

## Application

- Fine chemical industry
- Plastic industry
- Movable and replaceable machine parts

## Features

- Single or double thermocouple
- Sensing element according to EN 60584-1:
  - Type K (NiCr-NiAl)
  - Type J (Fe-CuNi)
  - Type N (NiCrSi-NiSi)
  - Type E (NiCr-CuNi)
  - Type T (Cu-CuNi)
- Adjustable spring force of sensor
- TTE3 - additional external thermowell version
- TTE4 - bayonet adaptor version (without additional external thermowell)

## Description

Thermocouples TTE3, TTE4 are designed for screw-fitting directly into process or into machine parts. Adjustable spring force of sensor provides optimum measurement conditions in environment where vibrations and turbulences appears.

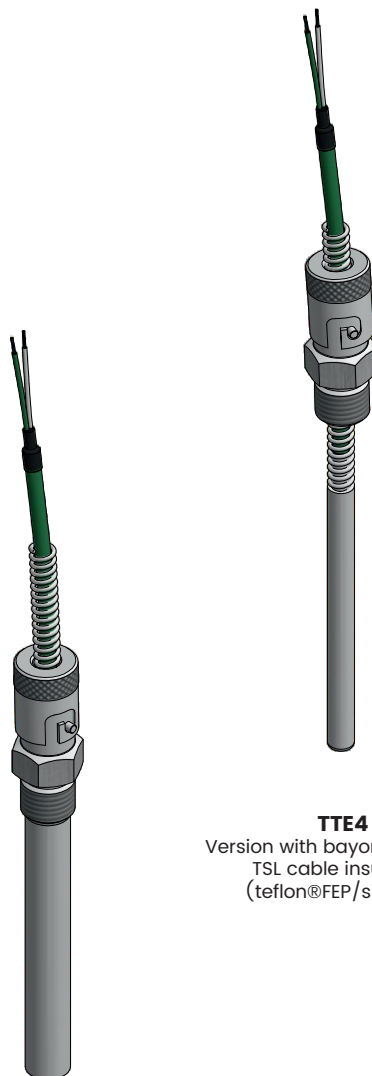
Additional external thermowell of TTE3 version allows for easy sensor disassembly without unsealing process installation. These thermocouples are suitable for liquid and gaseous media under moderate mechanical load and normal chemical conditions.

TTE3 sensor consists of thermocouple cable, protection tube made out of stainless steel, adjustable bayonet cap with spring and additional external thermowell with threaded process connection. TTE4 sensor is provided with bayonet adaptor, without additional external thermowell.

Insertion length, process connection thread, thermocouple type, 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.



**TTE3**

Version with additional external thermowell  
TSL cable insulation  
(teflon®/FEP/silicone)

**TTE4**

Version with bayonet adaptor  
TSL cable insulation  
(teflon®/FEP/silicone)

## ATEX, IECEx, EAC Ex versions

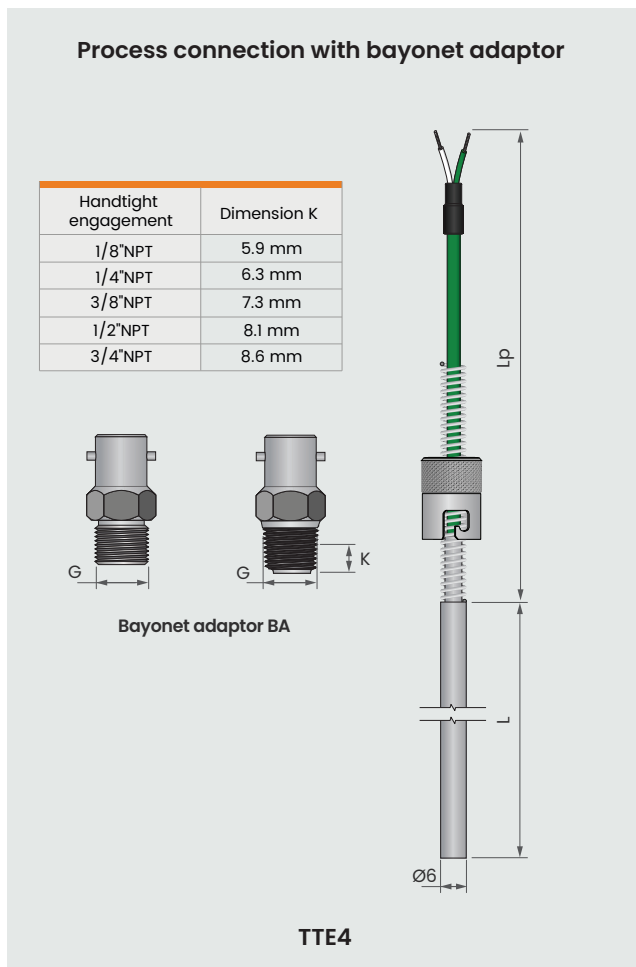
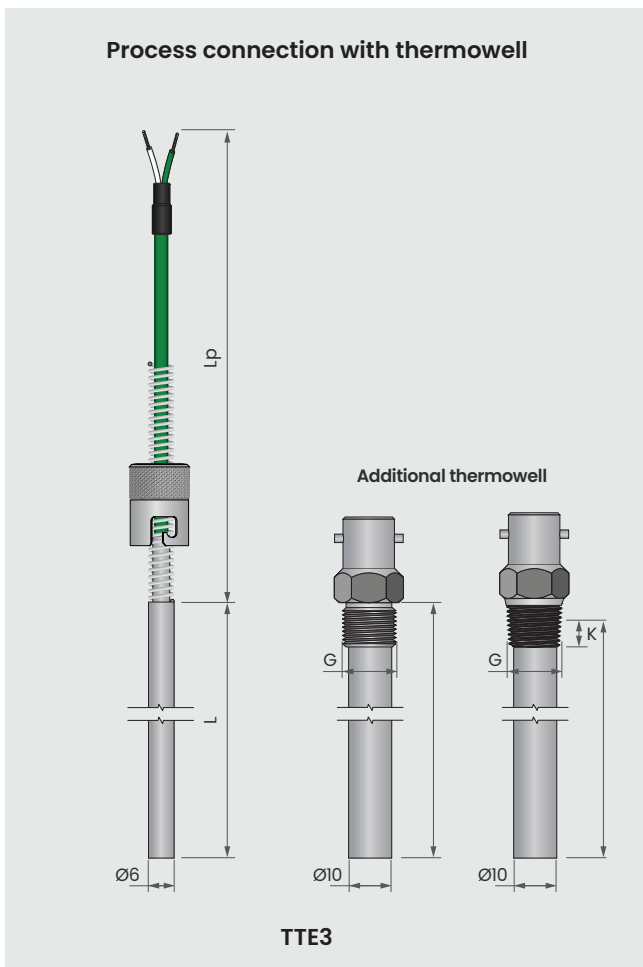
Intrinsically safe designs are available for applications in hazardous areas. These models are provided with certificate for "intrinsically safe" type of protection according to Directive 2014/34/UE (ATEX), IECEx scheme and EAC Ex TR-CU 012/2011 (Eurasian Economic Union).

Intrinsically safe (Exi)	XI-TTE310
	XI-TTE311
	XI-TTE312

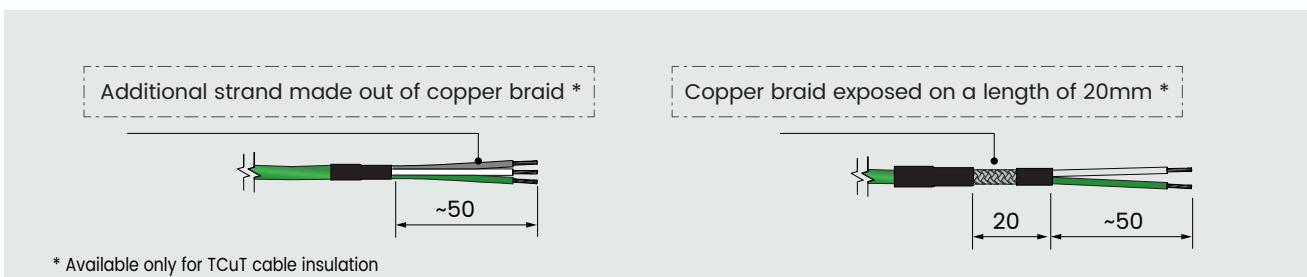
# CABLE THERMOCOUPLE

WITH BAYONET CAP, TYPE TTE3, TTE4

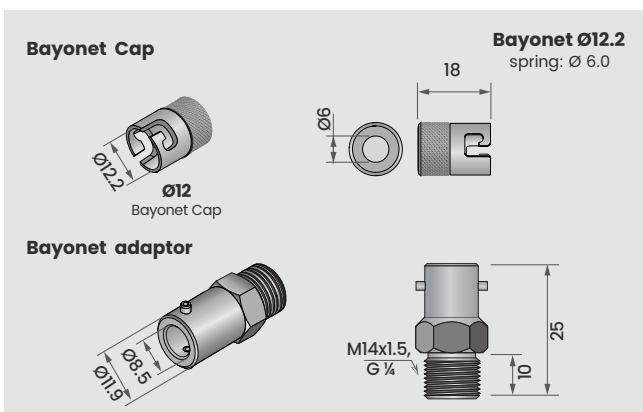
## Constructions



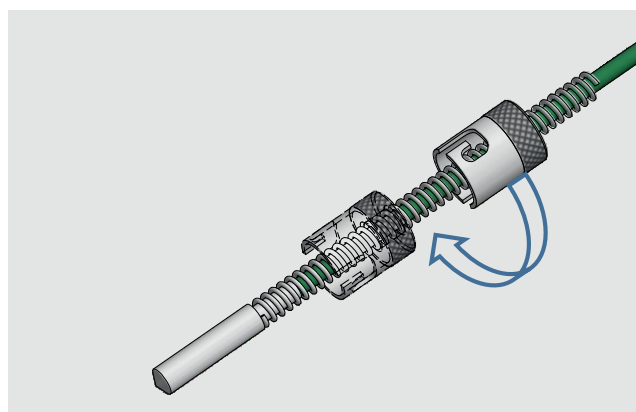
## Optional cable termination styles



## Bayonet cap and adaptor for TTE4



## Adjustable spring force of sensor



**Basic values of Thermocouples type J, K, N according to PN-EN 60584 / IEC 584**

Temperature		°C	100	200	300	400
Basic value	Type J	mV	5.27	10.78	16.33	21.85
	Type K	mV	4.10	8.14	12.21	16.40
	Type N	mV	2.77	5.91	9.34	12.97
Tolerance	Class 1	°C	±1.5	±1.5	±1.5	±1.6
	Class 2	°C	±2.5	±2.5	±2.5	±3.0

**Tolerances**

The EN 60584 Standard defines the formulas for calculating acceptable measure tolerance. More information available in the general thermocouple brochure.

**Type K (NiCr-NiAl), Type N (NiCrSi-NiSi)**

Tolerance Class	Temperature Range (°C)	Permissible error
1	-40°C ... +375°C	± 1.5°C
	+375°C ... +1000°C	± 0.0040 ×  t
2	-40°C ... +333°C	± 2.5°C
	+333°C ... +1200°C	± 0.0075 ×  t

**Type J (Fe-CuNi)**

Tolerance Class	Temperature Range (°C)	Permissible error
1	-40°C ... +375°C	± 1.5°C
	+375°C ... +750°C	± 0.0040 ×  t
2	-40°C ... +333°C	± 2.5°C
	+333°C ... +750°C	± 0.0075 ×  t

**Electrical parameters**

Isolation resistance >10 GΩ (test 500 VDC)

**Housing material**

Stainless steel 1.4541 ( AISI321 )

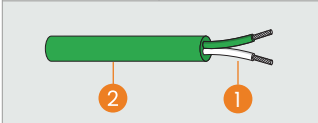
**Insulation types of connection cable**

Cable insulation plays a crucial role in ensuring the durability of thermocouples in various applications. Among the many available insulation materials, several stand out for their versatility and ability to work across a wide range of applications, considering factors such as temperature resistance, chemical resistance, and mechanical properties. Below presented the most popular versions of cables.

**Type K (NiCr-NiAl), color coding according to EN 60584-3**

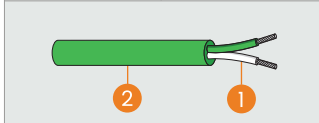
**JJ insulation**

① Conductor	PVC
② Sheath	PVC



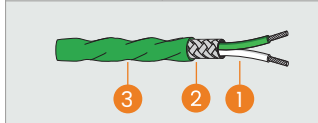
**TSL insulation**

① Conductor	Teflon® FEP
② Sheath	Silicone



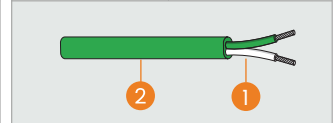
**TCuT insulation**

① Conductor	Teflon® FEP
② Screen	Copper braid
③ Sheath	Teflon® FEP



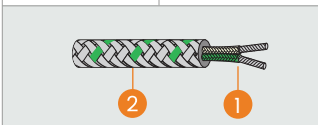
**TT insulation**

① Conductor	Teflon® PFA
② Sheath	Teflon® PFA



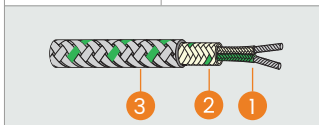
**GLP insulation**

① Conductor	Fiberglass
② Braid	Stainless steel braid



**GLGLP insulation**

① Conductor	Fiberglass
② Sheath	Fiberglass
③ Braid	Stainless steel braid



# CABLE THERMOCOUPLE

WITH BAYONET CAP, TYPE TTE3, TTE4

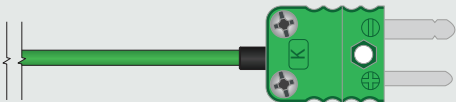
## Connectors (Optional)

Sensors with connection cable can be equipped with connector.

Available options:

### Connector S-010-(thermocouple type)-W

Miniature plug, 2-pin.



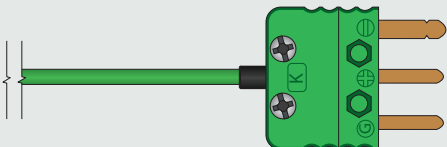
### Connector S-010-(thermocouple type)-G

Miniature socket, 2-pin.



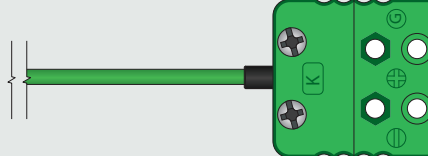
### Connector S-013-(thermocouple type)-W

Miniature plug, 3-pin.



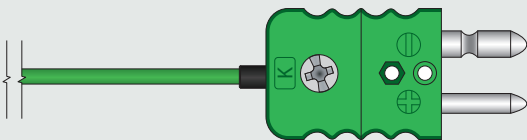
### Connector S-013-(thermocouple type)-G

Miniature socket, 3-pin.



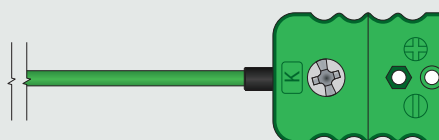
### Connector S-020-(thermocouple type)-W

Standard plug, 2-pin.



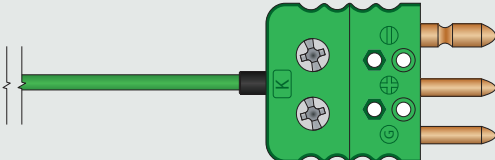
### Connector S-020-(thermocouple type)-G

Standard socket, 2-pin.



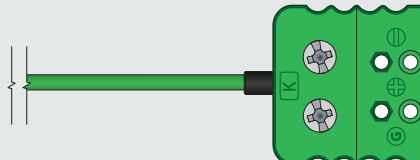
### Connector S-023-(thermocouple type)-W

Standard plug, 3-pin.



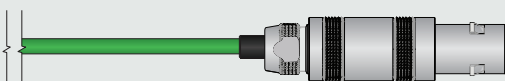
### Connector S-023-(thermocouple type)-G

Standard socket, 3-pin.



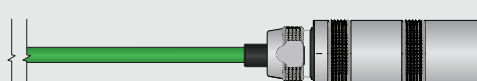
### Connector LEMO® FFA

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



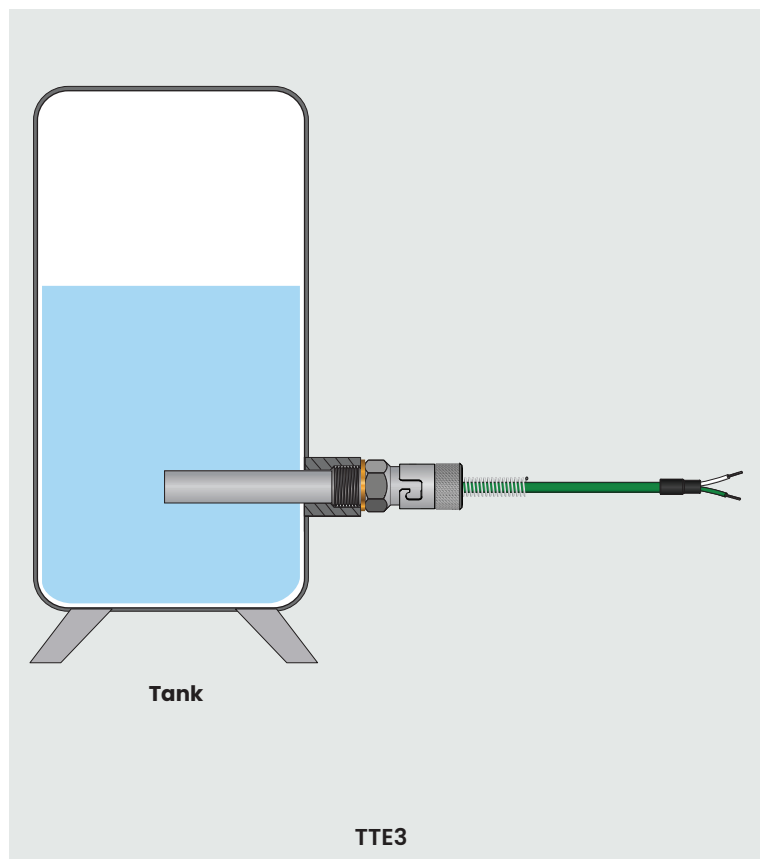
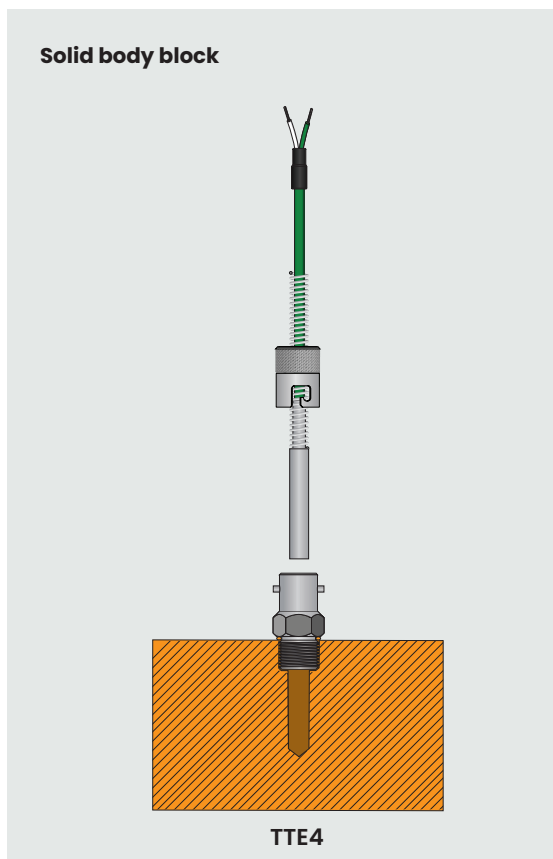
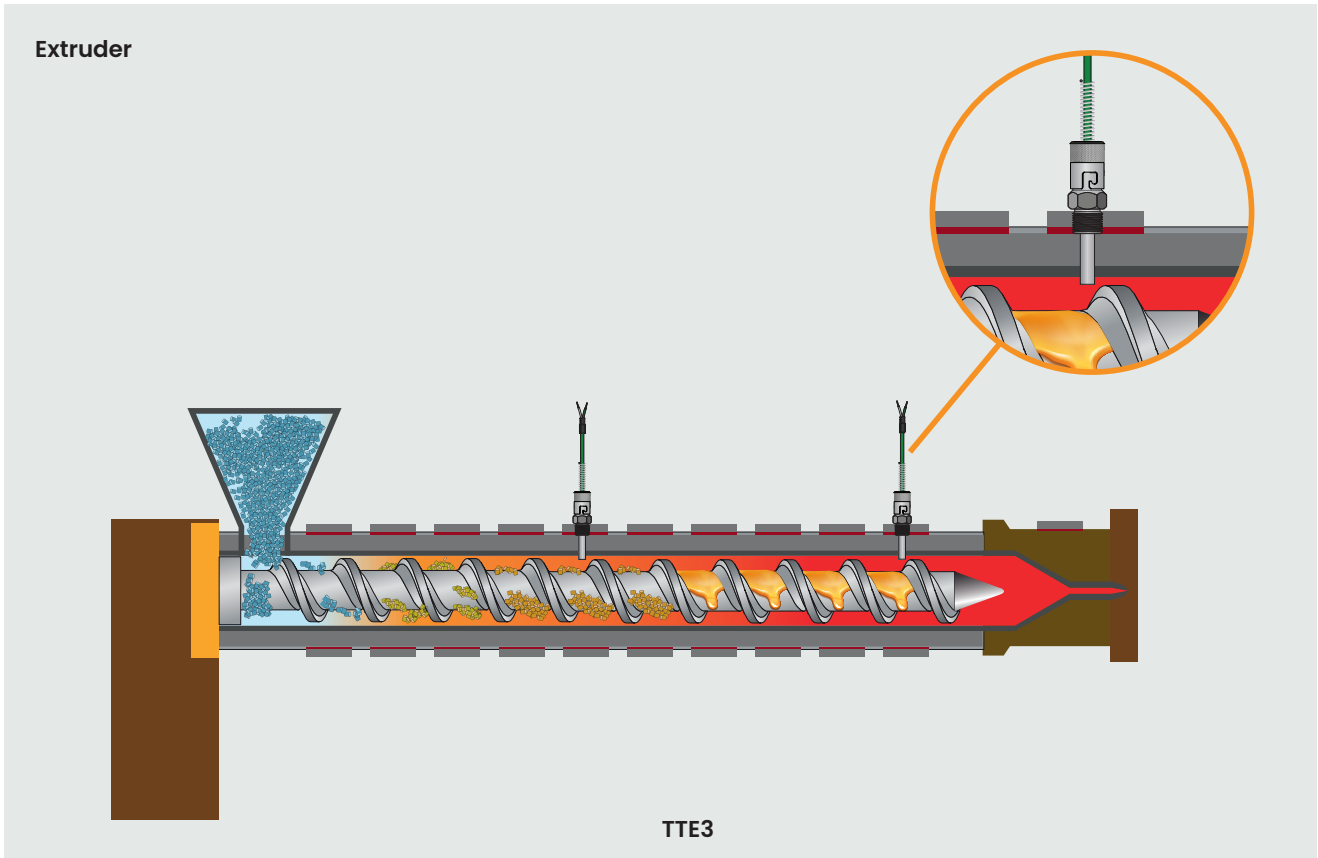
### Connector LEMO® PCA

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





**Installation examples**



# CABLE THERMOCOUPLE

WITH BAYONET CAP, TYPE **TTE3**, **TTE4**

## Ordering code

TTE    1    2    3    4    5    6    7    8    9  
 -  -  -  -  -  -  -  -  -

Order	Parameter	Code	<input checked="" type="checkbox"/>	Description
1	Model type	3	<input type="checkbox"/>	with additional external thermowell
		4	<input type="checkbox"/>	with bayonet adaptor (without additional external thermowell)
2	Type of sensing element	J	<input type="checkbox"/>	Type J ( Fe-CuNi)
		K	<input type="checkbox"/>	Type K ( NiCr-Ni)
		xxx	<input type="checkbox"/>	Other, please specify
3	Thermowell length L	50	<input type="checkbox"/>	50mm
		100	<input type="checkbox"/>	100mm
		150	<input type="checkbox"/>	150mm
		xxx	<input type="checkbox"/>	Other, please specify
4	Connecting cable length Lp	1000	<input type="checkbox"/>	1000mm
		2500	<input type="checkbox"/>	2500mm
		xxx	<input type="checkbox"/>	Other, please specify
5	Tolerance class	1	<input type="checkbox"/>	Class 1 according to PN-EN 60584-2
		2	<input type="checkbox"/>	Class 2 according to PN-EN 60584-2
6	Connecting cable type		<input type="checkbox"/>	Temperature range of sensor
		JJ	<input type="checkbox"/>	PVC / PVC -10 .. +105°C
		SLSL	<input type="checkbox"/>	Silicone / Silicone -50 .. +180°C
		TSL	<input type="checkbox"/>	Teflon® FEP / Silicone -50 .. +180°C
		TPSL	<input type="checkbox"/>	Teflon® FEP / Cu braid / Silicone -50 .. +180°C
		TT	<input type="checkbox"/>	Teflon® PFA / Teflon® PFA -50 .. +260°C
		TP	<input type="checkbox"/>	Teflon® PFA / Stainless steel -50 .. +260°C
		TCuT	<input type="checkbox"/>	Teflon® PFA / Cu braid / Teflon® PFA -50 .. +260°C
		GLGLP	<input type="checkbox"/>	Fiberglass / Fiber glass / Stainless steel -50 .. +400°C
7	Process connection thread	M12x1	<input type="checkbox"/>	M12x1
		G1/4"	<input type="checkbox"/>	G1/4"
		G1/2"	<input type="checkbox"/>	G1/2"
		1/2"NPT	<input type="checkbox"/>	1/2"NPT
		xxx	<input type="checkbox"/>	Other, please specify
8	Connector (optional)		<input type="checkbox"/>	without connector, free end conductors of connection cable
		S-010-K-W	<input type="checkbox"/>	Miniature plug, 2-pin, type K
		FFA.IS	<input type="checkbox"/>	Connector LEMO® FFA size IS
		xxx	<input type="checkbox"/>	Other, please specify

## Examples

### TTE3-K-150-2000-1-TSL-G1/4"

Model type with additional external thermowell dia. Ø10 mm, TC sensor type K, thermowell length L=150 mm, connection cable length Lp=2000 mm, tolerance class 1, single conductors in teflon insulation, sheath in silicone insulation, threaded thermowell connection G1/4".

### TTE4-J-100-2500-2-TT-M10x1-FFA.IS

Model type with bayonet adaptor, thermowell diameter Ø6 mm, TC sensor type J, thermowell length L=100 mm, connection cable length Lp=2500 mm, tolerance class 1, single conductors in teflon insulation, sheath in teflon insulation, threaded bayonet adaptor connection M10x1, connection cable equipped with LEMO® FFA plug size IS.