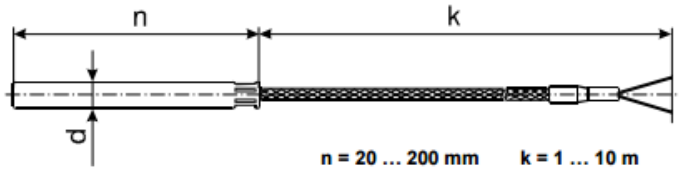
# TERMOCUPLE tip bara/tija, cu cablu : TSA DREPTE, TSAL in UNGHI de 90 grade, TSAB CURBATE

**(MI**) T/C CABLE PROBE FOR FREE MOUNTING** TSAx

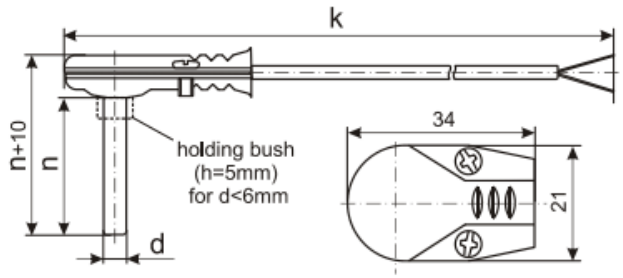
Sheath - stainless steel (see table notes)
Cable - see table notes

## STRAIGHT-TUBE DESIGN (TSA)



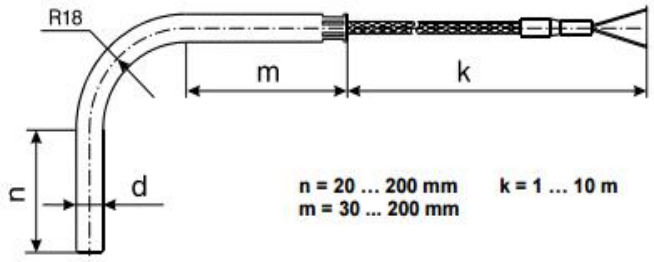

n = 20 ... 200 mm  k = 1 ... 10 m

## DESIGN WITH ANGLED TERMINATION (TSAL)




n = 20 ... 200 mm  k = 1 ... 10 m

## BENDED-TUBE DESIGN (TSAB)




n = 20 ... 200 mm  k = 1 ... 10 m
m = 30 ... 200 mm

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **Regular Design** | | | | |
| 1 x K | SLSL, TSL, YY, UU, YU | T9 -50...200 °C<br>T1* -50...400 °C | 4, 5, 6, 8 | 2 |
| | *GLGL, TT, SFSF* | *T7 0...200 °C*<br>*T8 0...400 °C*<br>*T4* 0...800 °C* | | |
| 1 x J, 1 x T | SLSL, TSL, YY, UU, YU | T9 -50...200 °C<br>T1* -50...400 °C | 4, 5, 6, 8 | 2 |
| | *GLGL, TT, SFSF* | *T7 0...200 °C*<br>*T8 0...400 °C* | | |
| **MI Design **** | | | | |
| 1 x N, 1 x E | SLSL, TSL, YY, UU, YU | T9 -50...200 °C<br>T1* -50...400 °C | 3, 4.5, 6, 8 | 2 |
| | *GLGL, TT, SFSF* | *T7 0...200 °C*<br>*T8 0...400 °C*<br>*T4* 0...800 °C* | | |
| 1 x T | SLSL, TSL, YY, UU, YU | T9 -50...200 °C<br>T1* -50...400 °C | 3, 4.5, 6, 8 | 2 |
| | *GLGL, TT, SFSF* | *T7 0...200 °C*<br>*T8 0...400 °C* | | |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9), 1.4841 (M5), 2.4816 (M8)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)
- YY (PVC, max. 100 °C ambient temperature)
- UU or YU (PUR, max. 80 °C ambient temperature)
- SFSF (mineral fiber, max. 1000 °C ambient temperature)

**Applicable cables:**

| Temp. range \ Probe design | TSA, TSAB | TSAL |
|---|---|---|
| T7, T9 | no PUR, no PVC | all |
| T1, T8 | GLGLP, SFSF | no PUR, no PVC |
| T4 | SFSF | GLGLP, SLSL*, TSL* |

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed
(see Appendix - Tip Shapes)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

**Cable connector:**
4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)
(see Appendix - Connectors)

* Please contact

** Available only for TSAL!

## Ordering code TSA(L,B) - (MI -[1]) G2.G3.G4.G6.G7.G8.G10.G11.G14.G15 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| G2 | Thermocouple | regular design | J - type "J", K - type "K", T - type "T" |
| | | MI design | E - type "E", N - type "N", T - type "T" |
| G3 | Temperature range | | T1 - -50...400 °C, T4 - 0...800 °C [4], T7 - 0...200 °C, T8 - 0...400 °C, T9 - -50...200 °C |
| G4 | Diameter 'd' [mm] | regular design | 4 [4], 5, 6, 8 |
| | | MI design | 3, 4.5, 6, 8 |
| G6 | Probe length 'n' [mm] | | 20...200 |
| G7 | Probe length 'm' [mm] [2] | | 30...200 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1MF...10MF - mineral fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon®, 1PU...10PU - polyurethane [4], 1PV...10PV - PVC |
| G10 | Sheath material (wetted parts) | regular design | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| | | MI design | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M5 - 1.4841, M8 - 2.4816 (Inconel 600), M9 - 1.4404 |
| G11 | Accuracy class | | 1 - '1' [4], 2 - '2' |
| G14 | Tip shape (hot junction) | | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled) [3], OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface [3] |

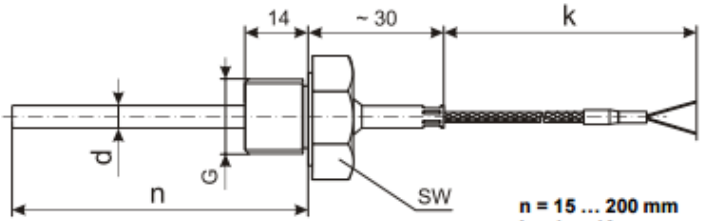
[1] Available only for TSAL!
[2] Only for TSAB!
[3] Only for non-MI (regular) design!

# TERMOCUPLE/TERMOREZISTENTE/TERMISTOARE cu filet : TSAG/TSAG2 DREPTE, TSAGL/TSAGL2 in UNGHI

**SCREW-IN CABLE PROBE** **TSAGx**

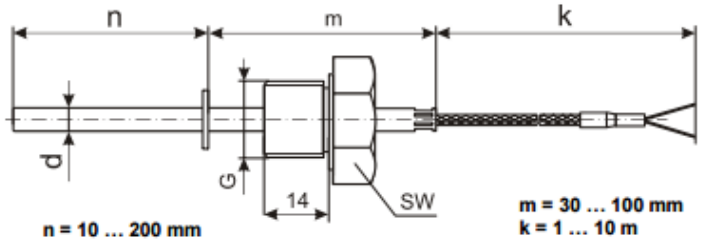
Sheath - stainless steel (see table notes)
Cable - see table notes

### STRAIGHT DESIGN WITH WELDED CONNECTION (TSAG)




n = 15 ... 200 mm
k = 1 ... 10 m

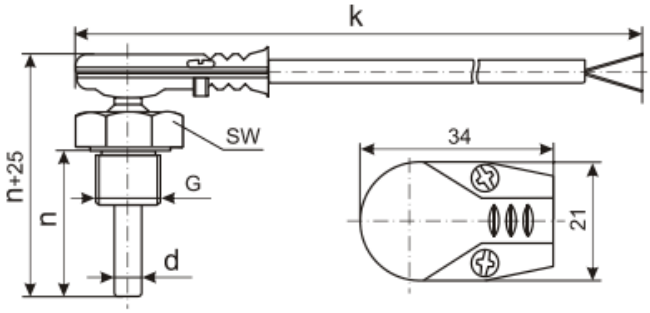
### STRAIGHT DESIGN WITH MOVABLE CONNECTION (TSAG2)




n = 10 ... 200 mm

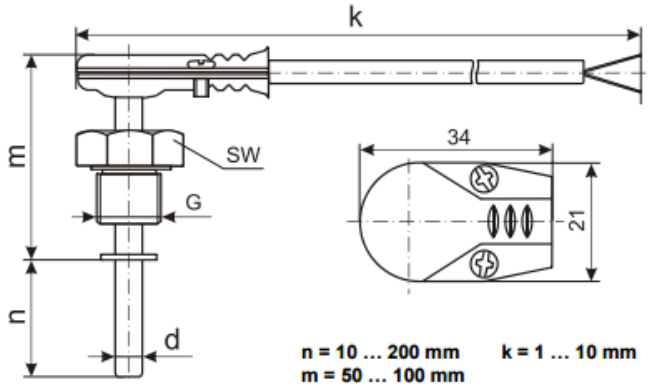
m = 30 ... 100 mm
k = 1 ... 10 m

### ANGLED DESIGN WITH WELDED CONNECTION (TSAGL)




n = 15 ... 200 mm k = 1 ... 10 m

### ANGLED DESIGN WITH MOVABLE CONNECTION (TSAGL2)




n = 10 ... 200 mm k = 1 ... 10 mm
m = 50 ... 100 mm

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **RTD Design** | | | | |
| 1 x Pt (RB,RD,RF,RG) | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 4, 5 | 2, 3* |
| | | T1* -50...400 °C | 6 | 2, 3, 4* |
| | *GLGL, TT* | *T7 0...200 °C* | 8 | 2, 3, 4 |
| 2 x Pt (RB,RD,RF,RG) | | *T8 0...400 °C* | 6, 8 | 2x2, 2x3* |
| | *TT* | *T22 -200...200 °C* | | |
| 1 x Cu (RH, RK) | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 5* | 2, 3* |
| | | | 6 | 2, 3, 4* |
| | | | 8 | 2, 3, 4 |
| 2 x Cu (RH, RK) | *GLGL, TT* | *T7 0...200 °C* | 6 ,8 | 2x2, 2x3* |
| 1 x PTC (RP, RQ) | SLSL, TSL, YY, UU, YU | T12 -50...100 °C | 6 | 2, 3 |
| 2 x PTC (RP, RQ) | *GLGL, TT* | *T19 0...100 °C* | 8 | 2x2 |
| **Thermocouple Design** | | | | |
| 1 x K, 1 x N, 1 x E | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 5, 6, 8 | 2 |
| | | T1* -50...400 °C | | |
| | *GLGL, TT, SFSF* | *T8 0...400 °C* | | |
| | | *T4 0...800 °C* | | |
| | | *T3* 0...850 °C* | | |
| 1 x J, 1 x T | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 5, 6, 8 | 2 |
| | | T1* -50...400 °C | | |
| | *GLGL, TT, SFSF* | *T8 0...400 °C* | | |
| | | *T4* 0...800 °C* | | |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)
- YY (PVC, max. 100 °C ambient temperature)
- UU or YU (PUR, max. 80 °C ambient temperature)
- SFSF (mineral fiber, max. 1000 °C ambient temperature)

**Applicable cables:**

| Probe design / Temp. range | TSAG, TSAG2 | TSAGL, TSAGL2 |
|---|---|---|
| T12, T19 | all | all |
| T7, T9 | no PUR, no PVC | |
| T22 | TT | TT, SLSL, TSL |
| T1, T8 | GLGLP, SFSF | no PUR, no PVC |
| T3, T4 | SFSF | GLGLP, SFSF |

**Tip shape:**
- RTD: standard, narrowed, pitted
- T/C: standard (isolated), grounded, open-tube, exposed

(see Appendix - Tip Shapes)

**Accuracy class:**
- RTD: 'A', 'B', or '2xB'
- T/C: '1' or '2'

(see Appendix - RTD or T/C Tolerance)

**Cable connector:**
4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)
(see Appendix - Connectors)

**Available threads and HEX sizes:**

| G | M6 | M8 | M10 1/8" | M12 1/4" | M14 | M16 3/8" | M18 | M20 1/2" |
|---|---|---|---|---|---|---|---|---|
| SW | 10 | 10 | 12(13) | 14 | 17 | 19 | 22 | 24 |

* Please contact

## Ordering code TSAG(2,L,L2) - G1G2.G3.G4.G6.G7.G8.G9.G10.G11.G12.G14.G15 - #1

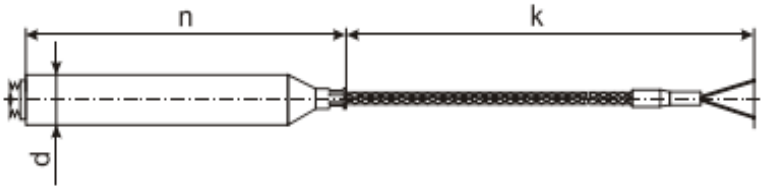
| Code | Feature or option | | Code values |
|---|---|---|---|
| G1 | Number of sensors | | 1 or 2 |
| G2 | Sensor | | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, RH - Cu50, RK - Cu100, RP -PTC 1k, RQ - PTC 2k, J - T/C type "J", K - T/C type "K", T - T/C type "T" |
| G3 | Temperature range | | T1 - -50...400 °C, T3 - 0...850 °C [4], T4 - 0...800 °C [4], T7 - 0...200 °C, T8 - 0...400 °C, T9 - -50...200 °C, T12 - 50...100 °C, T19 - 0...100 °C, T22 - -200...200 °C |
| G4 | Diameter 'd' [mm] | RTD | 4, 5, 6, 8 |
| | | T/C | 5, 6, 8 |
| G6 | Probe length 'n' [mm] | | 10...200 (see tables overleaf) |
| G7 | Probe length 'm' [mm] [1] | | 30...100 (see tables overleaf) |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon®, 1PU...10PU - polyurethane [4], 1MF...10MF - mineral fiber, 1PV...10PV - PVC |
| G9 | Mounting connection | | Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q7 - M12x1.5, Q8 - M14x1.5, Q10 - 1/2" NPT, Q18 - G1/8", Q19 - 1/8" NPT, Q20 - M10x1, Q23 - G1/4", Q24 - 1/4" NPT, Q26 - M8x1, Q29 - M8x1.25, Q30 - M10x1.5, Q31 - M6x1, Uxx - union nut (xx - same as for Qxx) |
| G10 | Sheath material (wetted parts) | | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| G11 | Accuracy class | RTD | X - none [2], A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' [4], 2 - '2' |
| G12 | Number of wires [3] | | 2, 3, 4 [4] |
| G14 | Tip shape | RTD | X - standard closed, N - narrowed, P - pitted |
| | | T/C | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled), OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface |

[1] Only for TSAG2 and TSAGL2!
[2] For non-Pt sensors
[3] Only for RTD sensors!

# TERMOCUPLE TSAS cu arc, pentru masurare pe suprafata

**SPRING THERMOCOUPLE FOR SURFACE MEASUREMENT** **TSAS**

Sheath - stainless steel (see table notes)
Extension cable - see table notes




n = 80 ... 160 mm  k = 1 ... 10 m

| SENSITIVE ELEMENT | TEMPERATURE RANGE | | DIMENSIONS WIRE [mm] | DIMENSIONS d [mm] |
|---|---|---|---|---|
| 1 x J, 1 x T | T8 | 0...400 °C | 0.5 | 10, 12 |
| 1 x K, 1 x N | T4 | 0...800 °C | 0.5 | 10, 12 |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)

**Tip shape:**
exposed hot junction, flat-surfaced
(see Appendix - Tip Shapes)

**Accuracy class:**
'1' or '2'
(see Appendix - T/C Tolerance)

**Thermocouple connector:**
'standard' (C5) or 'miniature' (C6)
(see Appendix - Connectors)

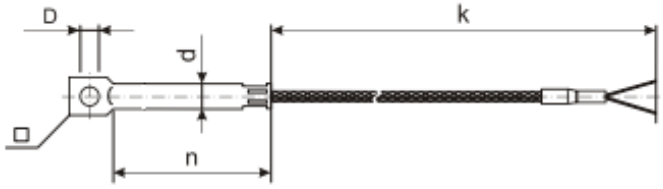
## Ordering code TSAS - G2.G3.G4.G6.G8.G10.G11.G15 - #1

| Code | Feature or option | Code values |
|---|---|---|
| G2 | Thermocouple | J - type "J", K - type "K", T - type "T", N - type "N" |
| G3 | Temperature range | T4 - 0...800 °C, T8 - 0...400 °C |
| G4 | Diameter 'd' [mm] | 10, 12 |
| G6 | Probe length 'n' [mm] | 80...160 |
| G8 | Cable length 'k' [m] and type | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon® |
| G10 | Sheath material | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| G11 | Accuracy class | 1 - '1' (1), 2 - '2' |
| G15 | Connector | X - none, C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | X - none, OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface |

# TERMOCUPLE/TERMOREZISTENTE/TERMISTOARE TSAT cu surub de fixare, pentru masurare pe suprafata

**CABLE PROBE WITH SCREW FIXING FOR SURFACE MEASUREMENT** — **TSAT**

Sheath - stainless steel (see table notes)
Cable - see table notes




n = 20 ... 30 mm  k = 1 ... 10 m

| d | 4 | 5 | 6 |
|---|---|---|---|
| □ | 6x6 | 7x7 | 8x8 |
| D | 3 | 3, 4 | 3, 4, 5 |

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **RTD Design** | | | | |
| 1 x Pt (RB,RD,RF,RG) | SLSL, TSL, TT, YY, UU, YU | T9 -50...200 °C<br>T12 -50...100 °C | 4, 5 | 2, 3* |
| | *GLGL* | *T7 0...200 °C* | 6 | 2, 3, 4* |
| 2 x Pt (RB,RD,RF,RG) | TT | *T8 0...400 °C*<br>T22 -200...200 °C | 6 | 2x2 |
| 1 x PTC (RP, RQ) | SLSL, TSL, YY, UU, YU | T12 -50...100 °C | 6 | 2, 3 |
| | *GLGL, TT* | *T19 0...100 °C* | | |
| **Thermocouple Design** | | | | |
| 1 x K,<br>1 x J,<br>1 x T | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 4, 5, 6 | 2 |
| | *GLGL, TT* | *T8 0...400 °C* | | |

Sheath material:
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)

Cable type:
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)
- YY (PVC, max. 100 °C ambient temperature)
- UU or YU (PUR, max. 80 °C ambient temperature)

Tip shape:
- RTD: standard
- T/C: standard (isolated) or grounded
(see Appendix - Tip Shapes)

Accuracy class:
- RTD: 'A', 'B', or '2xB'
- T/C: '1' or '2'
(see Appendix - RTD or T/C Tolerance)

Cable connector:
4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)
(see Appendix - Connectors)

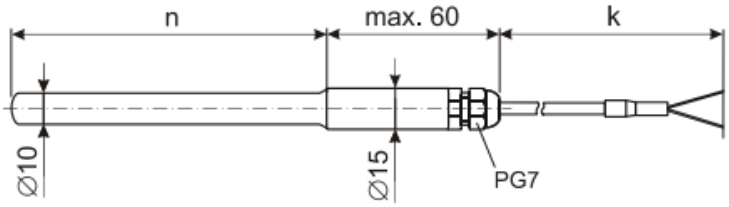
* Please contact

# TERMOCUPLE ceramice TSAZ1 cu tub de mentinere, TSAZ2 cu cablu de extensie

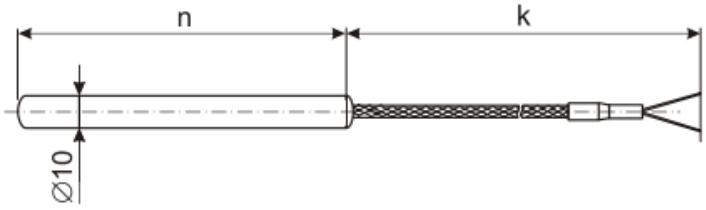
**CERAMIC PROBE WITH EXTENSION CABLE** **TSAZx**

Sheath - ceramic (see table notes)
Holding tube - stainless steel 1.4301 or 1.4541
Extension cable - see table notes

**DESIGN WITH HOLDING TUBE (TSAZ1)**




**DESIGN WITH HIGH-TEMPERATURE CABLE (TSAZ2)**




**k = 1 ... 10 mm**

| SENSITIVE ELEMENT | TEMPERATURE RANGE | | DIMENSIONS WIRE [mm] MI [mm] | DIMENSIONS n [mm] |
|---|---|---|---|---|
| 1 x K, 1 x N | T13 | 0...1000 °C | 1.0 | 50...300; 310...600 |
| | T16 | 0...1100 °C | MI 3.0, 4.5 (Inconel 600) | |
| | T6 | 0...1200 °C | MI 3.0, 4.5 (Nicrobell®) | |
| 1 x S 1 x R | T5 | 0...1500 °C | 0.35 | 100...300; 310...600 |
| | T14 | 0...1600 °C | 0.5 | |
| 1 x B | T14 | 0...1600 °C | 0.35 | 100...300; 310...600 |
| | T15 | 0...1700 °C | 0.5 | |

**Ceramic sheath material:**
**Oxal 710 (C2), Alsint 799 (C3), Hexoloy® (C6)**
**(see Appendix - Sheath Materials)**

**Cable type:**
- **SLSL or TSL (silicone, max. 250 °C ambient temperature)**
- **GLGLP (glass fiber w/ steel braid, max. 400 °C ambient temperature)**
- **SFSF (mineral fiber, max. 1000 °C ambient temperature)**
- **KFKF (ceramic fiber, max. 1200 °C ambient temperature)**

**Accuracy class:**
**'1' or '2'**
**(see Appendix - T/C Tolerance)**

**Thermocouple connector:**
**'standard' (C5) or 'miniature' (C6)**
**(see Appendix - Connectors)**

*** Please contact**

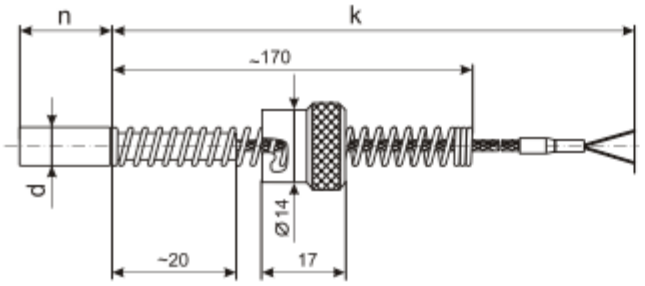
## Ordering code TSAZ(1,2) - G2.G3.G6.G8.G10.G11.G15 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| G2 | Thermocouple | | K - type "K", N - type "N", S - type "S", R - type "R", B - type "B" |
| G3 | Temperature range | | T5 - 0...1500 °C, T6 - 0...1200 °C, T13 - 0...1000 °C, T14 - 0...1600 °C, T15 - 0...1700 °C, T16 - 0...1100 °C |
| G6 | Probe length 'n' [mm] | T/Cs "K", "N" | 50...600 |
| | | T/Cs "S", "R", "B" | 100...600 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1MF...10MF - mineral fiber, 1CF...10CF - ceramic fiber |
| G10 | Sheath material | | C2 - ceramic Oxal 710, C3 - ceramic Alsint 799, C6 - Hexoloy® |
| G11 | Accuracy class | | 1 - '1' (1), 2 - '2' |
| G15 | Connector | | X - none, C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OB - braid termination lead (only w/o connector) |

# TERMOREZISTENTE/TERMOCUPLE TSBS baioneta, cu cablu inserat

**BAYONET CABLE INSERT** **TSBS**

Sheath - stainless steel (see table notes)
Cable - see table notes




n = 5 ... 25 mm  k = 1 ... 10 m

| insert diameter 'd' [mm] | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| spring OD [mm] | 5 | 6 | 7 | 8 |

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **RTD Design** | | | | |
| 1 x Pt (RB,RD,RF,RG) | SLSL, TSL | T9 -50...200 °C<br>T1* -50...400 °C | 5 | 2, 3* |
| | *GLGL, TT* | *T7 0...200 °C*<br>*T8 0...400 °C* | 6, 7, 8 | 2, 3 |
| **Thermocouple Design** | | | | |
| 1 x K,<br>1 x J | SLSL, TSL | T9 -50...200 °C<br>T1* -50...400 °C | 5*,<br>6, 7, 8 | 2 |
| | *GLGL, TT* | *T7 0...200 °C*<br>*T8 0...400 °C* | | |

**Sheath material:**
**1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)**

**Cable type:**
- **GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)**
- **SLSL or TSL (silicone, max. 250 °C ambient temperature)**
- **TT (Teflon®, max. 250 °C ambient temperature)**

**Tip shape:**
- **RTD: standard**
- **T/C: standard (isolated) or grounded**

**(see Appendix - Tip Shapes)**

**Accuracy class:**
- **RTD: 'A', 'B', or '2xB'**
- **T/C: '1' or '2'**

**(see Appendix - RTD or T/C Tolerance)**

**Cable connector:**
**4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)**
**(see Appendix - Connectors)**

**Bayonet:**
- **ø14x1; aluminum or Ni-plated brass (default)**
- **ø12x1, ø15x1, ø18x1, or other on request**

*** Please contact**

## Ordering code TSBS - G2.G3.G4.G5.G6.G8.G10.G11.G12.G14.G15 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| G2 | Sensor | | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, J - T/C type "J", K - T/C type "K" |
| G3 | Temperature range | | T7 - 0...200 °C, T9 - -50...200 °C, T8 - 0...400 °C, T1 - -50...400 °C |
| G4 | Diameter 'd' [mm] | | 5, 6, 7, 8 |
| G5 | Bayonet | | 12 - ø12x1, 14 - ø14x1, 15 - ø15x1, 18 - ø18x1, Z - other (specify!) (3) |
| G6 | Probe length 'n' [mm] | | 5...25 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon® |
| G10 | Sheath material (wetted parts) | RTD | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| | | T/C | M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| G11 | Accuracy class | RTD | A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' (3), 2 - '2' |
| G12 | Number of wires (1) | | 2, 3 (3) |
| G14 | Tip shape (hot junction) (2) | | X - standard (isolated from sheath), G - grounded |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface |

(1) Only for RTD sensors!
(2) Only for thermocouples!

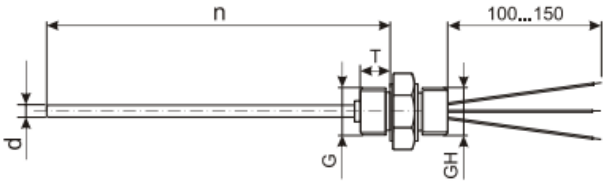
# TERMOCUPLE cu niplu de montaj :

## TSEC cu niplu fix, TSEC1 cu niplu sudat, TSEC2 cu niplu mobil, TSEC3 cu niplu ajustabil, TSEC4 cu niplu si presetupa, TSEC5 cu niplu union

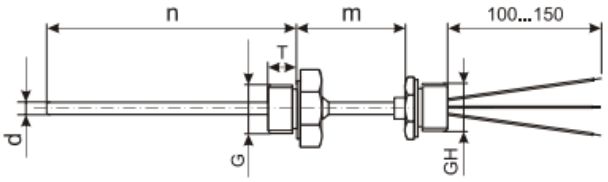
**(MI) T/C PROBE FOR HEAD ASSEMBLY** **TSECx**

Sheath - stainless steel (see Appendix - Sheath materials)
Extension wires - Teflon® or glass fiber

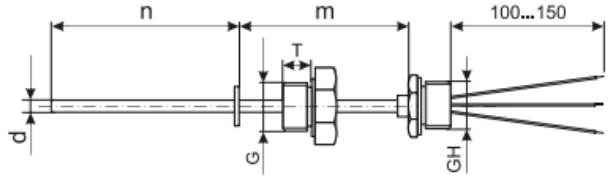
### DESIGN WITHOUT EXTENSION (TSEC)



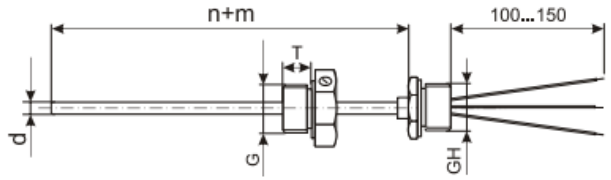

### EXTENDED DESIGN WITH WELDED CONNECTION (TSEC1)



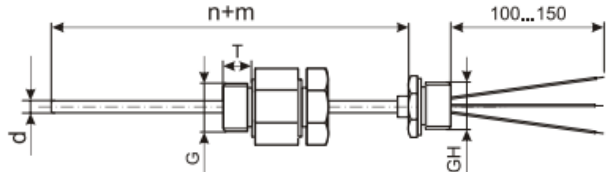

### EXTENDED DESIGN WITH MOVABLE CONNECTION (TSEC2)



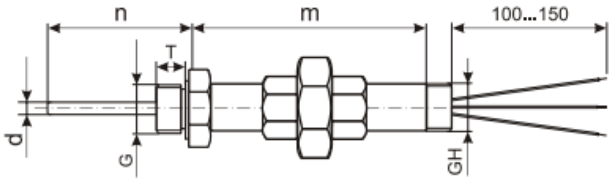

### DESIGN WITH ADJUSTABLE CONNECTION (TSEC3)




### DESIGN WITH GLAND-TYPE CONNECTION (TSEC4)




### DESIGN WITH NIPPLE-UNION-NIPPLE CONNECTION (TSEC5)




| SENSITIVE ELEMENT | TEMPERATURE RANGE | | DIMENSIONS n [mm] | DIMENSIONS d [mm] | wires |
|---|---|---|---|---|---|
| **Regular Design** | | | | | |
| 1(2) x J<br>1(2) x L | T4 | 0...800 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| 1(2) x K | T3<br>T16<br>T6* | 0...850 °C<br>0...1100 °C<br>0...1150 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| 1(2) x E | T3<br>T13 | 0...850 °C<br>0...1000 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| 1(2) x S<br>1(2) x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| **MI Design** | | | | | |
| 1 x J | T4 | 0...800 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x J | | | | | 2x2 |
| 1 x T | T8 | 0...400 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x T | | | | | 2x2 |
| 1 x K<br>1 x N, 1 x E | T3<br>T16 | 0...850 °C<br>0...1100 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x K<br>2 x N, 2 x E | T6*<br>T6* | 0...1150 °C<br>0...1250 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2x2 |
| 2 x S<br>2 x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...10000 | 3, 4.5, 6 | 2x2 |

**Process connection 'G' (nipple or union nut):**
- M16x1.5(Q0), M18x1.5(Q1), M20x1.5(Q2), M27x2(Q5), M33x2(Q25)
- 3/8"(Q3/Q9), 1/2"(Q4/Q10), 3/4"(Q6/Q11), 1"(Q12/Q15)
- welded or adjustable flange
- other
- w/o mounting appliances

**Thread length:**
- cylindrical thread: T = 15 mm
- NPT thread: according to ANSI B1.20.1

**Head connection 'GH':**
- M10x1(Q20), M12x1.5(Q7), M16x1.5(Q0), M18x1.5(Q1), M20x1.5(Q2)
- 1/4"(Q23/Q24), 3/8"(Q3/Q9), 1/2"(Q4/Q10), 3/4"(Q6/Q11)
- welding

**Extension length:**
m = 0...1500 mm (w/o spring-loaded adapter)
m = m1...1500 mm (w/ spring-loaded adapter)

**Extension diameter: (for TSEC1 and TSEC2 only, [mm])**

| Ext. length 'm' \ Probe diameter 'd' | 3 mm | 4.5, 6 mm | 8 mm | 10 mm | 10+ mm |
|---|---|---|---|---|---|
| up to 50 mm | 6 | d | d | d | d |
| 50...150 mm | 8 | 8 | d | d | d |
| 150...500 mm | 10 | 10 | 10 | d | d |
| 500+ mm | 14 | 14 | 14 | 14 | d |

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed (see Appendix - Tip Shapes)

**Process pressure:**

| Probe design | TSEC, TSEC1 | TSEC2 | TSEC4 | TSEC3, TSEC5 |
|---|---|---|---|---|
| Max. pressure * | 25 bar | 16 bar | 6 bar | 0 bar |

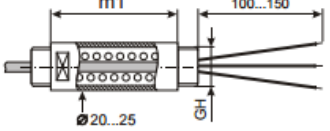
**Sheath material:**
1.4401/1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4845(M6), 1.4876(M7), 2.4816(M8), 1.4362 (M15)

**MI sheath material:**
1.4401/1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4876(M7), 2.4816(M8), Nicrobell® (M10)

**Extension wire isolation:**
Teflon® (T) or glass fiber (GL)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

**Spring-loaded adapter: (mounted between probe and protection head)**




m1 = 60...100 mm
d ≤ 8 mm

* Please contact

## Ordering code TSEC(1,2,3,4,5) - (MI -) G1G2.G3.G4.G6.G7.G9'9".GH.G10.G11.G14 - #1

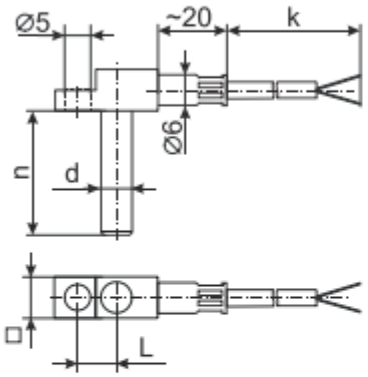
| Code | Feature or option | | Code values |
|---|---|---|---|
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple | regular design | E - type "E", J - type "J", K - type "K", L - type "L", R - type "R", S - type "S" |
| | | MI design | E - type "E", J - type "J", K - type "K", N - type "N", R - type "R", S - type "S", T - type "T" |
| G3 | Temperature range | | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [7], T13 - 0...1000 °C, T16 - 0...1100 °C |
| G4 | Diameter 'd' [mm] | regular design | 6, 8, 10, 12, 14, 16, 20, 22 |
| | | MI design | 3, 4.5, 6, 8, 10 |
| G6 | Probe length 'n' [mm] [1] | | 50...50000 (see table overleaf) |
| G7 | Probe length 'm' [mm] [2] | | 0...1500 (m1...1500 with 'OA' option) |
| G9' | Mounting connection | | X - no mounting appliances [3],<br>Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q5 - M27x2, Q6 - G3/4",<br>Q9 - 3/8" NPT, Q10 - 1/2" NPT, Q11 - 3/4" NPT, Q12 - G1", Q15 - 1" NPT, Q25 - M33x2,<br>Uxx - union nut (xx - same as for Qxx), F - flange (specify!), Z - other connection (specify!) |
| G9" | Compression fitting ferrule [4] | | BR - brass, GR - graphite, SS - stainless steel, TF - Teflon® |
| GH | Head connection | | W - welding, Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q6 - G3/4",<br>Q7 - M12x1.5, Q9 - 3/8" NPT, Q10 - 1/2" NPT, Q11 - 3/4" NPT, Q20 - M10x1, Q23 - G1/4", Q24 - 1/4" NPT,<br>Z - other connection (specify!) |
| G10 | Sheath material (wetted parts) | regular design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762, M5 - 1.4841, M6 - 1.4845, M7 - 1.4876, M8 - 2.4816,<br>M9 - 1.4401 (1.4404), M15 - 1.4362 |
| | | MI design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M7 - 1.4876 (Incolloy 800),<br>M8 - 2.4816 (Inconel 600), M9 - 1.4401 (1.4404), M10 - Nicrobell® |
| G11 | Accuracy class | | 1 - '1' [7], 2 - '2' |
| G14 | Tip shape (hot junction) | | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| #1 | Options | | X - none, OA - spring-loaded adapter [5], OP - electrochemically polished sheath surface [6] |

[1] 'n+m' for TSEC3 and TSEC4!
[2] Only for TSEC1, TSEC2, and TSEC5!
[3] Only for TSEC!
[4] Only for TSEC4!
[5] Only for TSEC, TSEC1, and TSEC5!
[6] Only for non-MI (regular) design!

# TERMOREZISTENTE/TERMOCUPLE TSG in UNGHI DREPT, cu surub de fixare

**ANGLED PROBE WITH SCREW FIXING** **TSG**

Sheath - stainless steel (see table notes)
Cable - see table notes




n = 10 ... 30 mm

k = 1 ... 10 m

| □ | 8x8 | 10x10 |
|---|---|---|
| Lmin | 7 | 9 |
| d | 4, 5 | 4, 5, 6 |

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|---|
| 1 x Pt (RB,RD,RF,RG) | GLGL | T8 | 0...400 °C | 4*, 5 | 2, 3* |
| | | T7 | 0...200 °C | 6 | 2, 3 |
| 1 x K, 1 x J, 1 x T | *SLSL, TSL* | *T9* | *-50...200 °C* | 5, 6 | 2 |
| | TT | T7 | 0...200 °C | | |
| | *YY, UU, YU* | *T10* | *-10...60 °C* | | |
| | | *T12* | *-50...100 °C* | | |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)
- YY (PVC, max. 100 °C ambient temperature)
- UU or YU (PUR, max. 80 °C ambient temperature)

**Tip shape:**
- RTD: standard
- T/C: standard (isolated) or grounded

(see Appendix - Tip Shapes)

**Accuracy class:**
- RTD: 'A', 'B', or '2xB'
- T/C: '1' or '2'

(see Appendix - RTD or T/C Tolerance)

**Cable connector:**
4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)
(see Appendix - Connectors)

* Please contact COMECO!

## Ordering code TSG - G2.G3.G4.G5.G6.G7.G8.G10.G11.G12.G14.G15 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| G2 | Sensor | | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, J - T/C type "J", K - T/C type "K", T - T/C type "T" |
| G3 | Temperature range | | T7 - 0...200 °C, T8 - 0...400 °C, T9 - -50...200 °C, T10 - -10...60 °C, T12 - -50...100 °C |
| G4 | Diameter 'd' [mm] | | 4, 5, 6 |
| G5 | Dimension '□' | | 8 - 8x8 mm, 10 - 10x10 mm |
| G6 | Probe length 'n' [mm] | | 10...30 |
| G7 | Dimension 'L' [mm] | | 7...20 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon®, 1PU...10PU - polyurethane (3), 1PV...10PV - PVC |
| G10 | Sheath material | | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| G11 | Accuracy class | RTD | A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' (3), 2 - '2' |
| G12 | Number of wires (1) | | 2, 3 |
| G14 | Tip shape (hot junction) (2) | | X - standard (isolated from sheath), G - grounded |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled), OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface |

(1) Only for RTD sensors!
(2) Only for thermocouples!

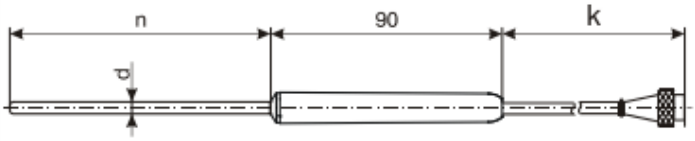
## TERMOREZISTENTE/TERMOCUPLE cu manevrare manuala, cu maner, cu conector :

## TSH maner plastic ; TSHN maner metal

**(MI) HAND-HELD PROBE WITH CONNECTOR** **TSHx**

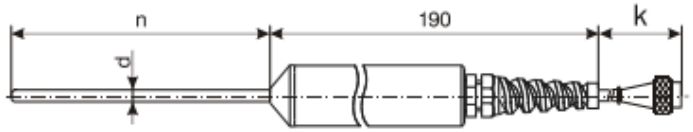
Sheath - see table
Cable - see table notes
Connector - see table notes

### DESIGN WITH PLASTIC HANDLE (TSH)




n = 200 ... 2 000 mm  d ≤ 6 mm  k = 1 ... 10 m

### DESIGN WITH ROBUST METAL HANDLE (TSHN)




n = 200 ... 2 000 mm  k = 1 ... 10 m

| SENSITIVE ELEMENT | SHEATH MATERIAL | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **RTD Design** | | | | |
| 1 x Pt (RB,RD,RF,RG) | M1, M2, M3, M9 | T7 0...200 °C<br>T8 0...400 °C | 4, 5 | 2, 3* |
| | | T1* -50...400 °C | 6 | 2, 3, 4* |
| 1 x Cu (RH, RK) | | T7 0...200 °C | 5*, 6 | 2, 3, 4* |
| **Regular Thermocouple Design** | | | | |
| 1 x K, 1 x J, 1 x T | M2, M3, M9 | T7 0...200 °C<br>T8 0...400 °C | 5, 6 | 2 |
| **MI Thermocouple Design** | | | | |
| 1 x J, 1 x T ** | M2, M3, M8 | T4 0...800 °C | 1, 1.5, 2, 3, 4.5, 6, 8, 10 | 2 |
| | M9, M5 | | 1, 1.5, 2, 3, 4.5, 6, 8 | 2 |
| | M4 | | 6, 8 | 2 |
| | M10 | | 3, 4.5, 6 | 2 |
| 1 x K, 1 x N, 1 x E ** | M2, M3 | T3 0...850 °C | 1, 1.5, 2, 3, 4.5, 6, 8, 10 | 2 |
| | M9 | | 1, 1.5, 2, 3, 4.5, 6, 8 | 2 |
| | M7* | T16 0...1100 °C | 3, 6, 10 | 2 |
| | M8 | | 1, 1.5, 2, 3, 4.5, 6, 8, 10 | 2 |
| | M4 | T6 0...1150 °C | 6, 8 | 2 |
| | M5 | | 1.5, 3, 4.5, 6, 8 | 2 |
| | M10 | T6 0...1250 °C | 3, 4.5, 6 | 2 |
| 1 x S(R) | M8 | T16 0...1100 °C | 3, 4.5, 6 | 2 |

**Sheath material:**
**1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4762 (M4), 1.4841 (M5), 1.4876 (M7), 2.4816 (M8), 1.4404 (M9), Nicrobell® (M10)**

**Cable type:**
- **GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)**
- **SLSL or TSL (silicone, max. 250 °C ambient temperature)**
- **TT (Teflon®, max. 250 °C ambient temperature)**

**Tip shape:**
- **RTD: standard, narrowed, pitted**
- **T/C: standard (isolated), grounded, open-tube, exposed**

**(see Appendix - Tip Shapes)**

**Accuracy class:**
- **RTD: 'A', 'B', or '2xB'**
- **T/C: '1' or '2'**

**(see Appendix - RTD or T/C Tolerance)**

**Cable connector:**
**4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)**
**(see Appendix - Connectors)**

*** Please contact**

**** For T/C type "T": (T8) 0...400 °C; for T/C type "E": (T13) 0...1000 °C**

## Ordering code TSH(N) - (MI-) G2.G3.G4.G6.G8.G10.G11.G12.G14.G15 - #1

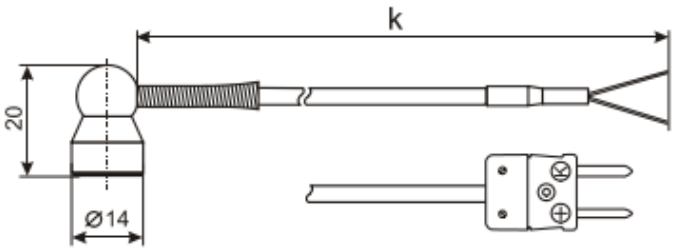
| Code | Feature or option | | Code values |
|---|---|---|---|
| G2 | Sensor | regular design | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, RH - Cu50, RK - Cu100, J - T/C type "J", K - T/C type "K", T - T/C type "T" |
| | | MI design | E - T/C type "E", J - T/C type "J", K - T/C type "K", N - T/C type "N", R - T/C type "R", S - T/C type "S", T - T/C type "T" |
| G3 | Temperature range | | T1 - -50...400 °C, T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1150(1250) °C, T7 - 0...200 °C, T8 - 0...400 °C, T16 - 0...1100 °C |
| G4 | Diameter 'd' [mm] | RTD | 4, 5, 6, 8 |
| | | regular T/C design | 5, 6 |
| | | MI T/C design | 1, 1.5, 2, 3, 4.5, 6, 8, 10 |
| G6 | Probe length 'n' [mm] | | 200...2000 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon® |
| G10 | Sheath material (wetted parts) | RTD | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| | | regular T/C design | M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| | | MI T/C design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M7 - 1.4876 (Incolloy 800), M8 - 2.4816 (Inconel 600), M9 - 1.4404, M10 - Nicrobell® |
| G11 | Accuracy class | RTD | X - none [1], A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' [5], 2 - '2' |
| G12 | Number of wires [2] | | 2, 3, 4 [5] |
| G14 | Tip shape | RTD | X - standard closed, N - narrowed, P - pitted |
| | | T/C | X - standard (isolated from sheath) [3], G - grounded, E - exposed hot junction [3], O - open-tube design [3] |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled) [4], OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface [4] |

[1] For non-Pt sensors
[2] Only for RTD sensors!
[3] Not available when d = 1!
[4] Only for non-MI (regular) design!

# TERMOREZISTENTE/TERMOCUPLE TSM cu fixare magnetica, pentru masurare pe suprafata

**MAGNETIC PROBE FOR SURFACE MEASUREMENT** **TSM**

Design - pawn-type plastic body w/ permanent magnet ring
Cable - see table notes




**k = 1 ... 10 m**

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | WIRES |
|---|---|---|---|
| 1 x Pt (RB,RD,RF,RG) | SLFSL, TFT | T7** 0...200 °C<br>T9** -50...200 °C | 2, 3* |
| 1 x K,<br>1 x J | *YFY* | *T10 -10...60 °C*<br>*T12 -50...100 °C* | 2 |
| 1 x T | | *T19 0...100 °C* | 2 |

**Sheath material:**
**PPS plastic, magnet ring w/ ferrous metal jacket**

**Cable type:**
**- SLFSL or TFSL (silicone w/ copper shield, max. 250 °C ambient temperature)**
**- TFT (Teflon® w/ copper shield, max. 250 °C ambient temperature)**
**- YFY (PVC w/ copper shield, max. 105 °C ambient temperature)**

**Tip shape:**
**- RTD: standard**
**- T/C: grounded**
**(see Appendix - Tip Shapes)**

**Accuracy class:**
**- RTD: 'A', 'B', or '2xB'**
**- T/C: '1' or '2'**
**(see Appendix - RTD or T/C Tolerance)**

**Cable connector:**
**4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)**
**(see Appendix - Connectors)**

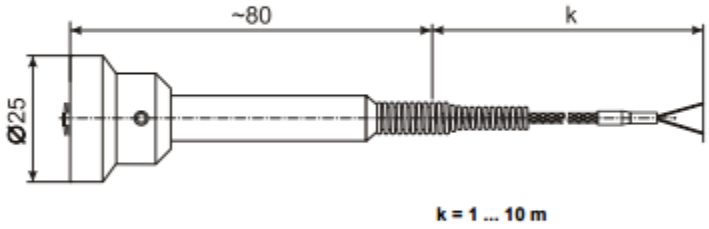
*** Please contact**
**** Up to 250 °C (short-term)**

## Ordering code TSM - G2.G3.G8.G11.G12.G15 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| G2 | Sensor | | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, J - T/C type "J", K - T/C type "K", T - T/C type "T" |
| G3 | Temperature range | | T7 - 0...200(250) °C, T9 - -50...200(250) °C, T10 - -10...60 °C, T12 - -50...100 °C, T19 - 0...100 °C |
| G8 | Cable length 'k' [m] and type | | 1SL...10SL - silicone, 1TF...10TF - Teflon®, 1PV...10PV - PVC |
| G11 | Accuracy class | RTD | A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' (2), 2 - '2' |
| G12 | Number of wires (1) | | 2, 3 (2) |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only),<br>C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OB - braid termination lead (only w/o connector) |

(1) Only for RTD sensors!

# TERMOREZISTENTE/TERMOCUPLE TSMS cu fixare magnetica, pentru masurare pe suprafata

| MAGNETIC THERMOCOUPLE PROBE FOR SURFACE MEASUREMENT — TSMS<br>Design - SS body w/ chromium plated magnet holder and T/C spring<br>Extension cable - see table notes | SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | WIRE [mm] |
|---|---|---|---|---|
|  <br>k = 1 ... 10 m | 1 x K,<br>1 x J,<br>1 x N | GLGLP, GLGLV | T8* 0...350 °C | 0.5 |
| **Sheath material:**<br>magnet holder: Cr-plated black steel<br>sensor body: stainless steel w/ ceramic isolator<br><br>**Cable type:**<br>GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)<br><br>**Tip shape:**<br>exposed hot junction, flat-surfaced (see Appendix - Tip Shapes)<br><br>**Accuracy class:**<br>'1' or '2' (see Appendix - T/C Tolerance)<br><br>**Thermocouple connector:**<br>'standard' (C5) or 'miniature' (C6) (see Appendix - Connectors) | | | | |
| * up to 400 °C for short-term use | | | | |

## Ordering code TSMS - G2.G8.G11.G15 - #1

| Code | Feature or option | Code values |
|---|---|---|
| G2 | Thermocouple | J - type "J", K - type "K", N - type "N" |
| G8 | Cable length 'k' [m] and type | 1GL...10GL - glass fiber |
| G11 | Accuracy class | 1 - '1' (1), 2 - '2' |
| G15 | Connector | X - none, C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | X - none, OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector) |

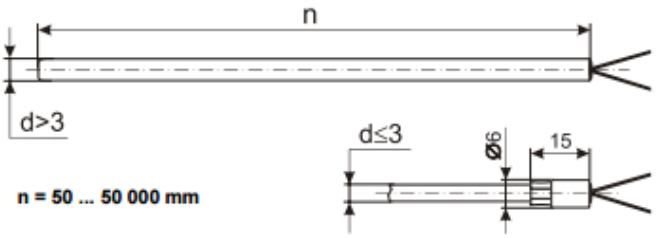
# TERMOCUPLE izolate mineral : TSN sensor-cablu ; TSNA sensor cu cablu de extensie

## TSNH cu conector ; TSNHA sensor cu conector si cablu de extensie

**MINERAL-INSULATED THERMOCOUPLE PROBE** **TSNx**

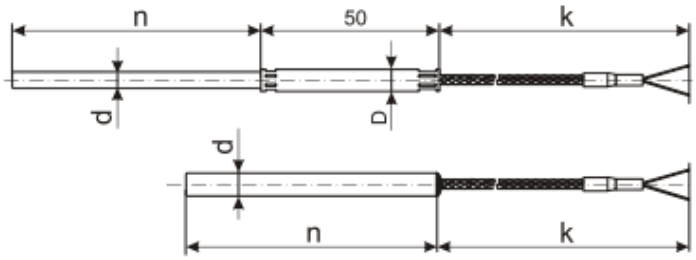
Sheath - see table
Extension cable - see table notes

### MI CABLE PROBE ONLY (TSN)




n = 50 ... 50 000 mm

### DESIGN WITH EXTENSION CABLE (TSNA)



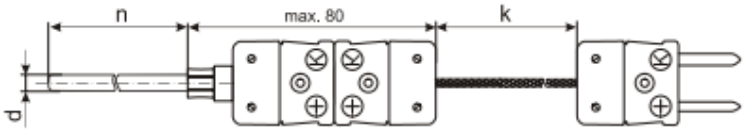

n = 50 ... 50 000 mm
k = 1 ... 10 m

| d | < 6 | 6 | 8, 10 |
|---|---|---|---|
| D | 6 | 8 | d |

### DESIGN WITH CONNECTOR (TSNH)


n = 50 ... 50 000 mm
d ≤ 6 mm

### DESIGN WITH CONNECTOR AND EXTENSION CABLE (TSNHA)




n = 50 ... 50 000 mm  d ≤ 6 mm  k = 1 ... 10 m

| SENSITIVE ELEMENT | SHEATH MATERIAL | TEMPERATURE RANGE | d [mm] |
|---|---|---|---|
| 1 x J, 1 x T ** | M1 | max. 400 °C | 1, 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M2,M3,M9,M5,M8 | max. 800 °C | |
| | M4 | | 6, 8 |
| | M10 | | 3, 4.5, 6 |
| 2 x J 2 x T ** | M1 | max. 400 °C | 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M2,M3,M9,M5,M8 | max. 800 °C | |
| | M4 | | 6, 8 |
| 1 x K, 1 x N, 1 x E ** | M1 | max. 400 °C | 1, 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M2, M3, M9 | max. 850 °C | |
| | M7* | max. 1100 °C | 3, 6, 10* |
| | M8 | | 1, 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M4 | max. 1150 °C | 6, 8 |
| | M5 | | 1.5, 3, 4.5, 6, 8 |
| | M10 | max. 1250 °C | 3, 4.5, 6 |
| 2 x K 2 x N 2 x E ** | M2, M3, M9 | max. 850 °C | 1.5, 3, 4.5, 6, 8 |
| | M7* | max. 1100 °C | 3, 6, 10* |
| | M8 | | 1.5, 3, 4.5, 6, 8 |
| | M4 | max. 1150 °C | 6, 8 |
| | M5 | | 1.5, 3, 4.5, 6, 8 |
| 1 x S(R), 2 x S(R) | M8 | max. 1100 °C | 3, 4.5, 6 |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4762 (M4), 1.4841 (M5), 1.4876 (M7), 2.4816 (M8), 1.4404 (M9), Nicrobell® (M10)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed
(see Appendix - Tip Shapes)

**Accuracy class:**
'1' or '2'
(see Appendix - T/C Tolerance)

**Thermocouple connector:**
'standard' (C5) or 'miniature' (C6)
(see Appendix - Connectors)

**Temperature limitation:**
The temperature around TSNA holding tube and TSNH(A) connector must not exceed -50...200 °C!

* Please contact

** For T/C type "T": max. 400 °C; for T/C type "E": max. 1000 °C

## Ordering code TSN(A,H,HA) - G1G2.G3.G4.G6.G8.G10.G11.G14.G15 - #1

| Code | Feature or option | Code values |
|---|---|---|
| G1 | Number of thermocouples | 1 or 2 [1] |
| G2 | Thermocouple | E - type "E", J - type "J", K - type "K", N - type "N", R - type "R", S - type "S", T - type "T" |
| G3 | Temperature range | T7 - 0...200 °C, T9 - -50...200 °C, T8 - 0...400 °C, T1 - -50...400 °C,<br>T4 - 0...800 °C, T3 - 0...850 °C, T16 - 0...1100 °C, T6 - 0...1150(1250) °C |
| G4 | Diameter 'd' [mm] [2] | 1 [3], 1.5 [4], 2, 3, 4.5, 6, 8, 10 |
| G6 | Probe length 'n' [mm] | 50...50000 |
| G8 | Cable length 'k' [m] and type | X - no cable, 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon® |
| G10 | Sheath material | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841,<br>M7 - 1.4876 (Incolloy 800), M8 - 2.4816 (Inconel 600), M9 - 1.4404, M10 - Nicrobell® |
| G11 | Accuracy class | 1 - '1' [5], 2 - '2' |
| G14 | Tip shape (hot junction) | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| G15 | Connector [5] | X - none, C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | X - none, OS - cable protection SS spring (≈ 50 mm) [5], OB - braid termination lead (only w/o connector) [5] |

[1] Only for TSN. Ask for TSNA!
[2] Up to 6 mm for TSNH and TSNHA
[3] Always grounded
[4] Grounded when G1="2"
[5] Only for TSNA and TSNHA!

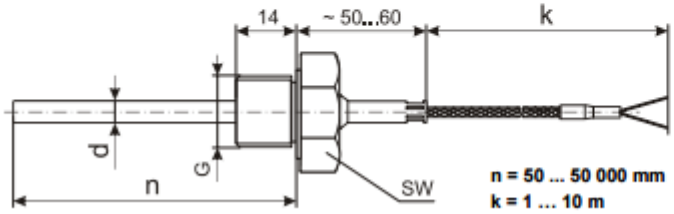
## TERMOCUPLE izolate mineral, cu filet :

## TSNG drept ; TSNG1 cu extensie ; TSNGL in unghi drept

**SCREW-IN MI THERMOCOUPLE PROBE** **TSNGx**

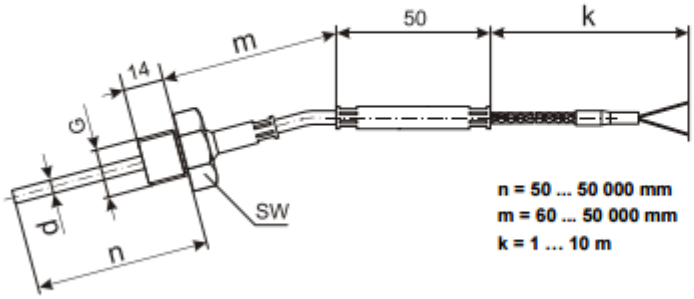
Sheath - see table
Extension cable - see table notes

### STRAIGHT DESIGN (TSNG)



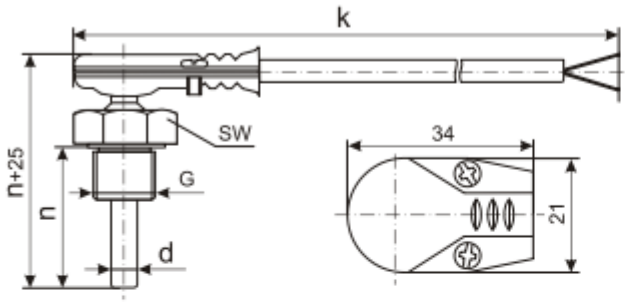

n = 50 ... 50 000 mm
k = 1 ... 10 m

### EXTENDED DESIGN (TSNG1)




n = 50 ... 50 000 mm
m = 60 ... 50 000 mm
k = 1 ... 10 m

### ANGLED DESIGN (TSNGL)




n = 50 ... 50 000 mm
k = 1 ... 10 m

| SENSITIVE ELEMENT | SHEATH MATERIAL | TEMPERATURE RANGE | d [mm] |
|---|---|---|---|
| 1 x J, 1 x T ** | M1 | max. 400 °C | 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M2,M3,M9,M5,M8 | max. 800 °C | |
| | M4 | | 6, 8 |
| | M10 | | 3, 4.5, 6 |
| 2 x J 2 x T ** | M1 | max. 400 °C | 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M2,M3,M9,M5,M8 | max. 800 °C | |
| | M4 | | 6, 8 |
| 1 x K, 1 x N, 1 x E ** | M1 | max. 400 °C | 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M2, M3, M9 | max. 850 °C | |
| | M7* | max. 1100 °C | 3, 6, 10* |
| | M8 | | 1.5, 2, 3, 4.5, 6, 8, 10* |
| | M4 | max. 1150 °C | 6, 8 |
| | M5 | | 1.5, 3, 4.5, 6, 8 |
| | M10 | max. 1250 °C | 3, 4.5, 6 |
| 2 x K 2 x N 2 x E ** | M2, M3, M9 | max. 850 °C | 1.5, 3, 4.5, 6, 8 |
| | M7* | max. 1100 °C | 3, 6, 10* |
| | M8 | | 1.5, 3, 4.5, 6, 8 |
| | M4 | max. 1150 °C | 6, 8 |
| | M5 | | 1.5, 3, 4.5, 6, 8 |
| 1 x S(R), 2 x S(R) | M8 | max. 1100 °C | 3, 4.5, 6 |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4762 (M4), 1.4841 (M5), 1.4876 (M7), 2.4816 (M8), 1.4404 (M9), Nicrobell® (M10)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed
(see Appendix - Tip Shapes)

**Accuracy class:**
'1' or '2'
(see Appendix - T/C Tolerance)

**Thermocouple connector:**
'standard' (C5) or 'miniature' (C6)
(see Appendix - Connectors)

**Temperature limitation:**
The temperature beyond the HEX body (SW) must not exceed -50...200 °C!

**Available threads and HEX sizes:**

| G | M6 | M8 | M10 1/8" | M12 1/4" | M14 | M16 3/8" | M18 | M20 1/2" |
|---|---|---|---|---|---|---|---|---|
| SW | 10 | 10 | 12(13) | 14 | 17 | 19 | 22 | 24 |

* Please contact
** For T/C type "T": max. 400 °C; for T/C type "E": max. 1000 °C

## Ordering code TSNG(G1,L) - G1G2.G3.G4.G6.G7.G8.G9.G10.G11.G14.G15 - #1

| Code | Feature or option | Code values |
|---|---|---|
| G1 | Number of thermocouples | 1 or 2 |
| G2 | Thermocouple | E - type "E", J - type "J", K - type "K", N - type "N", R - type "R", S - type "S", T - type "T" |
| G3 | Temperature range | T7 - 0...200 °C, T9 - -50...200 °C, T8 - 0...400 °C, T1 - -50...400 °C,<br>T4 - 0...800 °C, T3 - 0...850 °C, T16 - 0...1100 °C, T6 - 0...1150(1250) °C |
| G4 | Diameter 'd' [mm] | 1.5 [1], 2, 3, 4.5, 6, 8 |
| G6 | Probe length 'n' [mm] | 50...50000 |
| G7 | Probe length 'm' [mm] [2] | 60...50000 |
| G8 | Cable length 'k' [m] and type | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon® |
| G9 | Mounting connection | Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q7 - M12x1.5, Q8 - M14x1.5,<br>Q10 - 1/2" NPT, Q18 - G1/8", Q19 - 1/8" NPT, Q20 - M10x1, Q23 - G1/4", Q24 - 1/4" NPT, Q26 - M8x1,<br>Q29 - M8x1.25, Q30 - M10x1.5, Q31 - M6x1, Uxx - union nut (xx - same as for Qxx) |
| G10 | Sheath material | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841,<br>M7 - 1.4876 (Incolloy 800), M8 - 2.4816 (Inconel 600), M9 - 1.4404, M10 - Nicrobell® |
| G11 | Accuracy class | 1 - '1' [4], 2 - '2' |
| G14 | Tip shape (hot junction) | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| G15 | Connector | X - none, C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | X - none, OS - cable protection SS spring (≈ 50 mm) [3], OB - braid termination lead (only w/o connector) |

[1] Grounded when G1="2"
[2] Only for TSNG1!
[3] Only for TSNG!

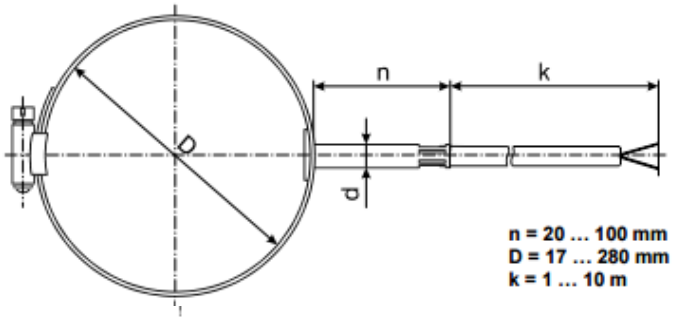
# TERMOREZISTENTE/TERMOCUPLE cu fixare cu clema, pentru masurare pe conducta :

## TST drept ; TSTL in unghi drept

**(MI**) CLAMP CABLE PROBE FOR PIPE-SURFACE MEASUREMENT** — **TSTx**

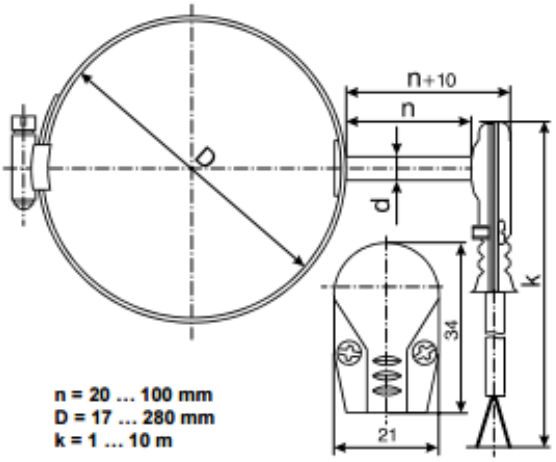
Sheath - stainless steel (see table notes)
Clamp - see table notes
Cable - see table notes

### STRAIGHT-TUBE DESIGN (TST)




n = 20 ... 100 mm
D = 17 ... 280 mm
k = 1 ... 10 m

### DESIGN WITH ANGLED TERMINATION (TSTL)




n = 20 ... 100 mm
D = 17 ... 280 mm
k = 1 ... 10 m

| Diameter 'D' | Average pipe OD |
|---|---|
| 17...29 mm | 22 |
| 25...45 mm | 35 |
| 40...60 mm | 50 |
| 63...83 mm | 73 |
| 78...98 mm | 88 |
| 93...113 mm | 103 |
| 108...128 mm | 118 |
| 123...143 mm | 133 |
| 138...158 mm | 148 |
| 153...173 mm | 163 |
| 168...188 mm | 178 |
| 183...203 mm | 193 |
| 198...218 mm | 208 |
| 213...233 mm | 223 |
| 228...248 mm | 238 |
| 243...263 mm | 253 |
| 258...280 mm | 269 |

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **RTD Design** | | | | |
| 1 x Pt (RB,RD,RF,RG) | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 4.5**, 5 | 2, 3* |
| | | T1* -50...400 °C | 6 | 2, 3, 4* |
| 2 x Pt (RB,RD,RF,RG) | GLGL, TT | T7 0...200 °C | 6 | 2x2 |
| | | T8 0...400 °C | | |
| 1 x Cu (RH, RK) | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 5* | 2, 3* |
| | | | 6 | 2, 3, 4* |
| 2 x Cu (RH, RK) | GLGL, TT | T7 0...200 °C | 6 | 2x2 |
| 1 x PTC (RP, RQ) | SLSL, TSL, YY, UU, YU | T12 -50...100 °C | 6 | 2, 3 |
| | GLGL, TT | T19 0...100 °C | | |
| **Regular Thermocouple Design** | | | | |
| 1 x J, 1 x K, 1 x T | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 5, 6 | 2 |
| | | T1* -50...400 °C | | |
| | GLGL, TT | T8 0...400 °C | | |
| **MI Thermocouple Design **** | | | | |
| 1 x N, 1 x E, 1 x T | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 4.5, 6 | 2 |
| | | T1* -50...400 °C | | |
| | GLGL, TT | T8 0...400 °C | | |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)
- YY (PVC, max. 100 °C ambient temperature)
- UU or YU (PUR, max. 80 °C ambient temperature)

**Tip shape:**
- RTD: standard
- T/C: standard (isolated) or grounded
(see Appendix - Tip Shapes)

**Accuracy class:**
- RTD: 'A', 'B', or '2xB'
- T/C: '1' or '2'
(see Appendix - RTD or T/C Tolerance)

**Cable connector:**
4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)
(see Appendix - Connectors)

**Available clamp sizes:**

| Diameter 'D' | Clamp width |
|---|---|
| 17...113 mm | 8 mm or 14 mm |
| 108...280 mm | 14 mm |

- other on request

* Please contact

** Available only for TSTL!

## Ordering code TST(L) - (MI -[1]) G1G2.G3.G4.G5.G6.G8.G10.G11.G12.G14.G15 - #1

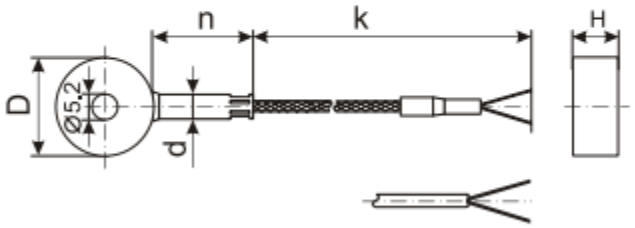
| Code | Feature or option | | Code values |
|---|---|---|---|
| G1 | Number of sensors [3] | | 1 or 2 |
| G2 | Sensor | regular design | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, RH - Cu50, RK - Cu100, RP -PTC 1k, RQ - PTC 2k, J - T/C type "J", K - T/C type "K", T - T/C type "T" |
| | | MI design | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, RH - Cu50, RK - Cu100, RP -PTC 1k, RQ - PTC 2k, E - T/C type "E", N - T/C type "N", T - T/C type "T" |
| G3 | Temperature range | | T1 - -50...400 °C, T7 - 0...200 °C, T8 - 0...400 °C, T9 - -50...200 °C, T12 - 50...100 °C, T19 - 0...100 °C |
| G4 | Diameter 'd' [mm] | regular design | 5, 6 |
| | | MI design | 4.5, 6 |
| G5 | Clamp diameter 'D' (average pipe OD) | | 22 - 17...29 mm, 35 - 25...45 mm, 50 - 40...60 mm, 73 - 63...83 mm, 88 - 78...98 mm, 103 - 93...113 mm, 118 - 108...128 mm, 133 - 123...143 mm, 148 - 138...158 mm, 163 - 153...173 mm, 178 - 168...188 mm, 193 - 183...203 mm, 208 - 198...218 mm, 223 - 213...233 mm, 238 - 228...248 mm, 253 - 243...263 mm, 269 - 258...280 mm, Z - other on request (specify average pipe OD) [6] |
| G6 | Probe length 'n' [mm] | | 20...100 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon®, 1PU...10PU - polyurethane [6], 1PV...10PV - PVC |
| G10 | Sheath material (wetted parts) | | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| G11 | Accuracy class | RTD | X - none [2], A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' [5], 2 - '2' |
| G12 | Number of wires [3] | | 2, 3, 4 [6] |
| G14 | Tip shape (hot junction) [4] | | X - standard (isolated from sheath), G - grounded |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled) [5], OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface [5] |

[1] Available only for TSTL!
[2] For non-Pt sensors
[3] Only for RTD sensors!
[4] Only for thermocouples!
[5] Only for non-MI (regular) design!

# TERMOREZISTENTE/TERMOCUPLE toroidale [gaura 5,2 mm], cu fixare cu surub : TSTO

**TOROIDAL CABLE PROBE** — **TSTO**

Sheath - stainless steel (see table notes)
Cable - see table notes




n = 20 ... 30 mm
D = 8 ... 24 mm
k = 1 ... 10 m

| d [mm] | 4 | 5 | 6 |
|---|---|---|---|
| H [mm] | 6 | 7 | 8 |

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **RTD Design** | | | | |
| 1 x Pt (RB,RD,RF,RG) | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 4, 5 | 2, 3* |
| | | T12 -50...100 °C | 6 | 2, 3, 4* |
| 2 x Pt (RB,RD,RF,RG) | GLGL, TT | T7 0...200 °C | 6 | 2x2 |
| | | T8 0...400 °C | | |
| 1 x PTC (RP, RQ) | SLSL, TSL, YY, UU, YU | T12 -50...100 °C | 6 | 2, 3 |
| | GLGL, TT | T19 0...100 °C | | |
| **Thermocouple Design** | | | | |
| 1 x K, 1 x J, 1 x T | SLSL, TSL, YY, UU, YU | T9 -50...200 °C | 5, 6 | 2 |
| | GLGL, TT | T8 0...400 °C | | |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)
- UU or YU (PUR, max. 80 °C ambient temperature)
- YY (PVC, max. 100 °C ambient temperature)

**Tip shape:**
- RTD: standard
- T/C: standard (isolated) or grounded

(see Appendix - Tip Shapes)

**Accuracy class:**
- RTD: 'A', 'B', or '2xB'
- T/C: '1' or '2'

(see Appendix - RTD or T/C Tolerance)

**Cable connector:**
4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)
(see Appendix - Connectors)

* Please contact

## Ordering code TSTO - G1G2.G3.G4.G5.G6.G8.G10.G11.G12.G14.G15 - #1

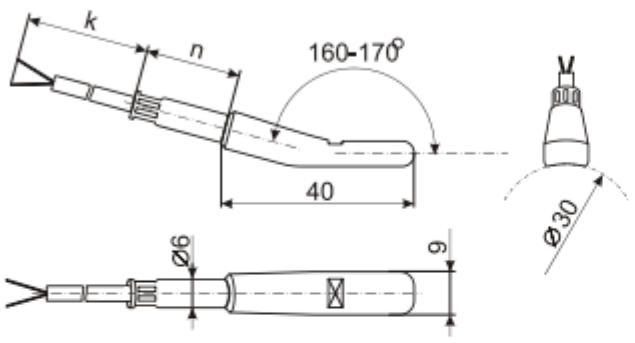
| Code | Feature or option | | Code values |
|---|---|---|---|
| G1 | Number of sensors | | 1 or 2 |
| G2 | Sensor | | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, RP -PTC 1k, RQ - PTC 2k, J - T/C type "J", K - T/C type "K", T - T/C type "T" |
| G3 | Temperature range | | T7 - 0...200 °C, T8 - 0...400 °C, T9 - -50...200 °C, T12 - 50...100 °C, T19 - 0...100 °C |
| G4 | Diameter 'd' [mm] | | 4, 5, 6 |
| G5 | Toroid diameter 'D' [mm] | | 8...24 |
| G6 | Probe length 'n' [mm] | | 20...30 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon®, 1PU...10PU - polyurethane [4], 1PV...10PV - PVC |
| G10 | Sheath material (wetted parts) | | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| G11 | Accuracy class | RTD | X - none [1], A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' [4], 2 - '2' |
| G12 | Number of wires [2] | | 2, 3, 4 [4] |
| G14 | Tip shape (hot junction) [3] | | X - standard (isolated from sheath), G - grounded |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled), OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface |

[1] For non-Pt sensors
[2] Only for RTD sensors!
[3] Only for thermocouples!

# TERMOREZISTENTE/TERMOCUPLE/TERMISTOARE TSY tip deget pentru masurare pe suprafata conducte

**FINGER CABLE PROBE FOR PIPE-SURFACE MEASUREMENT** — **TSY**

Sheath - stainless steel (see table notes)
Cable - see table notes




n = 20 ... 30 mm
k = 1 ... 10 m

| SENSITIVE ELEMENT | CABLE TYPE | TEMPERATURE RANGE | WIRES |
|---|---|---|---|
| **RTD Design** | | | |
| 1 x Pt (RB,RD,RF,RG) | SLSL, TSL, YY, UU, YU | T9 -50...200 °C<br>T12 -50...100 °C | 2, 3, 4* |
| 2 x Pt (RB,RD,RF,RG) | *GLGL, TT* | *T7 0...200 °C*<br>*T8 0...400 °C* | 2x2 |
| 1 x PTC (RP, RQ) | SLSL, TSL, YY, UU, YU<br>*GLGL, TT* | T12 -50...100 °C<br>*T19 0...100 °C* | 2, 3 |
| **Thermocouple Design** | | | |
| 1 x K,<br>1 x J,<br>1 x T | SLSL, TSL, YY, UU, YU<br>*GLGL, TT* | T9 -50...200 °C<br>*T8 0...400 °C* | 2 |

**Sheath material:**
1.4301 (M1), 1.4541 (M2), 1.4571 (M3), 1.4404 (M9)

**Cable type:**
- GLGLP(V) (glass fiber w/ steel braid, max. 400 °C ambient temperature)
- SLSL or TSL (silicone, max. 250 °C ambient temperature)
- TT (Teflon®, max. 250 °C ambient temperature)
- YY (PVC, max. 100 °C ambient temperature)
- UU or YU (PUR, max. 80 °C ambient temperature)

**Tip shape:**
- RTD: standard
- T/C: standard (isolated) or grounded

(see Appendix - Tip Shapes)

**Accuracy class:**
- RTD: 'A', 'B', or '2xB'
- T/C: '1' or '2'

(see Appendix - RTD or T/C Tolerance)

**Cable connector:**
4-pin (C3), 'T/C standard' (C5) or 'T/C miniature' (C6)
(see Appendix - Connectors)

* Please contact

## Ordering code TSY - G1G2.G3.G6.G8.G10.G11.G12.G14.G15 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| G1 | Number of sensors | | 1 or 2 |
| G2 | Sensor | | RB - Pt50, RD - Pt100, RF - Pt500, RG - Pt1000, RP -PTC 1k, RQ - PTC 2k, J - T/C type "J", K - T/C type "K", T - T/C type "T" |
| G3 | Temperature range | | T7 - 0...200 °C, T8 - 0...400 °C, T9 - -50...200 °C, T12 - 50...100 °C, T19 - 0...100 °C |
| G6 | Probe length 'n' [mm] | | 20...30 |
| G8 | Cable length 'k' [m] and type | | 1GL...10GL - glass fiber, 1SL...10SL - silicone, 1TF...10TF - Teflon®, 1PU...10PU - polyurethane (4), 1PV...10PV - PVC |
| G10 | Sheath material (wetted parts) | | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4404 |
| G11 | Accuracy class | RTD | X - none (1), A - 'A', B - 'B', C - '2xB' |
| | | T/C | 1 - '1' (4), 2 - '2' |
| G12 | Number of wires (2) | | 2, 3, 4 (4) |
| G14 | Tip shape (hot junction) (3) | | X - standard (isolated from sheath), G - grounded |
| G15 | Connector | | X - none, C3 - 4-pin male plug-in connector ø8 (for H5700 thermometer only), C5 - T/C connector, C6 - miniature T/C connector |
| #1 | Options | | X - none, OV - vibration proof (MgO or Silicone filled), OS - cable protection SS spring (≈ 50 mm), OB - braid termination lead (only w/o connector), OP - electrochemically polished sheath surface |

(1) For non-Pt sensors
(2) Only for RTD sensors!
(3) Only for thermocouples!

# TERMOCUPLE pentru inlocuire/inserare

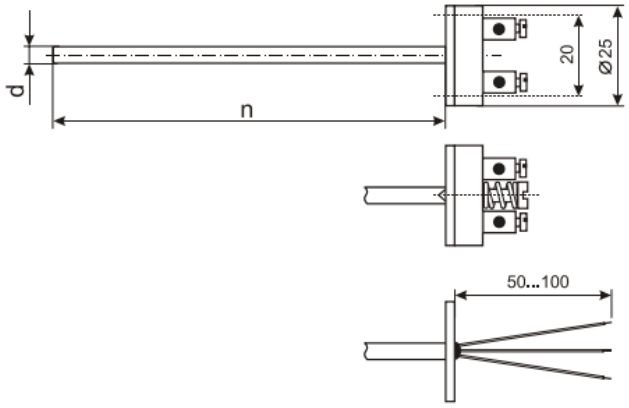
## TSSB, TSSM cu bloc de conexiuni ; TSOSB, TSOSM fara bloc de conexiuni/pentru transmiter

**(MI) T/C REPLACEABLE INSERT** TSSx

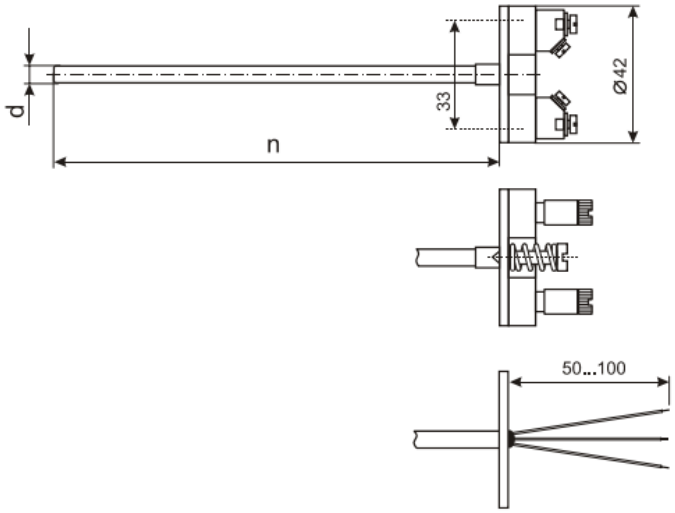
**- PREPARED FOR IN-HEAD TRANSMITTER **** TSOSx

Sheath - stainless steel (see Appendix - Sheath materials)
Terminal base - $Al_2O_3$. Terminals - Ni-plated brass

**DESIGN WITH TERMINAL BLOCK TYPE "M" (TS(O)SM)**




**DESIGN WITH TERMINAL BLOCK TYPE "B" (TS(O)SB)**




| SENSITIVE ELEMENT | TEMPERATURE RANGE | | DIMENSIONS n [mm] | d [mm] | wires |
|---|---|---|---|---|---|
| **Regular Design** | | | | | |
| 1(2) x J<br>1(2) x L | T4 | 0...800 °C | 50...1500 | 6 | 2 |
| | | | 50...3000 | 8, 10 | (2x2) |
| 1(2) x K | T3 | 0...850 °C | 50...1500 | 6 | 2 |
| | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...3000 | 8, 10 | (2x2) |
| 1(2) x E | T3 | 0...850 °C | 50...1500 | 6 | 2 |
| | T13 | 0...1000 °C | 50...3000 | 8, 10 | (2x2) |
| 1(2) x S<br>1(2) x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...1500 | 6 | 2 |
| | | | 50...3000 | 8, 10 | (2x2) |
| **MI Design** | | | | | |
| 1 x J | T4 | 0...800 °C | 50...50000 | 3, 4.5, 6, 8 | 2 |
| 2 x J | | | | | 2x2 |
| 1 x T | T8 | 0...400 °C | 50...50000 | 3, 4.5, 6, 8 | 2 |
| 2 x T | | | | | 2x2 |
| 1 x K<br>1 x N, 1 x E | T3<br>T16 | 0...850 °C<br>0...1100 °C | 50...50000 | 3, 4.5, 6, 8 | 2 |
| 2 x K<br>2 x N, 2 x E | T6*<br>T6* | 0...1150 °C<br>0...1250 °C | 50...50000 | 3, 4.5, 6, 8 | 2x2 |
| 2 x S<br>2 x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...10000 | 3, 4.5, 6 | 2x2 |

**Suitable protection heads:** (see Appendix - Protection Heads)
- TS(O)SM: heads with 20 mm mounting distance
- TS(O)SB: heads with 33 mm mounting distance

**Fixing to protection head:**
direct (default) or springing ('OS' option)

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed
(see Appendix - Tip Shapes)

**Sheath material:**
1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4845(M6), 1.4876(M7), 2.4816(M8), 1.4362 (M15)

**MI sheath material:**
1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4876(M7), 2.4816(M8), Nicrobell® (M10)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

* Please contact

** No transmitter mounted!

## Ordering code TS✱(B, M) - (MI -) G1G2.G3.G4.G6.G10.G11.G14 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| ✱ | Base model variant | | S - standard (w/ terminal block), OS - prepared for in-head transmitter (w/o terminal block) |
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple | regular design | E - type "E", J - type "J", K - type "K", L - type "L", R - type "R", S - type "S" |
| | | MI design | E - type "E", J - type "J", K - type "K", N - type "N", R - type "R", S - type "S", T - type "T" |
| G3 | Temperature range | | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [4], T13 - 0...1000 °C, T16 - 0...1100 °C |
| G4 | Diameter 'd' [mm] | regular design | 6, 8, 10 |
| | | MI design | 3, 4.5, 6, 8 |
| G6 | Insert length 'n' [mm] [1] | | 50...50000 (see table overleaf) |
| G10 | Sheath material (wetted parts) | regular design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762, M5 - 1.4841, M6 - 1.4845, M7 - 1.4876, M8 - 2.4816, M9 - 1.4404, M15 - 1.4362 |
| | | MI design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M7 - 1.4876 (Incolloy 800), M8 - 2.4816 (Inconel 600), M9 - 1.4404, M10 - Nicrobell® |
| G11 | Accuracy class | | 1 - '1' [4], 2 - '2' |
| G14 | Tip shape (hot junction) | | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| #1 | Options | | X - none, OV - vibration proof (secured screws) [2,3], OS - spring-fixed terminal block, OP - electrochemically polished sheath surface [2] |

[1] This length does not coincide with the probe immersion length!
[2] Only for non-MI (regular) design!
[3] Requires 'OS' option!

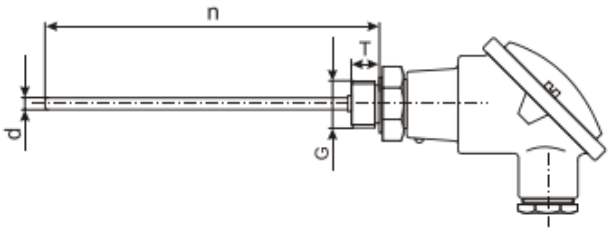
# TERMOCUPLE cu cap pentru bloc de conexiuni sau montaj transmiter
# TSC1/2/3/4, cu bloc de conexiuni ; TSOC1/2/3/4 fara bloc de conexiuni/pentru transmiter

**(MI) T/C PROBE WITH PROTECTION HEAD** TSCx

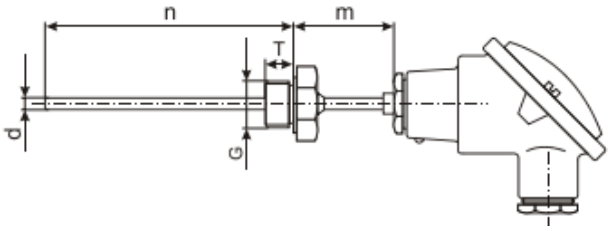
**- FOR IN-HEAD TRANSMITTER **** TSOCx

Sheath - stainless steel (see Appendix - Sheath materials)
Head - aluminum, stainless steel, iron, or plastic (see Appendix - Protection heads)

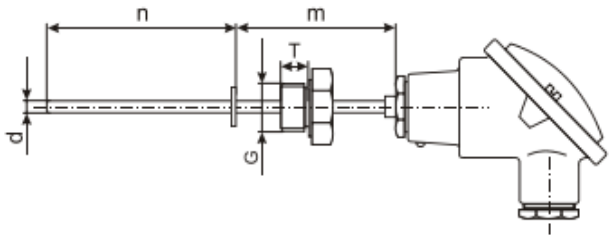
### DESIGN WITHOUT EXTENSION (TS(O)C)



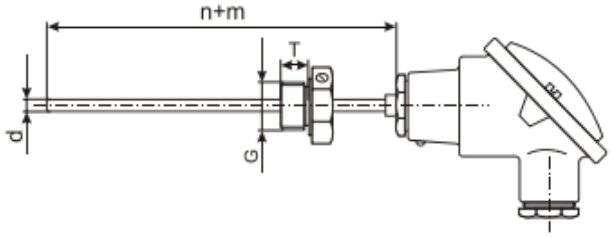

### EXTENDED DESIGN WITH WELDED CONNECTION (TS(O)C1)



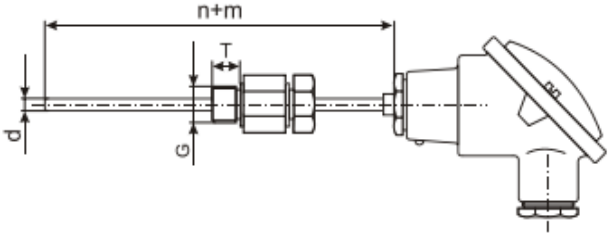

### EXTENDED DESIGN WITH MOVABLE CONNECTION (TS(O)C2)




### DESIGN WITH ADJUSTABLE CONNECTION (TS(O)C3)




### DESIGN WITH GLAND-TYPE CONNECTION (TS(O)C4)




| SENSITIVE ELEMENT | TEMPERATURE RANGE | | DIMENSIONS n [mm] | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|---|
| **Regular Design** | | | | | |
| 1(2) x J<br>1(2) x L | T4 | 0...800 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| 1(2) x K | T3<br>T16<br>T6* | 0...850 °C<br>0...1100 °C<br>0...1150 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| 1(2) x E | T3<br>T13 | 0...850 °C<br>0...1000 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| 1(2) x S<br>1(2) x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| **MI Design** | | | | | |
| 1 x J | T4 | 0...800 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x J | | | | | 2x2 |
| 1 x T | T8 | 0...400 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x T | | | | | 2x2 |
| 1 x K<br>1 x N, 1 x E | T3<br>T16 | 0...850 °C<br>0...1100 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x K<br>2 x N, 2 x E | T6*<br>T6* | 0...1150 °C<br>0...1250 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2x2 |
| 2 x S<br>2 x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...10000 | 3, 4.5, 6 | 2x2 |

**Protection head:**
B, MA, MB, G, N, Cx, Dx, Ex (see Appendix - Protection Heads)

**Process connection 'G' (nipple or union nut):**
- M16x1.5(Q0), M18x1.5(Q1), M20x1.5(Q2), M27x2(Q5), M33x2(Q25)
- 3/8"(Q3/Q9), 1/2"(Q4/Q10), 3/4"(Q6/Q11), 1"(Q12/Q15)
- welded or adjustable flange
- other
- w/o mounting appliances

**Thread length:**
- cylindrical thread: T = 15 mm
- NPT thread: according to ANSI B1.20.1

**Thermal isolation between nipple and metal head:** (for TS(O)C only)

| Protection head | Length 'n' |
|---|---|
| MA, MB | up to 50 mm |
| B | up to 100 mm |
| other | up to 150 mm |

| Maximum temperature | Insulation material |
|---|---|
| 200 °C | POM |
| 400 °C | Teflon® |

**Extension length:**
m = 0...1500 mm

**Extension diameter:** (for TS(O)C1 and TS(O)C2 only, [mm])

| Ext. length 'm' \ Probe diameter 'd' | 3, 4 mm | 4.5...6 mm | 8 mm | 10 mm | 10+ mm |
|---|---|---|---|---|---|
| up to 50 mm | 8 | d | d | d | d |
| 50...150 mm | 8 | 8 | d | d | d |
| 150...500 mm | 10 | 10 | 10 | d | d |
| 500+ mm | 14 | 14 | 14 | 14 | d |

**Tip shape:**
standard, narrowed, pitted (see Appendix - Tip Shapes)

**Process pressure:**

| Probe design | TS(O)C, TS(O)C1 | TS(O)C2 | TS(O)C4 | TS(O)C3 |
|---|---|---|---|---|
| Max. pressure * | 25 bar | 16 bar | 6 bar | 0 bar |

**Sheath material:**
1.4301(M1), 1.4401/1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4362(M15)

**Wire material:**
Cu, Ni, or Ag

**Accuracy class:**
'A', 'B', or '2xB' (see Appendix - RTD Tolerance)

* Please contact

** Order transmitter separately!!!

## Ordering code TS✱(1,2,3,4) - (MI -) G0.G1G2.G3.G4.G6.G7.G9'9".G10.G11.G14 - #1.#2

| Code | Feature or option | | Code values |
|---|---|---|---|
| ✱ | Base model variant | | C - standard (w/ terminal block), OC - prepared for in-head transmitter (w/o terminal block) |
| G0 | Protection head | | B - type "B", CC - type "CC", CS - type "CS",<br>D - type "D", DH - type "DH", DHW - type "DHW", DW - type "DW",<br>E - type "E", EG - type "EG", EGS - type "EGS", EGSS - type "EGSS", EGW - type "EGW",<br>EGWSS - type "EGWSS", ES - type "ES", G - type "G", MA - type "MA", MB - type "MB", N - type "N" |
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple | regular design | E - type "E", J - type "J", K - type "K", L - type "L", R - type "R", S - type "S" |
| | | MI design | E - type "E", J - type "J", K - type "K", N - type "N", R - type "R", S - type "S", T - type "T" |
| G3 | Temperature range | | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [9], T13 - 0...1000 °C, T16 - 0...1100 °C |
| G4 | Diameter 'd' [mm] | regular design | 6, 8, 10, 12, 14, 16, 20 [1], 22 [1] |
| | | MI design | 3, 4.5, 6, 8, 10 |
| G6 | Probe length 'n' [mm] [2] | | 50...50000 (see table overleaf) |
| G7 | Probe length 'm' [mm] [3] | | 0...1500 |
| G9' | Mounting connection | | X - no mounting appliances [4],<br>Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q5 - M27x2, Q6 - G3/4",<br>Q9 - 3/8" NPT, Q10 - 1/2" NPT, Q11 - 3/4" NPT, Q12 - G1", Q15 - 1" NPT, Q25 - M33x2,<br>Uxx - union nut (xx - same as for Qxx), F - flange (specify!), Z - other connection (specify!) |
| G9" | Compression fitting ferrule [5] | | BR - brass, GR - graphite, SS - stainless steel, TF - Teflon® |
| G10 | Sheath material (wetted parts) | regular design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M6 - 1.4845, M7 - 1.4876, M8 - 2.4816,<br>M9 - 1.4401 (1.4404), M15 - 1.4362 |
| | | MI design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M7 - 1.4876, M8 - 2.4816,<br>M9 - 1.4401 (1.4404), M10 - Nicrobell® |
| G11 | Accuracy class | | 1 - '1' [9], 2 - '2' |
| G14 | Tip shape (hot junction) | | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| #1 | Options | | X - none, OV - vibration proof (spring terminals [6], secured screws), OT - thermal isolation [4],<br>OP - electrochemically polished sheath surface [6] |
| #2 | Incorporated devices | | X - none, T - in-head transmitter [7], A - local indicator [8] |

[1] d = 21.3 mm for sheath materials 'M5' and 'M6'
[2] 'n+m' for TS(O)C3 and TS(O)C4!
[3] Only for TS(O)C1 and TS(O)C2!
[4] Only for TS(O)C!
[5] Only for TS(O)C4!
[6] Only for non-MI (regular) design!
[7] Only for variant 'OC'! See transmitter datasheets and order separately!
[8] With windowed head only! See indicator datasheets and order separately!

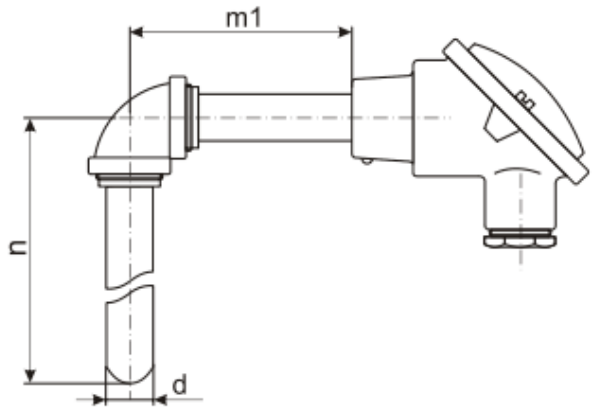
# TERMOCUPLE in unghi, cu cap pentru bloc de conexiuni sau montaj transmiter TSL1, TSL1, TSL3, cu bloc de conexiuni ; TSOL, TSOL1, TOSL3 fara bloc de conexiuni/pentru transmiter

**ANGLED T/C PROBE WITH PROTECTION HEAD** **Lx (TSLx)**

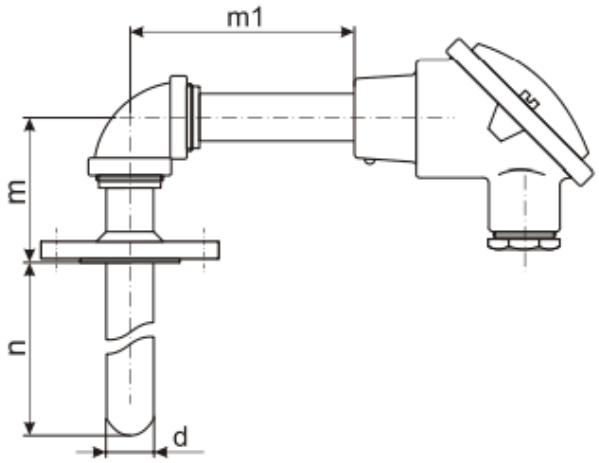
**(FOR IN-HEAD TRANSMITTER)**** **OLx (TSOLx)**

Sheath - stainless steel (see Appendix - Sheath materials)
Head - aluminum, stainless steel, or plastic (see Appendix - Protection heads)

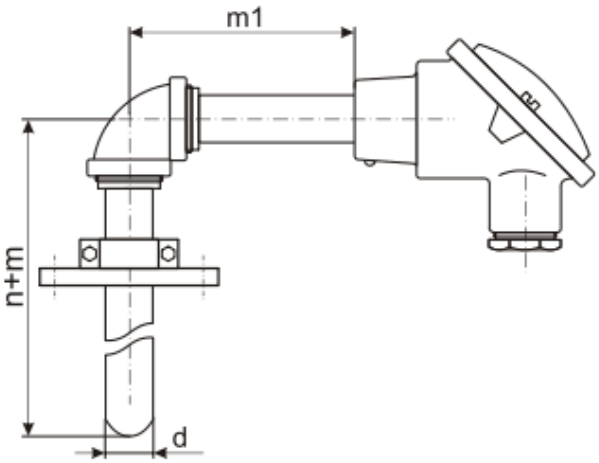
**DESIGN WITHOUT FLANGE (L)**




**DESIGN WITH WELDED FLANGE (L1)**




**DESIGN WITH ADJUSTABLE FLANGE (L3)**




| SENSITIVE ELEMENT | TEMPERATURE RANGE | | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **Regular Thermocouple Design** | | | | |
| 1 x J; 1 x L | T4 | 0...800 °C | 10, 12, 14, 16, 20, 22 | 2 |
| 2 x J; 2 x L | T4 | 0...800 °C | 10, 12, 14, 16, 20, 22 | 2x2 |
| 1 x K | T3<br>T16 | 0...850 °C<br>0...1100 °C | 10, 12, 14, 16, 20, 22 | 2 |
| 2 x K | T3<br>T16<br>T6* | 0...850 °C<br>0...1100 °C<br>0...1150 °C | 10, 12, 14, 16, 20, 22 | 2x2 |
| 1 x E | T3 | 0...850 °C | 10, 12, 14, 16, 20, 22 | 2 |
| 2 x E | T3<br>T13 | 0...850 °C<br>0...1000 °C | 10, 12, 14, 16, 20, 22 | 2x2 |
| 1 x S<br>1 x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 10, 12, 14, 16, 20, 22 | 2 |
| 2 x S<br>2 x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 10, 12, 14, 16, 20, 22 | 2x2 |
| **MI Thermocouple Design** | | | | |
| 1 x J | T4 | 0...800 °C | 10 | 2 |
| 1 x K<br>1 x N; 1 x E | T3<br>T16 | 0...850 °C<br>0...1100 °C | 10 | 2 |
| 2 x K | T3<br>T16 | 0...850 °C<br>0...1100 °C | 10 | 2x2 |

**Protection head:**
B, MA, MB, G, N, Dx, Ex, EX (see Appendix - Protection heads)

**Process connection:**
- welded flange
- adjustable flange
- no mounting appliances

**Insertion length:**
n = 200...1500 mm

**Extension length:**
m = 100...1000 mm

**Holding tube:**
- m1 = 100...1000 mm
- OD 20(22) mm
- material 1.4301 or 1.4541

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed
(see Appendix - Tip shapes)

**Process pressure:**

| Probe design | L, L1 | L3 |
|---|---|---|
| Max. pressure * | 25 bar | 0 bar |

**Sheath material:**
1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4845(M6), 1.4876(M7), 2.4816(M8), 1.4362 (M15)

**MI sheath material:**
1.4541(M2), 1.4571(M3), 1.4876(M7), 2.4816(M8)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

* Please contact

** Order transmitter separately!!!

## Ordering code TS✱(1,3) - G0.G1G2.G3.G4.G6.G7'.G7''.G9.G10.G11.G14 - #1.#2

| Code | Feature or option | | Code values |
|---|---|---|---|
| ✱ | Base model variant | | L - standard (w/ terminal block), OL - prepared for in-head transmitter (w/o terminal block) |
| G0 | Protection head | | B - type "B", MA - type "MA", MB - type "MB", G - IP65, type "G", N - type "N", D - type "D", DW - windowed, type "DW", DH - w/ high cap, type "DH", DHW - windowed, type "DHW", E - IP65, type "E", ES - stainless-steel, type "ES", EG - IP68 ATEX-approved, type "EG", EGS - IP66 ATEX-approved, type "EGS", EGW - windowed ATEX-approved, type "EGW", EX - explosion-proof instrument housing (specify!) |
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple | | J - type "J", K - type "K", N - type "N", E - type "E", L - type "L", S - type "S", R - type "R" |
| G3 | Temperature range | | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [5], T13 - 0...1000 °C, T16 - 0...1100 °C |
| G4 | Diameter 'd' [mm] | regular T/C | 10, 12, 14, 16, 20, 22 |
| | | MI T/C | 10 |
| G6 | Probe length 'n' [mm] [1] | | 200...1500 |
| G7' | Probe length 'm' [mm] [2] | | 100...1000 |
| G7'' | Probe length 'm1' [mm] | | 100...1000 |
| G9 | Mounting connection | | X - no mounting appliances, F - flange (specify!), Z - other connection (specify!) |
| G10 | Sheath material | regular T/C | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762, M5 - 1.4841, M6 - 1.4845, M7 - 1.4876, M8 - 2.4816, M9 - 1.4404, M15 - 1.4362 |
| | | MI T/C | M2 - 1.4541, M3 - 1.4571, M7 - 1.4876 (Incolloy 800), M8 - 2.4816 (Inconel 600) |
| G11 | Accuracy class | | 1 - '1' [5], 2 - '2' |
| G14 | Tip shape (hot junction) | | X - standard (isolated from sheath), G - grounded, E - exposed hot junction [3], O - open-tube design [3] |
| #1 | Options | | X - none, OV - vibration proof (spring-type terminals [5], secured screws), OP - electrochemically polished sheath surface |
| #2 | Local indicator | | X - none, A - local indicator mounted [4] |

[1] 'n+m' for TS(O)L3!
[2] Only for TS(O)L1!
[3] Only for non-explosion-proof thermocouples!
[4] With windowed head only! See indicator datasheets and order separately!

# TERMOCUPLE cu cap pentru bloc de conexiuni sau montaj transmiter si posibilitate de insertie pentru inlocuire/schimbare sensor

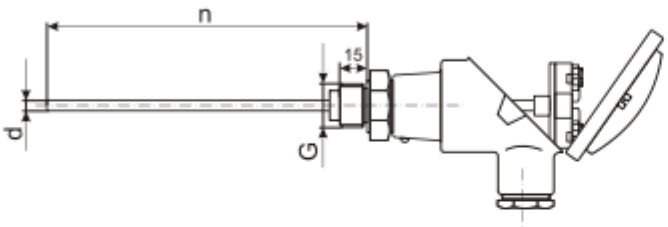
## TSDS, TSDS1, TSDS2, TSDS3, TSDS4, TSDS5 cu bloc de conexiuni ; TSODS, TSODS1, TSODS2, TSODS3, TSODS4, TSODS5 fara bloc de conexiuni/pentru transmiter

**T/C PROBE WITH PROTECTION HEAD AND OPEN REPLACEABLE INSERT FOR THERMOWELL OR PROTECTION TUBE** — **DSx (TSDSx)**

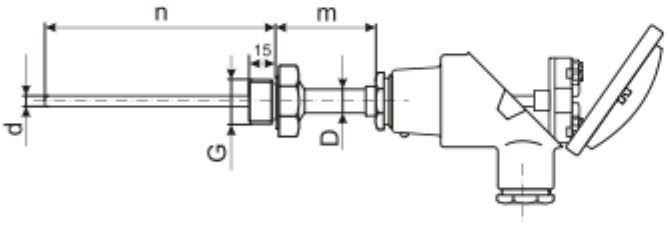
**(FOR IN-HEAD TRANSMITTER)*** — **ODSx (TSODSx)**

Sheath - stainless steel (see Appendix - Sheath materials)
Head - aluminum, stainless steel, or plastic (see Appendix - Protection heads)

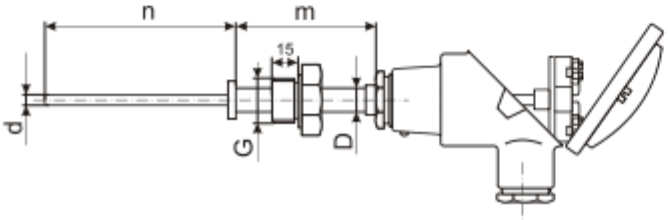
### DESIGN WITHOUT EXTENSION (DS)



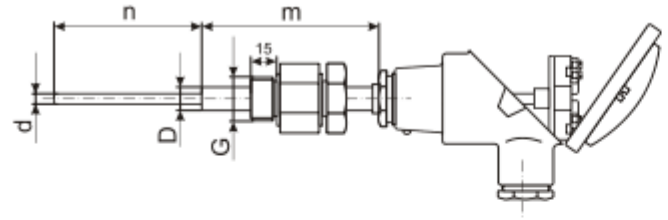

### EXTENDED DESIGN WITH WELDED CONNECTION (DS1)



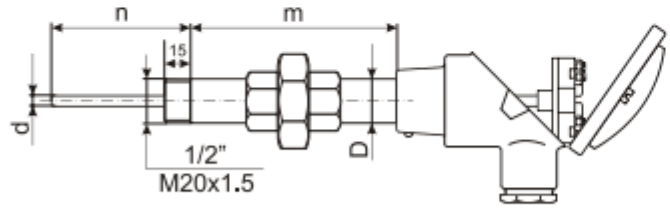

### EXTENDED DESIGN WITH MOVABLE CONNECTION (DS2)




### DESIGN WITH SLIDING GLAND-TYPE CONNECTION (DS4)




### DESIGN WITH NIPPLE-UNION-NIPPLE CONNECTION (DS5)




| SENSITIVE ELEMENT | TEMPERATURE RANGE | DIMENSIONS D [mm] | DIMENSIONS d [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **MI Thermocouple Insert Design** | | | | |
| 1 x J | T4 0...800 °C | 8,10,12,14 | 3, 4.5, 6, 8 | 2 |
| 2 x J | T4 0...800 °C | 8,10,12,14 | 3, 4.5, 6, 8 | 2x2 |
| 1 x K<br>1 x N, 1 x E | T3 0...850 °C<br>T16 0...1100 °C | 8,10,12,14 | 3, 4.5, 6, 8 | 2 |
| 2 x K<br>2 x N, 2 x E | T6* 0...1150 °C<br>T6* 0...1250 °C | 8,10,12,14 | 3, 4.5, 6, 8 | 2x2 |
| 1 x S, 1 x R | T16 0...1100 °C<br>T6* 0...1150 °C | 8,10,12,14 | 3, 4.5, 6 | 2 |
| 2 x S, 2 x R | T16 0...1100 °C<br>T6* 0...1150 °C<br>T14** 0...1600 °C<br>T15** 0...1700 °C | 8,10,12,14 | 3, 4.5, 6 | 2x2 |

**Protection head:**
B, MA, MB, G, N, Dx, Ex, EX (see Appendix - Protection heads)

**Process connection 'G' (nipple or union nut):**
- M16x1.5(Q0), M18x1.5(Q1), M20x1.5(Q2), M27x2(Q5), M33x2(Q25)
- 3/8"(Q3/Q9), 1/2"(Q4/Q10), 3/4"(Q6/Q11), 1"(Q12/Q15)
- welded flange

**Thermal isolation between nipple and metal head:** (for TS(O)DS only)

| Protection head | Length 'n' |
|---|---|
| MA, MB | up to 50 mm |
| B | up to 100 mm |
| other | up to 150 mm |

| Maximum temperature | Insulation material |
|---|---|
| 200 °C | POM |
| 400 °C | Teflon® |

**Insertion length (must fit thermowell / protection tube length 'L'!):**
n = 50...2000 mm

**Extension length:**
m = 50...1000 mm (w/o spring-loaded adapter)
m = m1...1000 mm (w/ spring-loaded adapter)

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed
(see Appendix - Tip shapes)

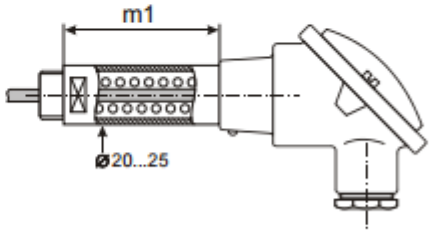
**Process pressure:**
- with metal thermowell up to 500 bar (see Accessories - Thermowells)
- with ceramic protection tube (see Accessories - Protection tubes) *

**Sheath material:**
1.4301(M1) or 1.4541(M2)

**MI-insert sheath material:**
1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4876(M7), 2.4816(M8)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

**Spring-loaded adapter:**
(mounted between probe and protection head)




m1 = 60...100 mm

* Please contact
** With ceramic protection tubes only!
*** Order transmitter separately!!!

## Ordering code TS✱(1,2,4,5) - G0.G1G2.G3.G4.G6.G7.G9'9".G10.G11.G14 - #1.#2

| Code | Feature or option | Code values |
|---|---|---|
| ✱ | Base model variant | DS - standard (w/ terminal block), ODS - prepared for in-head transmitter (w/o terminal block) |
| G0 | Protection head | B - type "B", MA - type "MA", MB - type "MB", G - IP65, type "G", N - type "N", D - type "D", DW - windowed, type "DW", DH - w/ high cap, type "DH", DHW - windowed, type "DHW", E - IP65, type "E", ES - stainless-steel, type "ES", EG - IP68 ATEX-approved, type "EG", EGS - IP66 ATEX-approved, type "EGS", EGW - windowed ATEX-approved, type "EGW", EX - explosion-proof instrument housing (specify!) |
| G1 | Number of thermocouples | 1 or 2 |
| G2 | Thermocouple | J - type "J", K - type "K", N - type "N", E - type "E", L - type "L", S - type "S", R - type "R" |
| G3 | Temperature range | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [3], T13 - 0...1000 °C, T14 - 0...1600 °C, T15 - 0...1700 °C, T16 - 0...1100 °C |
| G4 | Diameters 'D/d' [mm] [1] | 8/3, 10/3, 8/4.5, 10/4.5, 12/6, 14/6, 20/6 [2], 21/6, 20/8 [2], 21/8 |
| G6 | Probe length 'n' [mm] | 50...2000 |
| G7 | Probe length 'm' [mm] [3] | 50...1000 (m1...1000 with 'OA' option) |
| G9' | Mounting connection | X - no mounting appliances, Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q5 - M27x2, Q6 - G3/4", Q9 - 3/8" NPT, Q10 - 1/2" NPT, Q11 - 3/4" NPT, Q12 - G1", Q15 - 1" NPT, Q25 - M33x2, Uxx - union nut (xx - same as for Qxx), F - flange (specify!), Z - other connection (specify!) |
| G9" | Compression fitting ferrule [4] | TF - Teflon®, BR - brass, SS - stainless steel |
| G10 | Insert sheath material | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762, M5 - 1.4841, M6 - 1.4845, M8 - 2.4816, M9 - 1.4404 |
| G11 | Accuracy class | 1 - '1' [5], 2 - '2' |
| G14 | Insert tip shape (hot junction) | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| #1 | Options | X - none, OV - vibration proof (secured screws) [5], OS - spring-loaded insert, OT - thermal isolation [6], OA - spring-loaded adapter [7], OP - electrochemically polished sheath surface |
| #2 | Local indicator | X - none, A - local indicator mounted [8] |

[1] Only 'd' for TS(O)DS!
[2] Not available with G10='M6'
[3] Omit for TS(O)DS without 'OA' option!
[4] Only for TS(O)DS4!
[5] Requires 'OS' option!
[6] Only for TS(O)DS!
[7] Only for TS(O)DS, TS(O)DS1, and TS(O)DS5! Insert is not replaceable!
[8] With windowed head only! See indicator datasheets and order separately!

# TERMOCUPLE cu cap de protectie pentru bloc de conexiuni sau montaj transmiter si tub de protectie ceramic

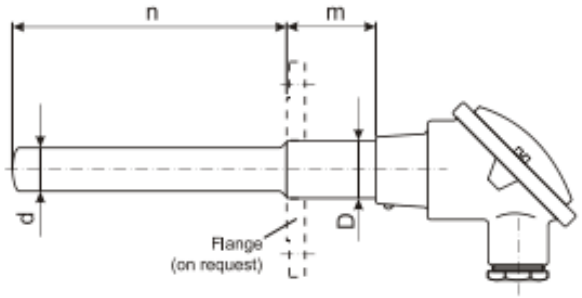
## TSZ, TSZL cu bloc de conexiuni ; TSOZ, TSOZL fara bloc de conexiuni/pentru transmiter

**(MI) T/C PROBE WITH PROTECTION HEAD AND CERAMIC PROTECTION TUBE** — **TSZx**

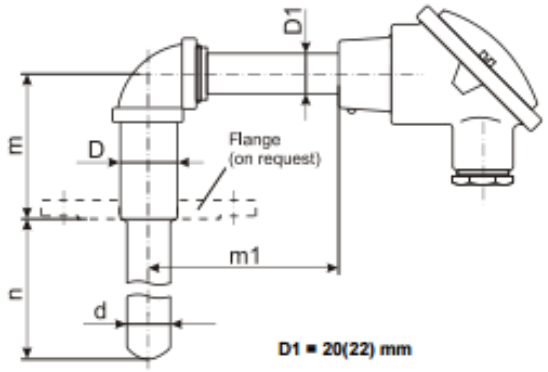
**- FOR IN-HEAD TRANSMITTER **** — **TSOZx**

Holding tube - stainless steel (see Appendix - Sheath materials)
Protection tube - ceramic (see Accessories - Protection tubes)
Head - aluminum, stainless steel, iron, or plastic (see Appendix - Protection heads)

### STRAIGHT DESIGN (TS(O)Z)




### ANGLED DESIGN (TS(O)ZL)




D1 = 20(22) mm

| SENSITIVE ELEMENT | TEMPERATURE RANGE | WIRE [mm] / MI [mm] | TUBE MATERIAL | DIMENSIONS d [mm] | DIMENSIONS D [mm] |
|---|---|---|---|---|---|
| **Regular Design** | | | | | |
| 1 x K; 1 x N<br>2 X K, 2 X N | T13 0...1000 °C | 1.0 | C1(2),C6 | 10 | 16 |
| | T6 0...1200 °C | 1.5 | C1(2) | 15 | 22 |
| | | | C6, C7 | 16, 19 | 22, 24 |
| | | | C5 | 17 | 24 |
| | T6 0...1200 °C | 3.0 | C1(2) | 24 | 32 |
| | | | C4, C7 | 22, 28 | 30, 36 |
| | | | C5 | 23 | 30 |
| | | | C6 | 25, 32 | 32, 40 |
| 1 x S; 1 x R<br>2 X S, 2 X R | T21 0...1300 °C | 0.35 | C1(2) | 10,15,24 | 16,22,32 |
| | | | C4 | 22 | 30 |
| | | | C5 | 17, 23 | 24, 30 |
| | | | C6 | 10,16,19,25 | 16,22,24,32 |
| | | | C7* | 16,22,28 | 22,30,36 |
| | T5 0...1500 °C | 0.35, 0.5 | C1(2) | 10,15,24 | 16,22,32 |
| | | | C5 | 17, 23 | 24, 30 |
| | | | C6 | 10,16,19,25 | 16,22,24,32 |
| | T14 0...1600 °C | 0.5 | C2 | 10,15,24 | 16,22,32 |
| | | | C6 | 10,16,19,25 | 16,22,24,32 |
| 1 x B; 2 x B | T14 0...1600 °C | 0.35 | C2 | 10,15,24 | 16,22,32 |
| | | | C6 | 10,16,19,25 | 16,22,24,32 |
| 1 x B; 2 x B | T15 0...1700 °C | 0.5 | C3 | 10,15,24 | 16,22,32 |
| | | | C6* | 10,16,19,25 | 16,22,24,32 |
| **MI Design** | | | | | |
| 1 x K; 1 x N<br>2 X K, 2 X N | T16 0...1100 °C | 3, 4.5 | C1(2), C6 | 10 | 16 |
| | T16 0...1100 °C (Inconel 600) | 3, 4.5, 6, 8 | C1(2) | 15 | 22 |
| | | | C6, C7 | 16, 19 | 22, 24 |
| | | | C5 | 17, 23 | 24, 30 |
| | T6 0...1200 °C (Nicrobell®) | 3, 4.5, 6, 8, 10 | C1(2) | 24 | 32 |
| | | | C4, C7 | 22, 28 | 30, 36 |
| | | | C6 | 25, 32 | 32, 40 |
| 1 x S, 2 x S | T16 0...1100 °C (Inconel 600) | 3, 4.5 | C1(2), C6 | 10 | 16 |
| | | 3, 4.5, 6 | C1(2) | 15 | 22 |
| | | | C6, C7 | 16, 19 | 22, 24 |
| | | | C5 | 17, 23 | 24, 30 |

n = 200...$n_{max}$

$n_{max}$ can be defined from the table below:

| n [mm] | d ≤ 16 | | d ≤ 32 |
|---|---|---|---|
| | single | double | any |
| ≤ 400 | L - 50 | L - 70 | L - 100 |
| ≤ 800 | L - 70 | L - 100 | L - 100 |
| ≤ 1800 | L - 100 | L - 100 | L - 100 |

where 'L' is the length of the protection tube (see Accessories - Protection Tubes)

**Protection head:**
B, MA, MB, G, N, Cx, Dx, Ex (see Appendix - Protection Heads)

**Process connection:**
- welded or adjustable flange
- w/o mounting appliances

**Extension length:**
m = 100...1000 mm
m1 = 100...1000 mm

**Holding tube / elbow material:**
1.4301(M1), 1.4401/1.4404(M9), 1.4541(M2), 1.4571(M3)

**MI sheath material:**
2.4816(M8), Nicrobell®(M10)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

* Please contact

** Order transmitter separately!!!

## Ordering code TS✱(L) - (MI -) G0.G1G2.G3.G4.G5.G6.G7'.G7''.G9.G10'.G10''.G11 - #1

| Code | Feature or option | | Code values |
|---|---|---|---|
| ✱ | Base model variant | | Z - standard (w/ terminal block), OZ - prepared for in-head transmitter (w/o terminal block) |
| G0 | Protection head | | B - type "B", CC - type "CC", CS - type "CS",<br>D - type "D", DH - type "DH", DHW - type "DHW", DW - type "DW",<br>E - type "E", EG - type "EG", EGS - type "EGS", EGSS - type "EGSS", EGW - type "EGW",<br>EGWSS - type "EGWSS", ES - type "ES", G - type "G", MA - type "MA", MB - type "MB", N - type "N" |
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple<br>Check wire-to-sheath compatibility in the specification table! | regular design | B - type "B", K - type "K", N - type "N", R - type "R", S - type "S" |
| | | MI design | K - type "K", N - type "N", S - type "S" |
| G3 | Temperature range | | T5 - 0...1500 °C, T6 - 0...1200 °C, T13 - 0...1000 °C, T14 - 0...1600 °C, T15 - 0...1700 °C,<br>T16 - 0...1100 °C, T21 - 0...1300 °C |
| G4 | Diameter 'd' [mm] | single tube | 10, 15, 16, 17, 19, 22, 23, 24, 25, 28, 32 (see table overleaf) |
| | | double tube | 24/10, 24/15, etc. (see 'Accessories - Protection Tubes YA' for available combinations!) |
| G5 | Diameter 'D' [mm] | | 16, 22, 24, 30, 32, 36, 40 |
| G6 | Probe length 'n' [mm] | | 200...1800 (see table overleaf) |
| G7' | Probe length 'm' [mm] | | 100...1000 |
| G7'' | Probe length 'm1' [mm] | | 100...1000 |
| G9 | Mounting connection | | X - no mounting appliances, F - flange (specify!), Z - other connection (specify!) |
| G10' | Protection tube material | | C1 - ceramic Pythagoras 610, C2 - ceramic Oxal 710, C3 - ceramic Alsint 799,<br>C4 - metal-ceramic Ucar®, C5 - silicon carbide, C6 - Hexoloy®, C7 - Syalon |
| G10'' | Holding tube material | | M1 - 1.4301, M2 - 1.4541, M3 - 1.4571, M9 - 1.4401 (1.4404) |
| G11 | Accuracy class | | 1 - '1' (3), 2 - '2' |
| #1 | Incorporated devices | | X - none, T - in-head transmitter (1), A - local indicator (2) |

(1) Only for variant 'OZ'! See transmitter datasheets and order separately!
(2) With windowed head only! See indicator datasheets and order separately!

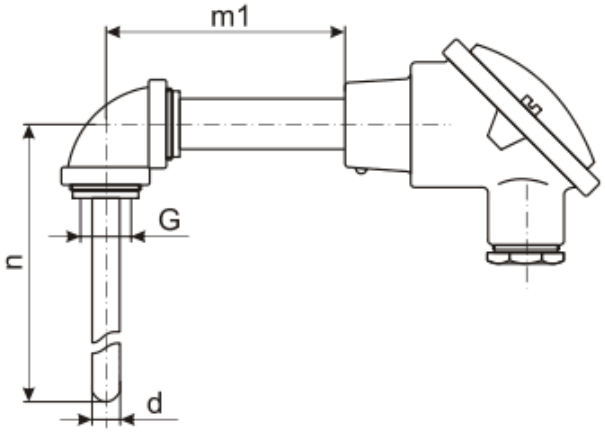
# TERMOCUPLE in unghi, cu cap pentru bloc de conexiuni sau pentru montaj transmiter si cu tub de protectie

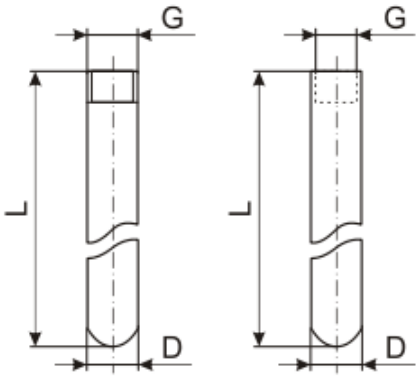
## TSLD cu bloc de conexiuni ; TSOLD fara bloc de conexiuni/pentru transmiter

**ANGLED T/C PROBE WITH PROTECTION HEAD FOR PROTECTION TUBE ASSEMBLY** **LDx (TSLDx)**

**(FOR IN-HEAD TRANSMITTER)**** **OLDx (TSOLDx)**

Holding tube - stainless steel 1.4301 or 1.4404
Protection tube - metal (see Accessories - Protection tubes)
Head - aluminum, stainless steel, or plastic (see Appendix - Protection heads)




| Protection Tube Material | Sheathed T/C max. d [mm] | Bare T/C max. ø [mm] |
|---|---|---|
| M11, M14 | 10 | 4 x ø3 |
| M3, M4, M6, M6S, M8, M9 | 10 | 2 x ø3 |

| SENSITIVE ELEMENT | TEMPERATURE RANGE | DIMENSIONS d [mm] | wire ø [mm] | wires |
|---|---|---|---|---|
| **Regular Thermocouple Design** | | | | |
| 1 x J; 2 x J | T4 0...800 °C | 8 | 1 | 2; 2x2 |
| | | 10 | 1.5 | |
| | | bare | 1, 1.5, 3 | |
| 1 x L; 2 x L | | 10 | 1.5 | 2; 2x2 |
| | | bare | 1.2, 3.2 | |
| 1 x K; 2 x K | T3 0...850 °C<br>T16 0...1100 °C<br>T6* 0...1150 °C | 8 | 1 | 2; 2x2 |
| | | 10 | 1.5 | |
| | | bare | 1, 1.5, 3 | |
| 1 x E; 2 x E | T3 0...850 °C<br>T13 0...1000 °C | 8 | 1 | 2; 2x2 |
| | | 10 | 1.5 | |
| | | bare | 1, 1.5, 3 | |
| 1 x S; 2 x S<br>1 x R; 2 x R | T16 0...1100 °C<br>T6* 0...1150 °C<br>T21 0...1300 °C | 8, 10, or bare | 0.35, 0.5 | 2; 2x2 |
| **MI Thermocouple Design** | | | | |
| 1 x J | T4 0...800 °C | 3, 4.5, 6, 8 | | 2 |
| 2 x J | | | | 2x2 |
| 1 x K<br>1 x N; 1 x E | T3 0...850 °C<br>T16 0...1100 °C | 3, 4.5, 6, 8, 10 | | 2 |
| 2 x K<br>2 x N, 2 x E | T6* 0...1150 °C<br>T6* 0...1250 °C | | | 2x2 |

**Protection head:**
B, MA, MB, G, N, Dx, Ex, EX (see Appendix - Protection heads)

**Process connection (must fit the YA connection 'G'):**
G1/2"(Q4), G3/4"(Q6), male or female (see Accessories - Protection tubes)

**Insertion length (must fit the YA length 'L'):**
n = 100...1000 mm

**Holding tube:**
- m1 = 100...1000 mm
- OD 20(22) mm
- tube/elbow material 1.4301 or 1.4541

**Tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed
(see Appendix - Tip shapes)

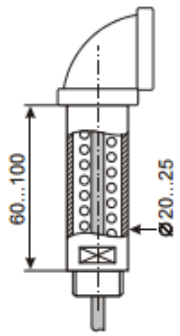
**Process pressure:**
YA protection tube process pressure (see Accessories - Protection tubes)

**Sheath material:**
1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4845(M6), 1.4876(M7), 2.4816(M8), 1.4362 (M15)

**MI sheath material:**
1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762(M4), 1.4841(M5), 1.4876(M7), 2.4816(M8), Nicrobell® (M10)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

**Spring-loaded adapter:**
(mounted between protection tube and elbow)




* Please contact

** Order transmitter separately!!!

## Ordering code TS✱ - G0.G1G2.G3.G4.G6.G7.G9.G10.G11.G14 - #1.#2

| Code | Feature or option | | Code values |
|---|---|---|---|
| ✱ | Base model variant | | LD - standard (w/ terminal block), OLD - prepared for in-head transmitter (w/o terminal block) |
| G0 | Protection head | | B - type "B", MA - type "MA", MB - type "MB", G - IP65, type "G", N - type "N", D - type "D", DW - windowed, type "DW", DH - w/ high cap, type "DH", DHW - windowed, type "DHW", E - IP65, type "E", ES - stainless-steel, type "ES", EG - IP68 ATEX-approved, type "EG", EGS - IP66 ATEX-approved, type "EGS", EGW - windowed ATEX-approved, type "EGW", EX - explosion-proof instrument housing (specify!) |
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple | | J - type "J", K - type "K", N - type "N", E - type "E", L - type "L", S - type "S", R - type "R" |
| G3 | Temperature range | | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [4], T13 - 0...1000 °C, T16 - 0...1100 °C, T21 - 0...1300 °C |
| G4 | Diameter 'd' [mm] (must fit the protection tube ID) | regular T/C | X (bare thermocouple), 8, 10 |
| | | MI T/C | 3, 4.5, 6, 8, 10 |
| G6 | Probe length 'n' [mm] | | 100...1000 |
| G7 | Probe length 'm1' [mm] | | 100...1000 |
| G9 | Mounting connection (must fit the protection tube thread) | | Q4 - G1/2", Q6 - G3/4", U4 - G1/2-F", U6 - G3/4-F" |
| G10 | Sheath material | regular T/C | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762, M5 - 1.4841, M6 - 1.4845, M7 - 1.4876, M8 - 2.4816, M9 - 1.4404, M15 - 1.4362 |
| | | MI T/C | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M7 - 1.4876 (Incolloy 800), M8 - 2.4816 (Inconel 600), M9 - 1.4404, M10 - Nicrobell® |
| G11 | Accuracy class | | 1 - '1' [4], 2 - '2' |
| G14 | Tip shape (hot junction) | | X - standard (isolated from sheath), G - grounded, E - exposed hot junction [1], O - open-tube design [1] |
| #1 | Options | | X - none, OV - vibration proof (spring-type terminals [4], secured screws), OA - spring-loaded adapter [2], OP - electrochemically polished sheath surface |
| #2 | Local indicator | | X - none, A - local indicator mounted [3] |

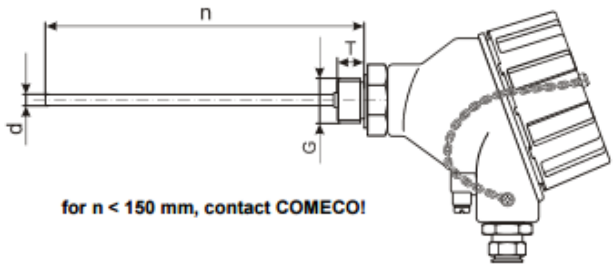
[1] Only for non explosion-proof thermocouples!
[2] Not available for bare thermocouple!
[3] With windowed head only! See indicator datasheets and order separately!

# TERMOCUPLE pentru zone EX, cu cap de montaj/conexiuni
## TSC, TSC1, TSC2, TSC3, TSC4, cu bloc de conexiuni
## TSOC, TSOC1, TSOC2, TSOC3, TSOC4, fara bloc de conexiuni/pentru montaj transmiter

**ATEX (MI) T/C PROBE** — **TSCx - EX**
**- FOR IN-HEAD TRANSMITTER **** — **TSOCx - EX**

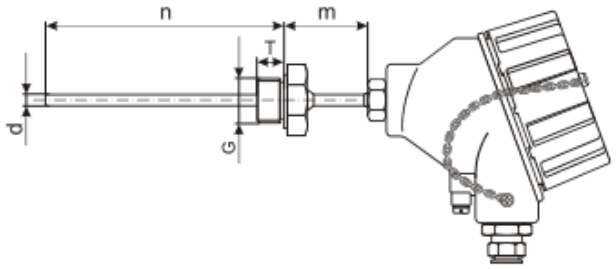
II 2 G Ex d IIC T6 Gb -20°C≤Ta≤+65°C
II 2 D Ex tb IIIC T80 °C Db IP65 — EC-type Certificate No. MP 08 ATEX 0002

### DESIGN WITHOUT EXTENSION (TS(O)C)

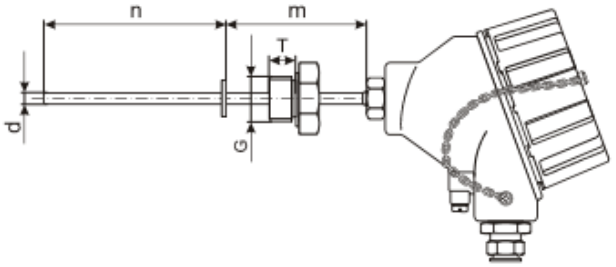



for n < 150 mm, contact COMECO!

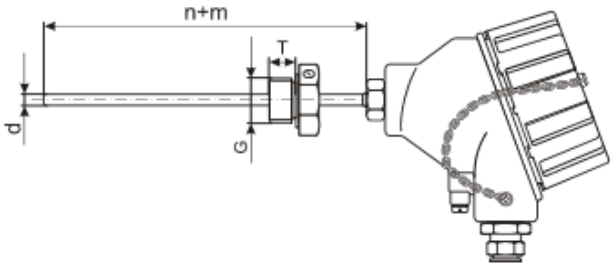
### EXTENDED DESIGN WITH WELDED CONNECTION (TS(O)C1)



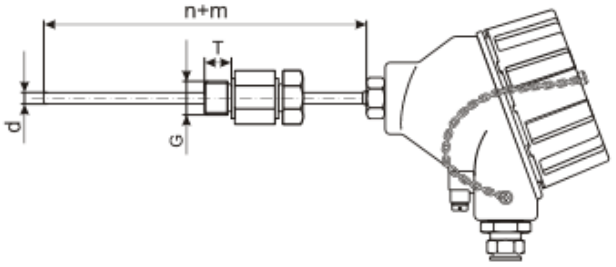

### EXTENDED DESIGN WITH MOVABLE CONNECTION (TS(O)C2)




### DESIGN WITH ADJUSTABLE CONNECTION (TS(O)C3)




### DESIGN WITH GLAND-TYPE CONNECTION (TS(O)C4)




| SENSITIVE ELEMENT | TEMPERATURE RANGE | | DIMENSIONS n [mm] | DIMENSIONS d [mm] | wires |
|---|---|---|---|---|---|
| **Regular Design** | | | | | |
| 1(2) x J<br>1(2) x L | T4 | 0...800 °C | 50...1500 | 6 | 2 |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | (2x2) |
| 1(2) x K | T3<br>T16<br>T6* | 0...850 °C<br>0...1100 °C<br>0...1150 °C | 50...1500 | 6 | 2 (2x2) |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | |
| 1(2) x E | T3<br>T13 | 0...850 °C<br>0...1000 °C | 50...1500 | 6 | 2 |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | (2x2) |
| 1(2) x S<br>1(2) x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...1500 | 6 | 2 |
| | | | 50...3000 | 8, 10, 12, 14, 16, 20, 22 | (2x2) |
| **MI Design** | | | | | |
| 1 x J | T4 | 0...800 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x J | | | | | 2x2 |
| 1 x T | T8 | 0...400 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x T | | | | | 2x2 |
| 1 x K<br>1 x N, 1 x E | T3<br>T16 | 0...850 °C<br>0...1100 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2 |
| 2 x K<br>2 x N, 2 x E | T6*<br>T6* | 0...1150 °C<br>0...1250 °C | 50...50000 | 3, 4.5, 6, 8, 10* | 2x2 |
| 2 x S<br>2 x R | T16<br>T6* | 0...1100 °C<br>0...1150 °C | 50...10000 | 3, 4.5, 6 | 2x2 |

**Protection head:**
EG(SS), EGS, EGW(SS), EX8(SS), EX8W(SS), EX10(SS), EX10W(SS), EX8WD, EX10WD (see Appendix - Protection Heads)

**Electrical entry:**
- cable gland(s): SS or brass, cemented, ID 7.5 mm
- threaded head conduit(s)

**Process connection 'G' (nipple or union nut):**
- M16x1.5(Q0), M18x1.5(Q1), M20x1.5(Q2), M27x2(Q5), M33x2(Q25)
- 3/8"(Q3/Q9), 1/2"(Q4/Q10), 3/4"(Q6/Q11), 1"(Q12/Q15)
- welded or adjustable flange
- other
- w/o mounting appliances

**Thread length:**
- cylindrical thread: T = 15 mm
- NPT thread: according to ANSI B1.20.1

**Extension length:**
m = 0...1500 mm

**Extension diameter:** (for TS(O)C1 and TS(O)C2 only, [mm])

| Probe diameter 'd' / Ext. length 'm' | 3 mm | 4.5, 6 mm | 8 mm | 10 mm | 10+ mm |
|---|---|---|---|---|---|
| up to 50 mm | 6 | d | d | d | d |
| 50...150 mm | 8 | 8 | d | d | d |
| 150...500 mm | 10 | 10 | 10 | d | d |
| 500+ mm | 14 | 14 | 14 | 14 | d |

**Tip shape (hot junction design):**
standard (isolated) (see Appendix - Tip Shapes)

**Process pressure:**

| Probe design | TS(O)C, TS(O)C1 | TS(O)C2 | TS(O)C4 | TS(O)C3 |
|---|---|---|---|---|
| Max. pressure * | 25 bar | 16 bar | 6 bar | 0 bar |

**Sheath material:**
1.4401/1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762/1.4749(M4), 1.4841(M5), 1.4845(M6), 1.4876(M7), 2.4816(M8), 1.4362(M15)

**MI sheath material:**
1.4401/1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762/1.4749(M4), 1.4841(M5), 1.4876(M7), 2.4816(M8), Nicrobell®(M10)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

* Please contact

** Order transmitter separately!!!

## Ordering code TS✱(1,2,3,4) - (MI -) G0'n0".G1G2.G3.G4.G6.G7.G9'9".G10.G11 - #1.#2 - EX

| Code | Feature or option | | Code values |
|---|---|---|---|
| ✱ | Base model variant | | C - standard (w/ terminal block), OC - prepared for in-head transmitter (w/o terminal block) |
| G0' | Protection head | | EG - type "EG", EGS - type "EGS", EGSS - type "EGSS", EGW - type "EGW", EGWSS - type "EGWSS", EX8 - type "EX8", EX8SS - type "EX8SS", EX8W - type "EX8W", EX8WSS - type "EX8WSS", EX10 - type "EX10", EX10SS - type "EX10SS", EX10W - type "EX10W", EX10WSS - type "EX10WSS", EX8WD - type "EX8WD", EX10WD - type "EX10WD" |
| G0" | Electrical entry ('n' - number of entries [10]) | | G - gland, U2 - M20x1.5, U4 - G1/2", U6 - G3/4", U10 - 1/2" NPT, U11 - 3/4" NPT |
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple | regular design | E - type "E", J - type "J", K - type "K", L - type "L", R - type "R", S - type "S" |
| | | MI design | E - type "E", J - type "J", K - type "K", N - type "N", R - type "R", S - type "S", T - type "T" |
| G3 | Temperature range | | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [9], T13 - 0...1000 °C, T16 - 0...1100 °C |
| G4 | Diameter 'd' [mm] | regular design | 6, 8, 10, 12, 14, 16, 20 [1], 22 [1] |
| | | MI design | 3, 4.5, 6, 8, 10 |
| G6 | Probe length 'n' [mm] [2] | | 50...50000 (see table overleaf) |
| G7 | Probe length 'm' [mm] [3] | | 0...1500 |
| G9' | Mounting connection | | X - no mounting appliances [4], Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q5 - M27x2, Q6 - G3/4", Q9 - 3/8" NPT, Q10 - 1/2" NPT, Q11 - 3/4" NPT, Q12 - G1", Q15 - 1" NPT, Q25 - M33x2, Uxx - union nut (xx - same as for Qxx), F - flange (specify!), Z - other connection (specify!) |
| G9" | Compression fitting ferrule [5] | | BR - brass, GR - graphite, SS - stainless steel, TF - Teflon® |
| G10 | Sheath material (wetted parts) | regular design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M6 - 1.4845, M7 - 1.4876, M8 - 2.4816, M9 - 1.4401 (1.4404), M15 - 1.4362 |
| | | MI design | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M7 - 1.4876, M8 - 2.4816, M9 - 1.4401 (1.4404), M10 - Nicrobell® |
| G11 | Accuracy class | | 1 - '1' [9], 2 - '2' |
| #1 | Options | | X - none, OV - vibration proof (spring terminals [9], secured screws), OP - electrochemically polished sheath surface [6] |
| #2 | Incorporated devices | | X - none, T - in-head transmitter [7], A - local indicator [8] |

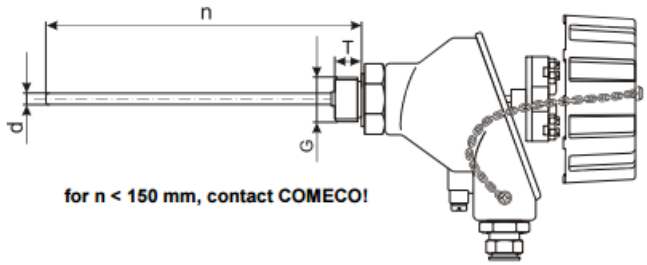
[1] d = 21.3 mm for sheath materials 'M5' and 'M6'
[2] 'n+m' for TS(O)C3 and TS(O)C4!
[3] Only for TS(O)C1 and TS(O)C2!
[4] Only for TS(O)C!
[5] Only for TS(O)C4!
[6] Only for non-MI (regular) design!
[7] Only for variant 'OC'! See transmitter datasheets and order separately!
[8] With windowed head only! See indicator datasheets and order separately!
[9] Contact
[10] Applicable for the selected head type (see Appendix - Protection Heads)

# TERMOCUPLE pentru zone EX, cu cap de conexiuni, pentru inserare senzori
# TSCS, TSCS1, TSCS2, TSCS3, TSCS4, cu bloc de conexiuni
# TSOCS, TSOCS1, TSOCS2, TSOCS3, TSOCS4, fara bloc de conexiuni/pentru transmiter

**ATEX T/C PROBE WITH (MI) INSERT** — **TSCSx - EX**
**- FOR IN-HEAD TRANSMITTER **** — **TSOCSx - EX**

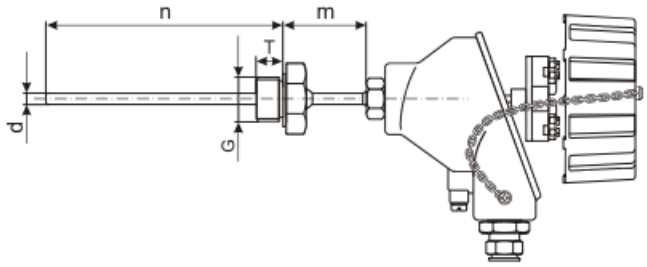
II 2 G Ex d IIC T6 Gb -20°C≤Ta≤+65°C
II 2 D Ex tb IIIC T80 °C Db IP65 — EC-type Certificate No. MP 08 ATEX 0002

### DESIGN WITHOUT EXTENSION (TS(O)CS)

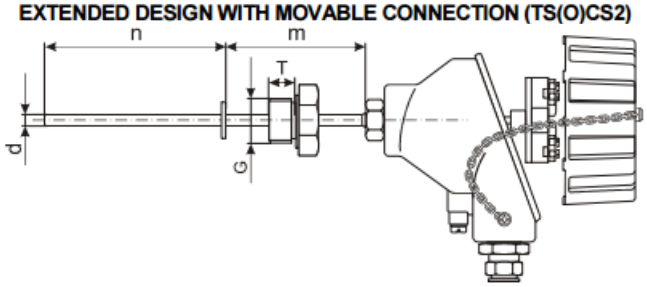



for n < 150 mm, contact COMECO!

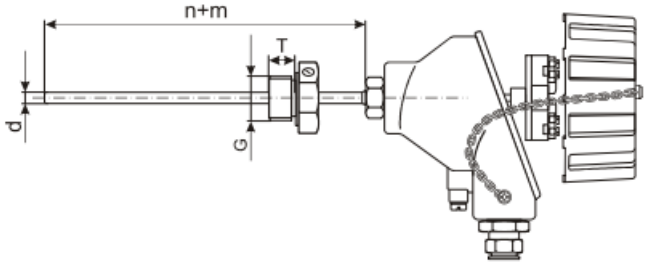
### EXTENDED DESIGN WITH WELDED CONNECTION (TS(O)CS1)



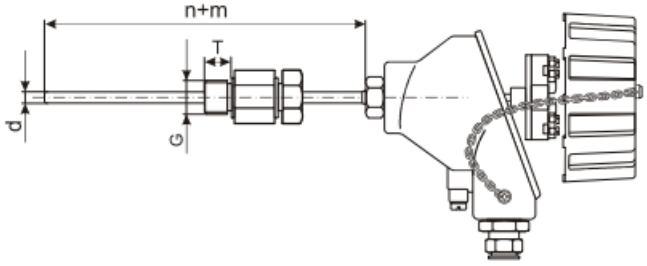

### EXTENDED DESIGN WITH MOVABLE CONNECTION (TS(O)CS2)




### DESIGN WITH ADJUSTABLE CONNECTION (TS(O)CS3)




### DESIGN WITH GLAND-TYPE CONNECTION (TS(O)CS4)




| SENSITIVE ELEMENT | TEMPERATURE RANGE | DIMENSIONS d [mm] | DIMENSIONS d insert [mm] | DIMENSIONS wires |
|---|---|---|---|---|
| **Regular Insert Design** | | | | |
| 1 x J; 1 x L | T4 0...800 °C | 10, 12, 14, 16, 20 | 6, 8, 10 | 2 |
| 2 x J; 2 x L | T4 0...800 °C | 12, 14, 16, 20 | 8, 10 | 2x2 |
| 1 x K | T3 0...850 °C<br>T16 0...1100 °C | 10, 12, 14, 16, 20 | 6, 8, 10 | 2 |
| 2 x K | T16 0...1100 °C<br>T6* 0...1150 °C | 12, 14, 16, 20 | 8, 10 | 2x2 |
| 1 x E | T3 0...850 °C | 10, 12, 14, 16, 20 | 6, 8, 10 | 2 |
| 2 x E | T13 0...1000 °C | 12, 14, 16, 20 | 8, 10 | 2x2 |
| 1 x S<br>1 x R | T16 0...1100 °C<br>T6* 0...1150 °C | 10, 12, 14, 16, 20 | 6, 8, 10 | 2 |
| 2 x S<br>2 x R | T16 0...1100 °C<br>T6* 0...1150 °C | 12, 14, 16, 20 | 8, 10 | 2x2 |
| **MI Insert Design** | | | | |
| 1 x J | T4 0...800 °C | 6, 8, 10, 12, 14, 16, 20 | 3, 4.5, 6, 8 | 2 |
| 2 x J | T4 0...800 °C | 6, 8, 10, 12, 14, 16, 20 | 3, 4.5, 6, 8 | 2x2 |
| 1 x K<br>1 x N, 1 x E | T3 0...850 °C<br>T16 0...1100 °C | 8, 10, 12, 14, 16, 20 | 4.5, 6, 8 | 2 |
| 2 x K<br>2 x N, 2 x E | T6* 0...1150 °C<br>T6* 0...1250 °C | 8, 10, 12, 14, 16, 20 | 4.5, 6, 8 | 2x2 |

**Protection head:**
EG(SS), EGS, EGW(SS), EX8(SS), EX8W(SS), EX10(SS), EX10W(SS), EX8WD, EX10WD
(see Appendix - Protection Heads)

**Electrical entry:**
- cable gland(s): SS or brass, cemented, ID 7.5 mm
- threaded head conduit(s)

**Process connection 'G' (nipple or union nut):**
- M16x1.5(Q0), M18x1.5(Q1), M20x1.5(Q2), M27x2(Q5), M33x2(Q25)
- 3/8"(Q3/Q9), 1/2"(Q4/Q10), 3/4"(Q6/Q11), 1"(Q12/Q15)
- welded or adjustable flange
- other
- w/o mounting appliances

**Thread length:**
- cylindrical thread: T = 15 mm
- NPT thread: according to ANSI B1.20.1

**Process length:**
n = 50...3000 mm

**Extension length:**
m = 0...1500 mm

**Extension diameter:** (for TS(O)CS1 and TS(O)CS2 only, [mm])

| Probe diameter 'd' / Ext. length 'm' | 6 mm | 8 mm | 10 mm | 10+ mm |
|---|---|---|---|---|
| up to 50 mm | d | d | d | d |
| 50...150 mm | 8 | d | d | d |
| 150...500 mm | 10 | 10 | d | d |
| 500+ mm | 14 | 14 | 14 | d |

**Insert tip shape (hot junction design):**
standard (isolated), grounded, open-tube, exposed (see Appendix - Tip Shapes)

**Process pressure:**

| Probe design | TS(O)CS, TS(O)CS1 | TS(O)CS2 | TS(O)CS4 | TS(O)CS3 |
|---|---|---|---|---|
| Max. pressure * | 25 bar | 16 bar | 6 bar | 0 bar |

**Sheath material:**
1.4401/1.4404(M9), 1.4541(M2), 1.4571(M3), 1.4762/1.4749(M4), 1.4841(M5), 1.4845(M6), 1.4876(M7), 2.4816(M8), 1.4362(M15)

**Accuracy class:**
'1' or '2' (see Appendix - T/C Tolerance)

* Please contact

** Order transmitter separately!!!

## Ordering code TS✱(1,2,3,4) - (MI -) G0'n0".G1G2.G3.G4.G6.G7.G9'9".G10.G11.G14 - #1.#2 - EX

| Code | Feature or option | | Code values |
|---|---|---|---|
| ✱ | Base model variant | | CS - standard (w/ terminal block), OCS - prepared for in-head transmitter (w/o terminal block) |
| G0' | Protection head | | EG - type "EG", EGS - type "EGS", EGSS - type "EGSS", EGW - type "EGW", EGWSS - type "EGWSS", EX8 - type "EX8", EX8SS - type "EX8SS", EX8W - type "EX8W", EX8WSS - type "EX8WSS", EX10 - type "EX10", EX10SS - type "EX10SS", EX10W - type "EX10W", EX10WSS - type "EX10WSS", EX8WD - type "EX8WD", EX10WD - type "EX10WD" |
| G0" | Electrical entry ('n' - number of entries [10]) | | G - gland, U2 - M20x1.5, U4 - G1/2", U6 - G3/4", U10 - 1/2" NPT, U11 - 3/4" NPT |
| G1 | Number of thermocouples | | 1 or 2 |
| G2 | Thermocouple | regular insert | E - type "E", J - type "J", K - type "K", L - type "L", R - type "R", S - type "S" |
| | | MI insert | E - type "E", J - type "J", K - type "K", N - type "N" |
| G3 | Temperature range | | T3 - 0...850 °C, T4 - 0...800 °C, T6 - 0...1200 °C [9], T13 - 0...1000 °C, T16 - 0...1100 °C |
| G4 | Diameter 'd' / 'd insert' [mm] | regular insert | 10/6, 10/8, 12/6, 12/8, 14/6, 14/8, 14/10, 16/10, 20/10 [1] |
| | | MI insert | 6/3, 8/4.5, 10/6, 12/6, 14/6, 16/6, 20/6 [1], 20/8 [1] |
| G6 | Probe length 'n' [mm] [2] | | 50...3000 |
| G7 | Probe length 'm' [mm] [3] | | 0...1500 |
| G9' | Mounting connection | | X - no mounting appliances [4], Q0 - M16x1.5, Q1 - M18x1.5, Q2 - M20x1.5, Q3 - G3/8", Q4 - G1/2", Q5 - M27x2, Q6 - G3/4", Q9 - 3/8" NPT, Q10 - 1/2" NPT, Q11 - 3/4" NPT, Q12 - G1", Q15 - 1" NPT, Q25 - M33x2, Uxx - union nut (xx - same as for Qxx), F - flange (specify!), Z - other connection (specify!) |
| G9" | Compression fitting ferrule [5] | | BR - brass, GR - graphite, SS - stainless steel, TF - Teflon® |
| G10 | Sheath material (wetted parts and insert) | regular insert | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M6 - 1.4845, M7 - 1.4876, M8 - 2.4816, M9 - 1.4401 (1.4404), M15 - 1.4362 |
| | | MI insert | M2 - 1.4541, M3 - 1.4571, M4 - 1.4762 (1.4749), M5 - 1.4841, M8 - 2.4816, M9 - 1.4401 (1.4404) |
| G11 | Accuracy class | | 1 - '1' [9], 2 - '2' |
| G14 | Insert tip shape (hot junction) | | X - standard (isolated from sheath), G - grounded, E - exposed hot junction, O - open-tube design |
| #1 | Options | | X - none, OV - vibration proof (secured screws) [6], OS - spring-loaded insert, OP - electrochemically polished wetted parts |
| #2 | Incorporated devices | | X - none, T - in-head transmitter [7], A - local indicator [8] |

[1] d = 21.3 mm for sheath materials 'M5' and 'M6'
[2] 'n+m' for TS(O)CS3 and TS(O)CS4!
[3] Only for TS(O)CS1 and TS(O)CS2!
[4] Only for TS(O)CS!
[5] Only for TS(O)CS4!
[6] Requires 'OS' option!
[7] Only for variant 'OCS'! See transmitter datasheets and order separately!
[8] With windowed head only! See indicator datasheets and order separately!
[9] Contact
[10] Applicable for the selected head type (see Appendix - Protection Heads)