

Application

- Plastic industry
- Movable and replaceable machine parts

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)
- TOPE310 - protection tube diameter $\varnothing 5$ mm
- TOPE311 - protection tube diameter $\varnothing 6$ mm
- TOPE312 - protection tube diameter $\varnothing 8$ mm

Description

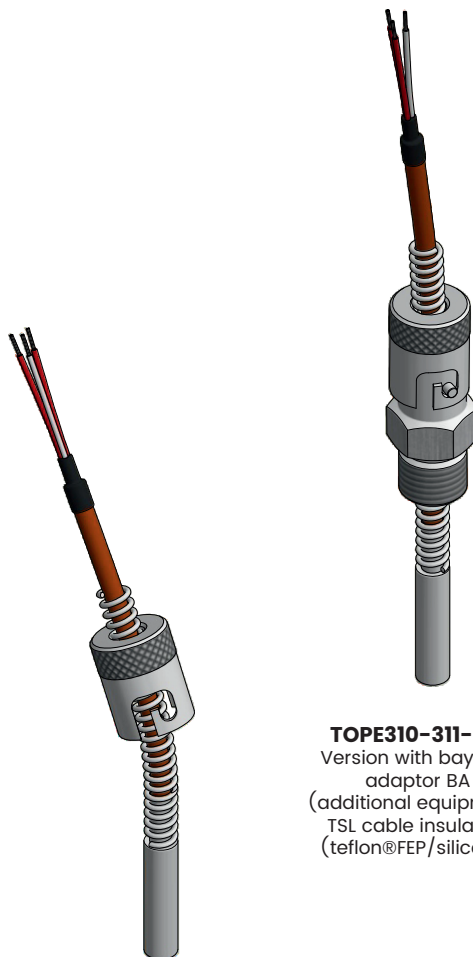
Resistance thermometers TOPE310, TOPE311, TOPE312 are designed for screw-fitting directly into process or into machine parts. Adjustable spring force of sensor provides optimal measurement conditions in environment where vibrations and turbulences appears.

TOPE310, TOPE311, TOPE312 sensor consists of thermometric resistor, protection tube made out of stainless steel, connection cable, adjustable bayonet cap with spring. Sensor can be additional equipped with bayonet adaptor.

Insertion length, process connection thread, construction type 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.



TOPE310-311-312
TSL cable insulation
(teflon®/FEP/silicone)

TOPE310-311-312
Version with bayonet
adaptor BA
(additional equipment)
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-TOPE310
 XI-TOPE311
 XI-TOPE312

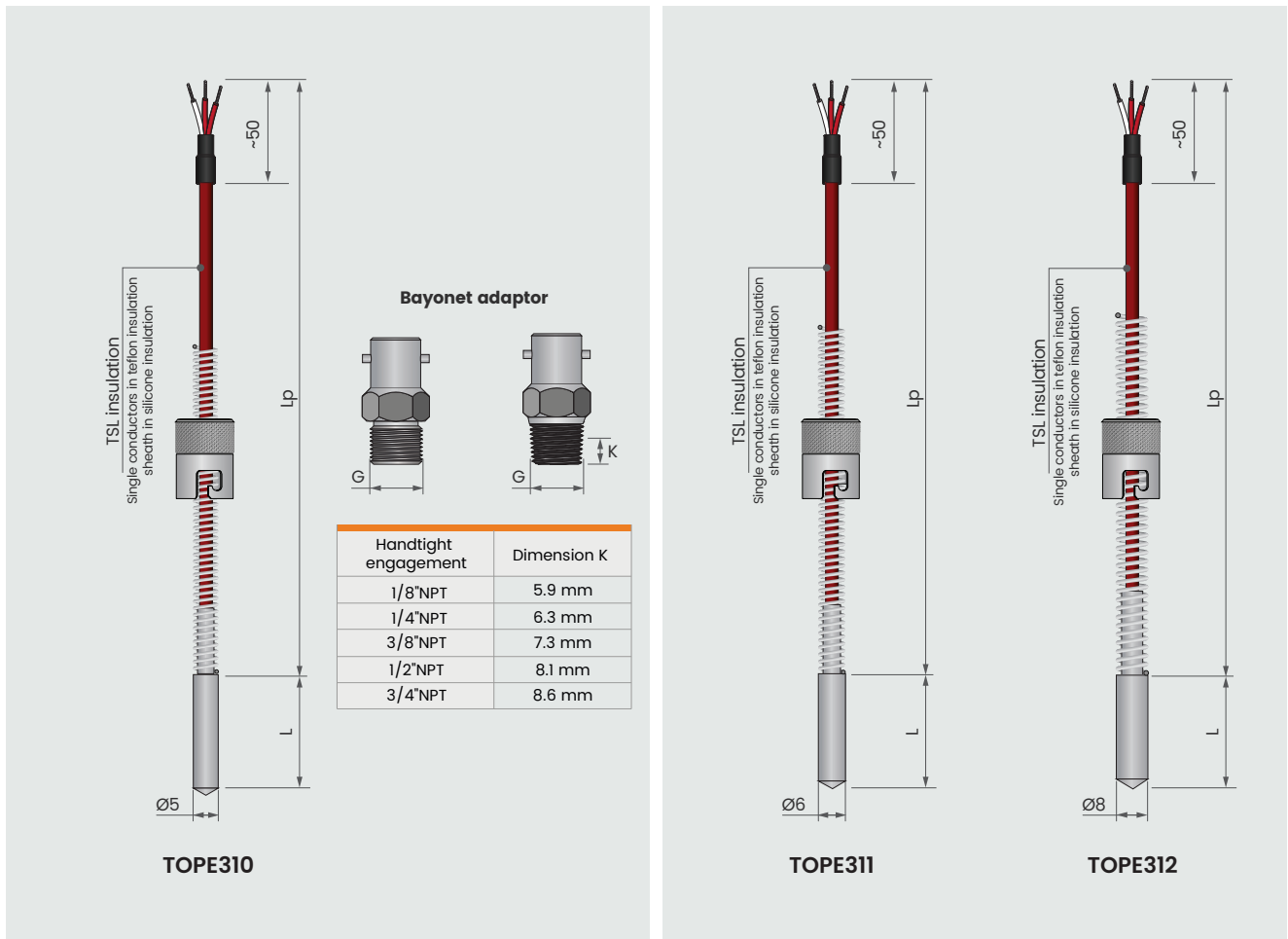
CABLE RESISTANCE THERMOMETER

WITH BAYONET CAP, TYPE TOPE310, TOPE311, TOPE312

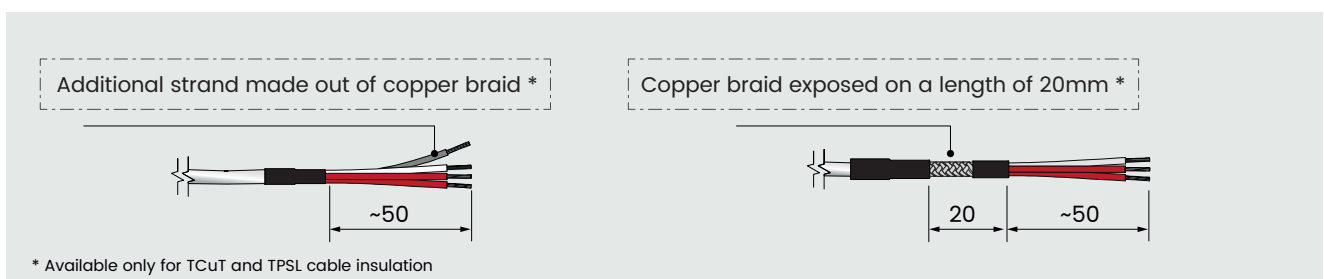


Data sheet TOPE310-311-312 | Edition 2023

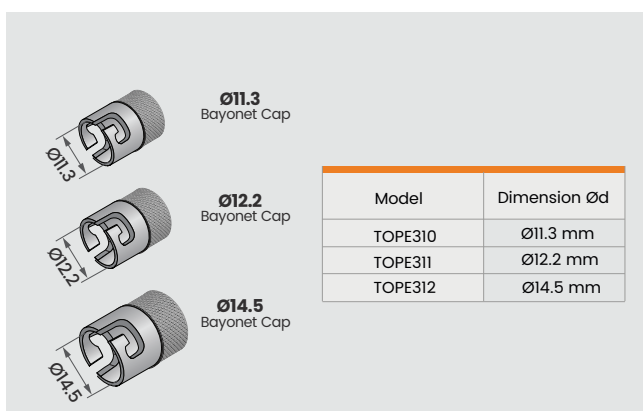
Construction



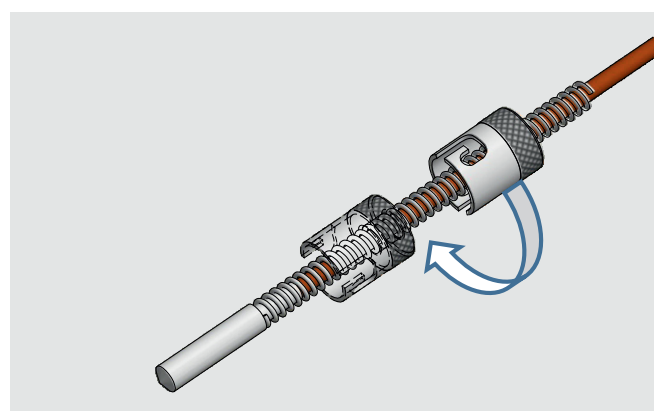
Optional cable termination styles



Bayonet cap



Adjustable spring force of sensor



Measuring ranges

Measuring range of the sensor depends on selected cable insulation material. Below table presents standard cable types.

Measuring range	Code	Insulation material
-10 .. +105°C	JJ	PVC
-50 .. +180°C	SLSL, TSL, TPSL	silicone
-50 .. +260°C	TT, TP, TCuT	teflon® PFA
-50 .. +400°C	GLGLP	fiberglass

Measuring range

from -50°C to +400°C (depends on cable insulation type)

Sensing element

Single or double

Pt100, Pt500, Pt1000 (IEC 751, $\alpha = 0.00385$)

Ni100, Ni500, Ni1000 (DIN 43760 $\alpha = 0.00618$)

Cu50, Cu100 (GOST 6651-94, $\alpha = 0.00426$)

Tolerances

Platinum

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

Nickel

($\pm 0.40^\circ\text{C}$ in 0°C)

Copper

($\pm 0.30^\circ\text{C}$ in 0°C)

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

Class of tolerance	Tolerance
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 G Ω (test 500 VDC)

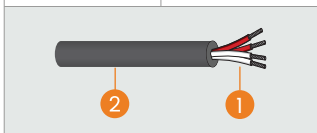
Housing material

Stainless steel 1.4541 (AISI321)

Insulation types of connection cable

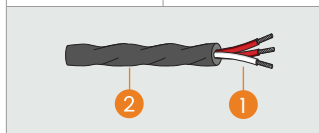
JJ insulation

1 Conductor	PVC
2 Sheath	PVC



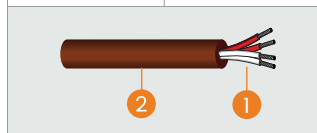
SLSL insulation

1 Conductor	Silicone
2 Sheath	Silicone



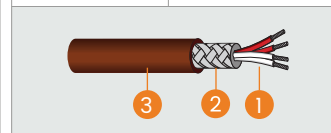
TSL insulation

1 Conductor	Teflon® FEP
2 Sheath	Silicone



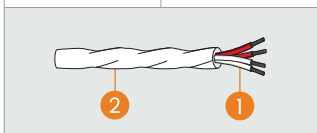
TPSL insulation

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



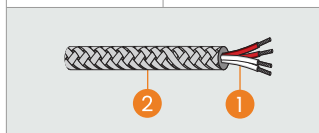
TT insulation

1 Conductor	Teflon® PFA
2 Sheath	Teflon® PFA



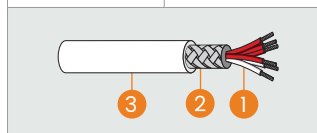
TP insulation

1 Conductor	Teflon® PFA
2 Sheath	Stainless steel braid



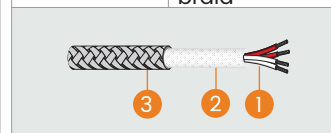
TCuT insulation

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



GLGLP insulation

1 Conductor	Fiberglass
2 Screen	Fiberglass
3 Sheath	Stainless steel braid



CABLE RESISTANCE THERMOMETER

WITH BAYONET CAP, TYPE TOPE310, TOPE311, TOPE312

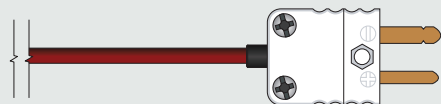
Connectors (Optional)

Sensors with connection cable can be equipped with connector.

Available options:

Connector S-010-Cu-W

Miniature plug, 2-pin.



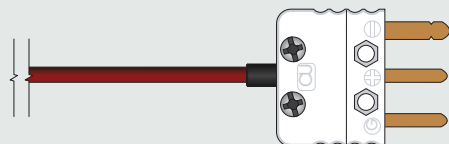
Connector S-010-Cu-G

Miniature socket, 2-pin.



Connector S-013-Cu-W

Miniature plug, 3-pin.



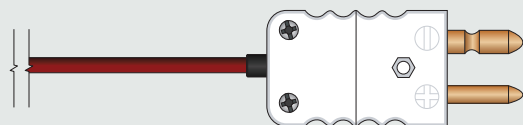
Connector S-013-Cu-G

Miniature socket, 3-pin.



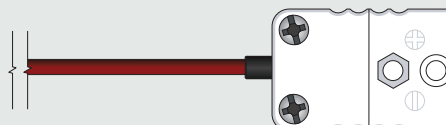
Connector S-020-Cu-W

Standard plug, 2-pin.



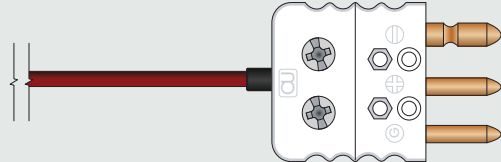
Connector S-020-Cu-G

Standard socket, 2-pin.



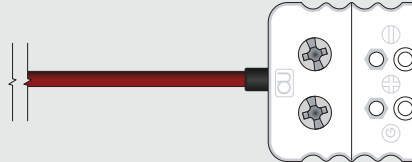
Connector S-023-Cu-W

Standard plug, 3-pin.



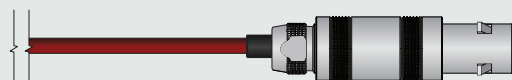
Connector S-023-Cu-G

Standard socket, 3-pin.



Connector LEMO® FFA

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



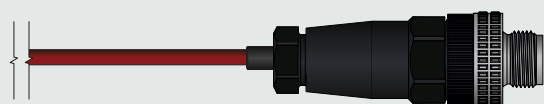
Connector LEMO® PCA

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



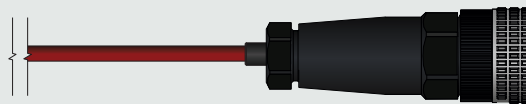
Hirschmann M12 series

4-pin.



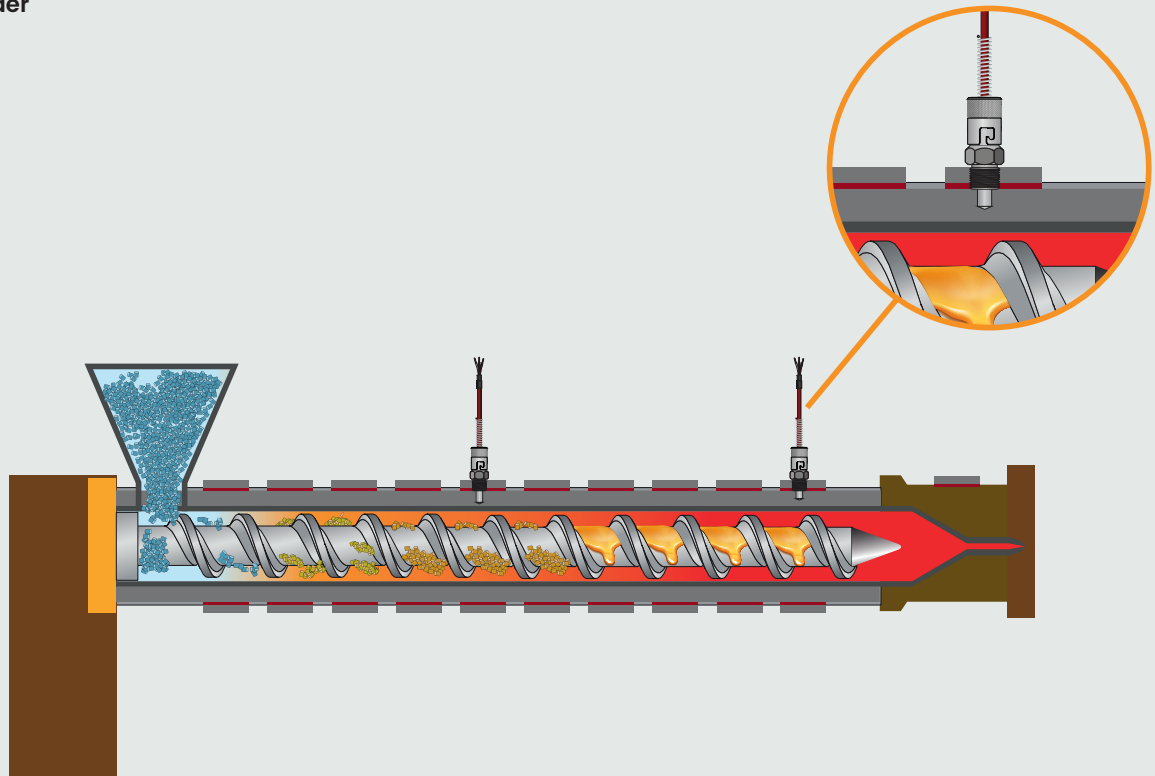
Hirschmann M12 series

Standard socket, 4-pin.

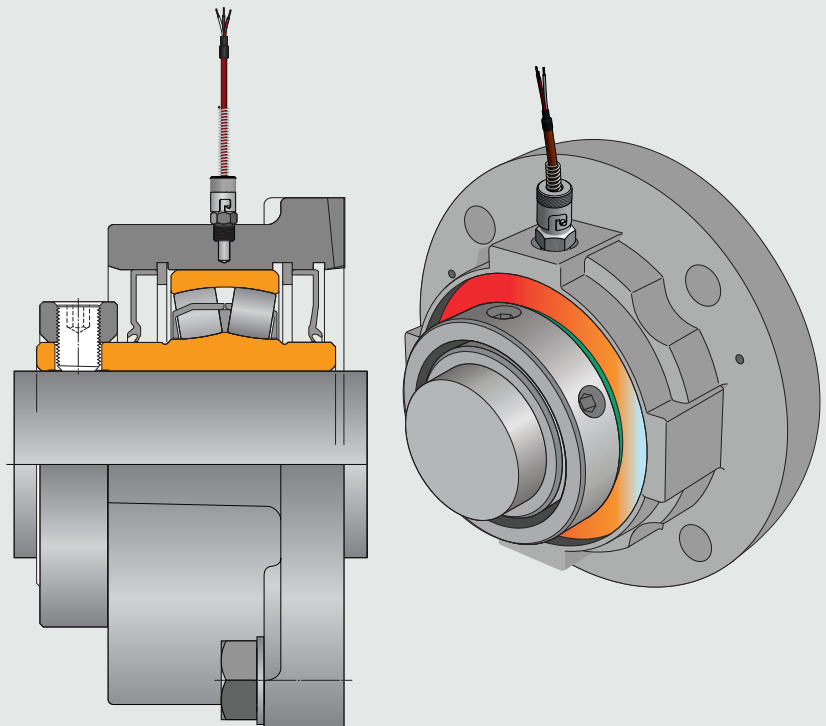
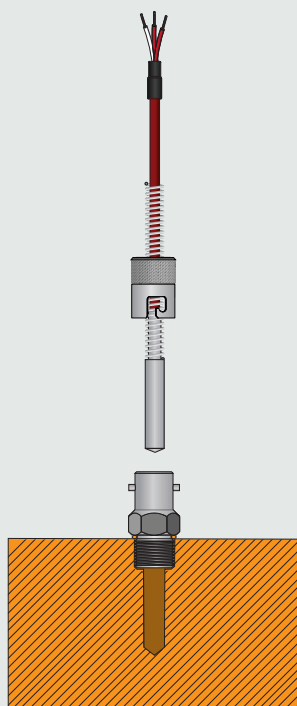


Installation examples

Extruder

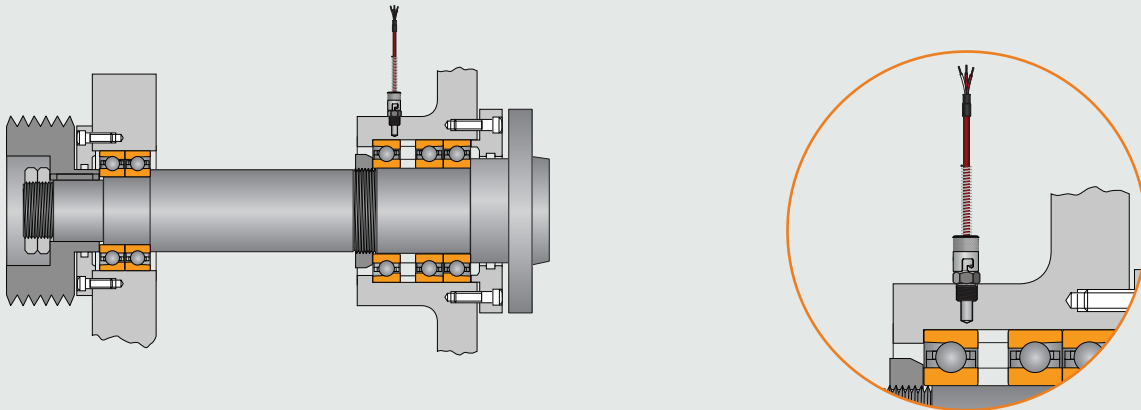


Solid body block

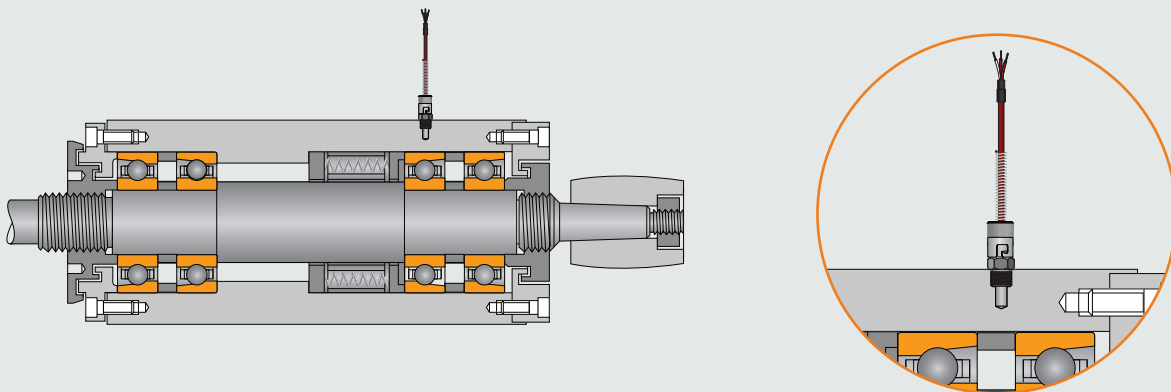


Installation examples

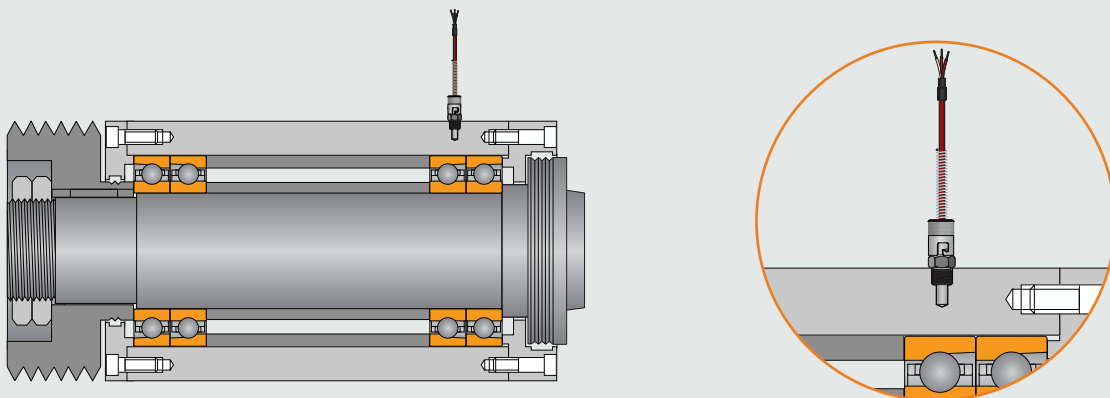
Medium Speed Spindle



High-Speed Spindle



Workhead Spindle



CABLE RESISTANCE THERMOMETER

WITH BAYONET CAP, TYPE **TOPE310**, **TOPE311**, **TOPE312**



Data sheet TOPE310-311-312 | Edition 2023

Ordering code

TOPE31 - - - - - - - - -

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	1xPt100	<input type="checkbox"/>	Single Pt100	IEC 751, α = 0.00385
		2xPt100	<input type="checkbox"/>	Double Pt100	IEC 751, α = 0.00385
		1xNi100	<input type="checkbox"/>	Single Ni100	DIN43760, α = 0.00618
		2xNi100	<input type="checkbox"/>	Double Ni100	DIN43760, α = 0.00618
		xxx	<input type="checkbox"/>	Other, please specify	
3	Thermowell length L	25	<input type="checkbox"/>	25mm	
		50	<input type="checkbox"/>	50mm	
		75	<input type="checkbox"/>	75mm	
		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	A	<input type="checkbox"/>	Class A acc. to PN-EN 60751 / IEC 751 (available only for Pt sensing elements)	
		B	<input type="checkbox"/>	Class B acc. to PN-EN 60751 / IEC 751 / DIN43760 / GOST 6651-94	
6	Measuring circuit	2	<input type="checkbox"/>	2-wire (not available for class A)	
		3	<input type="checkbox"/>	3-wire	
		4	<input type="checkbox"/>	4-wire	
7	Connecting cable type	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
8	Bayonet adaptor thread	M10x1	<input type="checkbox"/>	M10x1	
		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	
9	Connector (optional)		<input type="checkbox"/>	without connector, free end conductors of connection cable	
		S-013-Cu-W	<input type="checkbox"/>	Miniature plug, 3-pin	
		FFA.1S	<input type="checkbox"/>	Connector LEMO® FFA size 1S	
		xxx	<input type="checkbox"/>	Other, please specify	

Examples

TOPE310-1xPt100-25-2000-A-3-TSL-G1/4"

Model type with thermowell diameter Ø5 mm, RTD sensor 1xPt100, thermowell length L=25 mm, connection cable length Lp=2000 mm, A tolerance class, 3-wire measuring circuit, single conductors in teflon insulation, sheath in silicone insulation, threaded bayonet adaptor connection G1/4", bayonet cap diameter Ø11 mm.

TOPE311-1xPt100-50-2500-B-2-TT-FFA.1S

Model type with thermowell diameter Ø6 mm, RTD sensor 1xPt100, thermowell length L=50 mm, connection cable length Lp=2500 mm, B tolerance class, 2-wire measuring circuit, single conductors in teflon insulation, sheath in teflon insulation, connection cable equipped with LEMO® FFA plug size 1S, bayonet cap diameter Ø12 mm.