 23 mA is selected, LED shines also)<br/>8 ... 36 V DC, from the current loop line<br/>0 ... 60 °C<br/>99 x 12.5 x 114 mm<br/>ca. 80 g</p> |
| <ul style="list-style-type: none"> <li>• Power supply</li> <li>• Ambient temperature</li> <li>• Dimensions</li> <li>• Weight</li> </ul>  |   |

## type TAD

Table 1  
Summary of sensor types, input signal ranges and accuracy values.

Sensor type	Measuring range [°C]	Minimal measuring range [°C]	Transmitting error * (larger of values)	Thermal drift / 10°C * (larger of values)
<b>B</b> PtRh30-PtRh6	400 ... 1800	200	0.15% or ±5°C	0.05% or ±1°C
<b>J</b> Fe-CuNi	-100 ... 1000	50	0.15% or ±1°C	0.05% or ±0.5°C
<b>K</b> NiCr-NiAl	-100 ... 1200	50		
<b>N</b> NiCrSi-NiSi	-100 ... 1300	100		
<b>R</b> PtRh13-Pt	200 ... 1600	200	0.15% or ±2°C	0.05% or ±1°C
<b>S</b> PtRh10-Pt	200 ... 1600	200		
<b>T</b> Cu-CuNi	-100 ... 230	50	0.15% or ±1°C	0.05% or ±0.5°C
<b>Pt100</b>	-100 ... 850	30	0.15% or ±0.2°C	0.05% or ±0.1°C
<b>Ni100</b>	-60 ... 180	30		
Voltage [mV]	-10...80 mV	2 mV	0.15% or ±0.05 mV	0.05% or ±0.02mV
Resistance Ω	10...400 Ω	20 Ω	0.15% or ±0.1 Ω	0.05% or ±0.05 Ω

\* Error values in [%] are relative to user-defined range

### ORDERING GUIDE

When you order TAD transmitters, you can specify their parameters also. Then the transmitters are programmed with required parameters and their values are printed on serial number plates. If the parameters are not detailed in an order, default values are programmed. The parameters should be written down in a specific sequence that is shown in the below-mentioned list. There are default values of the parameters in the right hand column. The parameters should be separated with "/".

- |   |                                     |
|---|-------------------------------------|
| 1. Sensor type: Pt100, Ni100, J, K, N, S, R, T, mV, Ohm   | Pt100                               |
| 2. Start of measuring range - value in [°C], [mV] or [Ø]  | the least value for selected type   |
| 3. End of measuring range - value in [°C], [mV] or [Ø]  | the largest value for selected type |
| 4. Number of wires connecting RTD (plus symbol "P"): 2P, 3P or 4P<br>or cold junction compensation mode: W - internal, Z - external<br>For 2-wire connection sum of resistances of wires (in Ø) may be given also. For example: 2P0.75.<br>For external cold junction compensation, a temperature of the cold junction should be given in [°C]. For example: Z25. | 3P<br>W                             |
| 5. Output signal in [mA]: 4-20 or 20-4  | 4-20                                |
| 6. Time constant of digital filter - value in [s]   | 0.1                                 |
| 7. Alarm signal in [mA]: 23 or 3.5  | 23                                  |

**Examples:** TAD - K / 0 / 500 / Z25 / 4-20 / 0.2 / 23 denotes a transmitter for signal from thermocouple K; measuring range is 0 ... 500 °C; cold junction compensation is external (cold junction temperature 25 °C); current signal 4 ... 20 mA is at the output; time constant 0.2 s; in the case of sensor failure, output current is 23 mA.

TAD - Pt100 / 0 / 200 / 2P0.75 / 20-4 / 0.5 / 3.5 denotes a transmitter for signal from sensor Pt100; measuring range is 0 ... 200 °C; the RTD sensor is connected with two wires (sum of resistances of wires 0.75 Ω); current signal 20 ... 4 mA is at the output (characteristics is falling); time constant 0.5 s; in the case of sensor failure, output current is 3.5 mA.

## Yttemperaturgivare Pt100



Modell 201300.

2-tråds Pt100 klass B element monterat i stålhylsa med monteringshål M4.

Max temperatur 300°C.

Kabel 1m silicon/teflon 2xAWG24 (T max 200°C).

Stålhylsa längd 41mm, diameter 4mm.

Artikelnummer: 510103

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