CABLE RESISTANCE THERMOMETER

WITH ASSEMBLY SCREW HOLE, TYPE **TOPE416**

Data sheet TOPE416 | Edition 2023

Application

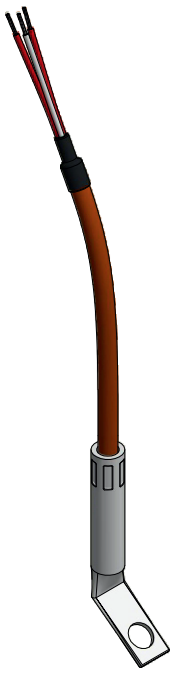
- General industrial services
- Temperature measurement on flat surfaces

Features

- Single and double sensing element
- Sensor ranges from -50 .. +400°C
- Connection line 2-, 3-, 4-wire
- Versions with/without connector
- Cable from PVC, silicone, PFA or other materials

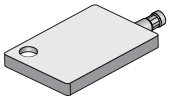
Options

- Cable material according to customer's specification
- Customized tip of sensor
- Spring protection at cable relief
- ATEX, IECEx certification

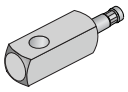


TOPE416
TSL cable insulation
(teflon®FEP/silicone)

Optional versions



TOPE416F
Metal contact block



TOPE416R
Rectangular shape block

Description

Resistance thermometers TOPE416 are designed for assembling directly onto machine parts or other construction elements.

Assembly screw hole in protection tube allows to mount sensor with standard fasteners e.g. bolts and rivets.

TOPE416 consists of thermometric resistor, protection tube made out of stainless steel and connection cable.

Number of sensors, accuracy, cable length and insulation can be selected individually for the respective application.

Temperature transmitter (Option)

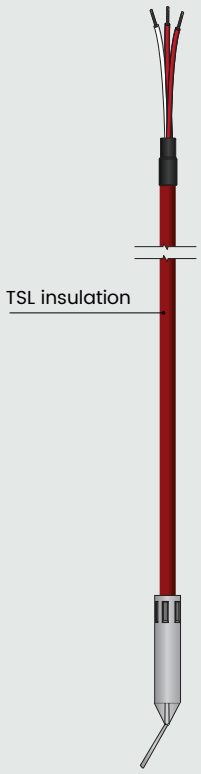
It is possible to use a temperature transmitter with signal output 4÷20mA or 0÷10V in the control cabinet. Transmitters with communication protocol HART®, Profibus® are also available. More details in "Temperature transmitters" section.

ATEX, IECEx, EAC Ex versions

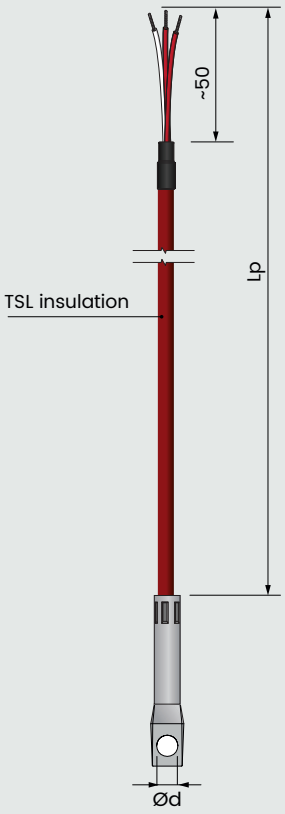
Intrinsically safe designs are available for applications in hazardous areas. These models are provided with certificate for ‚intrinsically safe" type of protection according to Directive 2014/34/UE (ATEX), IECEx scheme and EAC Ex TR-CU 012/2011 (Eurasian Economic Union).

Intrinsically safe (Exi)	XI-TOPE416

Construction



TOPE416



TOPE416

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

Sensing element

Pt100, Pt500, Pt1000 (IEC 751, α =0.00385)

Option:
Ni100, Ni500, Ni1000 (DIN43760,α =0.00618)
Cu50, Cu100 (GOST 6651-94,α =0.00426)

Tolerances

Platinum
Class A (±0.15°C in temp. 0°C)
Class B (±0.30°C in temp. 0°C)

PN-EN 60751 standard defines the formulas for calculating acceptable measure tolerance of platinum thermometers

Class of tolerance	Tolerance
A	± 0.15 + (0.002 x | t |)
B	± 0.30 + (0.005 x | t |)

Electrical parameters

Measuring current	nom. 0,1 mA to 1 mA
Isolation resistance	>10 GΩ (test 500 VDC)

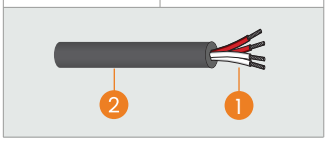
Housing material

Stainless steel 1H18N9T (1.4541 / AISI321)

Insulation types of connection cable

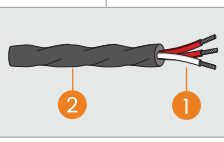
JJ insulation

① Conductor	PVC
② Sheath	PVC



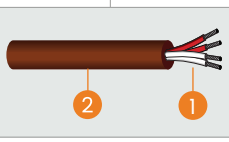
SLSL insulation

① Conductor	Silicone
② Sheath	Silicone



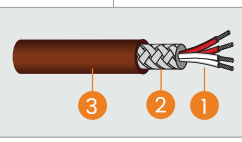
TSL insulation

① Conductor	Teflon® FEP
② Sheath	Silicone



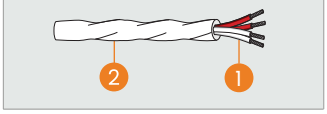
TPSL insulation

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



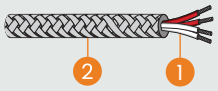
TT insulation

① Conductor	Teflon® PFA
② Sheath	Teflon® PFA



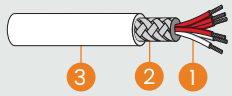
TP insulation

① Conductor	Teflon® PFA
② Sheath	Stainless steel braid



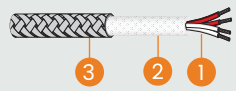
TCuT insulation

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



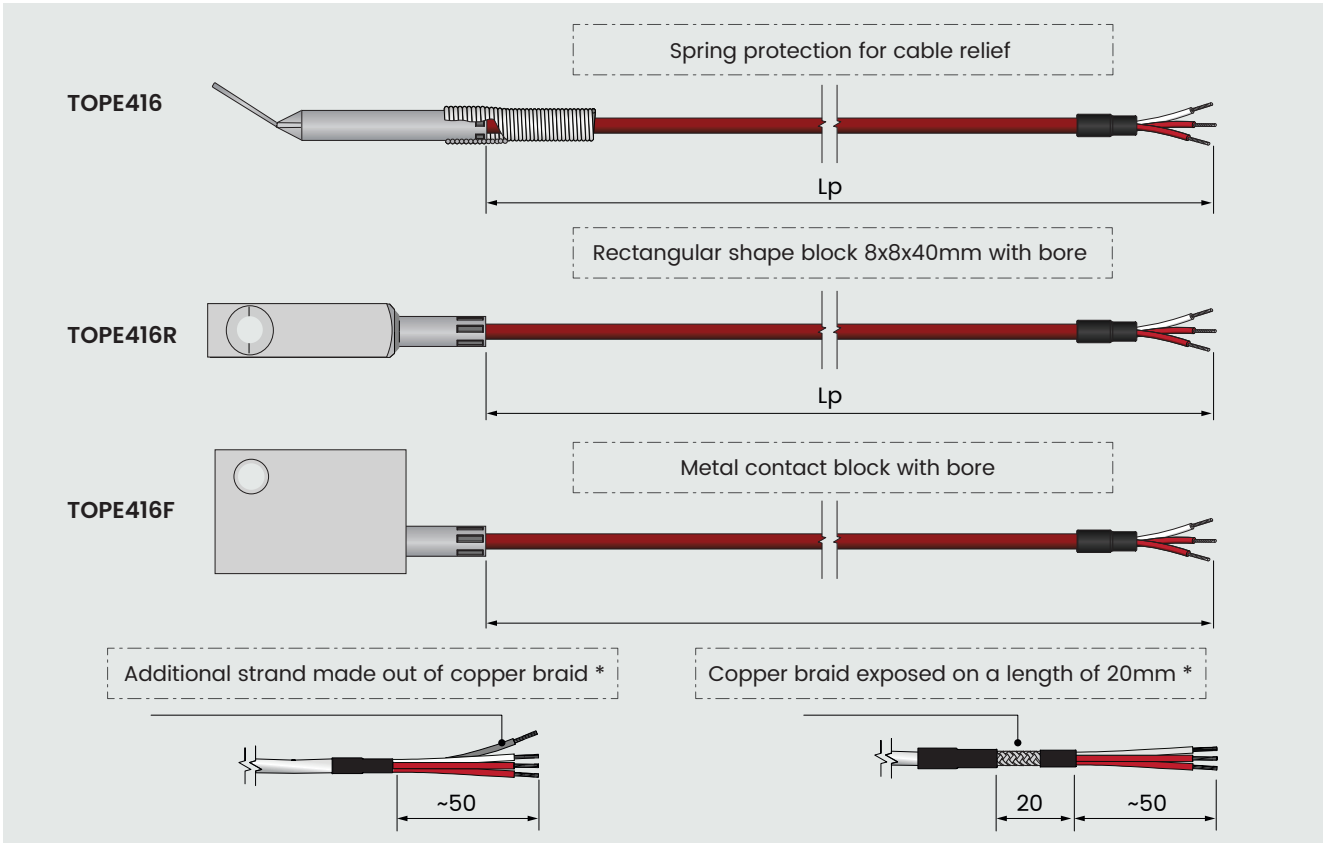
GLGLP insulation

① Conductor	Fiberglass
② Screen	Fiberglass
③ Sheath	Stainless steel braid



Non-standard sensor versions

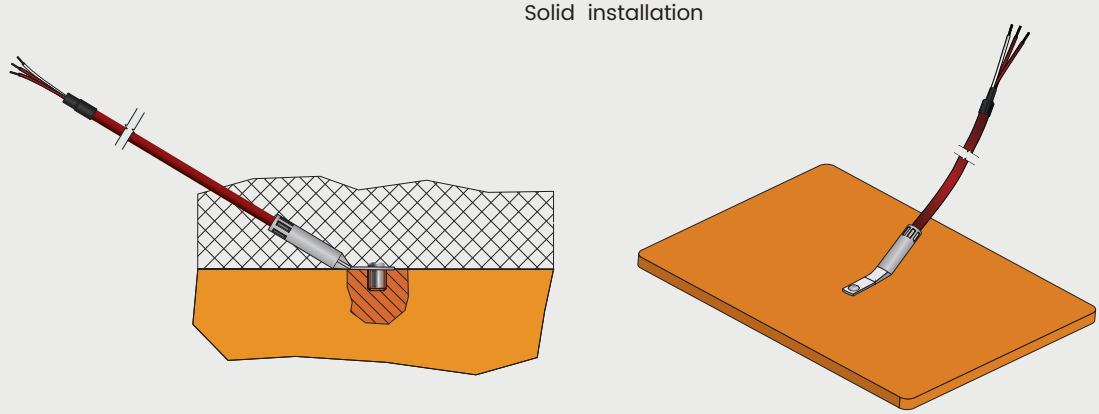
This data sheet contains only a small portion of our program of supplying cable resistance thermometers. Other versions can be supplied upon customer's request. Below presented examples of customized versions.



Installation examples

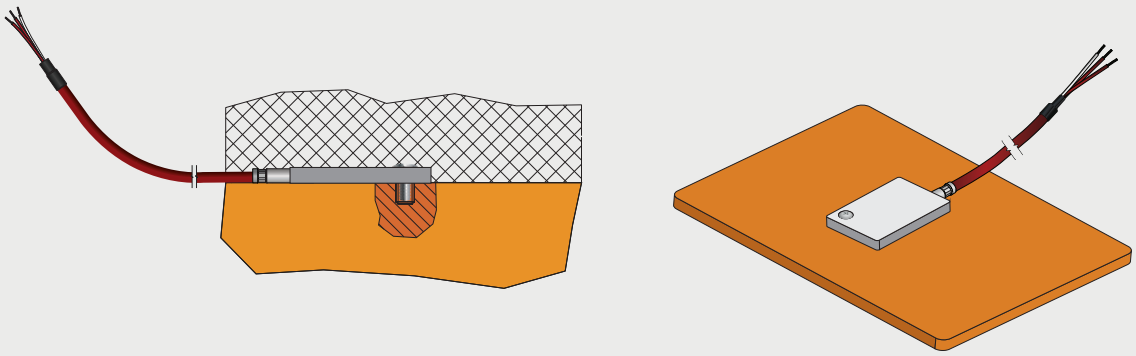
TOPE416

Solid installation



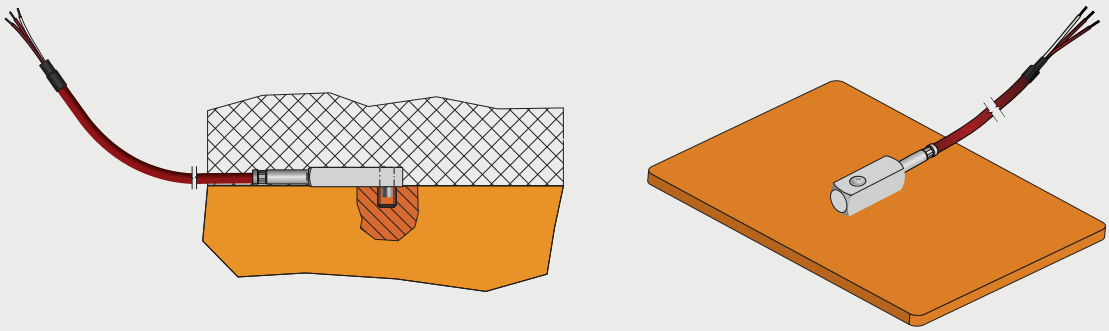
TOPE416F

Flat plate (metal contact block with bore)



TOPE416R

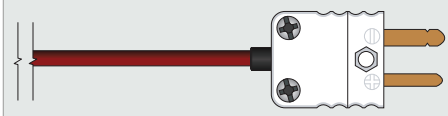
Rectangular shape block 8x8x40mm with bore



Connectors (Optional)

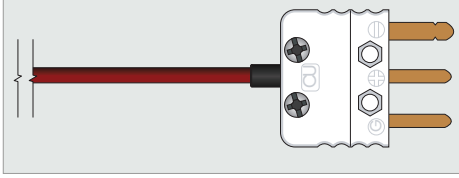
Sensors with connection cable can be equipped with connector.
Available options:

Connector S-010-Cu-W
Miniature plug, 2-pin.

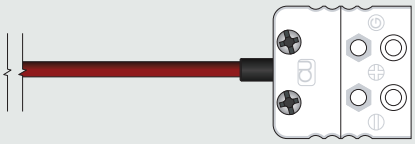


Connector S-010-Cu-G
Miniature socket, 2-pin.

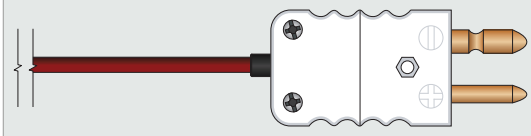
Connector S-013-Cu-W
Miniature plug, 3-pin.



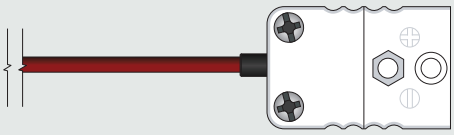
Connector S-013-Cu-G
Miniature socket, 3-pin.



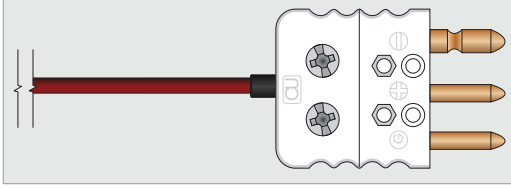
Connector S-020-Cu-W
Standard plug, 2-pin.



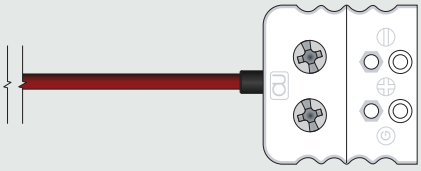
Connector S-020-Cu-G
Standard socket, 2-pin.



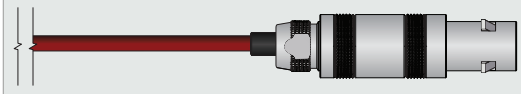
Connector S-023-Cu-W
Standard plug, 3-pin.



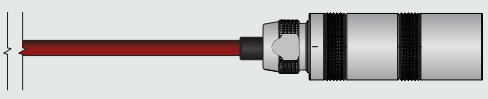
Connector S-023-Cu-G
Standard socket, 3-pin.



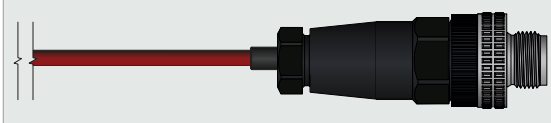
Connector LEMO® FFA
Plug size from 0S to 3S. 2-, 3-, 4-, 6-pin.



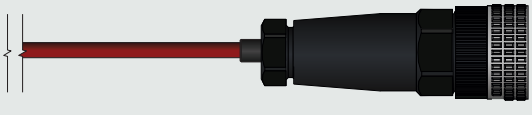
Connector LEMO® PCA
Plug size from 0S to 3S. 2-, 3-, 4-, 6-pin.



Hirschmann M12 series
4-pin.



Hirschmann M12 series
Standard socket, 4-pin.



Ordering code

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

Order	Parameter	Code	✓	Description	
1	Model type	16	☐	Angle version	
		16F	☐	Flat plate (metal contact block with bore)	
		16R	☐	Rectangular shape block 8x8x40mm with bore	
2	Type of sensing element	1xPt100	☐	Single Pt100	IEC 751, α =0.00385
		2xPt100	☐	Double Pt100	IEC 751, α =0.00385
		1xNi100	☐	Single Ni100	DIN43760, α =0.00618
		2xNi100	☐	Double Ni100	DIN43760, α =0.00618
		xxx	☐	Other, please specify	
3	Assembly screw hole diameter Ød	4.2	☐	Ø4,2 mm	
		6.2	☐	Ø6,2 mm	
		8.2	☐	Ø8,2 mm	
		xxx	☐	Other, please specify	
4	Connecting cable length Lp	1000	☐	1000mm	
		2500	☐	2500mm	
		xxx	☐	Other, please specify	
5	Tolerance class	A	☐	Class A acc. to PN-EN 60751 / IEC 751 (available only for Pt sensing elements)	
		B	☐	Class B acc. to PN-EN 60751 / IEC 751 / DIN43760 / GOST 6651-94	
6	Measuring circuit	2	☐	2-wire (only available in accuracy class B)	
		3	☐	3-wire	
		4	☐	4-wire	
7	Connecting cable type	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 / Fiber glass / Stainless steel	-50 .. +400°C
8	Connector (optional)			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

TOPE416-1xPt100-6.2-2000-A-3-TSL
RTD sensor 1xPt100, assembly screw hole diameter Ø6,2 mm, connection cable length Lp=2000 mm, A tolerance class, 3-wire measuring circuit, single conductors in teflon insulation, sheath in silicone insulation.

TOPE416R-1xPt100-4.2-2500-B-2-TT-FFA.1S
RTD sensor 1xPt100, assembly screw hole diameter Ø4,2 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.