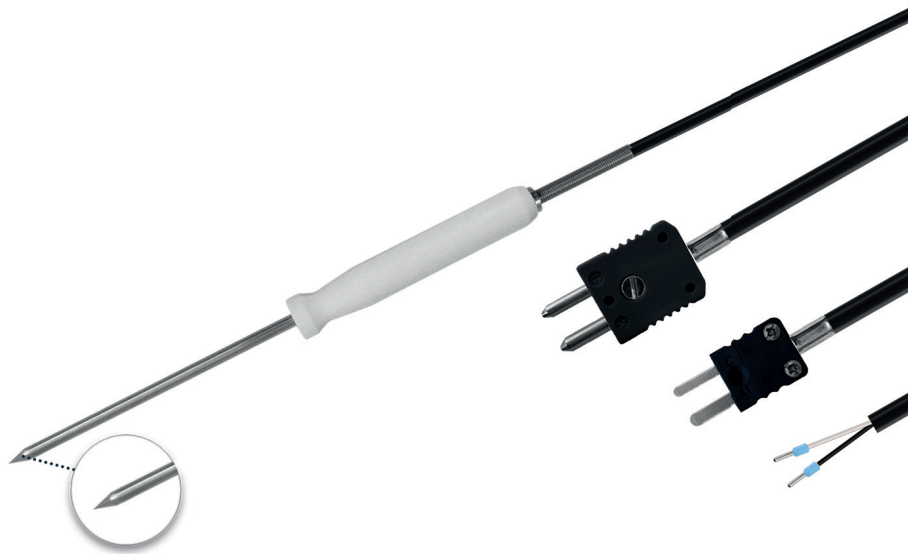


# User Manual

## Penetration probe thermocouple Type J

Article no.802410 1111



HP / CK 12.06.2024

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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)

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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.

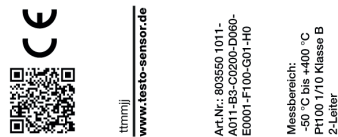
## 1.4. Signage, safety labels, type plate

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

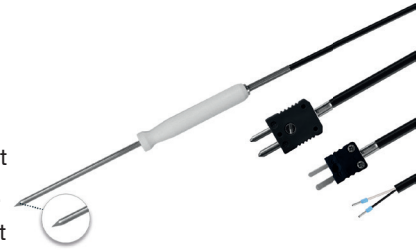
The product is to be classified as electrical and electronic equipment, so that it must be disposed of as electrical / electronic waste. Alternatively, you can return the product to us for proper disposal. The product should not be disposed of as household waste. Special treatment for special components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

## 4. Technical data and assembly instructions

### Penetration probe thermocouple Type J

Article no.802410 1111

Penetration Thermocouples are perfect for measuring the core temperature in viscoplastic media or for measuring the air temperature. The stainless steel sleeve with the centric measuring tip and the connecting cable are firmly connected and cast in a water vapor-tight manner. The ergonomic PTFE handle serves as heat protection. To order your penetration probe, select the required configuration features and submit the order code.



General Information	
Measuring range	-40 °C to +260 °C depending on chosen connection cable
Perm. °C range cable	see cable
Accuracy	-40 °C to +375 °C: ±1,5 °C according to DIN IEC 60584 Class 1
Response time	t63 / t99: information is available on request
Pull-out force	≥ 30 N
Supply and output	
Measuring element	Thermocouple Type J
Measuring point	Measuring point isolated
Measurement signal	Thermovoltage
Ambient conditions	
Protection class	IP65 according DIN 40050, water-vapour-proof casted   Probe not autoclavable / sterilizable
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
Certificates	Certificate of suitability (on request)



#### Customizable options

- E - Material connection cable
- F - Length connection cable
- G - Connector
- I - Ø measuring tip

Handle und Measuring tip							
Bild	Handle		Measuring tip		I - Ø measuring tip		Zeichnung
	Material	PTFE	Design	Central auxiliary tip	Code	Ø in mm	
	Length (mm)	120	Material	Stainless steel 1.4571   316TI	I4	4	
	Ø (mm)	20	Length	150 mm	I6	6	

E - Cable material and configuration connection cable												
	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	Ω / m <sup>4)</sup>
	E8210	Thermocouple cable	Type J <sup>3)</sup>	IP67	-50	+180	Silicone	FEP	3,6	0,22	bk, wt	2,5
	E8510	Thermocouple cable	Type J <sup>3)</sup>	IP67	-50	+260	PFA	PFA	2,6	0,22	bk, wt	2,5

Insulation resistance: ≥ 100 MOhm at 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
m	1	2	3	4	5	10

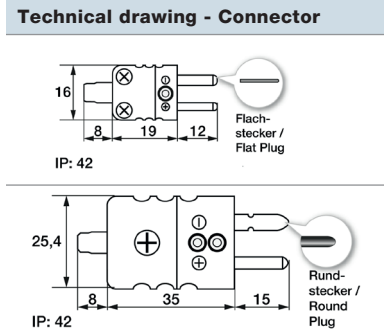
Other lengths on request

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G - Connector					
Picture	Code	Feature	Picture	Code	Feature
	G01	Insulated end ferrules (50 mm)			
	G11	Mini-TC connector Type J bk		G31	TC connector Type J bk

Other connectors available on request



H - Bend protection		
	Length (mm)	50
	Material	Stainless steel spring 1.4310   SUS 302

Delivery and Assembly	
Delivery and Packaging	Probe, separately packaged in PE bag

**Important advices**

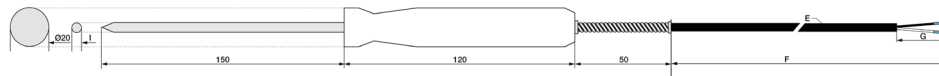
Eintauchtiefe = mind. 10 x Ø Sondenrohr  
Immersion depth = min 10 x Ø probe tube

For an exact measurement of the temperature, insert the probe sufficiently deep into the medium to be measured (at least 10 times the diameter of the probe shaft.) Please leave the probe in the medium until the final temperature is reached.  
Please make sure that you only immerse the probe shaft and not the cable or the connector into the medium.  
This probe cannot be autoclaved or sterilized.

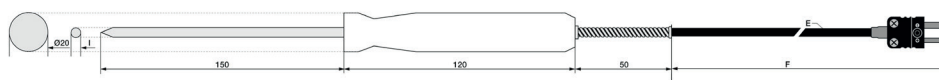
**Your order code**

Article no.	Material connection cable	Length connection cable	Connector	Ø measuring tip
802410 1111	E_____	F_____	G_____	I_____

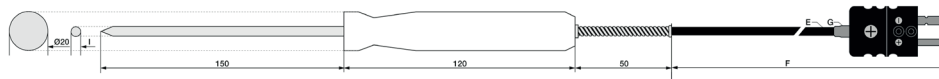
**Version with insulated end ferrules**



**Version with Mini TE connector**



**Version with TE connector**



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# Matching accessories: Cables & Connector

Details of accessories can be found on our website.

Thermocouple cables - Please select your desired cable first.												
Order 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	Ω / m <sup>4)</sup>	
809310 1	Thermocouple cable	Type J <sup>3)</sup>	IP67	-50	+180	Silicone	FEP	3,6	0,22	bk, wt	2,5	

Insulation resistance: ≥ 100 MOhm at min. 100 VDC | <sup>1)</sup>per. °C range | <sup>2)</sup>Tolerance ± 0.2 mm | <sup>3)</sup> Color according to IEC 584 | <sup>4)</sup>per thermocouple

Now please select the length and add the code to the article no. of the cable.

Length (m)	1	2	5	10	20
Code	010	020	050	100	200

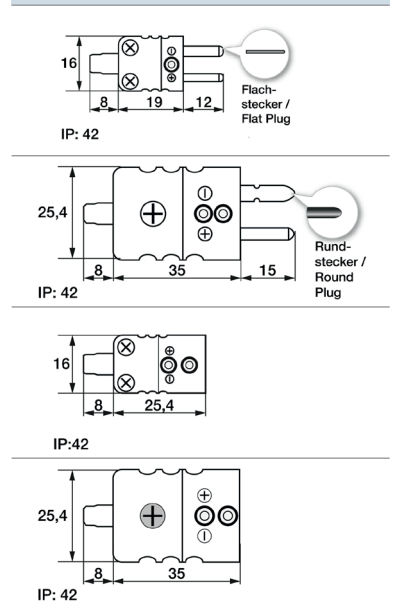
Please append these digits to the part number of your desired cable.

# Matching accessories: Connector

Connector					
Picture	Code	Feature	Picture	Code	Feature
	809140 1000	Mini-TC connector Type J bk		809100 1000	Mini-TC coupling Type J bk
	809150 1000	TC connector Type J bk		809110 1000	TC coupling Type J bk

Other connectors available on request

Technical drawing - Connector



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## 5. Characteristics

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# Kennlinie Thermoelement Typ J

Messbereich: -40 °C bis +750 °C

Genauigkeitsklassen Thermoelement Typ J lt. DIN IEC 60584	
Klasse	Formel
Kl. 1	-40 °C bis +375 °C: ±1,5 °C   +375 °C bis +750 °C: ±0,004  t
Kl. 2	-40 °C bis +333 °C: ±2,5 °C   +333 °C bis +750 °C: ±0,0075  t

Beispielwerte		
Wert bei T = 100 °C	Wert bei T = 500 °C	Wert bei T = 700 °C
±1,5 °C	±2,00 °C	±2,8 °C
± 2,5 °C	±3,75 °C	±5,25 °C

Typ J		max Tol. ± in °C**	
T in °C	EMF* in µV	Kl. 1	Kl. 2
-210	-8.095		
-200	-7.890		
-190	-7.659		
-180	-7.403		
-170	-7.123		
-160	-6.821		
-150	-6.500		
-140	-6.159		
-130	-5.801		
-120	-5.426		
-110	-5.037		
-100	-4.633		
-90	-4.215		
-80	-3.786		
-70	-3.344		
-60	-2.893		
-50	-2.431		
-40	-1.961	1,5	2,5
-30	-1.482	1,5	2,5
-20	-995	1,5	2,5
-10	-501	1,5	2,5
0	0	1,5	2,5
10	507	1,5	2,5
20	1.019	1,5	2,5
30	1.537	1,5	2,5
40	2.059	1,5	2,5
50	2.585	1,5	2,5
60	3.116	1,5	2,5
70	3.650	1,5	2,5
80	4.187	1,5	2,5
90	4.726	1,5	2,5
100	5.269	1,5	2,5
110	5.814	1,5	2,5
120	6.360	1,5	2,5
130	6.909	1,5	2,5
140	7.459	1,5	2,5

Typ J		max Tol. ± in °C**	
T in °C	EMF* in µV	Kl. 1	Kl. 2
150	8.010	1,5	2,5
160	8.562	1,5	2,5
170	9.115	1,5	2,5
180	9.669	1,5	2,5
190	10.224	1,5	2,5
200	10.779	1,5	2,5
210	11.334	1,5	2,5
220	11.889	1,5	2,5
230	12.445	1,5	2,5
240	13.000	1,5	2,5
250	13.555	1,5	2,5
260	14.110	1,5	2,5
270	14.665	1,5	2,5
280	15.219	1,5	2,5
290	15.773	1,5	2,5
300	16.327	1,5	2,5
310	16.881	1,5	2,5
320	17.434	1,5	2,5
330	17.986	1,5	2,5
340	18.538	1,5	2,6
350	19.090	1,5	2,6
360	19.642	1,5	2,7
370	20.194	1,5	2,8
380	20.745	1,5	2,9
390	21.297	1,6	2,9
400	21.848	1,6	3,0
410	22.400	1,6	3,1
420	22.952	1,7	3,2
430	23.504	1,7	3,2
440	24.057	1,8	3,3
450	24.610	1,8	3,4
460	25.164	1,8	3,5
470	25.720	1,9	3,5
480	26.276	1,9	3,6
490	26.834	2,0	3,7
500	27.393	2,0	3,8

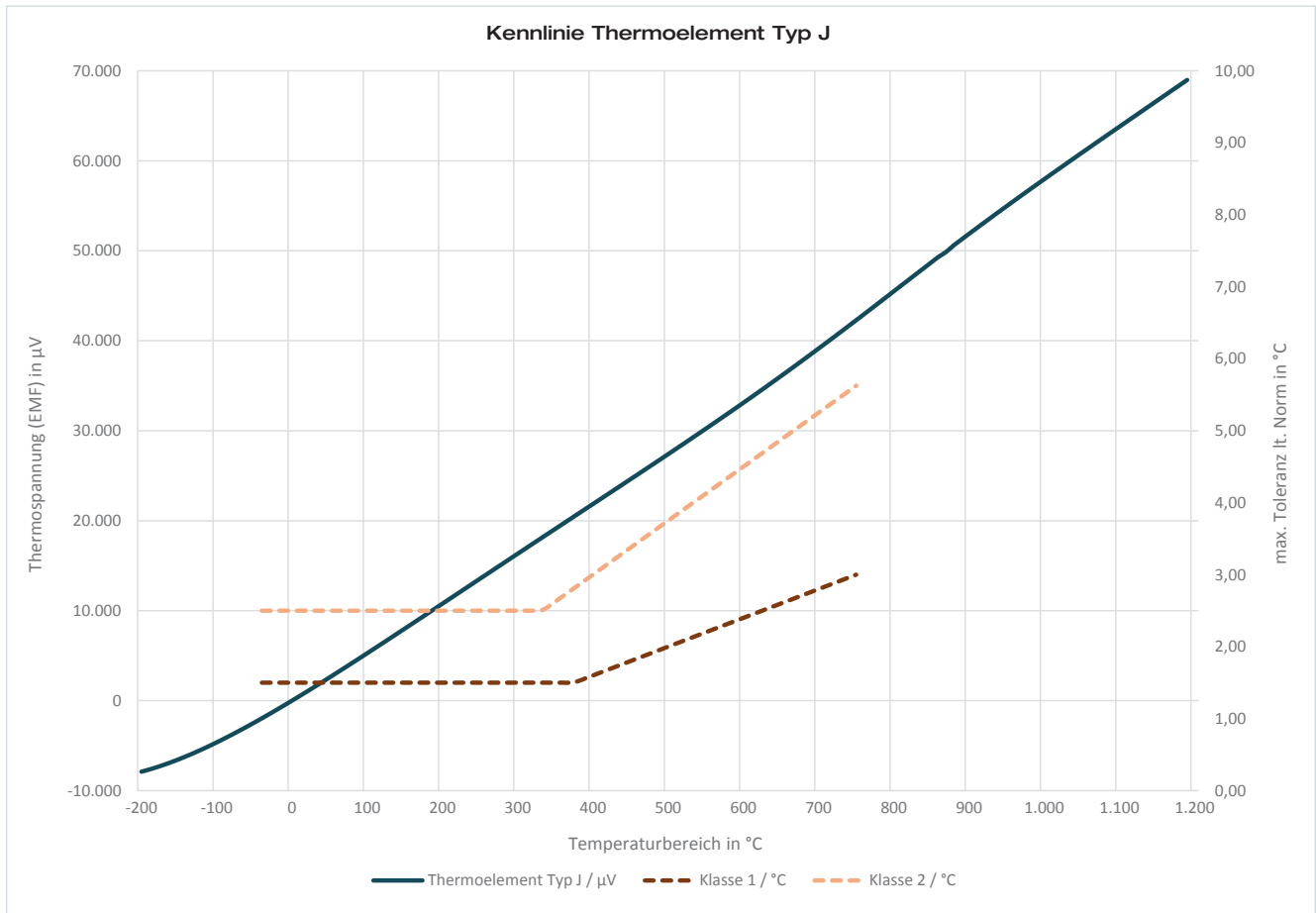
Typ J		max Tol. ± in °C**	
T in °C	EMF* in µV	Kl. 1	Kl. 2
510	27.953	2,0	3,8
520	28.516	2,1	3,9
530	29.080	2,1	4,0
540	29.647	2,2	4,1
550	30.216	2,2	4,1
560	30.788	2,2	4,2
570	31.362	2,3	4,3
580	31.939	2,3	4,4
590	32.519	2,4	4,4
600	33.102	2,4	4,5
610	33.689	2,4	4,6
620	34.279	2,5	4,7
630	34.873	2,5	4,7
640	35.470	2,6	4,8
650	36.071	2,6	4,9
660	36.675	2,6	5,0
670	37.284	2,7	5,0
680	37.896	2,7	5,1
690	38.512	2,8	5,2
700	39.132	2,8	5,3
710	39.755	2,8	5,3
720	40.382	2,9	5,4
730	41.012	2,9	5,5
740	41.645	3,0	5,6
750	42.281	3,0	5,6
760	42.919		
770	43.559		
780	44.203		
790	44.848		
800	45.494		
810	46.141		
820	46.786		
830	47.431		
840	48.074		
850	48.715		
860	49.353		

Typ J		max Tol. ± in °C**	
T in °C	EMF* in µV	Kl. 1	Kl. 2
870	49.898		
880	50.622		
890	51.251		
900	51.877		
910	52.500		
920	53.119		
930	53.735		
940	54.347		
950	54.956		
960	55.561		
970	56.164		
980	56.763		
990	57.360		
1.000	57.953		
1.010	58.545		
1.020	59.134		
1.030	59.721		
1.040	60.307		
1.050	60.890		
1.060	61.473		
1.070	62.054		
1.080	62.634		
1.090	63.214		
1.100	63.792		
1.110	64.370		
1.120	64.948		
1.130	65.525		
1.140	66.102		
1.150	66.679		
1.160	67.255		
1.170	67.831		
1.180	68.406		
1.190	68.980		

\*Thermospannung (EMF) in µV

\*\*Maximale Toleranz gemäß DIN IEC 60584

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Die Norm gibt für Thermoelemente Messbereiche vor, in denen die jeweilige Messgenauigkeit der Toleranzklasse gilt. Für eine Nutzung außerhalb dieses spezifizierten Messbereichs, ist eine Angabe zur Messgenauigkeit nicht möglich. Wird das Thermoelement außerhalb des spezifizierten Messbereichs seiner jeweiligen Toleranzklasse betrieben, kann es zudem zu irreversiblen Veränderungen am Thermoelement kommen, was in Folge zu einer Messabweichung (auch innerhalb des spezifizierten Bereichs) führt. Eine Nutzung über den Messbereich der Toleranzklasse hinaus, stellt eine unsachgemäße Verwendung dar und führt zu einem Gewährleistungsverlust.

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Registergericht: Amtsgericht Freiburg**

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We reserve the right to make technical changes.  
Please read the operating instructions before starting any work.