



- Flexible sheathed cable
- Measuring ranges:  
-50 ... +1100 °C
- Sheath in stainless steel 1.4571  
or Inconel
- NiCr-Ni or 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



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Model:  
TTM...

**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 IEC 584-1, category 2 are used in the measuring insert as standard. Thermocouples according to DIN 43 710 or other versions are also available upon request.

**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.

**Upon request**


- Sheath diameter 0.25 and 1.5 mm

**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

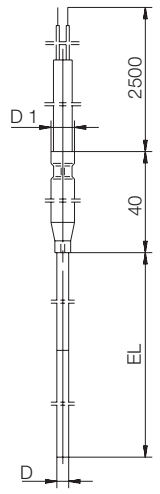


Enclosing tube in stainless steel 1.4571 Temperature range: max. 800 °C, depending on sheath diameter					
Model number	Sheath Ø	Immersion length	Sensor type/category	Connection cable	
TTM-804..	0.5 mm	..100..=100 mm	..J1..= 1xFeCu-Ni, cat. 2 ..J2..= 2xFeCu-Ni, cat. 2 <sup>1)</sup>	..0= (uninsulated 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				
Enclosing tube made of Inconel 2.4816 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..= 1xNiCr-Ni, cat. 2 ..K2..= 2xNiCr-Ni, cat. 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				

Please specify special lengths for enclosing tube in writing <sup>1)</sup> not for sheath diameter less than 2.0 mm

**Sheath thermocouples**

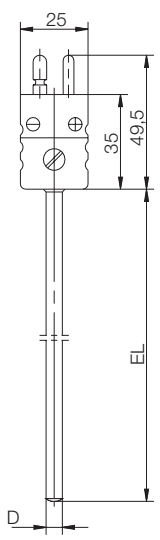
with reinforcing sleeve and silicone-insulated connecting lead

	Enclosing tube in stainless steel 1.4571 Connecting lead: teflon/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..=1xFeCu-Ni, cat. 2 ..J2..=2xFeCu-Ni, cat. 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	..xxx..=special length		
	Enclosing tube in Inconel 2.4816 Connecting lead: 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..=1xNiCr-Ni, cat. 2 ..K2..=2xNiCr-Ni, cat. 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	..xxx..=special length			

Please specify special lengths for enclosing tube and length of cable in writing <sup>1)</sup> not for sheath diameter less than 2.0 mm

**Sheath thermocouples**

with flat connector

	Enclosing tube in stainless steel 1.4571 Connection: flat connector, no thermal e.m.f. 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
	TTM-804..	0.5 mm	..100..=100 mm	..J1..=1xFeCu-Ni, cat. 2	..F= mini plug with flat pin
	TTM-814..	1.0 mm	..200..=200 mm		..F= standard plug with round pin
	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	..xxx..=special length		
	Enclosing tube in Inconel 2.4816 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
	TTM-80F..	0.5 mm	..100..=100 mm	..K1..=1xNiCr-Ni, cat. 2	..F= mini plug with flat pin
	TTM-81F..	1.0 mm	..200..=200 mm		..F= standard plug with round pin
	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	..xxx..=special length			

Please specify special lengths for enclosing tube in writing

**Sheath thermocouples**

with connection head MA without process connection

	Enclosing tube in 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
	TTM-804..	0.5 mm	..100..=100 mm	..J1..= 1xFeCuNi, cat. 2 ..J2..= 2xFeCuNi, cat. 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	length		
	Enclosing tube in 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
	TTM-80F..	0.5 mm	..100..=100 mm	..K1..= 1xNiCr-Ni, cat. 2 ..K2..= 2xNiCr-Ni, cat. 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	length			

Please specify special lengths for enclosing tube in writing <sup>1)</sup> not for sheath diameter less than 2.0 mm

**Sheath thermocouples**

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

	Enclosing tube in 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
	TTM-104..	0.5 mm	..100..=100 mm	..J1..= 1xFeCuNi, cat. 2 ..J2..= 2xFeCuNi, cat. 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	length		
	Enclosing tube in 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
	TTM-10F..	0.5 mm	..100..=100 mm	..K1..= 1xNiCr-Ni, cat. 2 ..K2..= 2xNiCr-Ni, cat. 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	length			

Please specify special lengths for enclosing tube in writing <sup>1)</sup> not for sheath diameter less than 2.0 mm

**Standard plug connections with no thermal e.m.f. for temperatures from -60 to +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.



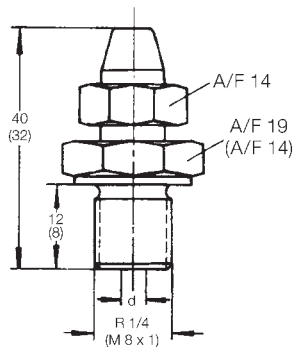
Measuring sensor	Order number		Sheath diameter
	Connector	Mating con.	
K (NiCr-Ni)	<b>TUZ-S900K</b>	<b>TUZ-S911K</b>	0.25 - 2.0 mm
K (NiCr-Ni)	<b>TUZ-M900K</b>	<b>TUZ-M911K</b>	3.0 - 6.0 mm
J (Fe-CuNi)	<b>TUZ-S900J</b>	<b>TUZ-S911J</b>	0.25 - 2.0 mm
J (Fe-CuNi)	<b>TUZ-M900J</b>	<b>TUZ-M911J</b>	3.0 -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

**Clamp process connections**

Clamp process connections for passing through sheath thermocouples with a pressure washer made of Teflon (up to

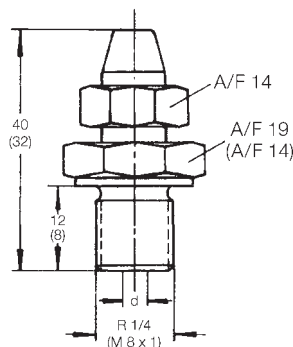
200°C, that can be removed) or a conical ring made of stainless steel (for higher temperatures and pressures).

**Process connection material: Steel**



for sheath thermocouple Ø	Thread	with Teflon pressure washer order no.	with stainless steel wedge order no.
1.0	M 8 x 1	<b>TUZ-VS10T</b>	<b>TUZ-VS10V</b>
2.0	M 8 x 1	<b>TUZ-VS23T</b>	<b>TUZ-VS20V</b>
3.0	M 8 x 1	<b>TUZ-VS30T</b>	<b>TUZ-VS30V</b>
4.5	R 1/4"	<b>TUZ-VS45T</b>	<b>TUZ-VS45V</b>
6.0	R 1/4"	<b>TUZ-VS60T</b>	<b>TUZ-VS60V</b>

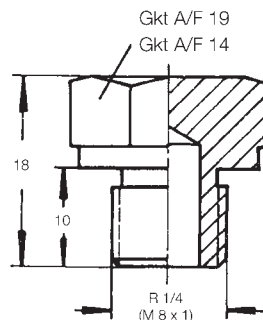
**Process connection material: stainless steel, material no. 1.4541**



for sheath thermocouple Ø	Thread	with Teflon pressure washer order no.	with stainless steel wedge order no.
1.0	M 8 x 1	<b>TUZ-VV10T</b>	<b>TUZ-VV10V</b>
2.0	M 8 x 1	<b>TUZ-VV23T</b>	<b>TUZ-VV20V</b>
3.0	M 8 x 1	<b>TUZ-VV30T</b>	<b>TUZ-VV30V</b>
4.5	R 1/4"	<b>TUZ-VV45T</b>	<b>TUZ-VV45V</b>
6.0	R 1/4"	<b>TUZ-VV60T</b>	<b>TUZ-VV60V</b>

**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)	<b>TUZ-V408</b>
Thread R 1/4"	<b>TUZ-V410</b>

# Resistance Temperature Sensor

Special temperature measurement  
for food applications



- Measuring range: -50 ... +250 °C
- Sensor Pt 100, accuracy class A
- p<sub>max</sub> 10 bar, t<sub>max</sub> 250 °C
- hygienic (acc. to EHEDG)
- variable mounting with different sleeves
- Sensor completely assembled from st. steel
- Optional with head mounted transmitter
- CIP/SIP-compliant

For more informations please refer to  
our brochure "Food L1"

**Model:**  
LTS