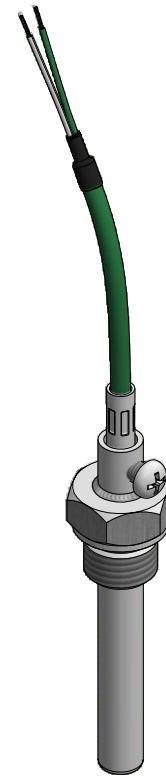


Applications

- Fine chemical industry
- Light energy industry
- General industrial services

Features

- Single or double thermocouple
- Sensing element according to (PN-EN 60584-2):
 - Type K (NiCr-NiAl),
 - Type J (Fe-CuNi),
 - Type N (NiCrSi-NiSi),
 - Type E (NiCr-CuNi),
 - Type T (Cu-CuNi)
- Non-standard sensor versions available upon customer's request:
 - cable type according to client's specification
 - thermowell spring protection against excessive cable bending



TTE150
Version with
additional thermowell
TSL cable insulation
(teflon®FEP/silicone)

Thermocouples TTE150 are designed for screw-fitting directly into process, mainly in vessels and pipelines.

Additional external thermowell 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.

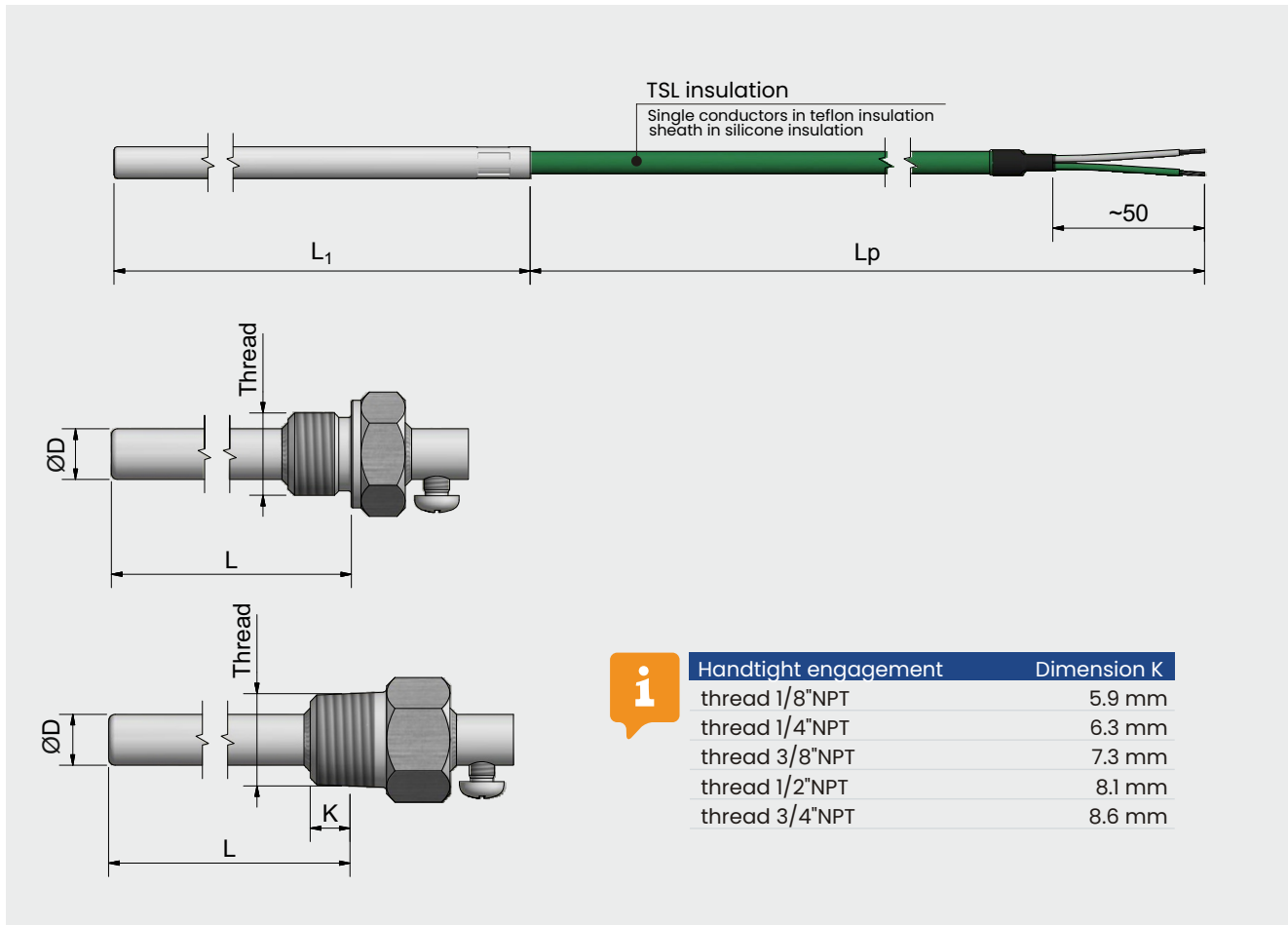
The sensor consists of thermocouple cable, protection tube made out of stainless steel and additional external thermowell with threaded process connection.

Insertion length, process connection thread and diameter, 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.

Designs



Handtight engagement	Dimension K
thread 1/8"NPT	5.9 mm
thread 1/4"NPT	6.3 mm
thread 3/8"NPT	7.3 mm
thread 1/2"NPT	8.1 mm
thread 3/4"NPT	8.6 mm

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

Tolerance

The PN-EN 60584 Standard defines the formulas for calculating acceptable measure tolerance. More information available in the general thermoelectric thermometer sheet.

Electrical parameters

Isolation resistance > 10 GΩ (test 500 VDC)

Housing material

Stainless steel 1H18N9T (1.4541 / AISI321)

Type J (Fe-CuNi)

Class	Temperature range	Tolerance
1	-40 °C .. +375 °C	± 1.5 °C
	+375 °C .. +750 °C	± 0.0040 x t
2	-40 °C .. +333 °C	± 2.5 °C
	+333 °C .. +750 °C	± 0.0075 x t

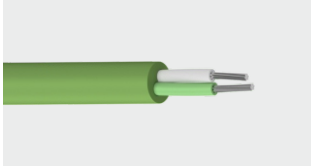
Type K (NiCr-Ni), Type N (NiCrSi-NiSi)

Class	Temperature range	Tolerance
1	-40 °C .. +375 °C	± 1.5 °C
	+375 °C .. +1000 °C	± 0.0040 x t
2	-40 °C .. +333 °C	± 2.5 °C
	+333 °C .. +1200 °C	± 0.0075 x t

Insulation types of connection cable

JJ insulation

Conductor: PVC
Sheath: PVC



TSL insulation

Conductor: Teflon® FEP
Sheath: Silicone



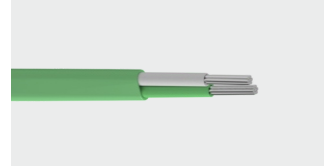
TCuT insulation

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



TT insulation

Conductor: Teflon® PFA
Sheath: Teflon® PFA



GLP insulation

Conductor: Fiberglass
Sheath: Stainless steel braid



GLGLP insulation

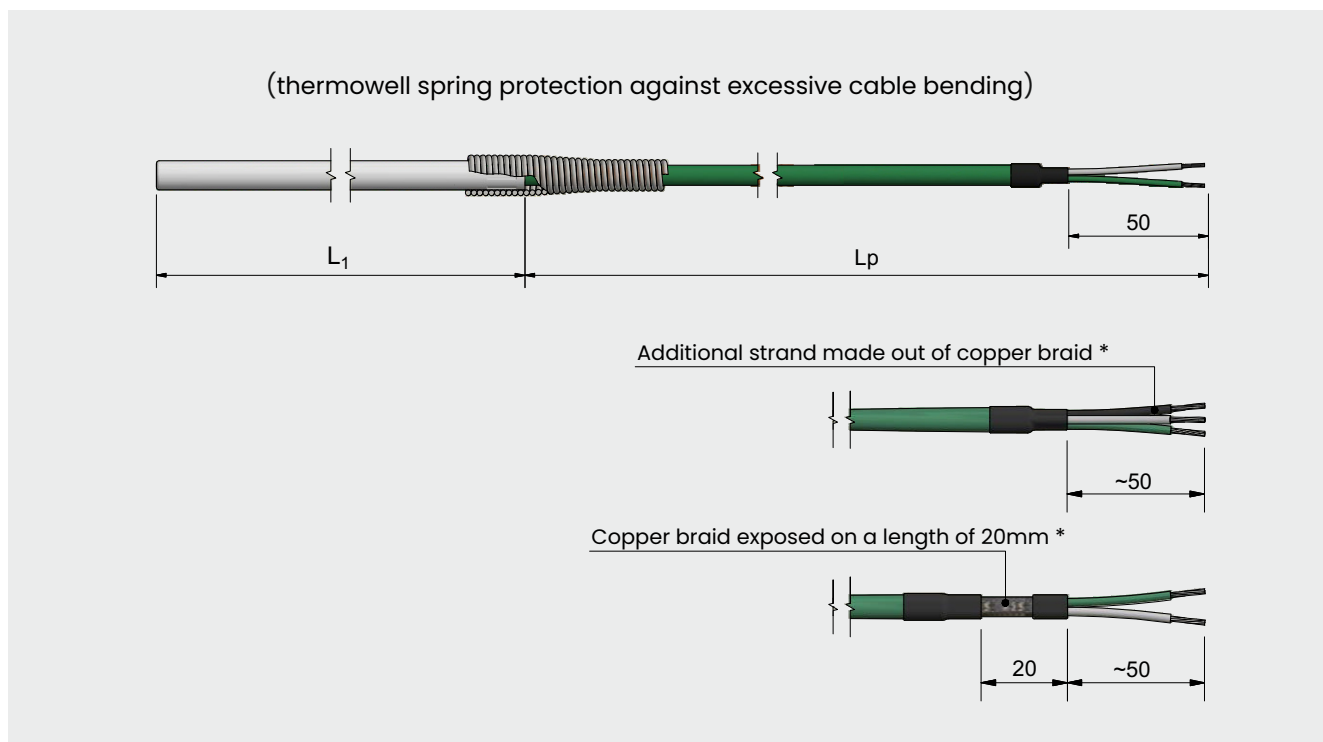
Conductor: Fiberglass
Sheath: Fiberglass
Braid: Stainless steel braid



Available measuring range and thermowell diameter

Measuring range	Thermowell dia. D [mm]	Insulation type	
-10 .. +105°C	Ø8, Ø9, Ø10	JJ	PVC
-50 .. +180°C	Ø8, Ø9, Ø10	TSL	silicone
-50 .. +205°C	Ø8, Ø9, Ø10	TCuT	teflon® FEP
-50 .. +260°C	Ø5, Ø6, Ø8, Ø9, Ø10	TT	teflon® PFA
-50 .. +400°C	Ø8, Ø9	GLP, GLGLP	fiberglass

Non-standard sensor versions



* Available only for TCuT cable insulation

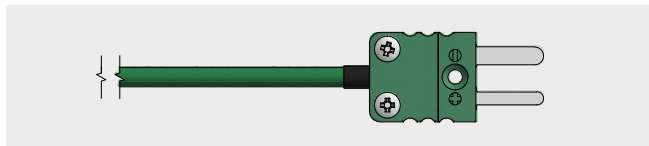
Connectors (optional)

Sensors with connection cable can be equipped with connector.

Available options:

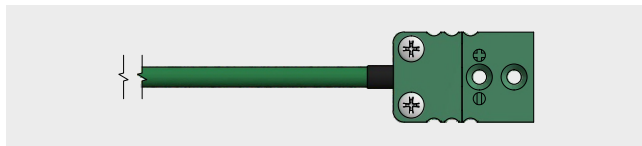
Connector S-010-(thermocouple type)-W

Miniature plug, 2-pin.



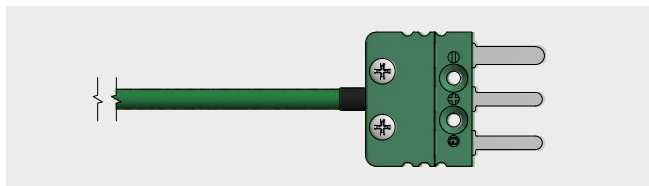
Connector S-010-(thermocouple type)-G

Miniature socket, 2-pin.



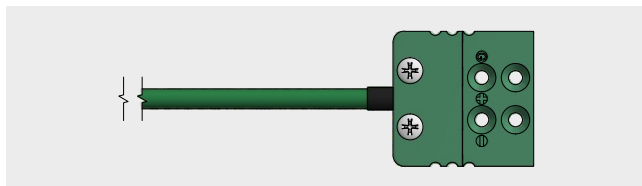
Connector S-013-(thermocouple type)-W

Miniature plug, 3-pin.



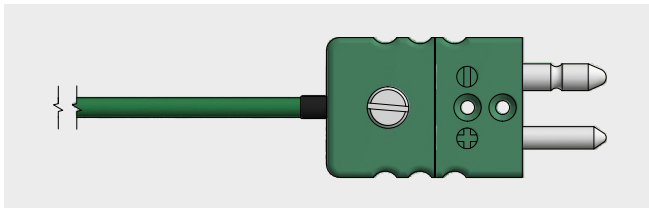
Connector S-013-(thermocouple type)-G

Miniature socket, 3-pin.



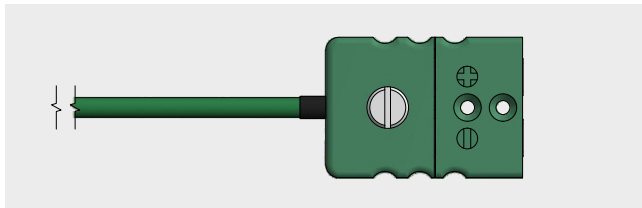
Connector S-020-(thermocouple type)-W

Standard plug, 2-pin.



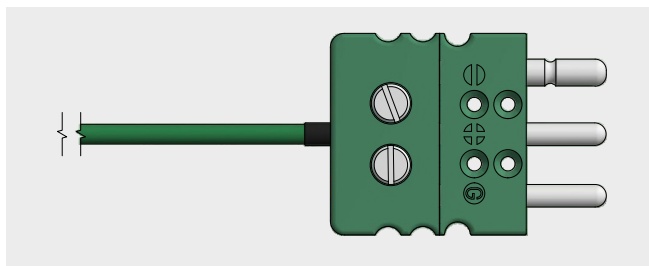
Connector S-020-(thermocouple type)-G

Standard socket, 2-pin.



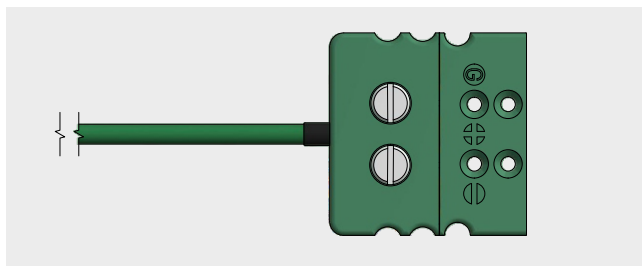
Connector S-023-(thermocouple type)-W

Standard plug, 3-pin.



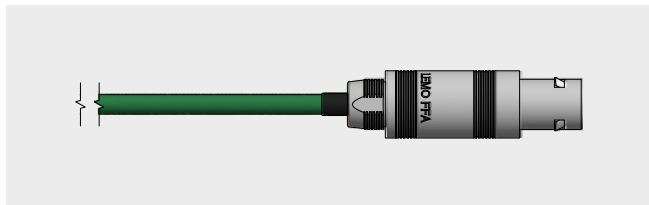
Connector S-023-(thermocouple type)-G

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.



Ordering code

TTEI50 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8

1	<input type="text"/>	Thermocouple type			
		J	Type J (Fe-CuNi)		
		K	Type K (NiCr-Ni)		
		xxx	other, please specify		
2	<input type="text"/>	Thermowell diameter ØD			
		6	Ø6 mm		
		8	Ø8 mm		
		9	Ø9 mm		
		xxx	other, please specify		
3	<input type="text"/>	Thermowell length L			
		50	50 mm		
		100	100 mm		
		150	150 mm		
		xxx	other, please specify		
4	<input type="text"/>	Connecting cable length Lp			
		1000	1000 mm		
		2500	2500 mm		
		xxx	other, please specify		
5	<input type="text"/>	Tolerance class			
		1	Class 1 according to PN-EN 60584-2		
		2	Class 2 according to PN-EN 60584-2		
6	<input type="text"/>	Process connection thread			
		M10x1	M10x1		
		M12x1	M12x1		
		G1/4"	G1/4"		
		G1/2"	G1/2"		
		1/2"NPT	1/2"NPT		
		xxx	other, please specify		
7	<input type="text"/>	Connecting cable type		Temperature range of sensor	
		JJ	PVC / PVC	-10 .. +105°C	
		TSL	Teflon® FEP / Silicone	-50 .. +180°C	
		TCuT	Teflon® FEP / Cu braid / Teflon® FEP	-50 .. +205°C	
		TT	Teflon® PFA / Teflon® PFA	-50 .. +260°C	
		GLP	Fiberglass / Stainless steel	-50 .. +400°C	
		GLGLP	Fiberglass / Fiberglass / Stainless steel	-50 .. +400°C	
8	<input type="text"/>	Connector (optional)			
			without connector, free end conductors of connection cable		
		S-010-K-W	Miniature plug, 2-pin, type K		
		FFA.IS	Connector LEMO® FFA size IS		
		xxx	other, please specify		

Example

TTEI50-K-8-150-2000-1-G1/4"-TSL

TC sensor type K, thermowell diameter Ø8 mm, thermowell length L=150 mm, connection cable length Lp=2000 mm, tolerance class 1, threaded thermowell connection G1/4", single conductors in teflon insulation, sheath in silicone insulation.

TTEI50-J-6-100-2500-2-M10x1-TT-FFA.IS

TC sensor type J, thermowell diameter Ø6 mm, thermowell length L=100 mm, connection cable length Lp=2500 mm, tolerance class 2, threaded thermowell connection M10x1, single conductors in teflon insulation, sheath in teflon insulation, connection cable equipped with LEMO® FFA plug size IS.