

# hotcontrol

Thermocouples – RTDs



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## Thermocouples – RTDs

### Components

We provide our customers with an extensive portfolio of technically mature products from the field of heating elements, thermal sensors and control technology. Since 1973, we have manufactured heating elements in Germany, and since 2002, we have been continuously developing our production location in Malta.

The manufactured products are usually individually-tailored to the customer – in extremely small unit numbers or in large quantities, at an attractive price. Our core process is organized highly efficiently using our own software, and we provide customer storage in all significant global markets. We work with our own specialists in order to select the best product for our customers.

## General information for all thermocouples and RTDs

- All dimensions are subject to general tolerances according to DIN 2768-m. Our tolerances in most cases exceed DIN 2768-m standards. Exact tolerances for your item are available on request.
- All thermocouples can be produced with ANSI color code. Other standards are available on request.
- All dimensions for mineral insulated thermocouples are subject to tolerances according to EN 61515.
- Deviations from the standard are available on request.

## Mineral Insulated Thermocouples

Technical key features	
Lead cross-section	0.22 mm <sup>2</sup>
Minimum bending radius	5.0 x sheath diameter
Classification tolerance	Class 1 or 2 (DIN 60584) Standard, Special (ANSI 96.1)

## Options

- Measuring point grounded or ungrounded
- Bend predection spring
- Attachments

## Lead Types

Lead Types	Max. Temperature	
	PFA/PFA	260 °C
GLS/GLS (MB*)	400 °C	750 °F
Kapton/Kapton	350 °C	600 °F
GLS/Kapton	350 °C	600 °F
PFA/Kapton	260 °C	500 °F
PFA/PFA/MB	260 °C	500 °F



Material information from the inside to the outside. Duplex MIT available with MB/GLS/GLS and PFA/PFA.

\* Glass silk insulated leads with glass silk insulated casing and metal braided predection sleeve.

## Performance Range

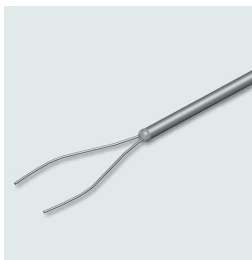
Diameter [mm]	Types	Connection head [mm]	Lead Options	Number of thermocouples
0.5	J, K, L	Ø 6 x 30	GLS/GLS/MB	1 x
0.75	J, K, L	Ø 6 x 30	GLS/GLS/MB	1 x
1.0	J, K, L	Ø 3.2 x 23	Kapton/Kapton GLS/Kapton GLS/GLS	1 x
1.0	J, K, L	Ø 4 x 22	any	1 x
1.5	J, K, L	Ø 3.2 x 23	Kapton/Kapton GLS/Kapton GLS/GLS	1 x
1.5	J, K, L	Ø 4 x 22	any	1 x
2.0	J, K, L	Ø 4 x 22	any	1 x
2.0	J, K, L	Ø 6 x 30	GLS/GLS/MB PFA/PFA	2 x
3.0	J, K, L	Ø 6 x 30	any	1 x or 2 x
4.5	J, K, L	Ø 6 x 30	any	1 x or 2 x
6.0	J, K, L	Ø 8 x 50	GLS/GLS/MB	1 x or 2 x

## Thermocouple Type Specifications

Type	Material	Standard	Lead Colors [+/-]	Sheath Material	Measurement Range
J	Fe-CuNi	IEC 60584	black/white	1.4541/ AISI 321	-40 to +750 °C -40 to 1380 °F
L*	Fe-CuNi	DIN 43710*	red/blue	1.4541	-40 to +750 °C -40 to 1380 °F
K	NiCr-Ni	IEC 60584	green/white	2.4816/ Alloy 600	-40 to +1100 °C -40 to 2010 °F
K*	NiCr-Ni	DIN 43710*	red/green	2.4816	-40 to +1100 °C -40 to 2010 °F
J	Fe-CuNi	ANSI MC 96.1	white/red	1.4541	-40 to +750 °C -40 to 1380 °F
K	NiCr-Ni	ANSI MC 96.1	yellow/red	2.4816	-40 to +1100 °C -40 to 2010 °F

\* Obsolete standard, usually for existing installations.

## Connection Type Range



BLANK  
Open ends



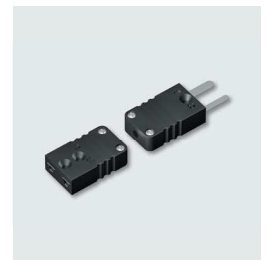
LEAD  
Connection head  
(260 or 400 °C / 500 or  
750 °F) and cable



LEMO  
LEMO connector (female)  
max. 250 °C / 480 °F



Standard  
male/female connector,  
max. 200 °C / 390 °F



Mini  
male/female connector,  
max. 200 °C / 390 °F

## Mineral Insulated Thermocouples

### Stock range

All with bend protection spring, lead length 2000 mm, measuring point ungrounded, Connection type LEAD

Stock ID	Type	Dimensions [mm]	Connection head (260 °C / 500 °F) [mm]	Lead Type
8512090	J	Ø 1.0 x 90	Ø 4 x 22	GLS/GLS MB
8512091	L	Ø 1.0 x 90	Ø 4 x 22	GLS/GLS MB
8512150	J	Ø 1.0 x 150	Ø 4 x 22	GLS/GLS MB
8512151	L	Ø 1.0 x 150	Ø 4 x 22	GLS/GLS MB
8501090	J	Ø 1.5 x 90	Ø 4 x 22	GLS/GLS MB
8501091	L	Ø 1.5 x 90	Ø 4 x 22	GLS/GLS MB
8501150	L	Ø 1.5 x 150	Ø 4 x 22	GLS/GLS MB
8501151	J	Ø 1.5 x 150	Ø 4 x 22	GLS/GLS MB
8501240	J	Ø 1.5 x 240	Ø 4 x 22	GLS/GLS MB
8501241	L	Ø 1.5 x 240	Ø 4 x 22	GLS/GLS MB
8511091	K	Ø 1.5 x 90	Ø 4 x 22	GLS/GLS MB
8511150	K	Ø 1.5 x 150	Ø 4 x 22	GLS/GLS MB

## Mineral Insulated RTDs

Technical key features	
Lead cross-section	0,22 mm <sup>2</sup>
Minimum bending radius	5,0 x sheath diameter
Classification tolerance	Class A or B
Wire circuit	2-wire-circuit: class B 3- and 4-wire-circuit: class A or B



## Lead Types

Lead Types	Max. Temperature	
PFA/PFA	260 °C	500 °F
GLS/GLS (MB*)	400 °C	750 °F
Silicone/Silicone	180 °C	355 °F

## Options

- Bend protection spring
- Attachments

Material information from the inside to the outside.

\* Glass silk insulated leads with glass silk insulated casing and metal braided protection sleeve.

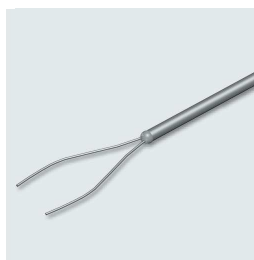
## Performance Range

Diameter [mm]	Types	Connection head [mm]	Lead Options	Number of RTDs
2.0	Pt 100, Pt 1000	Ø 6 x 30	any	1 x
3.0	Pt 100, Pt 1000	Ø 6 x 30	any	1 x
4.5	Pt 100, Pt 1000	Ø 6 x 30	any	1 x
6.0	Pt 100, Pt 1000	Ø 8 x 50	any	1 x

## Type Specifications

Type	Material	Standard	Lead Colors [+/-]	Sheath Material	Measurement Range
Pt 100	Platin	DIN EN 60751	red/white	1.4404	-50 to +600 °C -50 to 1120 °F
Pt 1000	Platin	DIN EN 60751	red/white	1.4404	-50 to +600 °C -50 to 1120 °F

## Connection Type Range



BLANK  
Open ends



LEAD  
Connection head  
(260 or 400 °C / 500 or  
750 °F) and cable



LEMO  
LEMO connector (female)  
max. 250 °C / 480 °F



Standard  
male/female connector  
max. 200 °C / 390 °F



Mini  
male/female connector  
max. 200 °C / 390 °F

## Compression Fittings for Mineral Insulated Thermocouples and RTDs

Technical key features	PTFE Clamping ring
Max. Temperature	max 200 °C / 390 °F
Max. Pressure	10 bar
Installation	removable
Technical key features	Stainless Steel Clamping ring
Max. Temperature	max. 500 °C / 930 °F
Max. Pressure	40 bar
Installation	not removable after tightening



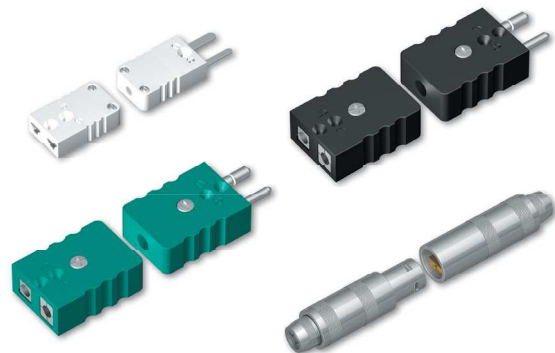
## Stock Range

Stock ID	Applicable for sheath diameter [mm]	Clamping ring material	Screw thread
8531010	1.0	PTFE	M8 x 1
8531015	1.5	PTFE	M8 x 1
8531020	2.0	PTFE	M8 x 1
8531030	3.0	PTFE	M8 x 1
8531045	4.5	PTFE	G ¼ inch
8531060	6.0	PTFE	G ¼ inch
8532010	1.0	Stainless steel	M8 x 1
8532015	1.5	Stainless steel	M8 x 1
8532020	2.0	Stainless steel	M8 x 1
8532030	3.0	Stainless steel	M8 x 1
8532045	4.5	Stainless steel	G ¼ inch
8532060	6.0	Stainless steel	G ¼ inch

## Male and female connectors (single part)

Available on request:

- Standard/Mini connectors for single or duplex thermocouples (J, K), 200 °C / 390 °F
- Standard/Mini connectors for RTDs (2, 3, 4-wire-circuit), 200 °C / 390 °F
- Standard/Mini connectors (male/female connector) 350 °C / 662 °F, 425 °C / 797 °F and 650 °C / 1202 °F
- LEMO according to customer request



## Angle RTD TEF 1

Technical key features	
Temperature range	0 to 350 °C / 32 to 660 °F
Sensor structure	Ermeto-fitting M10x1, rectangular exit, bend protection spring, immersion depth 10 to 35 mm / 0.39 to 1.38 inch
Sensor type	J, K, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



## Angle RTD PWF 1

Technical key features	
Temperature range	0 to 350 °C / 32 to 660 °F
Sensor structure	Ermeto-fitting M10x1, rectangular exit, bend protection spring, immersion depth 10 to 35 mm / 0.39 to 1.38 inch
Sensor type	Pt 100 with 2-wire-circuit
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom
Classification tolerance	Class B

## Stock range

Lead length 2000 mm

Stock ID	Type	Standard	Dimension [mm]	Leads
8700203	Pt 100	DIN EN 60751	Ø 6,0 x 60	red/white

## Insert Surface Thermocouple TEF 2

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Diameter	3, 3.5, 4, 5, 6 mm
Length	max. 500 mm
Sensor type	Type J, K, L
Lead options	GLS/GLS, GLS/GLS/MB*, PFA/PFA
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



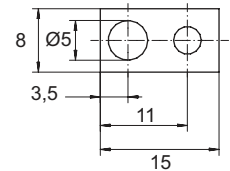
TEF2/PWF2 without mounting plate

## Insert Surface RTD PWF 2

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Diameter	3, 3.5, 4, 5, 6 mm
Length	max. 500 mm
Sensor type	Pt 100 with 2-, 3- or 4-wire-circuit*
Lead options	GLS/GLS, GLS/GLS/MB*, PFA/PFA, Silicone/Silicone*
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom
Classification tolerance	Class A or B, B is standard



TEF2/PWF2 with mounting plate



\* Depending on diameter of the tube.

## Stock range

Lead length 2000 mm, GLS/GLS, with GLS sleeving, TEF: Measuring point grounded, PWF: 2-wire-circuit

Stock ID	Type	Standard	Dimensions [mm]	Leads	Mounting plate
8600200	L Fe-CuNi	DIN 43710	Ø 3.5 x 30	red/blue	
8600210	J Fe-CuNi	IEC 60584	Ø 3.5 x 30	black/white	
8600201	L Fe-CuNi	IN 43710	Ø 3.5 x 30	red/blue	yes
8600211	J Fe-CuNi	IEC 60584	Ø 3.5 x 30	black/white	yes
8600202	L Fe-CuNi	DIN 43710	Ø 3.5 x 40	red/blue	yes
8600212	J Fe-CuNi	IEC 60584	Ø 3.5 x 40	black/white	yes
8600203	L Fe-CuNi	DIN 43710	Ø 3.5 x 40	red/blue	
8600213	J Fe-CuNi	IEC 60584	Ø 3.5 x 40	black/white	
8600204	K NiCr-Ni	DIN 43710	Ø 3.5 x 30	red/green	
8600214	K NiCr-Ni	IEC 60584	Ø 3.5 x 30	green/white	
8600207	K NiCr-Ni	DIN 43710	Ø 3.5 x 30	red/green	yes
8600217	K NiCr-Ni	IEC 60584	Ø 3.5 x 30	green/white	yes
8700200	Pt 100	DIN EN 60751	Ø 3.5 x 30	red/white	
8700201	Pt 100	DIN EN 60751	Ø 3.5 x 30	red/white	yes



## Thermocouple with Bayonet Cap TEF 4

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	bayonet cap $\varnothing i = 14.2$ mm, compression spring 200 mm / 7.87 inch immersion depth 25 to 200 mm / 0.98 to 7.87 inch
Sensor type	Type J, K, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



## RTD with Bayonet Cap PWF 4

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	bayonet cap $\varnothing i = 14.2$ mm, compression spring 200 mm / 7.87 inch immersion depth 25 to 200 mm / 0.98 to 7.87 inch
Sensor type	Pt 100 with 2-, 3- or 4-wire-circuit
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom
Classification tolerance	Class A or B, B is standard

## Stock range

Lead length 2000 mm, TEF: Measuring point grounded, PWF: 3-wire-circuit

Stock ID	Type		Standard	Dimensions [mm]		Leads
8600400	L	Fe-CuNi	DIN 43710	$\varnothing 8.0 \times 12$	118°	red/blue
8600401	J	Fe-CuNi	IEC 60584	$\varnothing 8.0 \times 12$	118°	black/white
8700205	Pt 100		DIN EN 60751	$\varnothing 8.0 \times 10.5$	118°	red/white

## Thermocouple with Bayonet Cap TEF 16

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	bayonet cap Ø i = 14.2 mm, compression spring 200 mm / 7.87 inch immersion depth 25 to 200 mm / 0.98 to 7.87 inch
Sensor type	Type J, K, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



## RTD with Bayonet Cap PWF 16

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	bayonet cap Ø i = 14.2 mm, compression spring 200 mm / 7.87 inch immersion depth 25 to 200 mm / 0.98 to 7.87 inch
Sensor type	Pt 100 with 2-, 3- or 4-wire-circuit
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom
Classification tolerance	Class A or B, B is standard

## Stock range

Lead length 2000 mm, TEF: Measuring point grounded, PWF: 2-wire-circuit

Stock ID	Type		Standard	Dimensions [mm]		Leads
8601600	L	Fe-CuNi	DIN 43710	Ø 8.0 x 12	118°	red/blue
8601601	J	Fe-CuNi	IEC 60584	Ø 8.0 x 12	118°	black/white
8700209	Pt 100		DIN EN 60751	Ø 8.0 x 12	118°	red/white
8701216	K	NiCr-Ni	DIN 43710	Ø 8.0 x 12	118°	red/green
8701233	K	NiCr-Ni	IEC 60584	Ø 8.0 x 12	118°	green/white

## Thermocouple with Bayonet Cap TEF 20

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	bayonet cap Ø i = 14.2 mm, compression spring 200 mm / 7.87 inch immersion depth 25 to 200 mm / 0.98 to 7.87 inch
Sensor type	Type J, K, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



## RTD with Bayonet Cap PWF 20

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	bayonet cap Ø i = 14.2 mm, compression spring 200 mm / 7.87 inch immersion depth 25 to 200 mm / 0.98 to 7.87 inch
Sensor type	Pt 100 with 2-, 3- or 4-wire-circuit
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom
Classification tolerance	Class A or B, B is standard

## Stock range

Lead length 2000 mm, TEF: Measuring point grounded , PWF: 2-wire-circuit

Stock ID	Type		Standard	Sensor cylinder		Leads
				upper part	lower part	
8602000	L	Fe-CuNi	DIN 43710	Ø 5.0 x 19.0 mm	Ø 4.0 x 6.0 mm	red/blue
8602001	J	Fe-CuNi	IEC 60584	Ø 5.0 x 19.0 mm	Ø 4.0 x 6.0 mm	black/white
8700207	Pt 100		DIN EN 60751	Ø 5.0 x 19.0 mm	Ø 4.0 x 6.0 mm	red/white

## Screw-in Adaptors for Thermocouples and RTDs with Bayonet Cap

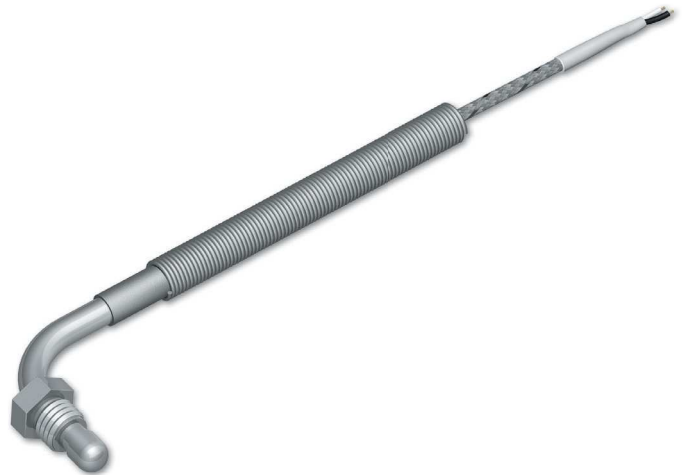


Stock ID	TEF 4	PWF 4	TEF 16	PWF 16	TEF 20	PWF 20	Screw Thread	Thread Length	Bayonet Cap	Total Length	Outside Hexagon
8700400	x	x					R 3/8 inch	10 mm	14 mm	30 mm	x
8700401	x	x					R 1/4 inch	10 mm	14 mm	30 mm	x
8700402	x	x					M14 x 1.5	10 mm	14 mm	30 mm	x
8700410	x	x					M12 x 1	8 mm	14 mm	40 mm	
8700404			x	x	x	x	M12 x 1	10 mm	12 mm	25 mm	
8700408			x	x	x	x	M12 x 1	10 mm	12 mm	40 mm	
8700411			x	x	x	x	M12 x 1	10 mm	12 mm	60 mm	

## Angle Thermocouple TEF 12

### Technical key features

Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	semicircular probe with screw-in fitting M8 x 1, bend protection spring immersion depth 10 to 15 mm / 0.39 to 0.59 inch
Sensor type	Type J, K, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded/ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



## Stock range

Lead length 2000 mm, Measuring point grounded

Stock ID	Type	Standard	Dimensions [mm]	Leads
8601200	L Fe-CuNi	DIN 43710	Ø 6.0 x 10	blue/red
8601201	J Fe-CuNi	IEC 60584	Ø 6.0 x 10	black/white

## Ring Thermocouple TEF 13

Technical key features	
Temperature range	350 °C / 660 °F
Sensor structure	washer Ø 14 mm with bore hole M4, GLS sleeve
Sensor type	Type J, K, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at washer, grounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



## Stock range

Lead length 2000 mm, Measuring point grounded, ferrules uninsulated

Stock ID	Type	Standard	Dimensions [mm]	Leads
8601300	L Fe-CuNi	DIN 43710	14 x 10 Bore hole M4	red/blue
8601301	J Fe-CuNi	IEC 60584	14 x 10 Bore hole M4	black/white
8701213	K NiCr-Ni	DIN 43710	14 x 10 Bore hole M4	red/green
8701232	K NiCr-Ni	IEC 60584	14 x 10 Bore hole M4	green/white

## Surface Thermocouple TEF A

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Sensor structure	15 x 30 x 0.5 mm, bent Ø 100 mm ±5 mm, bend protection spring
Sensor type	Type J, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



## Stock range

Lead length 2000 mm, Measuring point grounded

Stock ID	Type	Standard	Dimensions [mm]	Leads
8608815	L Fe-CuNi	DIN 43710	Ø 6.0 x 40	red/blue
8608816	J Fe-CuNi	IEC 60584	Ø 6.0 x 40	black/white

## Clamping Band Thermocouple TEF SP

### Technical key features

Temperature range	0 to 350 °C / 32 to 660 °F
Sensor structure	with clamping band, width 9 mm, bend protection spring
Sensor type	Type J, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



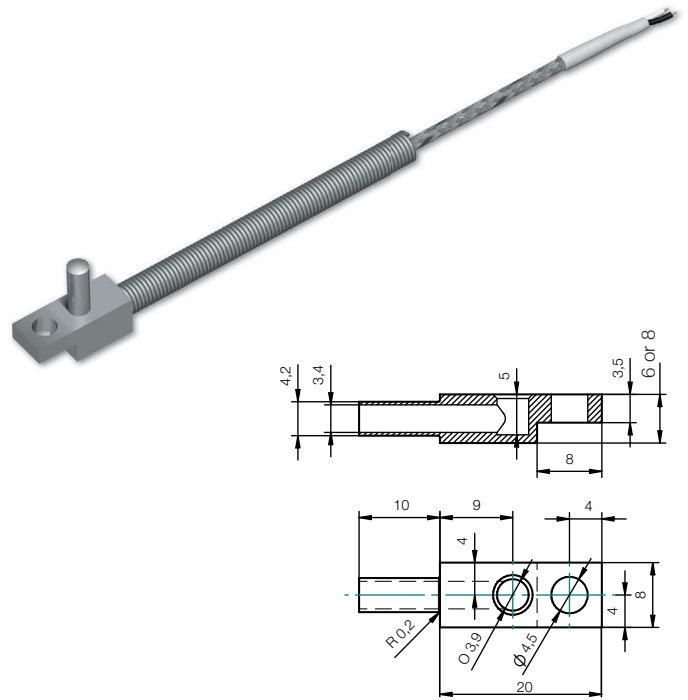
### Stock range

Lead length 2000 mm, Measuring point grounded

Stock ID	Type	Standard	Clamping range [mm]	Leads
8609925	L Fe-CuNi	DIN 43710	25 ... 40	red/blue
8609926	J Fe-CuNi	IEC 60584	25 ... 40	black/white
8609940	K NiCr-Ni	DIN 43710	40 ... 60	red/blue
8609941	K NiCr-Ni	IEC 60584	40 ... 60	black/white

## Flange Mounted Thermocouple TEF 68

Technical key features	
Temperature range	0 to 400 °C / 32 to 750 °F
Diameter	4 mm
Länge	12, 20, 35, 80 mm
Sensor structure	tip: conical and round are possible, mounting probe 90° to the block 8 x 8 x 20 mm or 6 x 8 x 20 mm, bend protection spring
Sensor type	Type J, K, L
Lead structure	GLS/GLS/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at bottom, grounded or ungrounded
Classification tolerance	Class 2 (DIN), Standard (ANSI 96.1)



### Stock range

Lead length 2000 mm, Measuring point ungrounded

Stock ID	Type	Standard	Sensor dimension [mm]	Mounting plate [mm]	Leads
8606800	L Fe-CuNi	DIN 43710	Ø 4.0 x 12	8 x 8 x 20	red/blue
8606801	J Fe-CuNi	IEC 60584	Ø 4.0 x 12	8 x 8 x 20	black/white
8701223	K NiCr-Ni	DIN 43710	Ø 4.0 x 12	8 x 8 x 20	red/green
8701234	K NiCr-Ni	IEC 60584	Ø 4.0 x 12	8 x 8 x 20	green/white

## Ring Thermocouple TEF 30

Technical key features	
Temperature range	0 to 260 °C / 32 to 500 °F
Sensor structure	Ring
Sensor type	Type J, K, L
Lead structure	PFA/PFA/MB
Lead cross-section	0.22 mm <sup>2</sup>
Measuring point	at washer, grounded or ungrounded
Classification tolerance	Class 1 (DIN), Standard (ANSI 96.1)



### Stock range

Lead length 1000 mm, Measuring point ungrounded, ferrules uninsulated

Stock ID	Type	Standard	Dimensions [mm]	Leads
8603080	L Fe-CuNi	DIN 43710	Ø 14.0 x 8.0	red/blue
8603081	J Fe-CuNi	IEC 60584	Ø 14.0 x 8.0	black/white
8603082	J Fe-CuNi	ANSI MC 96.1	Ø 14.0 x 8.0	white/red



hotset

Hotset GmbH  
Hueckstraße 16  
58511 Lüdenscheid  
Germany

Telefon +49 / 23 51 / 43 02-0  
Fax +49 / 23 51 / 43 02-25

[www.hotset.com](http://www.hotset.com)