

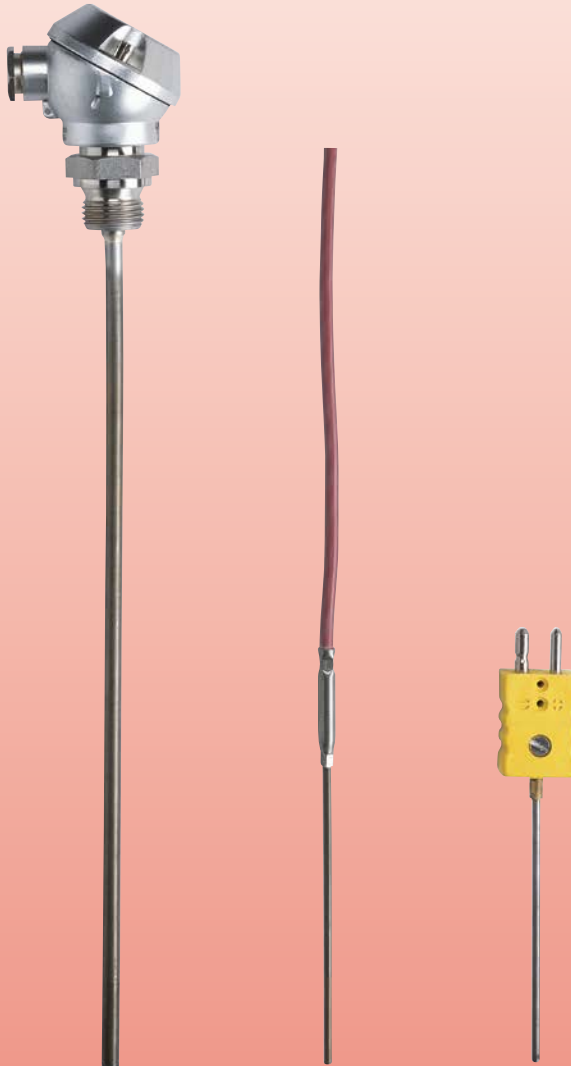


## Sheath Thermocouples



measuring  
•  
monitoring  
•  
analysing

TTM



- Flexible sheathed cable
- Measuring ranges:  
-50 ... +1100 °C
- Sheath in stainless steel 1.4571 or Inconel
- NiCr-Ni oder Fe-CuNi thermocouples
- Sheath diameter from 0.5 mm
- Fast response times
- Accuracy class 2 (option category 1)
- Connection: cable, connector or connection head MA



T2

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**Description**

Sheath thermocouples comprise a thin-walled and flexible sheathed cable made of stainless steel or Inconel. The cable contains thermal wires embedded in pressed fireproof magnesium oxide.

Good heat transfer between sheath and thermocouple allows fast response times and high measuring accuracies. The vibration-proof design assures long service life.

The flexible probe tube allows temperature measurements at locations that are difficult to access. The minimum bend radius is 5 x outer diameter. The minimum mounting length is ≥ 50 mm for sheath diameter 0.5 to 2.0 mm; ≥ 100 mm for sheath diameter 3.0 to 6.0 mm.

Thermocouples according to IEC584-1, category 2 are used in the measuring insert as standard. Thermocouples according to DIN 43710 or other versions are also available upon request.

**Upon request**

- Sheath diameter 0.25 and 1.5 mm

**Applications**

Because of their characteristics sheath thermocouples are used in difficult measurement applications with strong vibrations as well as at all measuring positions where flexibility and ease of replacement are needed.

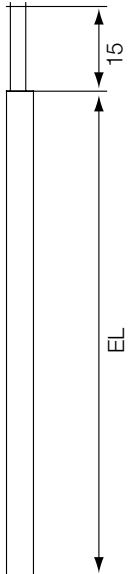
Areas of application are to be found in chemical plants, power stations, motors, as well as in machine construction and building installations and in general industrial applications.

**Temperature ranges**

Sheath diameter	Temperature
0.5 ... 1.0 mm	- 50 ... +600 °C
2.0 ... 3.0 mm	- 50 ... +900 °C
4.0 ... 6.0 mm	- 50 ... +1100 °C

**Sheath thermocouples**

with (uninsulated) connecting wires

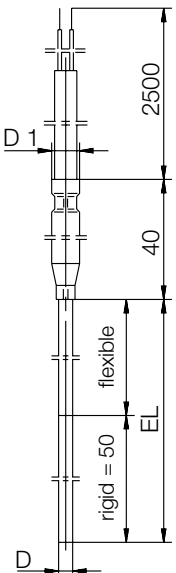
	<b>Enclosing tube made of stainless steel 1.4571</b>				
	Temperature range: max. 800 °C, depending on sheath diameter				
	<b>Model number</b>	<b>Sheath Ø</b>	<b>Immersion length</b>	<b>Sensor type/category</b>	<b>Connection cable</b>
	TTM-804..	0.5 mm	..100.. = 100 mm	..J1.. = 1x FeCu-Ni, category 2 ..J2.. = 2x FeCu-Ni, category 2 <sup>1)</sup>	..0 = uninsulated wires
	TTM-814..	1.0 mm	..200.. = 200 mm		
	TTM-824..	2.0 mm	..300.. = 300 mm		
	TTM-834..	3.0 mm	..500.. = 500 mm		
	TTM-844..	4.5 mm	..xxx.. = special length		
	TTM-864..	6.0 mm			
	<b>Enclosing tube made of Inconel 2.4816</b>				
	Temperature range: max. 1100 °C, depending on sheath diameter				
	<b>Model number</b>	<b>Sheath Ø</b>	<b>Immersion length</b>	<b>Sensor type/category</b>	<b>Connection cable</b>
	TTM-80F..	0.5 mm	..100.. = 100 mm	..K1.. = 1x NiCr-Ni, category 2 ..K2.. = 2x NiCr-Ni, category 2 <sup>1)</sup>	..0 = uninsulated wires
	TTM-81F..	1.0 mm	..200.. = 200 mm		
TTM-82F..	2.0 mm	..300.. = 300 mm			
TTM-83F..	3.0 mm	..500.. = 500 mm			
TTM-84F..	4.5 mm	..xxx.. = special length			
TTM-86F..	6.0 mm				

<sup>1)</sup> not for sheath diameter less than 2.0 mm

Please specify special lengths for enclosing tube in writing

### Sheath thermocouples

with reinforcing sleeve and silicone-insulated connecting lead

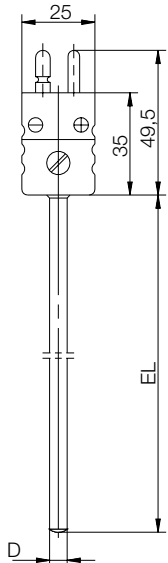
	<b>Enclosing tube made of stainless steel 1.4571</b> Connecting lead: PTFE/silicone 0.22 mm <sup>2</sup> with reinforcing sleeve Standard cable length: 2500 mm, others upon request Temperature range: max. +800 °C, depending on sheath diameter				
	Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
	TTM-804..	0.5 mm	..100.. = 100 mm	..J1.. = 1x FeCu-Ni, category 2  ..J2.. = 2x FeCu-Ni, category 2 <sup>1)</sup>	..S = silicone cable
	TTM-814..	1.0 mm	..200.. = 200 mm		
	TTM-824..	2.0 mm	..300.. = 300 mm		
	TTM-834..	3.0 mm	..500.. = 500 mm		
	TTM-844..	4.5 mm	..xxx.. = special length		
	TTM-864..	6.0 mm			
	<b>Enclosing tube made of Inconel 2.4816</b> Connecting lead: PTFE/silicone 0.22 mm <sup>2</sup> with reinforcing sleeve Standard cable length: 2500 mm, others upon request Temperature range: max. 1100 °C, depending on sheath diameter				
	Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
	TTM-80F..	0.5 mm	..100.. = 100 mm	..K1.. = 1x NiCr-Ni, category 2  ..K2.. = 2x NiCr-Ni, category 2 <sup>1)</sup>	..S = silicone cable
	TTM-81F..	1.0 mm	..200.. = 200 mm		
TTM-82F..	2.0 mm	..300.. = 300 mm			
TTM-83F..	3.0 mm	..500.. = 500 mm			
TTM-84F..	4.5 mm	..xxx.. = special length			
TTM-86F..	6.0 mm				

<sup>1)</sup> not for sheath diameter less than 2.0 mm

Please specify special lengths for enclosing tube and length of cable in writing

### Sheath thermocouples

with flat connector

	<b>Enclosing tube made of stainless steel 1.4571</b> Connection: flat connector, no thermal e.m.f. Temperature range: max. 800 °C, depending on sheath diameter				
	Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
	TTM-804..	0.5 mm	..100.. = 100 mm	..J1.. = 1x FeCu-Ni, category 2	..F = Plug with flat pin (sheath-diameter up to 3 mm)
	TTM-814..	1.0 mm	..200.. = 200 mm		
	TTM-824..	2.0 mm	..300.. = 300 mm		
	TTM-834..	3.0 mm	..500.. = 500 mm		
	TTM-844..	4.5 mm	..xxx.. = special length		
	TTM-864..	6.0 mm			
	<b>Enclosing tube made of Inconel 2.4816</b> Connection: flat connector, no thermal e.m.f. Temperature range: max. 1100 °C, depending on sheath diameter				
	Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
	TTM-80F..	0.5 mm	..100.. = 100 mm	..K1.. = 1x NiCr-Ni, category 2	..F = Plug with flat pin (sheath-diameter up to 3 mm)
	TTM-81F..	1.0 mm	..200.. = 200 mm		
TTM-82F..	2.0 mm	..300.. = 300 mm			
TTM-83F..	3.0 mm	..500.. = 500 mm			
TTM-84F..	4.5 mm	..xxx.. = special length			
TTM-86F..	6.0 mm				

Please specify special lengths for enclosing tube in writing

**Sheath thermocouples**

with connection head MA without process connection

Enclosing tube made of stainless steel 1.4571 Connection: small compact connection head MA Temperature range: max. +800 °C, depending on sheath diameter				
Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
TTM-804..	0.5 mm	..100.. = 100 mm	..J1.. = 1x FeCu-Ni, category 2 ..J2.. = 2x FeCu-Ni, category 2 <sup>1)</sup>	..M = head form MA
TTM-814..	1.0 mm	..200.. = 200 mm		
TTM-824..	2.0 mm	..300.. = 300 mm		
TTM-834..	3.0 mm	..500.. = 500 mm		
TTM-844..	4.5 mm	..xxx.. = special length		
TTM-864..	6.0 mm			
Enclosing tube made of Inconel 2.4816 Connection: small compact connection head MA Temperature range: max. 1100 °C, depending on sheath diameter				
Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
TTM-80F..	0.5 mm	..100.. = 100 mm	..K1.. = 1x NiCr-Ni, category 2 ..K2.. = 2x NiCr-Ni, category 2 <sup>1)</sup>	..M = head form MA
TTM-81F..	1.0 mm	..200.. = 200 mm		
TTM-82F..	2.0 mm	..300.. = 300 mm		
TTM-83F..	3.0 mm	..500.. = 500 mm		
TTM-84F..	4.5 mm	..xxx.. = special length		
TTM-86F..	6.0 mm			

<sup>1)</sup> not for sheath diameter less than 2.0 mm

Please specify special lengths for enclosing tube in writing

**Sheath thermocouples**

with connection head form MA, process connection thread G 1/2

Enclosing tube made of stainless steel 1.4571 Connection: small compact connection head MA Temperature range: max. 800 °C, depending on sheath diameter				
Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
TTM-104..	0.5 mm	..100.. = 100 mm	..J1.. = 1x FeCu-Ni, category 2 ..J2.. = 2x FeCu-Ni, category 2 <sup>1)</sup>	..M = head form MA
TTM-114..	1.0 mm	..200.. = 200 mm		
TTM-124..	2.0 mm	..300.. = 300 mm		
TTM-134..	3.0 mm	..500.. = 500 mm		
TTM-144..	4.5 mm	..xxx.. = special length		
TTM-164..	6.0 mm			
Enclosing tube made of Inconel 2.4816 Connection: small compact connection head MA Temperature range: max. 1100 °C, depending on sheath diameter				
Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable
TTM-10F..	0.5 mm	..100.. = 100 mm	..K1.. = 1x NiCr-Ni, category 2 ..K2.. = 2x NiCr-Ni, category 2 <sup>1)</sup>	..M = head form MA
TTM-11F..	1.0 mm	..200.. = 200 mm		
TTM-12F..	2.0 mm	..300.. = 300 mm		
TTM-13F..	3.0 mm	..500.. = 500 mm		
TTM-14F..	4.5 mm	..xxx.. = special length		
TTM-16F..	6.0 mm			

<sup>1)</sup> not for sheath diameter less than 2.0 mm

Please specify special lengths for enclosing tube in writing

**Standard plug connections with no thermal e.m.f. for temperatures from -60 bis +200 °C**

**Plug connections for thermocouples**

No thermal e.m.f. is produced in the connections between thermocouples and compensating lead, when the contact material is the same as the thermocouple material.

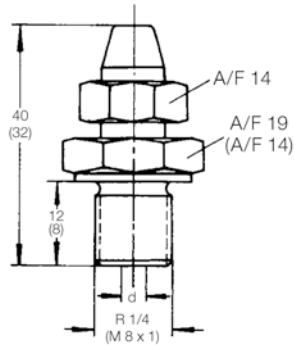


Measuring sensor	Order number		Sheath diameter
	Connector	Mating con.	
K (NiCr-Ni)	TUZ-S900K	TUZ-S911K	0.25 - 2.0 mm
K (NiCr-Ni)	TUZ-M900K	TUZ-M911K	3.0 - 6.0 mm
J (Fe-CuNi)	TUZ-S900J	TUZ-S911J	0.25 - 2.0 mm
J (Fe-CuNi)	TUZ-M900J	TUZ-M911J	3.0 - 6.0 mm

**Clamp process connections**

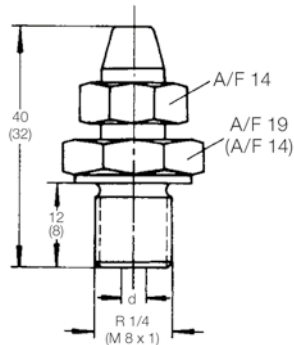
Clamp process connections for passing through sheath thermocouples with a pressure washer made of PTFE (up to 200 °C, that can be removed) or a conical ring made of stainless steel (for higher temperatures and pressures).

**Process connection material: Steel**



for sheath thermo-couple Ø	Thread	with PTFE pressure washer order number	with stainless steel wedge order number
1.0	M 8 x 1	TUZ-VS10T	TUZ-VS10V
2.0	M 8 x 1	TUZ-VS20T	TUZ-VS20V
3.0	M 8 x 1	TUZ-VS30T	TUZ-VS30V
4.5	R ¼"	TUZ-VS45T	TUZ-VS45V
6.0	R ¼"	TUZ-VS60T	TUZ-VS60V

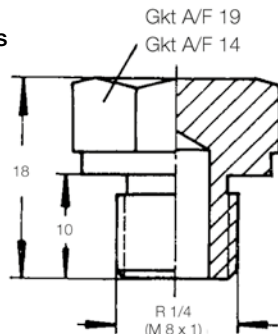
**Process connection material: stainless steel, material no. 1.4541**



for sheath thermo-couple Ø	Thread	with PTFE pressure washer order number	with stainless steel wedge order number
1.0	M 8 x 1	TUZ-VV10T	TUZ-VV10V
2.0	M 8 x 1	TUZ-VV20T	TUZ-VV20V
3.0	M 8 x 1	TUZ-VV30T	TUZ-VV30V
4.5	R ¼"	TUZ-VV45T	TUZ-VV45V
6.0	R ¼"	TUZ-VV60T	TUZ-VV60V

**Hard soldered thread glands**

for hard-soldering sheath thermocouples tapped to specification or with a centre hole 3.0 mm Ø.



Thread	Order number
M 8 x 1 (up to 3.0 mm Ø)	TUZ-V408
Thread R ¼"	TUZ-V410