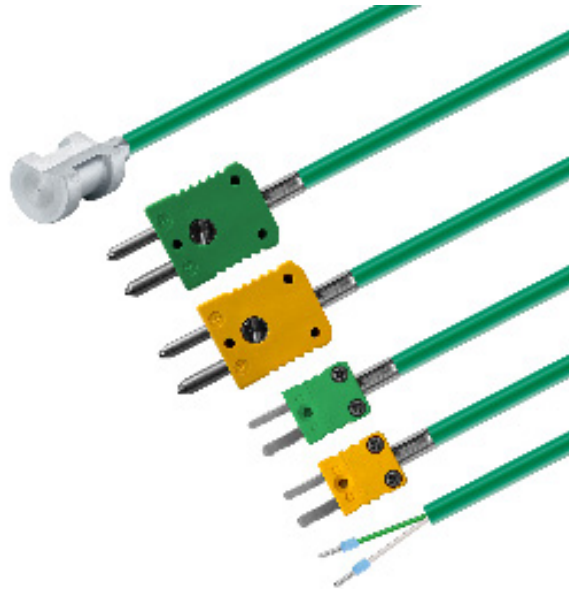


# User Manual

## Pipe contact thermocouple Type K with PFA cable

Article no.802170 1211



HP / CK 07.07.2025

All rights reserved. Changes to the documents are not allowed. Please read the operating instructions before starting any work and keep them carefully and to hand.

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Please find our whole temperature probe and transmitter portfolio in our webshop at: [www.testo-sensor.shop](http://www.testo-sensor.shop)

Managing Directors: Timo Löffler, Peter Kräuter

Amtsgericht Freiburg HRB 706025 | VAT-ID: DE274417683 | Business-ID: DE274417683-00001

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## 1. General

- The temperature probe described in the operating instructions is manufactured according to the current state of the art. All components are subject to strict quality and environmental criteria during manufacture. Our management systems are certified according to ISO 9001 and ISO 14001. The general terms and conditions in the sales documents apply, subject to technical changes.
- These operating instructions are an important part of the product. It must be available to qualified personnel and must be carefully read and understood before starting any work. Please be sure to comply with all the safety and handling instructions given. In particular, observe the local accident prevention regulations and general safety regulations applicable to the area of use of the product.
- The manufacturer's liability expires in the event of damage caused by improper use, non-observance of the instructions, use of insufficiently qualified personnel and unauthorised modifications to the product.

### 1.1. Security

**WARNING! Before installation, commissioning and operation, please make absolutely sure that the correct temperature probe has been selected with regard to design and specific measuring conditions. Failure to do so may result in serious personal injury and/or damage to property.**

- The selection of the products and, in particular, the determination of their suitability for a specific purpose are the sole responsibility of the purchaser, who must also ensure that incorrect planning, operation or installation does not cause any further damage and that compliance with the relevant construction and safety guidelines is observed and guaranteed.
- No liability or warranty is expressly accepted for damage caused by incorrect planning, operation, installation or malfunction of the products.
- The technical data and connection conditions in the supplied installation and operating instructions apply exclusively. Changes are possible in the interests of technical progress and the continuous improvement of our products.

### 1.2. Intended use

- For the intended use of the probe, please refer to the technical data and the commissioning instructions in the operating instructions. The product is designed and built exclusively for the intended use described there and may only be used accordingly. The technical specifications must be observed. Claims due to improper use are excluded.
- This product must not be used for safety-relevant tasks, such as monitoring or protecting persons against danger or injury, as an emergency stop switch on systems or machines, etc.
- This type of temperature probe has been developed, qualified and manufactured to the highest quality standards. Application-specific environmental or stress conditions can influence the behaviour and lead to deviations from the specifications in the data sheet. To avoid this, we recommend application-specific advice.

**Application-specific environmental or stress conditions can be in particular:**

- Ingress of humidity, which can lead to falsification of measured values
- Vibration, which causes high acceleration forces
- UV irradiation, which can lead to embrittlement of the cable insulation
- Tensile forces acting on the cable, which can damage the probe's internal structure
- Insufficient thermal coupling to the measured medium, with increased response times as a result
- impact with excessively high temperatures, which can change or destroy the built-in measuring resistor or electronic components
- corrosion at the cable ends or the connector contacts, so that measured value falsifications can occur

### 1.3. Personnel qualification

**WARNING! - Risk of injury due to insufficient professional qualification! Improper handling can lead to considerable personal injury and damage to property.**

- The activities described in these operating instructions may only be carried out by adequately qualified personnel. Special operating conditions may require additional, appropriate knowledge, e.g. about aggressive media, possible dangers or country-specific regulations, standards or guidelines. Please keep unqualified personnel away from the danger areas.

## 1.4. Signage, safety labels, type plate

Products are labelled as follows. (Exemplary representation)

Label for temperature probes with housing/head



Label for cable probes (attached to the cable as a flag)



## 2. Transport, packaging and storage

**Transport:** Please inspect the product for any transport damage immediately after delivery. Please notify us immediately of any obvious damage.

**Packaging:** Please remove the packaging only immediately before assembly and keep it, as the packaging provides optimum protection during transport.

**Storage:** The permissible storage temperature is -20 ... +70 °C and the ambient humidity conditions at the storage location should preferably be approx. 20% ... 85% relative humidity; condensation should be avoided.

**The following influences should be avoided:**

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (hard impact)
- Exposure to soot, steam, dust or corrosive gases
- Explosive environment, flammable atmospheres

**Original packaging: Please store the product in the original packaging in a place that meets the conditions listed above. If the original packaging is not available, please pack and store the product as follows:**

- Wrap the product in an antistatic plastic sheet.
- Place the product with the insulation material in the packaging.
- For longer storage (more than 30 days), add a bag of desiccant to the packaging.

## 3. Commissioning

### 3.1. Assembly

- The products may only be connected in a de-energised state, only to safety extra-low voltages and only by suitably qualified personnel.
- Please observe the safety regulations of the VDE, the federal states, their monitoring bodies, the TÜV and the local EVU. The installation instructions in the data sheet must be observed.
- Please observe EMC guidelines to prevent damage, faults on the product or measured value deviations.

### 3.2. Requirements for achieving the protection class (IP 65)

- Only use the cable gland in the specified clamping range (select the cable Ø to match the cable gland).
- Do not use the lower clamping area when using very soft cable types.
- Only use round cables (a slightly oval cross-section may also be suitable).
- Do not twist the cable.
- Multiple opening/closing is possible, but can have a negative effect on the protection class.
- For cables with pronounced cold flow behaviour, please tighten the screw connection if necessary.

### 3.3. Drilling template

You will find the drilling template, if available, in the technical data.

### 3.4. Pin assignment

The characteristics of our sensors can be found on our website or in the appendix to these operating instructions.

- The products are designed for operation on safety extra-low voltages (SELV).
- For the electrical connection of the products, the technical data of the products apply.
- Especially for passive probes (e.g. Pt100 etc.) in a two-wire circuit, the lead resistance of the supply line must be taken into account in order to correct measured value deviations (offset).
- If necessary, the lead resistance must be corrected in the subsequent electronics.
- Due to self-heating, the measuring current influences the measuring accuracy. Therefore, the measuring current should not be greater than 1 mA.

#### Wiring diagram



### 3.5. Maintenance

The product is maintenance-free. Repairs may only be carried out by the manufacturer or by qualified personnel.

### 3.6. Disposal

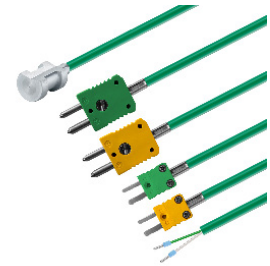
The product is to be classified as electrical and electronic equipment, so that it must be disposed of as electrical / electronic waste. Alternatively, you can return the product to us for proper disposal. The product should not be disposed of as household waste. Special treatment for special components may be legally mandatory and ecologically sensible. Please also observe the local legislation applicable to disposal.

## 4. Technical data and assembly instructions

### Pipe contact thermocouple Type K with PFA cable

#### Article no.802170 1211

Type K pipe contact thermocouples with aluminum prism and PFA cable precisely measure the surface temperature of bent objects such as pipes. The contact body with a special radius is ideal for pipes with a diameter of 30 mm to 110 mm. The measuring range extends from -30 to 260 °C. We offer various cable lengths and connection plugs so that you can adapt the thermocouple optimally to your installation situation. You will find suitable plugs and connection cables in our accessories.



General Information	
Measuring range	-40 °C to +260 °C depending on chosen connection cable
Perm. °C range cable	-50 °C to +260 °C
Accuracy	-40 °C to +375 °C: ±1,5 °C according to DIN IEC 60584 Class 1

Supply and output	
Measuring element	Thermocouple Type K
Measuring point	Measuring point isolated
Measurement signal	Thermovoltage

Ambient conditions	
Protection class	IP54 according DIN 60529 (depending on cable)
Humidity and moisture condensation resistance	according to application-specific qualification

Certificates and Standards	
Standards	DIN EN 61326-1:2013   DIN EN IEC 63000:2019-05
Directive	RoHS 2011/65/EU   2014/30/EU



**Customizable options**  
 E - Material connection cable  
 F - Length connection cable  
 G - Connector  
 H - Bend protection

Contact body				
Picture	Contact body		Dimensioning	Drawing
	Contact geometry	Prism	Length (mm)	20
	Material	Aluminium	Total length (mm)	32
	Contact angle	162°	Ø (mm)	15
	We offer other contact bodies on request.			

E - Cable material and configuration connection cable											
Picture	Code	Type	Color	IP	From (°C) <sup>1)</sup>	To (°C) <sup>1)</sup>	Outside material	Material strand	Ø (mm) <sup>2)</sup>	Q (mm <sup>2</sup> )	Color strand
	E8520	Thermocouple cable	Type K <sup>3)</sup>	IP67	-50	+260	PFA	PFA	2,5	0,22	gn, wt
Insulation resistance: ≥ 100 MOhm a min. 100 VDC   <sup>1)</sup> Perm. range °C   <sup>2)</sup> Tolerance ± 0,2 mm   <sup>3)</sup> Color according to IEC 584   <sup>4)</sup> per thermocouple											

F - Length									
Code	F010	F020	F030	F040	F050	F100	F150	F200	
m	1	2	3	4	5	10	15	20	
Other lengths on request									

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G - Connector			
Picture	Code	Feature	Technical drawing - Stecker
	G01	Insulated end ferrules (50 mm)	
	G12	Mini-TC connector Type K gn	
	G19	Mini-TC connector Type K ye	
	G32	TC connector Type K gn	
	G39	TC connector Type K ye	

H - Bend protection				
Picture	Length (mm)	Material	Code	Feature
	50	Stainless steel spring 1.4310   SUS 302	H0	Without (Standard)
			H1	Metal bend protection

Your order code				
Article no.	Material connection cable	Length connection cable	Connector	Bend protection
802170 1211	E_____	F_____	G_____	H_____

Delivery and Assembly	
Assembly instructions	Using quick-release strap, clamping range Ø 30 mm to 110 mm
Delivery and Packaging	Probe, Quick-release strap, separately packaged in PE bag

Important assembly advices	
<p>The surface must be polished and free of residues. Please attach the probe securely. Use the quick-release strap provided. Ensure good thermal contact and use the thermal conduction paste provided. Depending on requirements, it may be advisable to insulate the probe to minimize the influence of the ambient temperature.</p>	

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**Technical drawing**

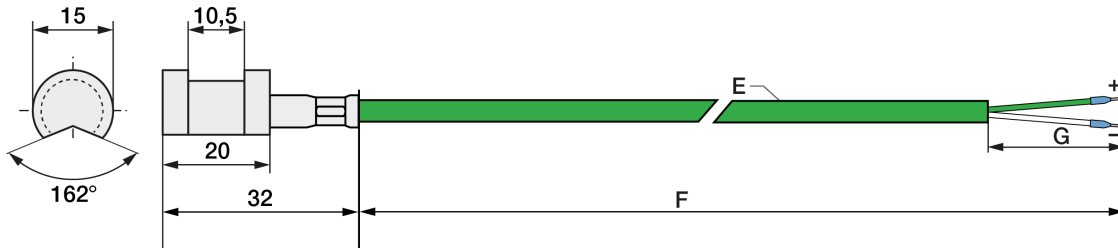
**Customizable options**

E - Material connection cable  
F - Length connection cable

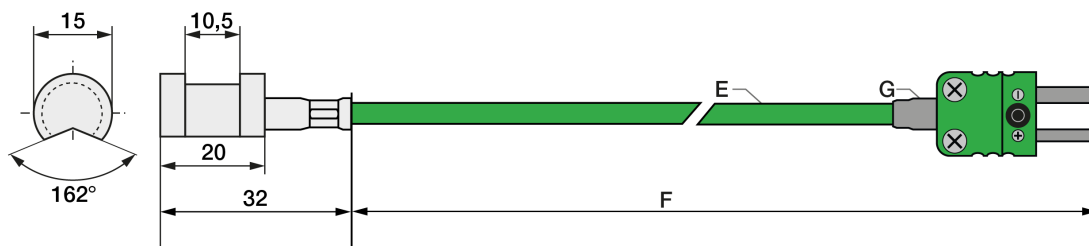
G - Connector  
H - Bend protection

All dimensions in mm

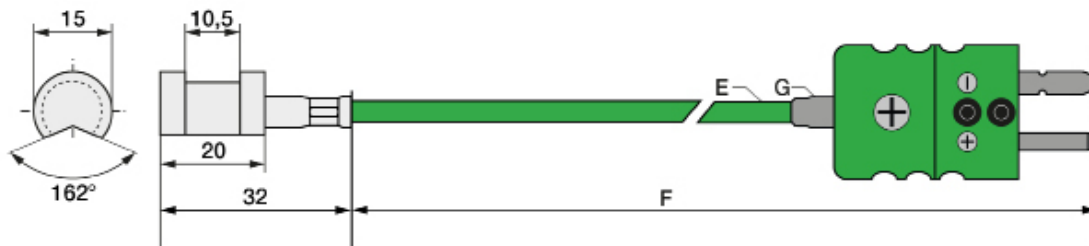
**Version with insulated end ferrules**



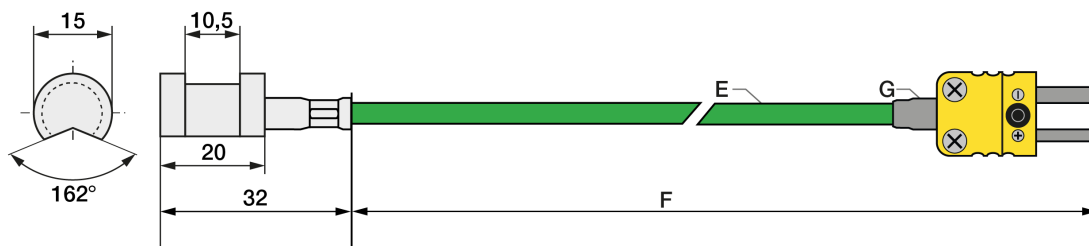
**Version with Mini TE connector**



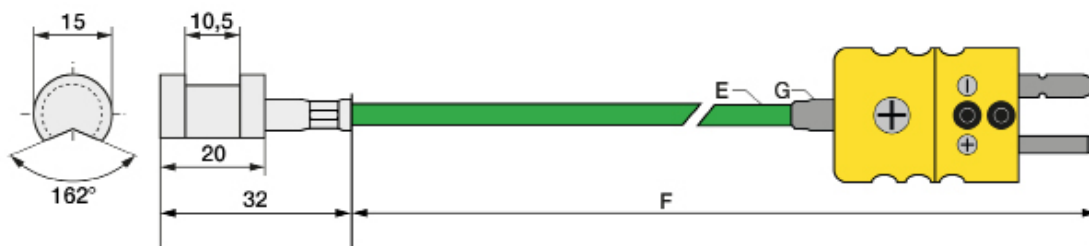
**Version with TE connector**



**Version with Mini TE connector**



**Version with TE connector**



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## Matching accessories: Connector

G - Connector					
Picture	Code	Feature	Picture	Code	Feature
	809140 2000	Mini-TC connector Type K gn		809100 2000	Mini-TC coupling Type K gn
	809150 2000	TC connector Type K gn		809110 2000	TC coupling Type K gn
	809140 2001	Mini-TC connector Type K ye		809100 2001	Mini-TC coupling Type K ye
	809150 2001	TC connector Type K ye		809110 2001	TC coupling Type K ye

Technical drawing - Connector			
	Mini-TC connector		Mini-TC coupling
	TC connector		TC coupling

Other connectors available on request

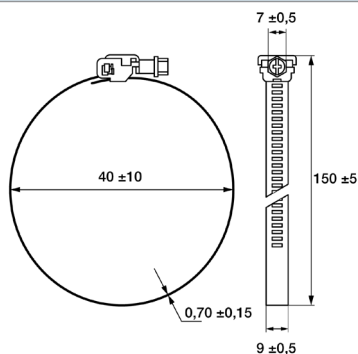
## Matching accessories: Heat-conducting paste

Heat-conducting paste		
Picture	Article no.	809540 1000
	Content	10 ml
	Thermal conductivity	>2.5 W/mK
	Min / Max °C	-30 °C to +280 °C
	Thermal resistance	< 0.126

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# Matching accessories: Quick-release strap

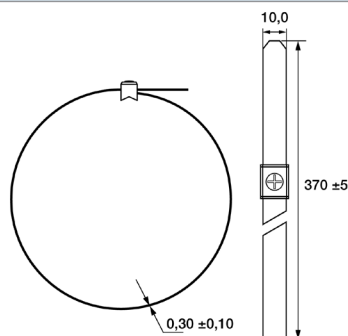
## Quick-release strap



<b>Article no.</b>	<b>809550 1000</b>
Clamping range (mm)	Ø 25 to 40
Material	Stainless Steel
Dimensions (L/W) (mm)	150 <sup>1)</sup> / 9 <sup>2)</sup>
Closure	Screw closure

<sup>1)</sup>± 5 mm | <sup>2)</sup>± 0,5 mm

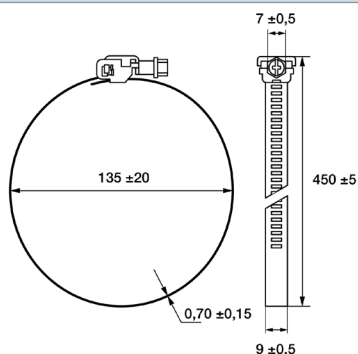
## Quick-release strap



<b>ArtikelnrArticle no.</b>	<b>809550 2000</b>
Clamping range (mm)	Ø 30 to 110
Material	Stainless Steel
Dimensions (L/W) (mm)	370 <sup>1)</sup> / 10
Closure	Screw closure

<sup>1)</sup>± 5 mm | <sup>2)</sup>± 0,5 mm

## Quick-release strap



<b>Article no.</b>	<b>809550 3000</b>
Clamping range (mm)	Ø 25 to 135
Material	Stainless Steel
Dimensions (L/W) (mm)	450 <sup>1)</sup> / 9 <sup>2)</sup>
Closure	Screw closure

<sup>1)</sup>± 5 mm | <sup>2)</sup>± 0,5 mm

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## 5. Characteristics

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# Characteristic Thermocouple Type K

## Measuring range: -40 °C to +1.200 °C

Accuracy class Thermocouple Type K according DIN IEC 60584	
Class	Formula
Cl. 1	-40 °C to +375 °C: ±1,5 °C   +375 °C to +1.000 °C: ±0,004  t
Cl. 2	-40 °C to +333 °C: ±2,5 °C   +333 °C to +1.200 °C: ±0,0075  t

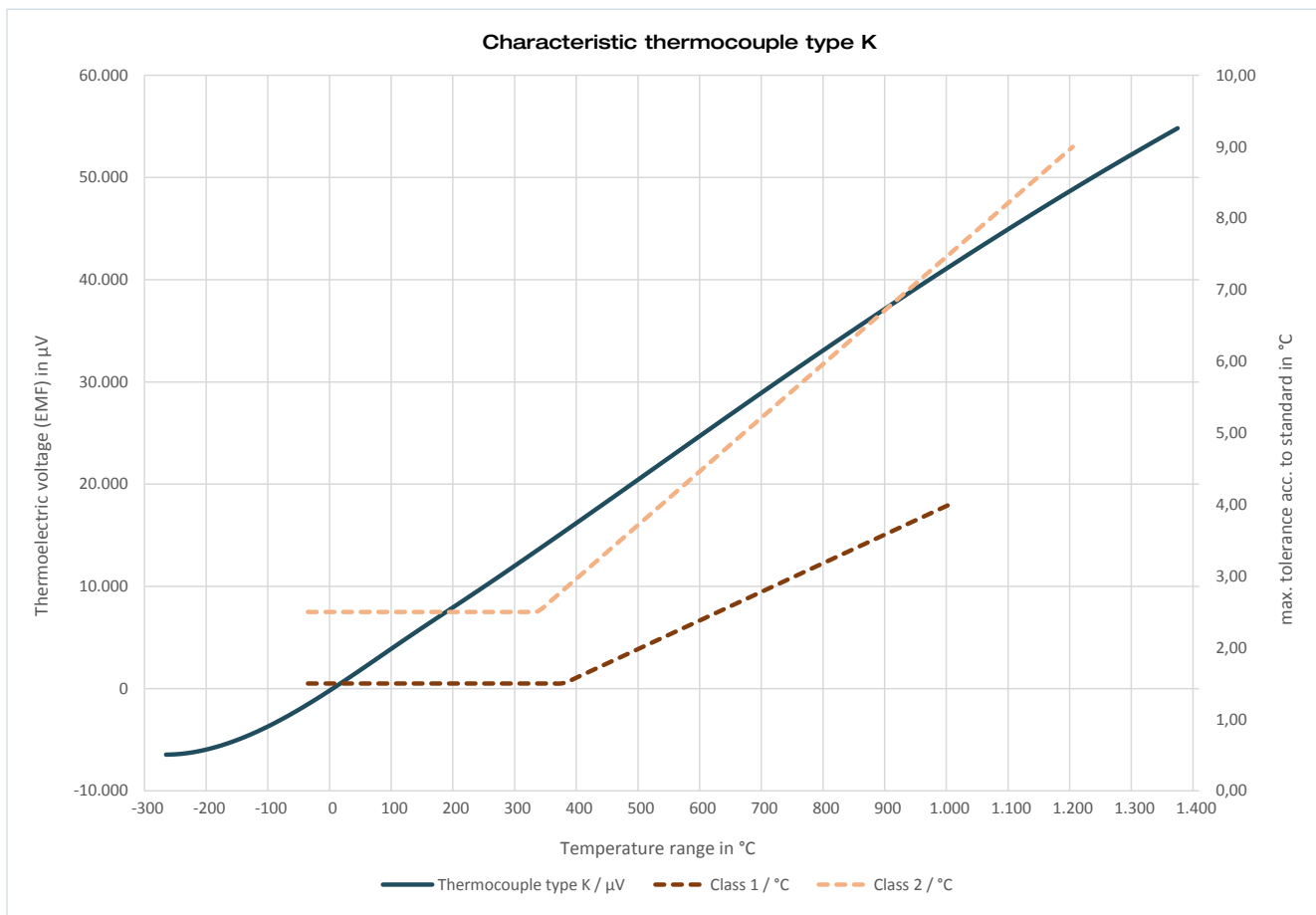
Example values		
Value @ T = 100 °C	Value @ T = 500 °C	Value @ T = 1.000 °C
±1,5 °C	±2,00 °C	±4,0 °C
± 2,5 °C	±3,75 °C	±7,5 °C

Type K T in °C	EMF* in µV	Max. tol. ± in °C**		Type K T in °C	EMF* in µV	Max. tol. ± in °C**		Type K T in °C	EMF* in µV	Max. tol. ± in °C**		Type K T in °C	EMF* in µV	Max. tol. ± in °C**	
		Cl. 1	Cl. 2			Cl. 1	Cl. 2			Cl. 1	Cl. 2			Cl. 1	Cl. 2
-270	-6.458			90	3.682	1,5	2,5	450	18.516	1,8	3,4	810	33.685	3,2	6,1
-260	-6.441			100	4.096	1,5	2,5	460	18.941	1,8	3,5	820	34.093	3,3	6,2
-250	-6.404			110	4.509	1,5	2,5	470	19.366	1,9	3,5	830	34.501	3,3	6,2
-240	-6.344			120	4.920	1,5	2,5	480	19.792	1,9	3,6	840	34.908	3,4	6,3
-230	-6.262			130	5.328	1,5	2,5	490	20.218	2,0	3,7	850	35.313	3,4	6,4
-220	-6.158			140	5.735	1,5	2,5	500	20.644	2,0	3,8	860	35.718	3,4	6,5
-210	-6.035			150	6.138	1,5	2,5	510	21.071	2,0	3,8	870	36.121	3,5	6,5
-200	-5.891			160	6.540	1,5	2,5	520	21.497	2,1	3,9	880	36.524	3,5	6,6
-190	-5.730			170	6.941	1,5	2,5	530	21.924	2,1	4,0	890	36.925	3,6	6,7
-180	-5.550			180	7.340	1,5	2,5	540	22.350	2,2	4,1	900	37.326	3,6	6,8
-170	-5.354			190	7.739	1,5	2,5	550	22.776	2,2	4,1	910	37.725	3,6	6,8
-160	-5.141			200	8.138	1,5	2,5	560	23.203	2,2	4,2	920	38.124	3,7	6,9
-150	-4.913			210	8.539	1,5	2,5	570	23.629	2,3	4,3	930	38.522	3,7	7,0
-140	-4.669			220	8.940	1,5	2,5	580	24.055	2,3	4,4	940	38.918	3,8	7,1
-130	-4.411			230	9.343	1,5	2,5	590	24.480	2,4	4,4	950	39.314	3,8	7,1
-120	-4.138			240	9.747	1,5	2,5	600	24.905	2,4	4,5	960	39.708	3,8	7,2
-110	-3.852			250	10.153	1,5	2,5	610	25.330	2,4	4,6	970	40.101	3,9	7,3
-100	-3.554			260	10.561	1,5	2,5	620	25.755	2,5	4,7	980	40.494	3,9	7,4
-90	-3.243			270	10.971	1,5	2,5	630	26.179	2,5	4,7	990	40.885	4,0	7,4
-80	-2.920			280	11.382	1,5	2,5	640	26.602	2,6	4,8	1.000	41.276	4,0	7,5
-70	-2.587			290	11.795	1,5	2,5	650	27.025	2,6	4,9	1.010	41.665		7,6
-60	-2.243			300	12.209	1,5	2,5	660	27.447	2,6	5,0	1.020	42.053		7,7
-50	-1.889			310	12.624	1,5	2,5	670	27.869	2,7	5,0	1.030	42.440		7,7
-40	-1.527	1,5	2,5	320	13.040	1,5	2,5	680	28.289	2,7	5,1	1.040	42.826		7,8
-30	-1.156	1,5	2,5	330	13.457	1,5	2,5	690	28.710	2,8	5,2	1.050	43.211		7,9
-20	-778	1,5	2,5	340	13.874	1,5	2,6	700	29.129	2,8	5,3	1.060	43.595		8,0
-10	-392	1,5	2,5	350	14.293	1,5	2,6	710	29.548	2,8	5,3	1.070	43.978		8,0
0	0	1,5	2,5	360	14.713	1,5	2,7	720	29.965	2,9	5,4	1.080	44.359		8,1
10	397	1,5	2,5	370	15.133	1,5	2,8	730	30.382	2,9	5,5	1.090	44.740		8,2
20	798	1,5	2,5	380	15.554	1,5	2,9	740	30.798	3,0	5,6	1.100	45.119		8,3
30	1.203	1,5	2,5	390	15.975	1,6	2,9	750	31.213	3,0	5,6	1.110	45.497		8,3
40	1.612	1,5	2,5	400	16.397	1,6	3,0	760	31.628	3,0	5,7	1.120	45.873		8,4
50	2.023	1,5	2,5	410	16.820	1,6	3,1	770	32.041	3,1	5,8	1.130	46.249		8,5
60	2.436	1,5	2,5	420	17.243	1,7	3,2	780	32.453	3,1	5,9	1.140	46.623		8,6
70	2.851	1,5	2,5	430	17.667	1,7	3,2	790	32.865	3,2	5,9	1.150	46.995		8,6
80	3.267	1,5	2,5	440	18.091	1,8	3,3	800	33.275	3,2	6,0	1.160	47.367		8,7

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Type K T in °C	EMF* in µV	Max. tol. ± in °C**		Type K T in °C	EMF* in µV	Max. tol. ± in °C**		Type K T in °C	EMF* in µV	Max. tol. ± in °C**		Type K T in °C	EMF* in µV	Max. tol. ± in °C**	
		Cl. 1	Cl. 2			Cl. 1	Cl. 2			Cl. 1	Cl. 2			Cl. 1	Cl. 2
1.170	47.737		8,8	1.230	49.926			1.290	52.060			1.350	54.138		
1.180	48.105		8,9	1.240	50.286			1.300	52.410			1.360	54.479		
1.190	48.473		8,9	1.250	50.644			1.310	52.759			1.370	54.819		
1.200	48.838		9,0	1.260	51.000			1.320	53.106						
1.210	49.202			1.270	51.355			1.330	53.451						
1.220	49.565			1.280	51.708			1.340	53.795						

\*Thermoelectric voltage (EMF) in µV  
\*\*Maximum tolerance according DIN IEC 60584



The standard specifies measuring ranges for thermocouples in which the respective measuring accuracy of the tolerance class applies. For use outside this specified measuring range, it is not possible to specify the measuring accuracy. If the thermocouple is operated outside the specified measuring range of its respective tolerance class, irreversible damage to the thermocouple may occur, which will result in a measurement deviation (even within the specified range). Use beyond the measuring range of the tolerance class represents misuse and leads to a loss of warranty.

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