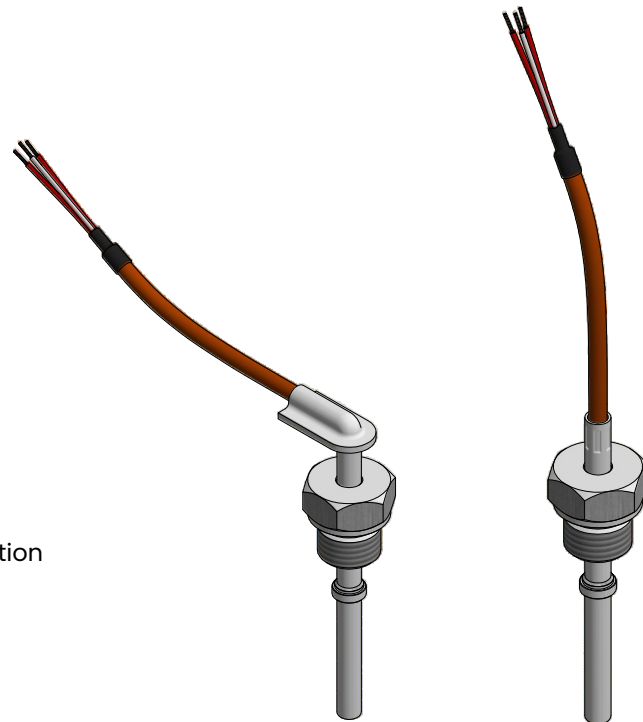


## Applications

- Fine chemical industry
- General industrial services

## Features

- Single or double RTD
- Connection line 2-, 3-, 4-wire
- Single or double RTD:  
Pt100, Pt500, Pt1000 (IEC751),  
Ni100, Ni500, Ni1000 (DIN43760),  
Cu50, Cu100 (GOST 6651-2009)
- TOPE418 - angle version
- TOPE419 - straight version
- Non-standard sensor versions available upon customer's request:
  - cable type according to client's specification
  - thermowell spring protection against excessive cable bending
  - reduced tip of thermowell
  - spring-loaded thermowell
  - non-standard design of welded ring



**TOPE418**  
Angle version  
TSL cable insulation  
(teflon®FEP/silicone)

**TOPE419**  
Straight version  
TSL cable insulation  
(teflon®FEP/silicone)

Resistance thermometers TOPE418, TOPE419 are designed for screw-fitting directly into machine body or parts.

TOPE418, TOPE419 sensor consists of thermometric resistor, protection tube made out of stainless steel, moveable threaded process connection and connection cable.

Insertion length, thermowell diameter, process connection thread, number of sensors, accuracy, cable length and insulation can be selected individually for the respective application.

## Temperature transmitter (Option)

There is possibility of using standard temperature transmitter(4÷20mA, 0÷10V) or temperature transmitter with HART®, Profibus® PA, Foundation Fieldbus communication protocol, mounted inside electrical control cabinet.

## ATEX, IECEx, EAC Ex versions



Intrinsically safe designs are available for applications in hazardous areas. These models are provided with certificate for „intrinsically safe“ type of protection according to Directive 2014/34/UE (ATEX), IECEx scheme and EAC Ex TR-CU 012/2011 (Eurasian Economic Union).

Intrinsically safe (Exi)

XI-TOPE418  
XI-TOPE419

Sensors with connection head

Sensors with connection cable

Mineral insulated sensors

Sensors with GDM connectors

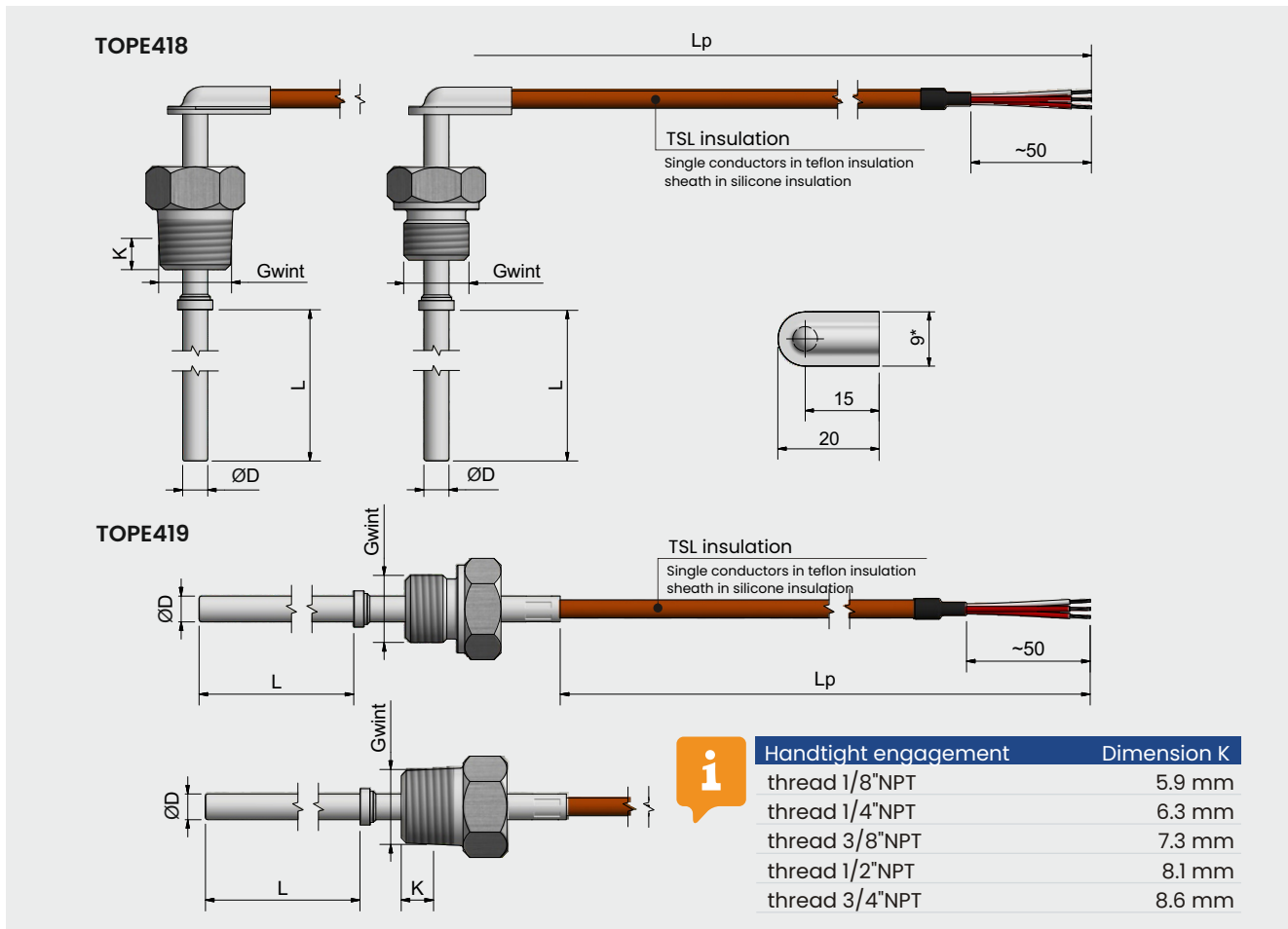
Sensors with MI2 connectors

Sensors with field transmitter

Stator RTDs

Ambient temperature sensors

## Designs



\* Width 9 mm is standard for thermowell diameter  $\leq \varnothing 6$  mm

## Measuring range

from  $-50^{\circ}\text{C}$  to  $+400^{\circ}\text{C}$  (depends on cable insulation type)

## Sensing element

Single or double

Pt100, Pt500, Pt1000	(IEC 751, $\alpha=0.00385$ )
Ni100, Ni500, Ni1000	(DIN43760, $\alpha=0.00618$ )
Cu50, Cu100	(GOST 6651-94, $\alpha=0.00426$ )

## Tolerance class

Platinum	Class A ( $\pm 0.15^{\circ}\text{C}$ in temp. $0^{\circ}\text{C}$ ) Class B ( $\pm 0.30^{\circ}\text{C}$ in temp. $0^{\circ}\text{C}$ )
Nickel	( $\pm 0.40^{\circ}\text{C}$ in temp. $0^{\circ}\text{C}$ )
Copper	( $\pm 0.30^{\circ}\text{C}$ in temp. $0^{\circ}\text{C}$ )

PN-EN 60751 standard defines the formulas for calculating acceptable measure tolerance.

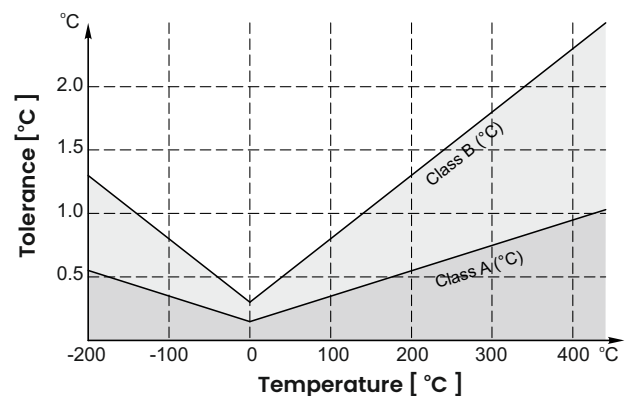
Class of tolerance	Tolerance $^{\circ}\text{C}$
A	$\pm 0.15 + (0.002 \times  t )$
B	$\pm 0.30 + (0.005 \times  t )$

## Electrical parameters

Measuring current	nom. 0,1 mA to 1 mA
Isolation resistance	$> 10 \text{ G}\Omega$ (test 500 VDC)

## Housing material

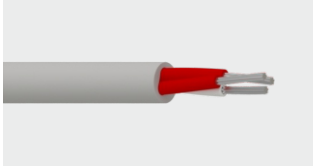
Stainless steel 1H18N9T ( 1.4541 / AISI321 )



**Insulation types of connection cable**

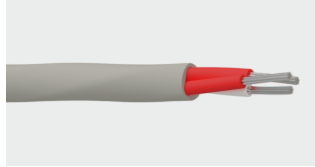
**JJ insulation**

Conductor: PVC  
Sheath: PVC



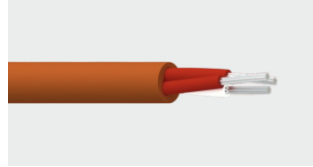
**SLSL insulation**

Conductor: Silikon  
Sheath: Silikon



**TSL insulation**

Conductor: Teflon® FEP  
Sheath: Silicone



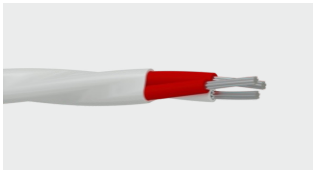
**TPSL insulation**

Conductor: Teflon®FEP  
Screen: Copper braid  
Sheath: Silicone



**TT insulation**

Conductor: Teflon® PFA  
Sheath: Teflon® PFA



**TP insulation**

Conductor: Teflon® PFA  
Sheath: Stainless steel braid



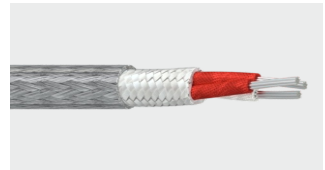
**TCuT insulation**

Conductor: Teflon® PFA  
Screen: Copper braid  
Sheath: Teflon® PFA



**GLGLP insulation**

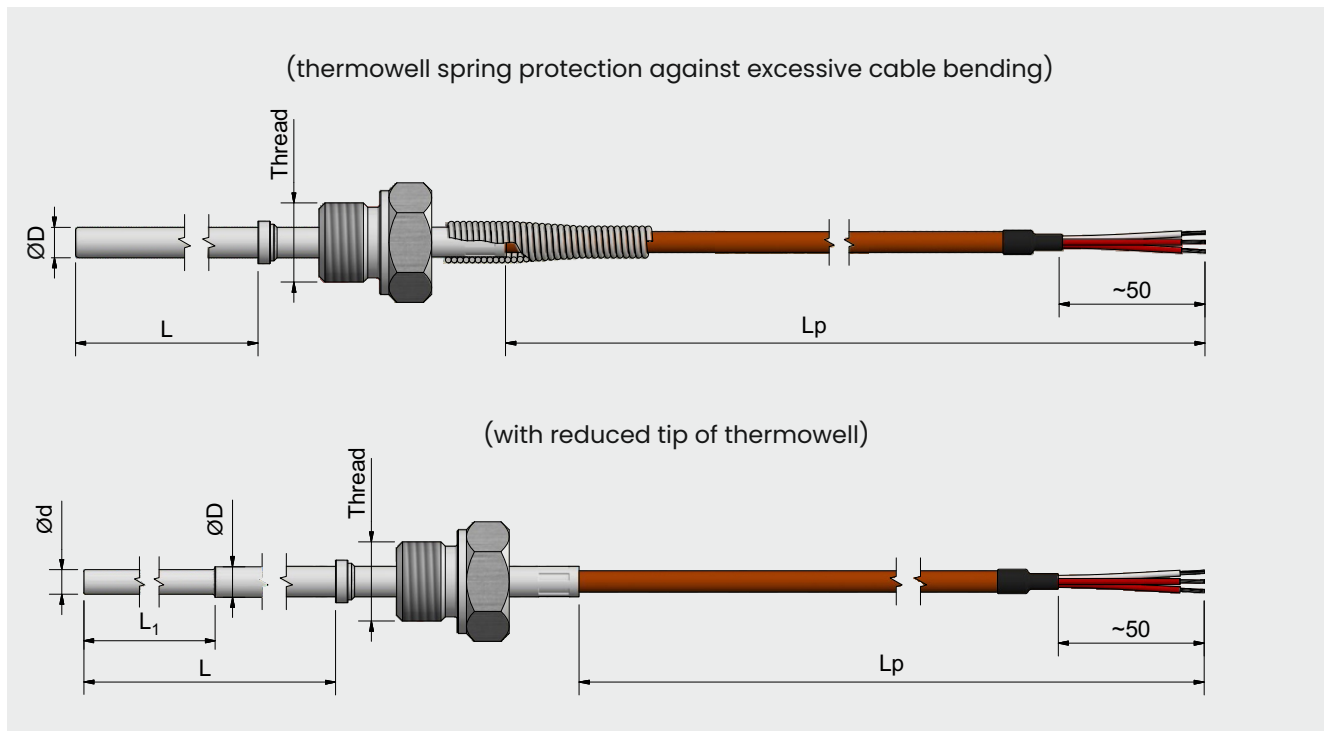
Conductor: Fiberglass  
Screen: Fiberglass  
Sheath: Stainless steel braid



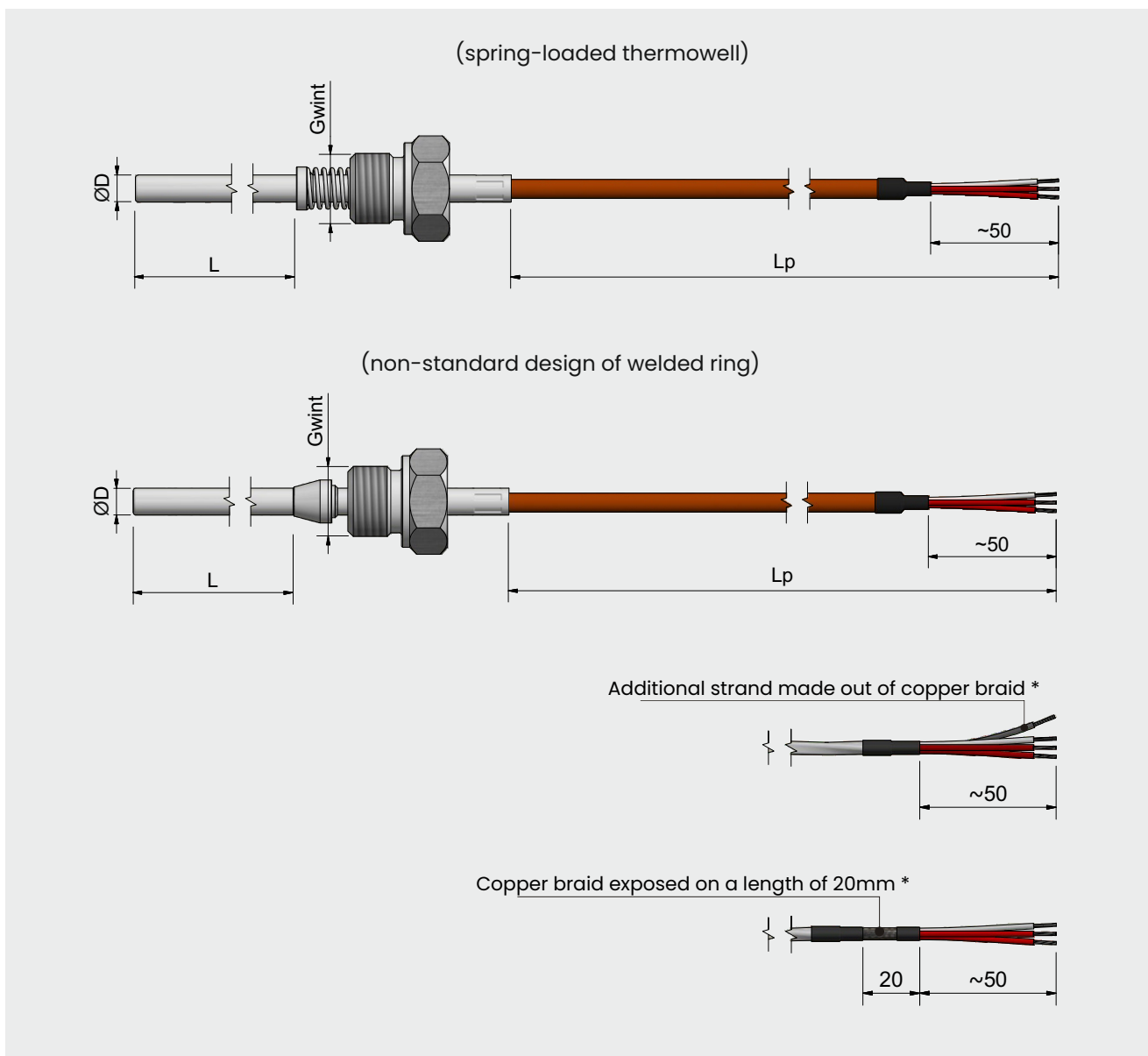
**Available measuring range and thermowell diameter**

Measuring range	Thermowell dia. D [mm]	Insulation type	
-10 .. +105°C	Ø5, Ø6, Ø8	JJ	PVC
-50 .. +180°C	Ø4, Ø5, Ø6, Ø8	SLSL, TSL, TPSL	silicone
-50 .. +260°C	Ø3, Ø4, Ø5, Ø6, Ø8	TT, TP, TCuT	teflon® PFA
-50 .. +400°C	Ø5, Ø6, Ø8	GLGLP	fiberglass

**Non-standard sensor versions**



Non-standard sensor versions



\* Available only for TCuT and TPSL cable insulation

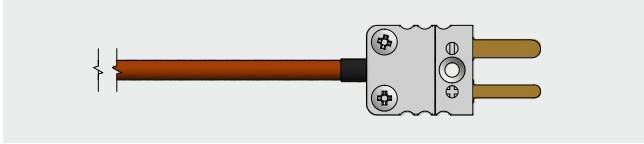
**| Connectors (optional)**

Sensors with connection cable can be equipped with connector.

Available options:

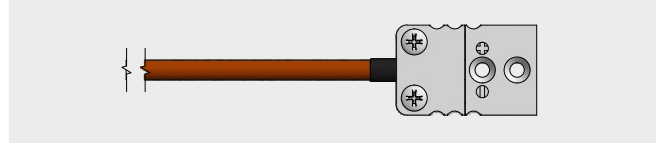
**Connector S-010-Cu-W**

Miniature plug, 2-pin.



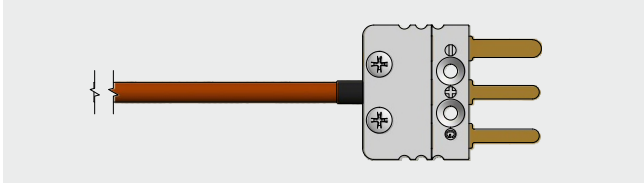
**Connector S-010-Cu-G**

Miniature socket, 2-pin.



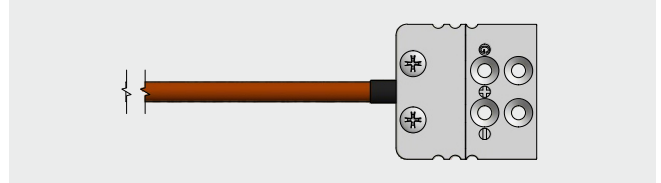
**Connector S-013-Cu-W**

Miniature plug, 3-pin.



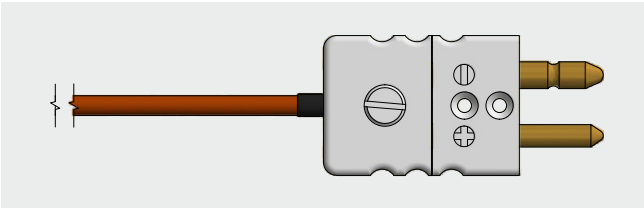
**Connector S-013-Cu-G**

Miniature socket, 3-pin.



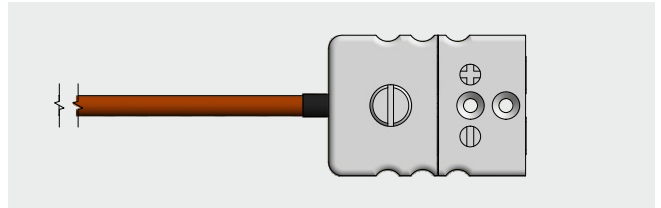
**Connector S-020-Cu-W**

Standard plug, 2-pin.



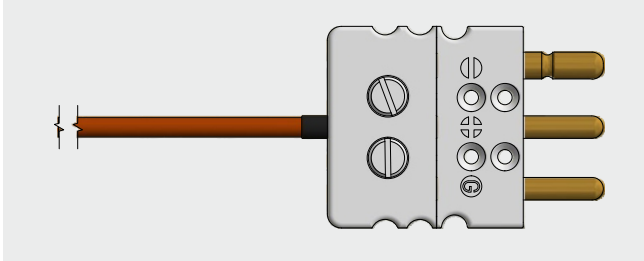
**Connector S-020-Cu-G**

Standard socket, 2-pin.



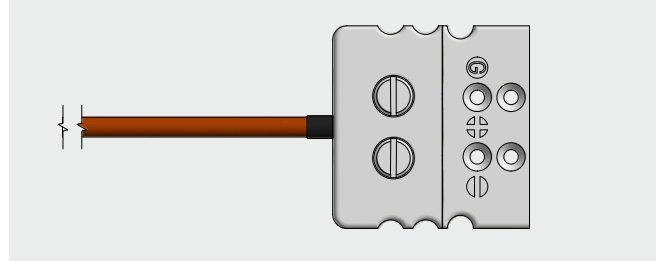
**Connector S-023-Cu-W**

Standard plug, 3-pin.



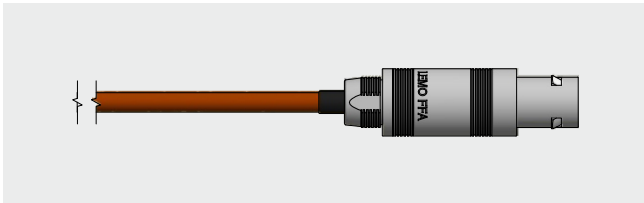
**Connector S-023-Cu-G**

Standard socket, 3-pin.



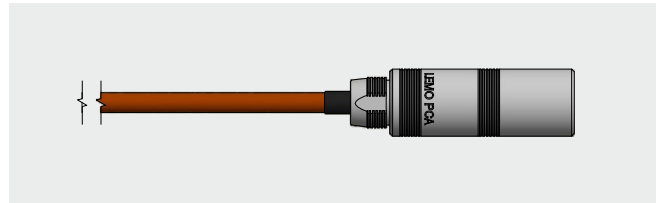
**Connector LEMO® FFA**

Plug size from 0S to 3S. 2-, 3-, 4-, 6-pin.



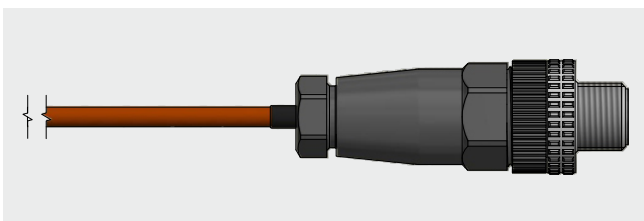
**Connector LEMO® PCA**

Plug size from 0S to 3S. 2-, 3-, 4-, 6-pin.



**Hirschmann M12 series**

4-pin.



## Ordering code

TOPE4  1 -  2 -  3 -  4 -  5 -  6 -  7 -  8 -  9 -  10

1	<input type="text"/>	<b>Model type</b>			
		18	angle version		
		19	straight version		
2	<input type="text"/>	<b>Type of sensing element</b>			
		1xPt100	Single Pt100 IEC 751, $\alpha=0.00385$		
		2xPt100	Double Pt100 IEC 751, $\alpha=0.00385$		
		1xNi100	Single Ni100 DIN43760, $\alpha=0.00618$		
		2xNi100	Double Ni100 DIN43760, $\alpha=0.00618$		
	xxx	other, please specify			
3	<input type="text"/>	<b>Thermowell diameter ØD</b>			
		5	Ø5 mm		
		6	Ø6 mm		
		8	Ø8 mm		
	xxx	other, please specify			
4	<input type="text"/>	<b>Thermowell length L</b>			
		50	50 mm		
		100	100 mm		
		150	150 mm		
	xxx	other, please specify			
5	<input type="text"/>	<b>Connecting cable length Lp</b>			
		1000	1000 mm		
		2500	2500 mm		
	xxx	other, please specify			
6	<input type="text"/>	<b>Tolerance class</b>			
		A	Class A wg PN-EN 60751 / IEC 751 (available only for platinum sensing elements)		
		B	Class B wg PN-EN 60751 / IEC 751 / DIN43760 / GOST 6651-94		
7	<input type="text"/>	<b>Measuring circuit</b>			
		2	2-wire (available only in B tolerance class)		
		3	3-wire		
		4	4-wire		
8	<input type="text"/>	<b>Process connection thread</b>			
		M10x1	M10x1		
		M12x1	M12x1		
		G1/4"	G1/4"		
		G1/2"	G1/2"		
		1/2"NPT	1/2"NPT		
	xxx	other, please specify			
9	<input type="text"/>	<b>Connecting cable type</b>		<b>Temperature range of sensor</b>	
		JJ	PVC / PVC		-10 .. +105°C
		SLSL	Silicone / Silicone		-50 .. +180°C
		TSL	Teflon® FEP / Silicone		-50 .. +180°C
		TPSL	Teflon® FEP / Cu braid / Silicone		-50 .. +180°C
		TT	Teflon® PFA / Teflon® PFA		-50 .. +260°C
		TP	Teflon® PFA / Stainless steel		-50 .. +260°C
		TCuT	Teflon® PFA / Cu braid / Teflon® PFA		-50 .. +260°C
GLGLP	Fiberglass / Fiberglass / Stainless steel	-50 .. +400°C			
10	<input type="text"/>	<b>Connector (optional)</b>			
			without connector, free end conductors of connection cable		
		S-013-Cu-W	Miniature plug, 3-pin		
		FFA.1S	Connector LEMO® FFA size 1S		
	xxx	other, please specify			

## Example

TOPE418-1xPt100-8-150-2000-A-3-G1/4"-TSL

Angle version type, RTD sensor 1xPt100, thermowell diameter Ø8 mm, thermowell length L=150 mm, connection cable length Lp=2000 mm, A tolerance class, 3-wire measuring circuit, threaded thermowell connection G1/4", single conductors in teflon insulation, sheath in silicone insulation.

TOPE419-1xPt100-6-100-2500-B-2-M10x1-TT-FFA.1S

Straight version type, RTD sensor 1xPt100, thermowell diameter Ø6 mm, thermowell length L=100 mm, connection cable length Lp=2500 mm, B tolerance class, 2-wire measuring circuit, threaded thermowell connection M10x1, single conductors in teflon insulation, sheath in teflon insulation, connection cable equipped with LEMO® FFA plug size 1S.