

Application

- 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
- TTE310 - protection tube diameter $\varnothing 5$ mm
- TTE311 - protection tube diameter $\varnothing 6$ mm
- TTE312 - protection tube diameter $\varnothing 8$ mm

Description

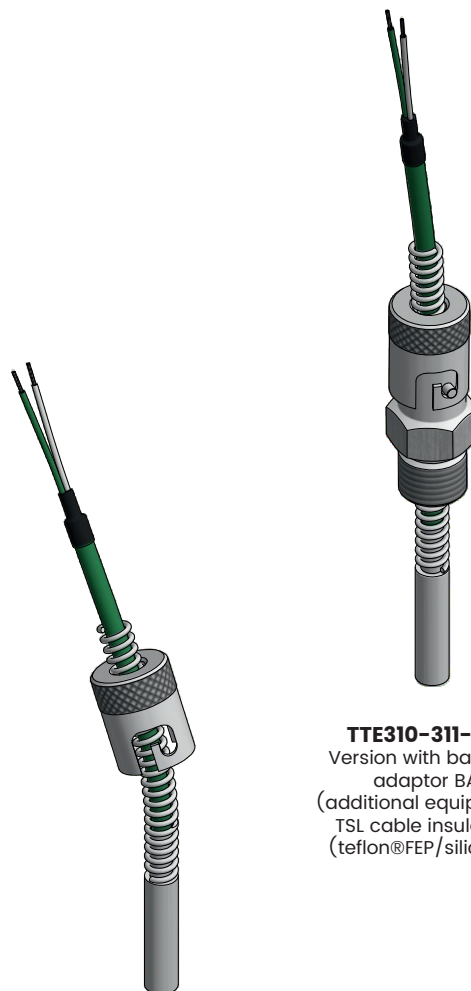
Thermocouples TTE310, TTE311, TTE312 are designed for screw-fitting directly into process or into machine parts. Adjustable spring force of sensor provides optimum measurement conditions in environment where vibrations appear.

TTE310, TTE311, TTE312 sensor consists of thermocouple cable, protection tube made out of stainless steel, adjustable bayonet cap with spring. Sensor can be additionally equipped with bayonet adaptor.

Insertion length, process connection thread, construction type, 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.



TTE310-311-312
Version with bayonet adaptor BA (additional equipment)
TSL cable insulation (teflon®/FEP/silicone)

TTE310-311-312
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 TTE310, TTE311, TTE312

Construction

Bayonet adaptor

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

TOPE310 (Ø5)

TOPE311 (Ø6)

TOPE312 (Ø8)

Optional cable termination styles

Additional strand made out of copper braid *

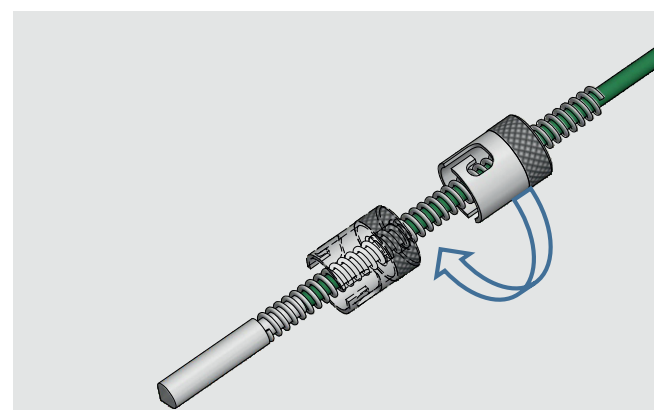
Copper braid exposed on a length of 20mm *

* Available only for TCuT cable insulation

Bayonet cap

Model	Dimension Ød
TTE310	Ø11.3 mm
TTE311	Ø12.2 mm
TTE312	Ø14.5 mm

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)

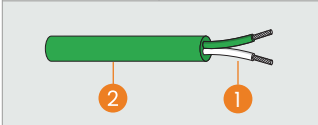
Insulation types of connection cable

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

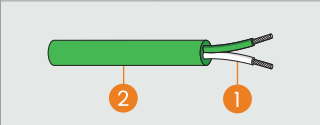
JJ insulation

① Conductor	PVC
② Sheath	PVC



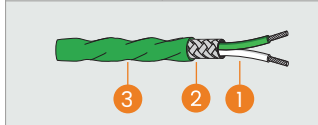
TSL insulation

① Conductor	Teflon® FEP
② Sheath	Silicone



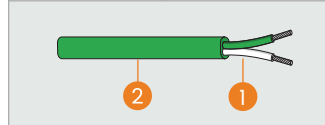
TCuT insulation

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



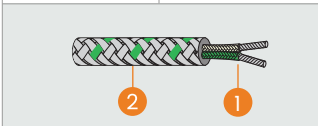
TT insulation

① Conductor	Teflon® PFA
② Sheath	Teflon® PFA



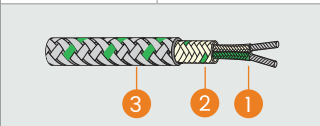
GLP insulation

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 TTE310, TTE311, TTE312

Connectors (Optional)

Sensors with connection cable can be equipped with connector.

Available options:

Connector S-010-(thermocouple type)-W

Miniature plug, 2-pin.



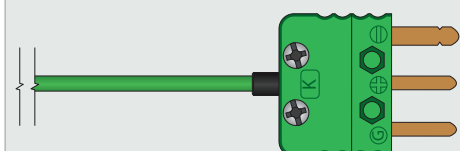
Connector S-010-(thermocouple type)-G

Miniature socket, 2-pin.



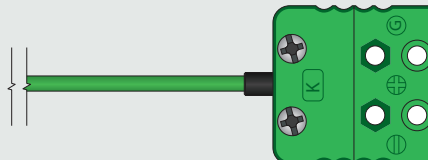
Connector S-013-(thermocouple type)-W

Miniature plug, 3-pin.



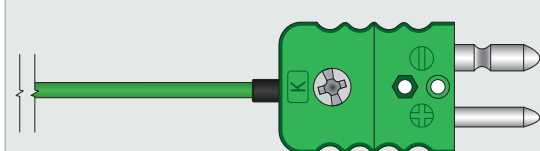
Connector S-013-(thermocouple type)-G

Miniature socket, 3-pin.



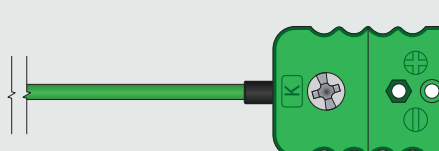
Connector S-020-(thermocouple type)-W

Standard plug, 2-pin.



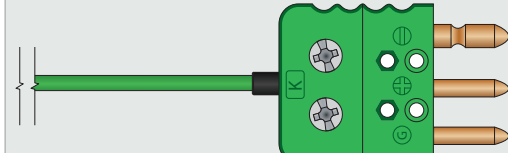
Connector S-020-(thermocouple type)-G

Standard socket, 2-pin.



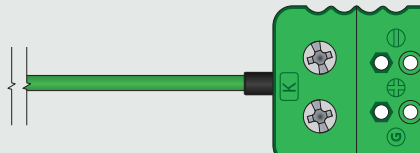
Connector S-023-(thermocouple type)-W

Standard plug, 3-pin.



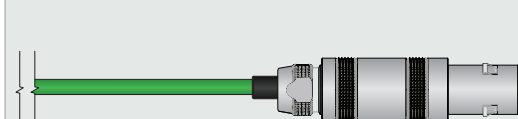
Connector S-023-(thermocouple type)-G

Standard socket, 3-pin.



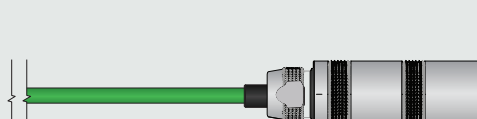
Connector LEMO® FFA

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



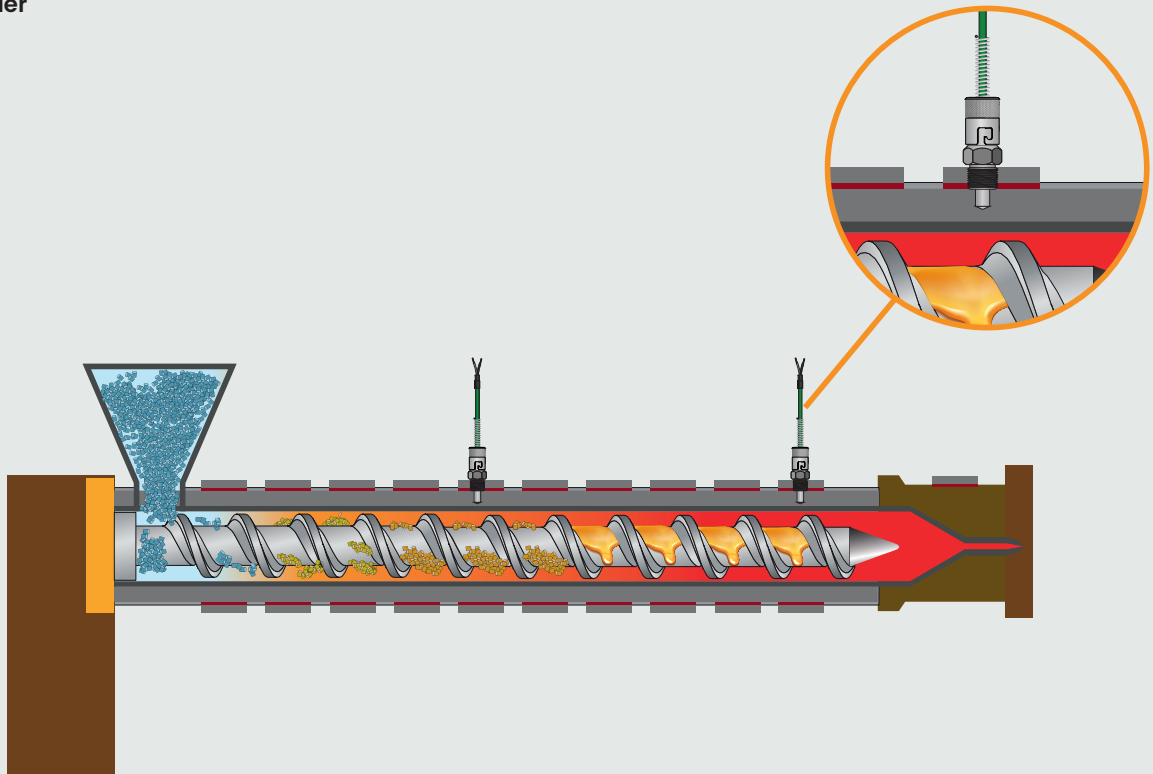
Connector LEMO® PCA

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

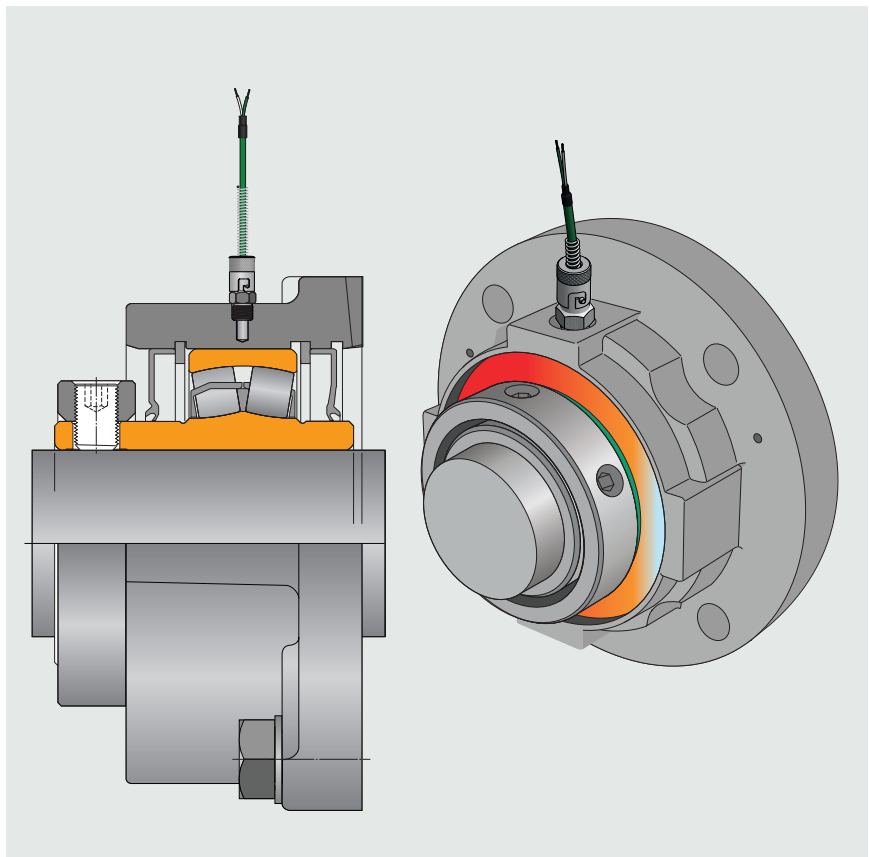
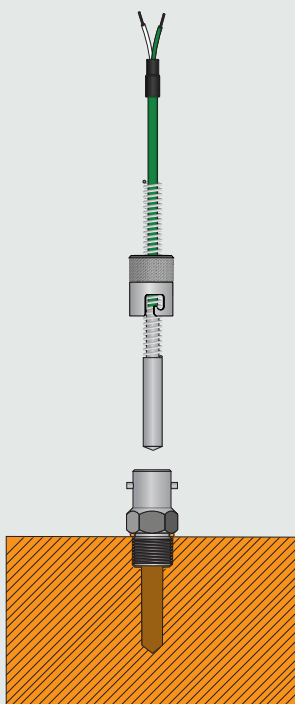


Installation examples

Extruder

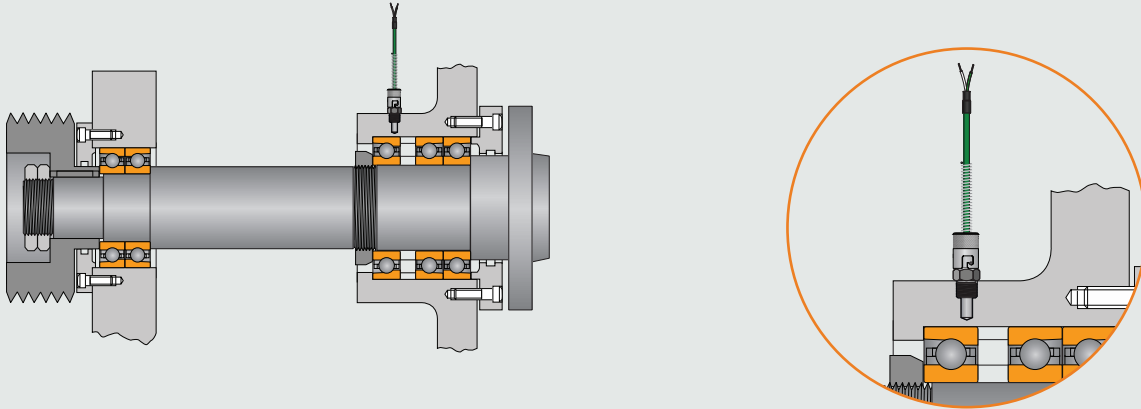


Solid body block

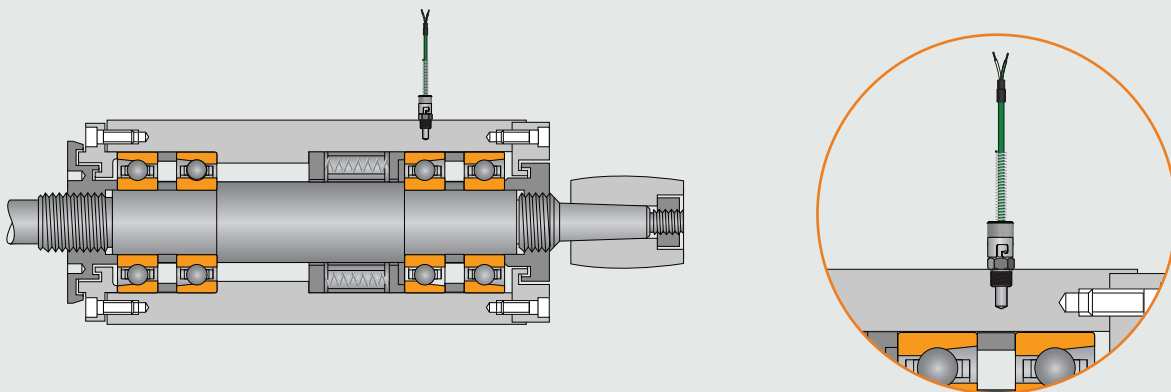


Installation examples

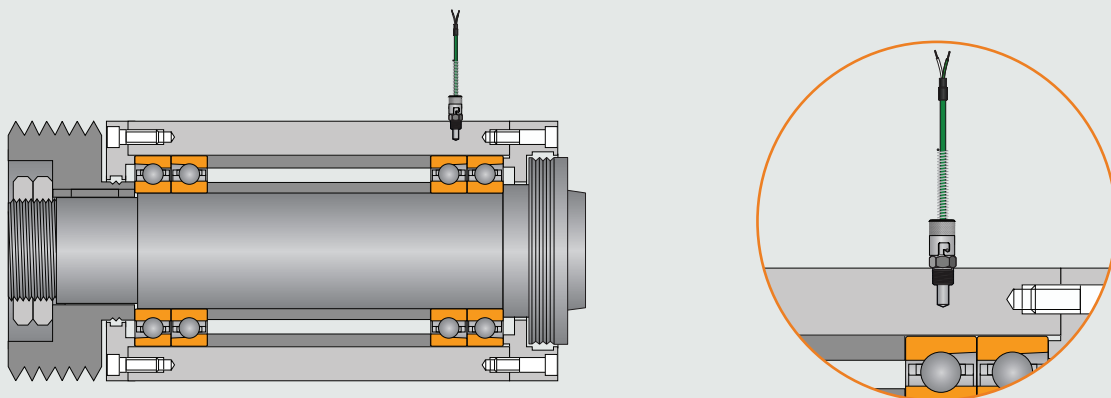
Medium Speed Spindle



High-Speed Spindle



Workhead Spindle



CABLE THERMOCOUPLE

WITH BAYONET CAP, TYPE TTE310, TTE311, TTE312



Data sheet TTE310, TTE311, TTE312 | Edition 2023

Ordering code

TTE31 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8

Order	Parameter	Code	<input checked="" type="checkbox"/>	Description
1	Model type / diameter ØD	0	<input type="checkbox"/>	Ø5 mm
		1	<input type="checkbox"/>	Ø6 mm
		2	<input type="checkbox"/>	Ø8 mm
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	25	<input type="checkbox"/>	25 mm (standard)
		50	<input type="checkbox"/>	50mm
		75	<input type="checkbox"/>	75mm
4	Connecting cable length Lp	xxx	<input type="checkbox"/>	Other, please specify
		1000	<input type="checkbox"/>	1000mm
		2500	<input type="checkbox"/>	2500mm
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
		TSL	<input type="checkbox"/>	Teflon® FEP / Silicone -50 .. +180°C
		TCuT	<input type="checkbox"/>	Teflon® PFA / Cu braid / Teflon® PFA -50 .. +260°C
		TT	<input type="checkbox"/>	Teflon® PFA / Teflon® PFA -50 .. +260°C
7	Process connection thread	GLGLP	<input type="checkbox"/>	Fiberglass / Fiber glass / Stainless steel -50 .. +400°C
			<input type="checkbox"/>	without bayonet adaptor
		M12x1	<input type="checkbox"/>	M12x1
		G1/4"	<input type="checkbox"/>	G1/4"
		G1/2"	<input type="checkbox"/>	G1/2"
8	Connector (optional)	1/2"NPT	<input type="checkbox"/>	1/2"NPT
		xxx	<input type="checkbox"/>	Other, please specify
			<input type="checkbox"/>	without connector, free end conductors of connection cable
		S-010-K-W	<input type="checkbox"/>	Miniature plug, 2-pin, type K
		<input type="checkbox"/>	Connector LEMO® FFA size 1S	
		<input type="checkbox"/>	Other, please specify	

Example

TTE310-K-25-2000-1-TSL-G1/4"

Model type with protection tube diameter Ø5 mm, TC sensor type K, thermowell length L=25 mm, connection cable length Lp=2000 mm, tolerance class 1, single conductors in teflon insulation, sheath in silicone insulation, threaded bayonet adaptor connection G1/4", bayonet cap diameter Ø11 mm.

TTE311-J-50-2500-2-TT-FFA.1S

Model type with protection tube diameter Ø6 mm, TC sensor type J, thermowell length L=50 mm, connection cable length Lp=2500 mm, tolerance class 2, single conductors in teflon insulation, sheath in teflon insulation, connection cable equipped with LEMO® FFA plug size 1S, bayonet cap diameter Ø12 mm.