00 - TMT // Thermocouples with a metal thermowell and a built-in thermocouple

00 - TMT // Thermocouples with a metal protection tube and a built-in thermocouple

This list contains ready-to-install large and small straight thermocouples with built-in thermocouples.
Sensors of this kind are used for standard temperature measurements, mainly in liquid and gaseous media.
The thermocouples listed are examples of those that can be ordered.

Günther GmbH supplies any kind of standard straight thermocouple as well as special custom-made models.
The number of possible combinations is virtually innumerable, depending on the dimensions, material, fastening, etc.
The system of article numbers can be used to assemble the thermocouples in accordance with the respective operating conditions.

The highest permissible operation temperature of a selected thermocouple or of the protection tube material determines the maximum operation temperature of the thermocouple.

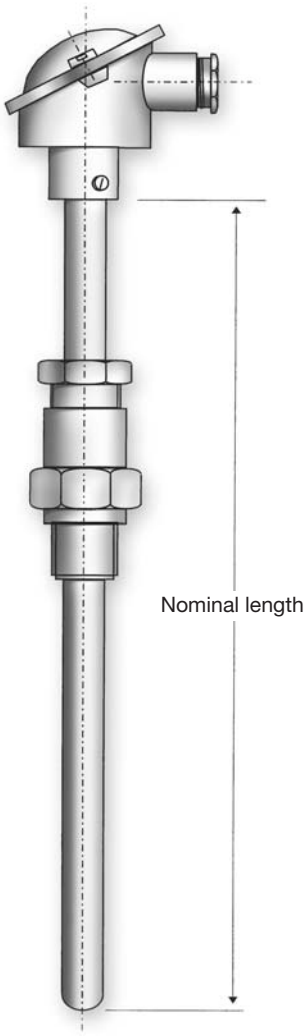
Repairs
Günther GmbH carries out repairs on thermocouples and on resistance thermometers; however, high assembly costs frequently make repairs uneconomical.

Thermoelectric voltages and limiting deviations of the thermocouples supplied by Günther GmbH comply with the DIN EN 60584 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable. Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x NiCr-Ni/K small straight thermocouple with a metal protection tube and a mounting thread

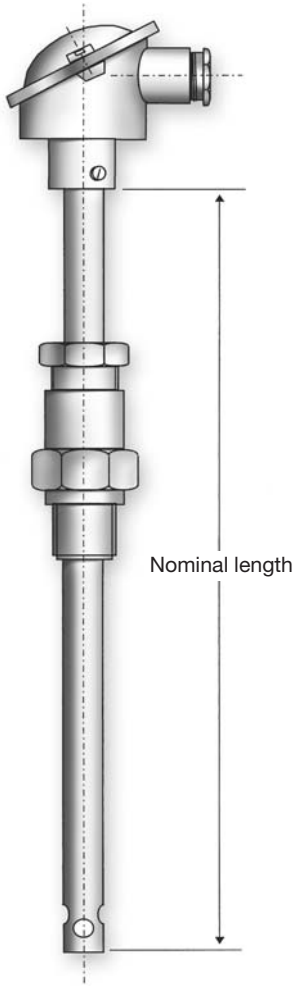


Product group:	**00-TMT**
Günther Art. No.:	**00-16006412-0710**
Connection head:	Type B
Protection tube:	ø 15 x 2 mm, material no. 1.4762
Thermocouple:	1 x NiCr-Ni/K ø 2.0 mm
Nominal length:	710 mm
Fastening:	G 3/4 A mounting thread, steel
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

00 - TMT // Thermocouples with a metal protection tube and a built-in thermocouple

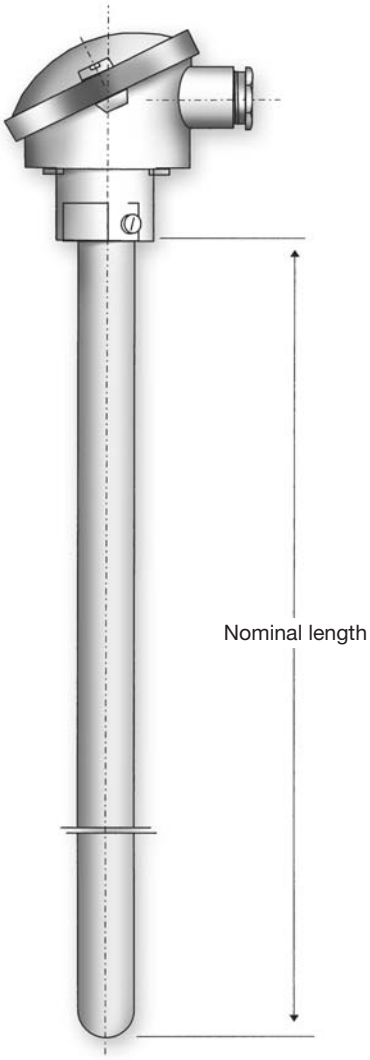
More order samples:

2 x NiCr-Ni/K small straight thermocouple with an open metal protection tube and a mounting thread



Product group:	**00-TMT**
Günther Art. No.:	**00-99000006-0500**
Connection head:	Type B
Protection tube:	ø 15 x 2 mm, material no. 1.4841 perforated
Thermocouple:	2 x NiCr-Ni/K ø 2.0 mm
Nominal length:	500 mm
Fastening:	G 1/2 A mounting thread, steel, zinc-coated
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Feature:	Gasproof connection head

1 x NiCr-Ni/K large straight thermocouple with a metal protection tube, no fastening



Product group:	**00-TMT**
Günther Art. No.:	**00-26001410-1000**
Connection head:	Type A
Protection tube:	ø 22 x 2 mm, material no. 1.4762
Thermocouple:	1 x NiCr-Ni/K ø 3.0 mm
Nominal length:	1000 mm
Fastening:	None
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

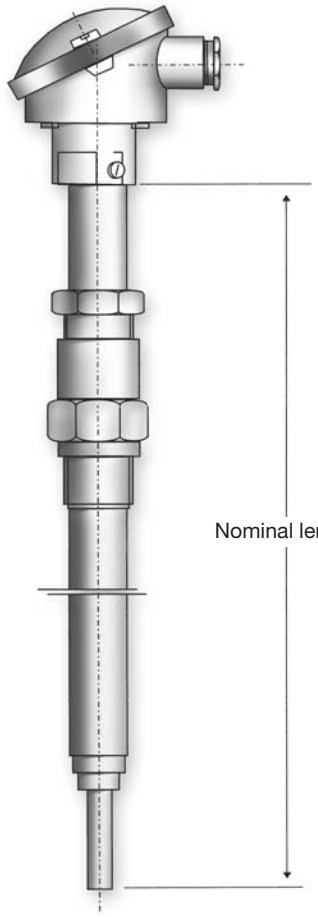
Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

00 - TMT // Thermocouples with a metal protection tube and a built-in thermocouple

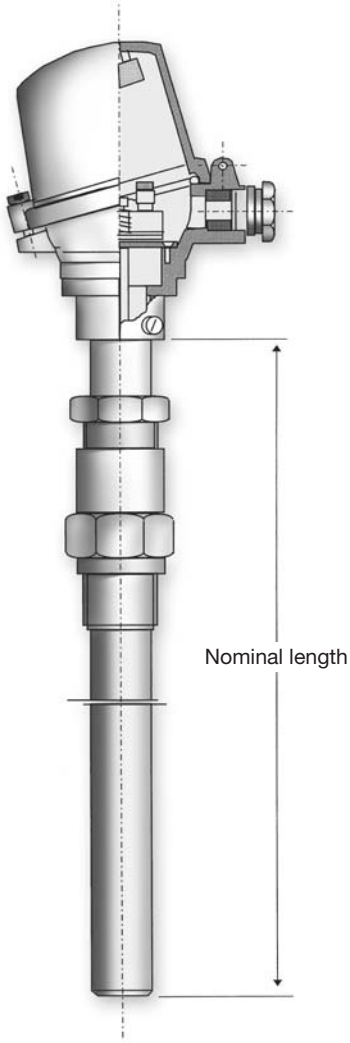
More order samples:

2 x PtRh10-Pt/S double thermocouple with a Type A connection head and steel mounting thread, protection tube material 1.4762 22 x 2 mm, with a tapered sensor tip, ø 10 mm



Product group:	**00-TMT**
Günther Art. No.:	**00-26251232-1850**
Connection head:	Type A
Protection tube:	ø 22 x 2 mm, material no. 1.4762
Inner tube 1:	ø 15 x 11 mm, C610
Inner tube 2:	ø 6 x 4 mm, C799
Insulation rod:	ø 3.5 mm, 4-hole, C799
Thermocouple:	2 x PtRh10-Pt/S ø 0.5 mm
Nominal length:	1850 mm
Fastening:	G 1 A mounting thread, steel
Sensor tip:	Tapered, ø 10 x 60 mm
Temperatures measured:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

2 x PtRh30-PtRh6/B double thermocouple with a Type AUZH connection head for measuring transducer, protection tube material 2.4816 Inconel 22 x 2 mm



Product group:	**00-TMT**
Günther Art. No.:	**00-28204342-2000**
Connection head:	Type AUZH
Protection tube:	2.4816 Inconel ø 22 x 2 mm
Inner tube:	ø 15 x 11 mm, C799
Insulation rod:	ø 8.5 mm, 5-hole, testable, C799
Thermocouple:	2 x PtRh30-PtRh6/B ø 0.5 mm
Nominal length:	2000 mm
Fastening:	G 1 A mounting thread, steel, for ø 25.8 mm
Temperatures measured:	0 - 1200°C
Limiting deviation:	Class 2 acc. to DIN EN 60584-2

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

00 - TMT // Thermocouples with a metal protection tube and a built-in thermocouple

Metal protection tube + thermocouple | 0 | 0 | - | | | | | | | | | - | | | | |

Nominal length / mm

Protection tube (dimensions)

			Special sizes:		
15 x 2	mm	**1**	12 x 1.5	mm	**5**
22 x 2	mm	**2**	15 x 1.3	mm	**6**
24 x 3	mm	**3**	11 x 1.5	mm	**7**
26 x 4	mm	**4**	10 x 1.5	mm	**8**
			9 x 1	mm	**9**

Protection tube (material)

St 35.8	Mat. no. 1.0305	**1**
Kanthal AF		**2**
Stainless steel	Mat. no. 1.4301	**3**
Stainless steel	Mat. no. 1.4571	**4**
X18Cr N 28	Mat. no. 1.4749	**5**
X10Cr Al 24	Mat. no. 1.4762	**6**
X15CrNi Si 25 20	Mat. no. 1.4841	**7**
Inconel	Mat. no. 2.4816	**8**
Heat-res. steel	Mat. no. 1.4893	**9**

Inner tube

None		**0**
C610	gastight ceramic	**1**
C799	Aluminium oxide	**2**

Sensor point

Not tapered	**0**	Tapered to 10 mm	**5**
Tapered to 15 mm	**1**	Tapered to 8 mm	**6**
Tapered to 12 mm	**2**		
Tapered to 9 mm	**3**		
Tapered to 6 mm	**4**	Tapered, other	**9**

Head

A	**1**	B	**6**
AUS	**2**	BUS	**7**
AUZ	**3**	BUZ	**8**
AUZH	**4**	BUZH	**9**
AUSH	**5**	BBK	**0**

Thermocouple

Type R	PtRh13-Pt	**1**
Type S	PtRh10-Pt	**2**
Type B	PtRh30-PtRh6	**3**
Type K	NiCr-Ni	**4**
Type J	Fe-CuNi	**5**
Type L	Fe-CuNi	**6**
Type C	WRe5-WRe26	**7**
Type N	Nicrosil-Nisil	**8**
Type D	WRe3-WRe25	**9**

Thermocouple

Standard	**1**	Standard (testable)	**2**
Double	**3**	Double (testable)	**4**
Triple	**5**		

Fastening

None	**0**
Stop flange	**1**
Mounting thread	**2**
Flange/counter flange	**3**

Custom designs: | 0 | 0 | - | 9 | 9 | 0 | 0 | x | x | x | x | - | | | | |

Consecutive no.

Nominal length / mm

05 - TKT // Thermocouples with a ceramic protection tube and a built-in thermocouple

05 - TKT // Thermocouples with a ceramic protection tube and a built-in thermocouple

The 05 product group comprises ready-to-install large and small straight thermocouples with ceramic protection tubes and built-in thermocouples. The elements are used for technical temperature measurements for temperatures ranging from 200°C to 1800°C at pressures of max. one bar.

Günther GmbH supplies any kind of standard straight thermocouple as well as special custom-made models.

The highest permissible operation temperature of a selected thermocouple or of the protection tube material determines the maximum operation temperature of the thermocouple.

The service life of the thermocouples can be increased if a gasproof ceramic inner tube is installed in addition to the protection tube.

Properties of the most widely-used types of ceramic materials for protection tubes and inner tubes:

C799 aluminium oxide
Gasproof, highly fire-resistant, 99.7%
maximum operation temperature of 1800°C

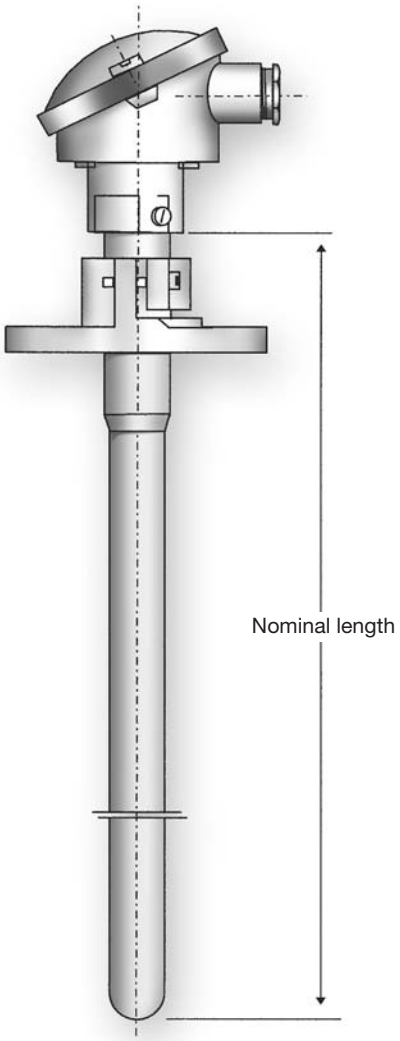
C610 gastight ceramic
Gasproof, high aluminium oxide content > 60%,
maximum operation temperature of 1450°C

C530 porous ceramic material
Not gasproof, medium-fine structure, resistant to temperature change, high aluminium oxide content, maximum operation temperature of 1500°C

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x PtRh10-Pt/S thermocouple with a Type A connection head and flange, C610 ceramic protection tube, steel holding tube

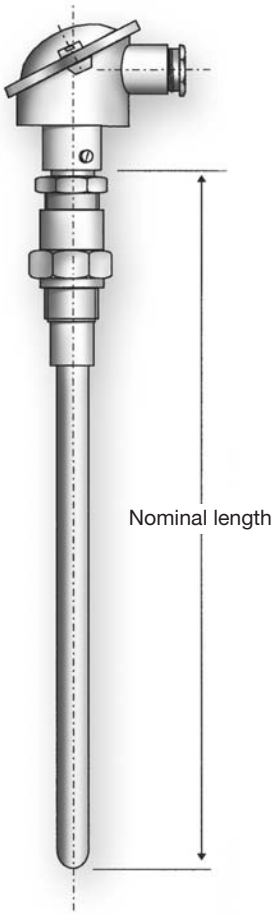


Product group:	**05-TKT**
Günther Art. No.:	**05-62211211-1000**
Connection head:	Type A
Holding tube:	ø 32 x 2 x 200 mm, material no. 1.0305
Protection tube:	ø 24 x 19 mm, C610
Inner tube:	ø 15 x 11 mm, C610
Insulation rod:	ø 8.5 mm, 2-hole, C610
Thermocouple:	1 x PtRh10-Pt/S ø 0.5 mm
Nominal length:	1000 mm
Fastening:	DIN 43734 stop flange
Temperature range:	0 - 1450°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

05 - TKT // Thermocouples with a ceramic protection tube and a built-in thermocouple

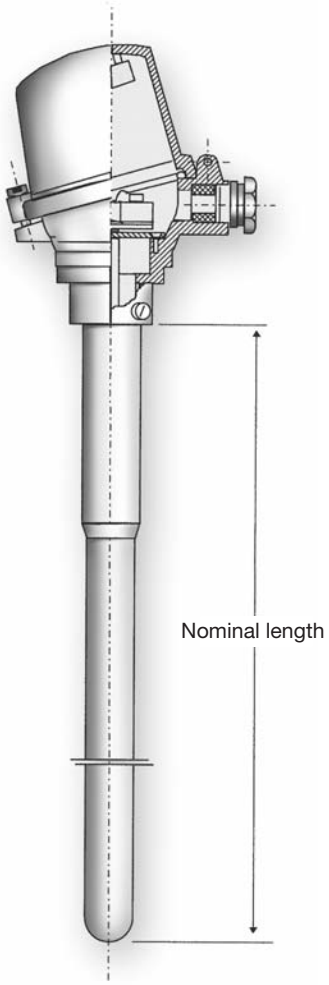
More order samples:

2 x PtRh30-PtRh6/B thermocouple with a Type B connection head and a ceramic protection tube as well as a gasproof mounting thread



Product group:	**05-TKT**
Günther Art. No.:	**05-20086332-0600**
Connection head:	Type B
Holding tube:	ø 15 x 2 x 100 mm, material no. 1.0305
Protection tube:	ø 10 x 6 mm, C799, gastight
Inner tube:	None
Insulation rod:	ø 5.5 mm, 4-hole, C799
Thermocouple:	2 x PtRh30-PtRh6/B ø 0.5 mm
Nominal length:	600 mm
Fastening:	G 3/4 A mounting thread, steel, gasproof
Temperature range:	0 - 1700°C
Limiting deviation:	Class 2 acc. to DIN EN 60584-2

2 x PtRh10-Pt/S thermocouple with a connection head Type AUZH, C530 ceramic protection tube



Product group:	**05-TKT**
Günther Art. No.:	**05-82214230-0710**
Connection head:	Type AUZH
Holding tube:	ø 32 x 2 x 200 mm, material no. 1.0305
Protection tube:	ø 26 x 18 mm, C530
Inner tube:	ø 15 x 11 mm, C610
Insulation rod:	ø 8.5 mm, C610
Thermocouple:	2 x PtRh10-Pt/S ø 0.5 mm
Nominal length:	710 mm
Fastening:	None
Temperature range:	0 - 1450°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Feature:	Measuring transducer installed in the connecting head

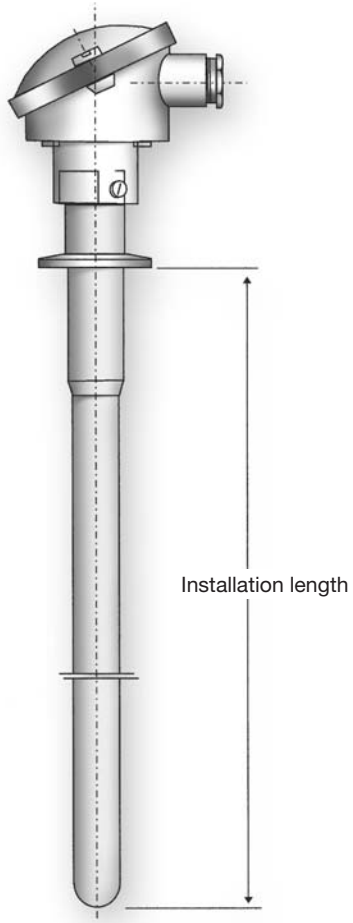
Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions. All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

05 - TKT // Thermocouples with a ceramic protection tube and a built-in thermocouple

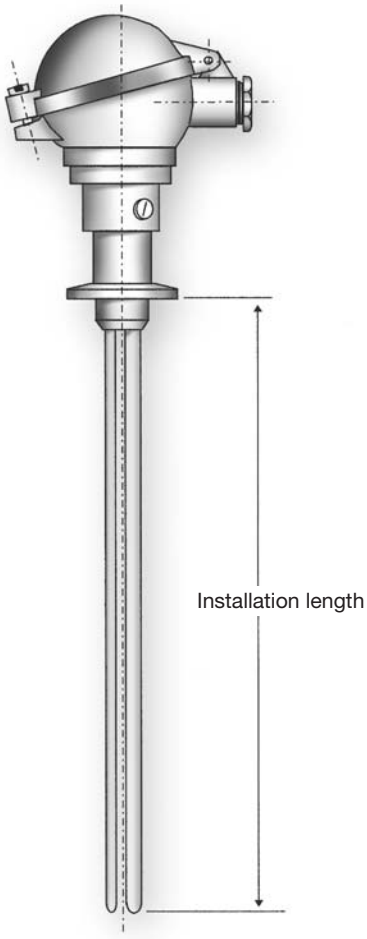
More order samples:

3 x PtRh10-Pt/S triple vacuum thermocouple, with a Type A connection head and a DN 20 vacuum flange



Product group:	**05-TKT**
Günther Art. No.:	**05-99050013-0500**
Connection head:	Type A
Holding tube:	ø 22 x 2 x 100 mm, material no. 1.0305, with a vacuum flange welded on
Protection tube:	ø 15 x 10 mm, C530
Inner tube:	ø 8 x 6 mm, C799
Insulation rod:	ø 5.5 mm, 6-hole, C799
Thermocouple:	3 x PtRh10-Pt/S ø 0.5 mm
Installation length:	500 mm
Fastening:	DN 20 vacuum flange acc. to DIN 28403
Feature:	Holding tube in the head, gasproof, moulded
Temperature range:	0 - 1300°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

1 x PtRh10-Pt/S single-vacuum thermocouple, testable, with a Type AUZ connection head and a DN 20 vacuum flange



Product group:	**05-TKT**
Günther Art. No.:	**05-99050216-0500**
Connection head:	Type AUZ
Holding tube:	ø 22 x 2 x 80 mm, material no. 1.4571
Protection tube 1:	ø 7 x 5 mm, C799
Protection tube 2:	ø 6 x 4 mm, C799 for test thermal element
Inner tube:	None
Insulating stem:	ø 4.0 mm, 4-hole, C799 Installed in protection tube 1
Thermocouple:	1 x PtRh10-Pt/S ø 0.5 mm
Installation length:	500 mm
Fastening:	DN 20 vacuum flange acc. to DIN 28403
Temperature range:	0 - 1400°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

05 - TKT // Thermocouples with a ceramic protection tube and a built-in thermocouple

Ceramic protection tube + thermocouple | 0 | 5 | - | | | | | | | | | - | | | | |

Nominal length / mm

Protection tube (dimensions / material)	10 x 7	mm	C610	**1**
	10 x 6	mm	C799	**2**
	15 x 11	mm	C610	**3**
	15 x 10	mm	C799	**4**
	16 x 12	mm	C610	**5**
	24 x 19	mm	C610	**6**
	24 x 18	mm	C799	**7**
	26 x 18	mm	C530	**8**
	16 x 12	mm	C799	**9**

Inner tube	None		**0**
	C530	Porous ceramic material (on request)	**1**
	C610	gastight ceramic	**2**
	C799	Aluminium oxide	**3**

Holding tube (visible length)		**1.0305**	**1.4571**	**1.4762**	**1.4841**
15x 2	50 mm	**05**	**75**	**-**	**-**
15 x 2	60 mm	**06**	**76**	**26**	**36**
15 x 2	80 mm	**07**	**77**	**27**	**37**
15 x 2	100 mm	**08**	**78**	**28**	**38**
15 x 2	150 mm	**09**	**79**	**29**	**39**
15 x 2	200 mm	**10**	**80**	**30**	**40**
22 x 2	100 mm	**11**	**81**	**31**	**41**
22 x 2	150 mm	**12**	**82**	**32**	**42**
22 x 2	200 mm	**13**	**83**	**33**	**43**
22 x 2	250 mm	**14**	**84**	**34**	**44**
22 x 2	300 mm	**15**	**85**	**35**	**45**
28.3 x 1.5	80 mm	**16**	-	-	-
28.3 x 1.5	180 mm	**17**	-	-	-
32 x 2	50 mm	**18**	**88**	-	**48**
32 x 2	100 mm	**19**	**89**	-	**49**
32 x 2	150 mm	**20**	**90**	-	**70**
32 x 2	200 mm	**21**	**91**	-	**71**
32 x 2	250 mm	**22**	**92**	-	**72**

Alloy 600 (mat. no. 2.4816)			**Kanthal**		
22 x 2	200 mm	**61**	15 x 1.3	100 mm	**51**
22 x 2	300 mm	**62**	15 x 1.3	150 mm	**52**
22 x 2	400 mm	**63**	15 x 1.3	200 mm	**53**
22 x 2	500 mm	**64**			
30 x 2.5	230 mm	**65**	Individual		**00**
30 x 2.5	400 mm	**66**	No holding tube		**99**

Head	A	**1**	B	**6**
	AUS	**2**	BUS	**7**
	AUZ	**3**	BUZ	**8**
	AUZH	**4**	BUZH	**9**
	AUSH	**5**	BBK	**0**

Thermocouple	Type R	PtRh13-Pt	**1**
	Type S	PtRh10-Pt	**2**
	Type B	PtRh30-PtRh6	**3**
	Type K	NiCr-Ni	**4**
	Type J	Fe-CuNi	**5**
	Type L	Fe-CuNi	**6**
	Type C	WRe5-WRe26	**7**
	Type N	Nicrosil-Nisil	**8**
	Type D	WRe3-WRe25	**9**

Thermocouple	Standard	**1**	Standard (testable)	**2**
	Double	**3**	Double (testable)	**4**
	Triple	**5**		

Fastening	None	**0**
	Stop flange	**1**
	Mounting thread	**2**
	Flange/counter flange	**3**

Custom designs: | 0 | 5 | - | 9 | 9 | 0 | 5 | x | x | x | x | - | | | | |

Consecutive no.

Nominal length / mm

08 - TMP // Straight thermocouples with a precious metal protective sleeve

08 - TMP // Straight thermocouples with a precious metal protective sleeve

The 08-TMP catalogue section contains high-temperature thermocouples with precious metal protective sleeves and precious metal thermocouples. Sensors of this kind are used in high-temperature furnaces and plants, particularly for measuring the temperature of molten materials in the glass industry.

Günther GmbH supplies standard straight thermocouples with protective sleeves made of platinum rhodium or with platinum coatings as well as special custom-made models.

The highest permissible operation temperature of a selected thermocouple or of the protection tube material determines the maximum operation temperature of the thermocouple.

Limiting deviations of the thermoelectric voltages comply with DIN EN 60584-2 Class 1 for Types S and R and Class 2 for Type B.

The useful life span of thermocouples is increased when:

- Wire of a diameter of 0.5 mm is used
- Top-quality ceramic material (C799) is used
- An additional inner tube is installed

Properties of the most widely-used types of ceramic materials for protection tubes and inner tubes:

C799 aluminium oxide
Gastight, highly fire-resistant, Al_2O_3 content of 99.7%
Maximum operation temperature: 1800°C

C610 gastight ceramic
Gastight, high aluminium oxide content > 60%
Maximum operation temperature: 1450°C

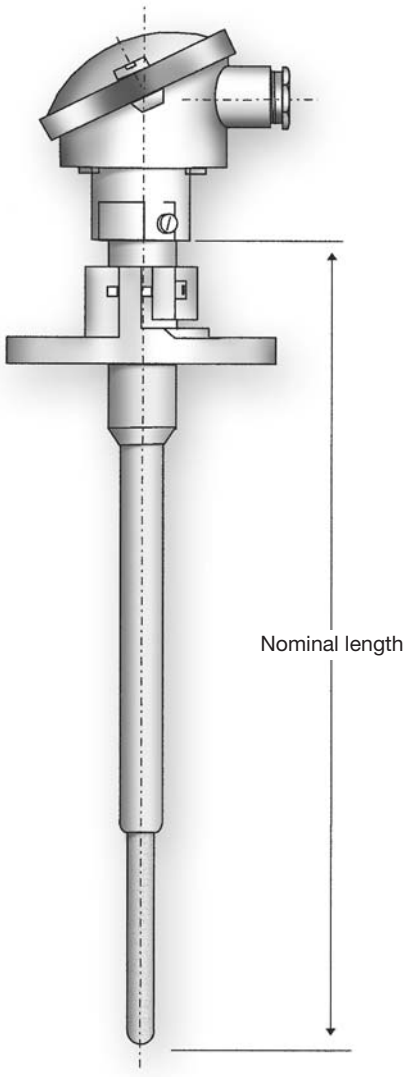
C530 porous ceramic material
Not gastight, medium-fine structure
Resistant to temperature change
High aluminium oxide content
Maximum operation temperature: 1500°C

Operation temperatures for precious metal thermocouples:

Type	Diameter	Max. temp
S,R	0.35 mm	1350°C
B	0.35 mm	1600°C
S,R	0.5 mm	1600°C
B	0.5 mm	1800°C

Order sample:

1 x PtRh10-Pt/S standard thermocouple with a Type A connection head, C799 16 x 12 mm ceramic protection tube and a PtRh protective sleeve.

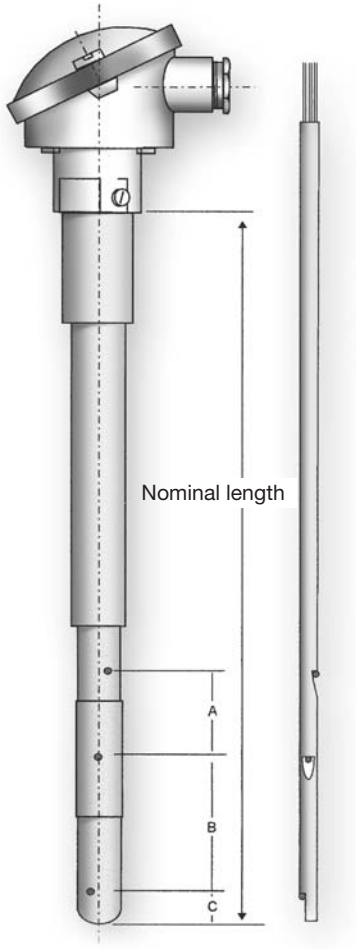


Product group:	**08-TMP**
Günther Art. No.:	**08-93321461-0960/0095**
Connection head:	Type A
Holding tube:	ø 22 x 2 x 150 mm, material no. 1.4762
Protection tube:	ø 16 x 12 mm, C799
Inner tube:	ø 8 x 5 mm, C799
Insulation rod:	ø 4.5 mm, 2-hole, C799
Protective sleeve:	PtRh 80/20 ø 9.1 x 0.5 x 95 mm
Thermocouple:	1 x PtRh10-Pt/S ø 0.5 mm
Nominal length:	960 mm
Fastening:	DIN 43734 stop flange
Temperature range:	0 - 1500°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

08 - TMP // Straight thermocouples with a precious metal protective sleeve

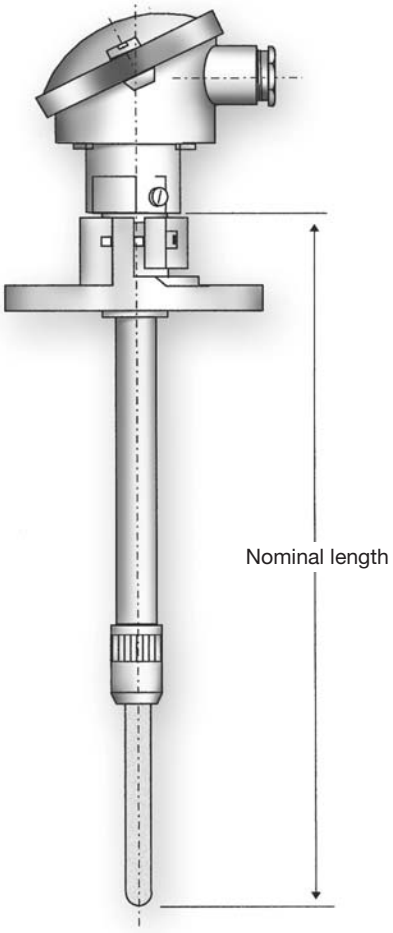
More order samples:

3 x PtRh10-Pt/S triple thermocouple, protection tube coated with platinum at the lower end



Product group:	**08-TMP**
Günther Art. No.:	**08-99080018-0950/0200**
Connection head:	Type A
Protection tube:	ø 17.5 x 12.5 mm x 750 mm, C799
Inner tube:	ø 10 x 6 mm, C799
Insulation rod:	ø 4.5 mm, 6-hole, C799
Holding tube:	ø 26.67 x 22.4 x 150 mm, material no. 1.4571
Thermocouple:	3 x PtRh10-Pt/S ø 0.5 mm
Measuring point 1:	C = 20 mm
Measuring point 2:	B = 76 mm
Measuring point 3:	A = 116 mm
Nominal length:	950 mm
Fastening:	None
Sensor tip:	Platinum-coated, length: 200 mm
Temperature range:	0 - 1500°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

1 x PtRh10-Pt/S standard element with a stainless steel shaft tube and replaceable precious metal protective sleeves



Product group:	**08-TMP**
Günther Art. No.:	**08-99080004-0710/0100**
Connection head:	Type A
Shaft tube (SR):	ø 15 x 3 mm, material no. 1.4571
Inner tube:	ø 8 x 5 mm, C799
Insulation rod:	ø 4.0 mm, 2-hole, C799
Holding tube:	ø 28.3 x 1.5 x 35 mm, material no. 1.0305
Thermocouple:	1 x PtRh10-Pt/S ø 0.5 mm
Nominal length:	710 mm
Fastening:	DIN 43734 stop flange
PtRh protective sleeve:	ø 9.1 x 0.5 x 100 mm PtRh90/10
Feature:	Protective sleeve replaceable with M14 x 1.5 knurled nut, material no. 2.4816
Temperature range:	0 - 1500°C, momentary 1600°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

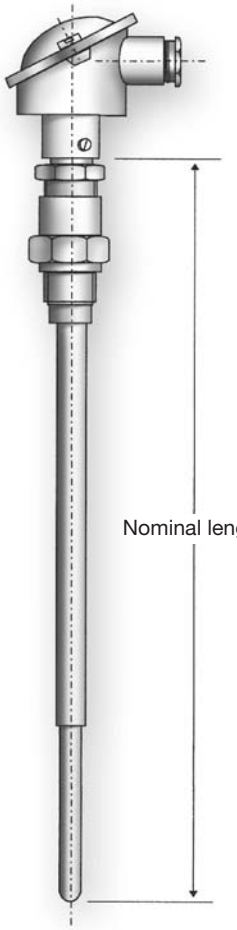
Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions. All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

08 - TMP // Straight thermocouples with a precious metal protective sleeve

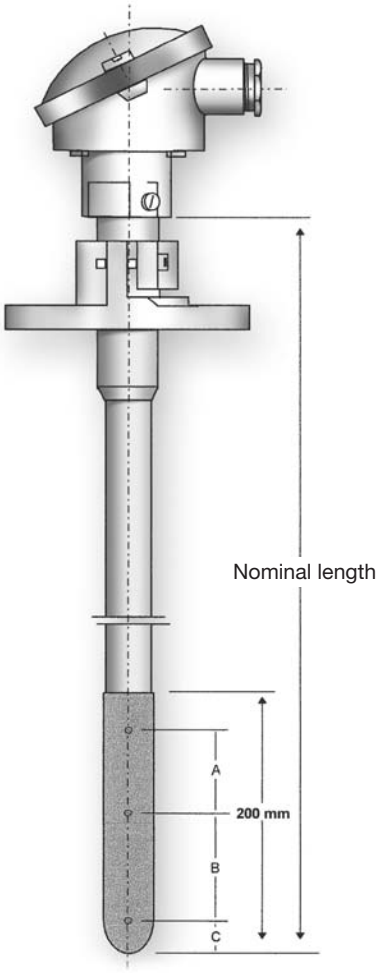
More order samples:

2xPtRh30-PtRh6/B double thermocouple with a Type B connection head and a PtRh protective sleeve adhered to the protection tube



Product group:	**08-TMP**
Günther Art. No.:	**08-20076832-0800/0050**
Connection head:	Type B
Holding tube:	ø 15 x 2 x 80 mm, material no. 1.0305
Protection tube:	ø 10 x 6 mm, C799
Inner tube:	None
Insulation rod:	ø 5.5 mm, 4-hole, C799
Thermocouple:	2 x PtRh30-PtRh6/B ø 0.5 mm
Nominal length:	800 mm
PtRh protective sleeve:	ø 6.5 x 0.5 x 75 mm made of PtRh90/10 50 mm protruding from the protection tube
Fastening:	G 1/2 A mounting thread, steel, zinc-coated
Temperature range:	0 - 1500°C
Limiting deviation:	Class 2 acc. to DIN EN 60584-2

3xPtRh30-PtRh6/B triple thermocouple with a PtRh protective sleeve applied



Product group:	**08-TMP**
Günther Art. No.:	**08-99080058-1450/0200**
Connection head:	Type A
Holding tube:	ø 22 x 2 x 200 mm, material no. 1.0305
Protection tube:	ø 15 x 10 mm, C799
Inner tube:	None
Insulation rod:	ø 8.5 mm, 6-hole, C799
Thermocouple:	3 x PtRh30-PtRh6/B ø 0.5 mm
Nominal length:	1450 mm
PtRh protective sleeve:	ø 15.5 x 0.2 x 200 mm, made of PtRh90/10, fastened onto the protection tube with putty
Fastening:	DIN 43734 stop flange
Measuring points:	0 - 80 - 160 mm
Temperature range:	0 - 1500°C
Limiting deviation:	Class 2 acc. to DIN EN 60584-2

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

08 - TMP // Straight thermocouples with a precious metal protective sleeve

Thermocouples with PtRh protective sleeves

0	8	-								-					/				

Nominal length

Visible length of the PtRh protective sleeve

Protection tube (dimensions / material)	7 x 4	mm	C799	**0**
	10 x 7	mm	C610	**1**
	10 x 6	mm	C799	**2**
	15 x 11	mm	C610	**3**
	15 x 10	mm	C799	**4**
	16 x 12	mm	C610	**5**
	24 x 19	mm	C610	**6**
	24 x 18	mm	C799	**7**
	16 x 12	mm	C530	**8**
	16 x 12	mm	C799	**9**

Inner tube	None		**0**
	C530	Porous ceramic material (on request)	**1**
	C610	gastight ceramic	**2**
	C799	Aluminium oxide	**3**

Holding tube (visible length)		**1.0305**	**1.4571**	**1.4762**	**1.4841**
15x 2	50 mm	**05**	**75**	**-**	**-**
15 x 2	60 mm	**06**	**76**	**26**	**36**
15 x 2	80 mm	**07**	**77**	**27**	**37**
15 x 2	100 mm	**08**	**78**	**28**	**38**
15 x 2	150 mm	**09**	**79**	**29**	**39**
15 x 2	200 mm	**10**	**80**	**30**	**40**
22 x 2	100 mm	**11**	**81**	**31**	**41**
22 x 2	150 mm	**12**	**82**	**32**	**42**
22 x 2	200 mm	**13**	**83**	**33**	**43**
22 x 2	250 mm	**14**	**84**	**34**	**44**
22 x 2	300 mm	**15**	**85**	**35**	**45**
28.3 x 1.5	80 mm	**16**	**-**	**-**	**-**
28.3 x 1.5	180 mm	**17**	**-**	**-**	**-**
32 x 2	50 mm	**18**	**88**	**-**	**48**
32 x 2	100 mm	**19**	**89**	**-**	**49**
32 x 2	150 mm	**20**	**90**	**-**	**70**
32 x 2	200 mm	**21**	**91**	**-**	**71**
32 x 2	250 mm	**22**	**92**	**-**	**72**
Alloy 600 (mat. no. 2.4816)			**Kanthal**		
22 x 2	200 mm	**61**	15 x 1.3	100 mm	**51**
22 x 2	300 mm	**62**	15 x 1.3	150 mm	**52**
22 x 2	400 mm	**63**	15 x 1.3	200 mm	**53**
22 x 2	500 mm	**64**			
30 x 2.5	230 mm	**65**	Individual		**00**
30 x 2.5	400 mm	**66**	No holding tube		**99**

Head	A	**1**	B	**6**
	AUS	**2**	BUS	**7**
	AUZ	**3**	BUZ	**8**
	AUZH	**4**	BUZH	**9**
	AUSH	**5**	BBK	**0**

Thermocouple	Type R	1x	PtRh13-Pt	Standard	**1**
	Type R	2x	PtRh13-Pt	Double	**2**
	Type R	3x	PtRh13-Pt	Triple	**3**
	Type S	1x	PtRh10-Pt	Standard	**4**
	Type S	2x	PtRh10-Pt	Double	**5**
	Type S	3x	PtRh10-Pt	Triple	**6**
	Type B	1x	PtRh30-PtRh6	Standard	**7**
	Type B	2x	PtRh30-PtRh6	Double	**8**
	Type B	3x	PtRh30-PtRh6	Triple	**9**

Protective sleeves	PtRh90/10	9.1 x 0.3	mm	**1**
	PtRh90/10	9.1 x 0.5	mm	**2**
	PtRh90/10	6.5 x 0.5	mm	**3**
	PtRh90/10	9.0 x 0.8	mm	**4**
	PtRh85/15	7.3 x 0.4	mm	**5**
	PtRh80/20	9.1 x 0.5	mm	**6**
	PtRh90/10	9.0 x 0.5	mm	**7**
	Other			**9**

Fastening	None	**0**	Mounting thread	**2**
	Flange	**1**	Flange/counter flange	**3**

Custom designs:

0	8	-	9	9	0	8	x	x	x	x	-					/				

Consecutive no.

Nominal length / mm

10 - TMM // Thermocouples with a metal thermowell and a built-in sheath measurement insert

10 - TMM // Thermocouples with a metal protection tube and a built-in sheath measurement insert

This product group comprises ready-to-install large and small straight thermocouples with built-in sheath measurement inserts. Sensors of this type are used for standard temperature measurements, primarily in liquid and gaseous media.
The thermocouples listed are examples of those that can be ordered.

Günther GmbH supplies any kind of standard straight thermocouple as well as special custom-made models. The number of possible combinations is virtually innumerable, depending on the dimensions, material, fastening, etc. The system of article numbers can be used to assemble the thermocouples in accordance with the respective operating conditions.

The main difference between thermocouples with thermocouples insulated in ceramic material (product group 00-TMT) and thermocouples with sheath measurement inserts is that in the case of the latter the thermoelectric wires (internal conductors) are protected by a metal sheath – usually made of Alloy 600 – which may serve to increase the service life.

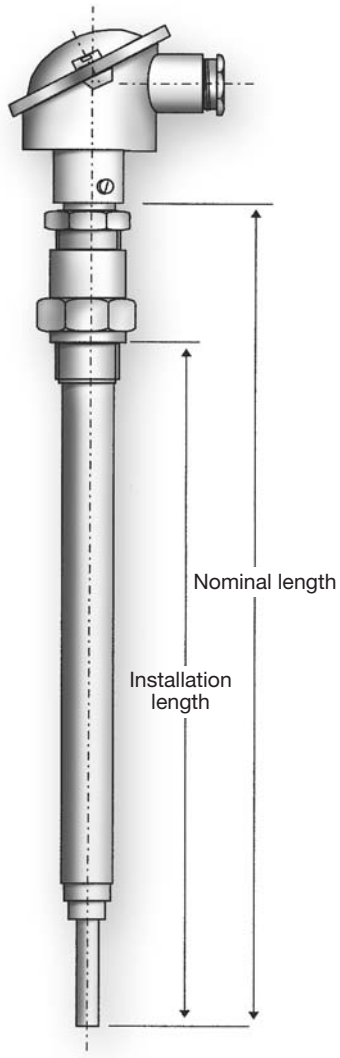
Unlike thermocouples, sheath measurement inserts are easy to replace.

Thermoelectric voltages and limiting deviations of the sheathed thermocouples supplied by Günther GmbH comply either with the DIN 43710 norm or with the DIN EN 60584 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x NiCr-Ni/K thermocouple with a Type B connection head and a G 3/4 A mounting thread

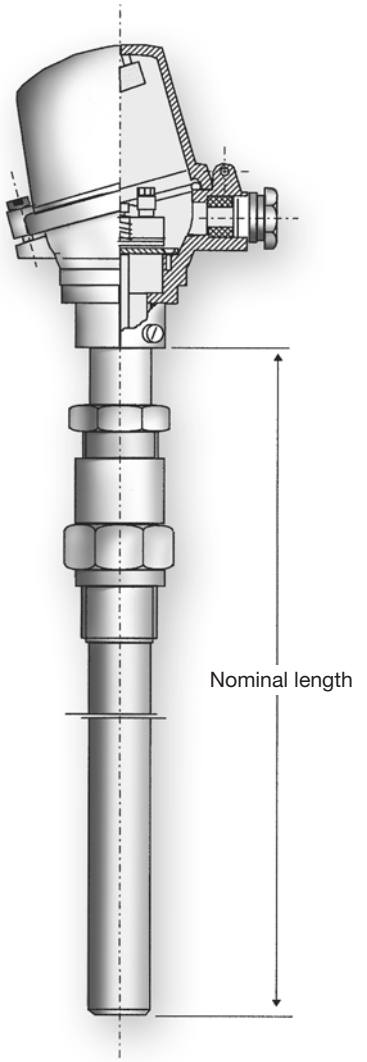


Product group:	**10-TMM**
Günther Art. No.:	**10-11046632-0750**
Connection head:	Type B
Protection tube:	ø 15 x 3 mm, material no. 1.0305
Measurement insert:	1 x NiCr-Ni/K ø 4.5 mm
Nominal length:	750 mm
Fastening:	3/4 A mounting thread, steel
Sensor tip:	Tapered, stainless steel, ø 6 x 60 mm
Temperature range:	0 - 600°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

10 - TMM // Thermocouples with a metal protection tube and a built-in sheath measurement insert

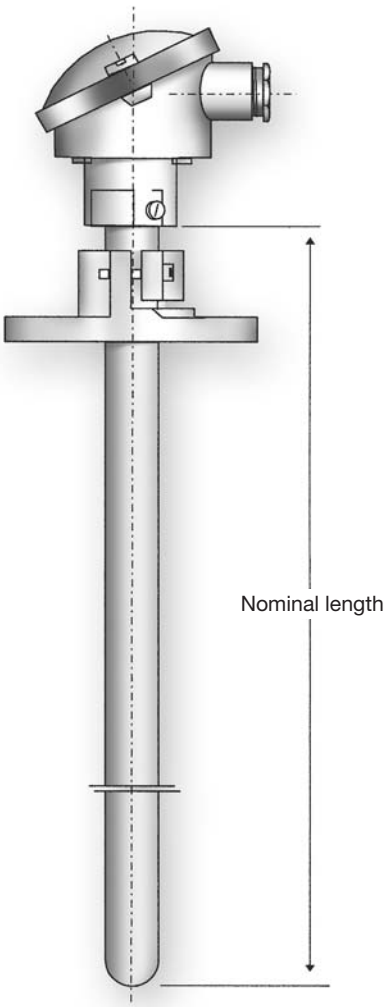
More order samples:

1 x Fe-CuNi/J thermocouple with a Type AUZH connection head and a mounting thread



Product group:	**10-TMM**
Günther Art. No.:	**10-24004832-0600**
Connection head:	Type AUZH
Protection tube:	ø 22 x 2 mm, material no. 1.4571
Measurement insert:	1 x Fe-CuNi/J ø 6.0 mm
Nominal length:	600 mm
Fastening:	G 1 A gasproof mounting thread
Feature:	Measuring transducer fitted in the head, 4..20 mA equivalent to 0-800°C
Temperature range:	0 - 800°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

1 x NiCr-Ni/K standard thermocouple with a connection head Type A and flange (testable model)

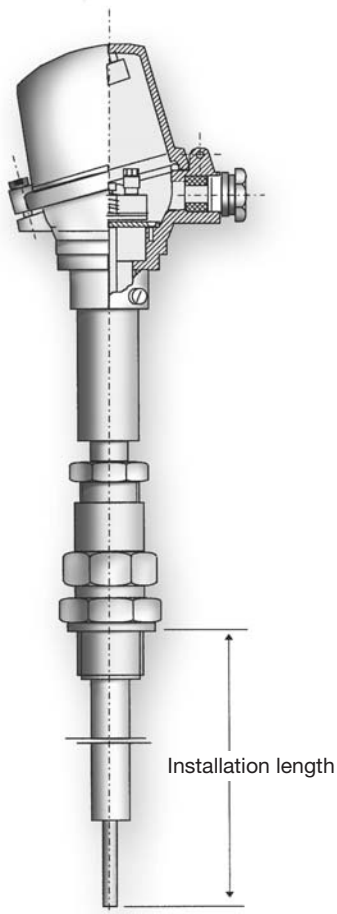


Product group:	**10-TMM**
Günther Art. No.:	**00-26201731-1300**
Connection head:	Type A
Protection tube:	ø 22 x 2 mm, material no. 1.4762
Inner tube:	ø 15 x 11 mm, C610
Measurement insert:	11 x NiCr-Ni/K ø 6.0 mm with a ø 3.5 mm borehole
Nominal length:	1300 mm
Fastening:	DIN 43734 stop flange
Temperature range:	0 - 1200°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

10 - TMM // Thermocouples with a metal protection tube and a built-in sheath measurement insert

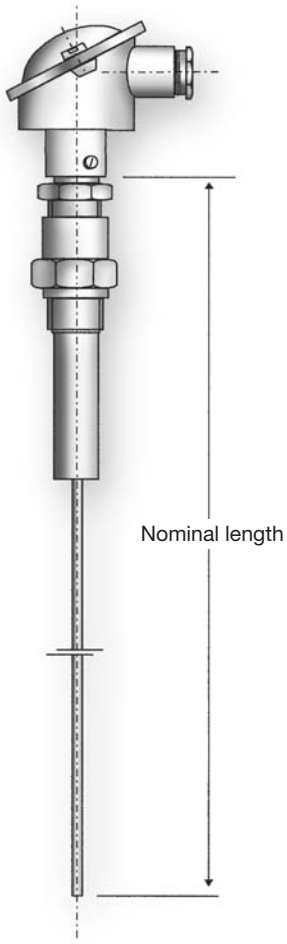
More order samples:

1 x NiCr-Ni/K thermocouple with a Type AUZH connection head and a fitted measuring transducer



Product group:	**10-TMT**
Günther Art. No.:	**10-99100060-0700**
Connection head:	Type AUZH with a measuring transducer
Protection tube:	ø 15 x 2 mm, material no. 1.4841
	650 mm long
Holding tube:	ø 22 x 2 x 80 mm, material no. 1.4571
Measurement insert:	1 x NiCr-Ni/K ø 6.0 mm,
	installation length = 745 mm
Nominal length:	700 mm
Fastening:	G 3/4 A gasproof mounting thread
	G1 A - G 3/4 I reducing coupling
Sensor tip:	Sheath measurement insert 50 mm
	freely protruding (resilient)
Measuring transducer:	Temperature straight, 4 - 20 mA
	equivalent 0 - 1000°C
Temperature range:	0 - 1000°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Feature:	Sheath measurement insert with
	resilient installation, sealed at the
	connection head

1 x NiCr-Ni/K thermocouple with a Type B connection head and a freely-protruding sensor



Product group:	**10-TMT**
Günther Art. No.:	**10-99100035-2000**
Connection head:	Type B
Holding tube:	ø 15 x 2 x 500 mm, material no. 1.4841
Inner tube:	None
Measurement insert:	1 x NiCr-Ni/K ø 3.0 mm, sheath made
	of Alloy 600
Nominal length:	2000 mm
Fastening:	G 1/2 A mounting thread, steel,
	zinc-coated
Temperature range:	0 - 1000°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Feature:	Measurement insert protrudes freely from
	the holding tube and is adhered into
	the tube

10 - TMM // Thermocouples with a metal protection tube and a built-in sheath measurement insert

Metal protection tube + sheath | 1 | 0 | - | | | | | | | | | - | | | | |

Nominal length / mm

Protection tube (dimensions)

			Special sizes:		
15 x 2	mm	**1**	12 x 1.5	mm	**5**
22 x 2	mm	**2**	15 x 1.3	mm	**6**
24 x 3	mm	**3**	11 x 1.5	mm	**7**
26 x 4	mm	**4**	10 x 1.5	mm	**8**
			9 x 1	mm	**9**

Protection tube (Material)	St 35.8	Mat. no. 1.0305	**1**
	Kanthal AF		**2**
	Stainless steel	Mat. no. 1.4301	**3**
	Stainless steel	Mat. no. 1.4571	**4**
	X18CrN 28	Mat. no. 1.4749	**5**
	X10CrAl 24	Mat. no. 1.4762	**6**
	X15CrNiSi 25 20	Mat. no. 1.4841	**7**
	Alloy 600	Mat. no. 2.4816	**8**
	Heat-res. steel	Mat. no. 1.4893	**9**

Inner tube	None		**0**
	C530	Porous ceramic material	**1**
	C610	Porcelain	**2**
	C799	Aluminium oxide	**3**

Sensor point

Not tapered	**0**	Tapered to 10 mm	**5**
Tapered to 15 mm	**1**	Tapered to 8 mm	**6**
Tapered to 12 mm	**2**		
Tapered to 9 mm	**3**		
Tapered to 6 mm	**4**	Tapered other	**9**

Head	A	**1**	B	**6**
	AUS	**2**	BUS	**7**
	AUZ	**3**	BUZ	**8**
	AUZH	**4**	BUZH	**9**
	AUSH	**5**	BBK	**0**

Sheath element (type/number of thermocouples/sheath material/diameter/verifiability)

	NiCr-Ni /K Alloy 600 2.4816					Fe-CuNi/L 1.4541				Fe-CuNi/J 1.4541				Nicrosil-Nisil/N 2.4816			
	Standard, testable	Double, testable	Standard	Double	Triple	Standard, testable	Double, testable	Standard	Double	Standard, testable	Double, testable	Standard	Double	Standard, testable	Double, testable	Standard	Double
ø / mm																	
1.5	**25**	**26**	**27**	**28**	-	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**10**	**11**	**12**	**13**
2	**37**	**38**	**39**	**40**	-	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**14**	**15**	**16**	**17**
3	**49**	**50**	**51**	**52**	**90**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**18**	**19**	**20**	**21**
4.5	**61**	**62**	**63**	**64**	**91**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**22**	**23**	**24**	**94**
6	**73**	**74**	**75**	**76**	**92**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**95**	**96**	**97**	**98**
8	**85**	**86**	**87**	**88**	**93**	-	-	-	-	-	-	-	-	-	-	-	-

Fastening

None	**0**
Stop flange	**1**
Mounting thread	**2**
Flange/counter flange	**3**

Custom designs: | 1 | 0 | - | 9 | 9 | 1 | 0 | x | x | x | x | - | | | | |

Consecutive no.

Nominal length / mm

12 - THD // Welding-in thermocouples with D-sleeves

12 - THD // Welding-in thermocouples with D-sleeves

Welding-in thermocouples are used for measuring temperatures in gaseous and in liquid media such as air, steam, water, oil, etc. at high flow velocities and high pressures.
Special welding sleeves are suitable for pressures of up to 700 bar. The fittings of this assembly are equipped with replaceable sheath measurement inserts.
The most significant component is a protective sleeve made of high-quality, solid metallic material which is welded into the respective system. In this case the protective sleeve and the system should be made of the same material.
Available space at the place of use and stress levels to be expected will determine the choice of the most suitable protective sleeve.
The service life of the protective sleeve depends of numerous factors such as temperature, pressure, the respective medium for use, installation position (vertical/horizontal), thermowell material and the incoming flow relationship.

Guidelines for the working stability of the protective sleeves in terms of pressure and temperature can be seen in the DIN 43772 diagrams.
It is particularly the question of chemical stability that will need to be checked on carefully for each individual situation. Frequently it is only after operation tests have been carried out that information is gained, since even minor impurities in the surrounding media can have a considerable effect on the behaviour of the protective sleeves.

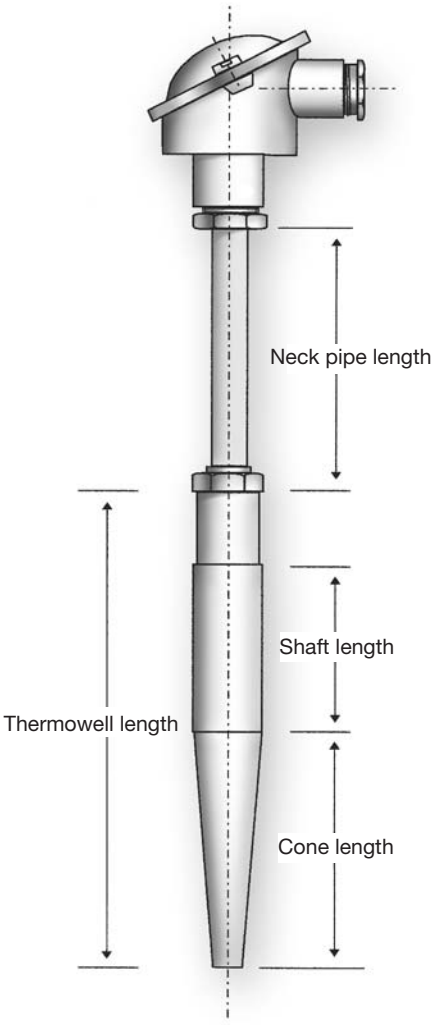
Most suitable areas of application:

- Containers and pipings
- Apparatus and machines
- Laboratories
- Test ranges
- Process technology
- Energy production and heat distribution
- Food and beverages production
- Machine and plant construction

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x NiCr-Ni/K welding-in thermocouple with a Type B connection head, M18 x 1.5 connection thread and a D2 welding sleeve

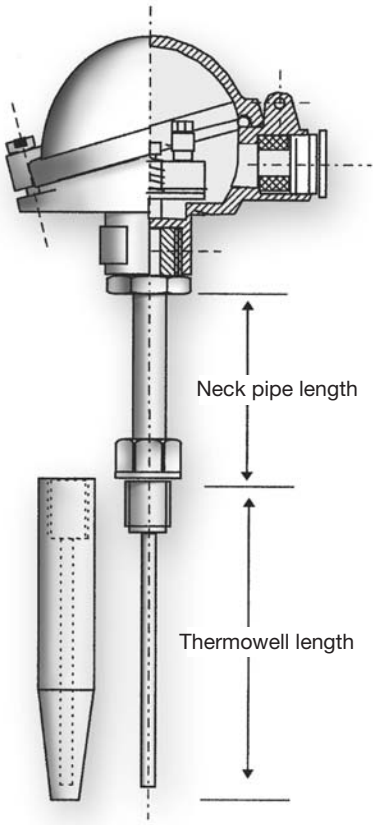


Product group:	**12-THD**
Günther Art. No.:	**12-10022107-0200/0140**
Connection head:	Type B (M24 x 1.5)
Protection tube:	D2 welding sleeve, mat. no. 1.4571
Neck pipe:	ø 11 x 2 x 140 mm, material no. 1.4571
Measuring insert:	1 x NiCr-Ni/K ø 6.0 mm
Thermowell length:	200 mm
Fastening:	None
Temperature range:	0 - 400°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

12 - THD // Welding-in thermocouples with D-sleeves

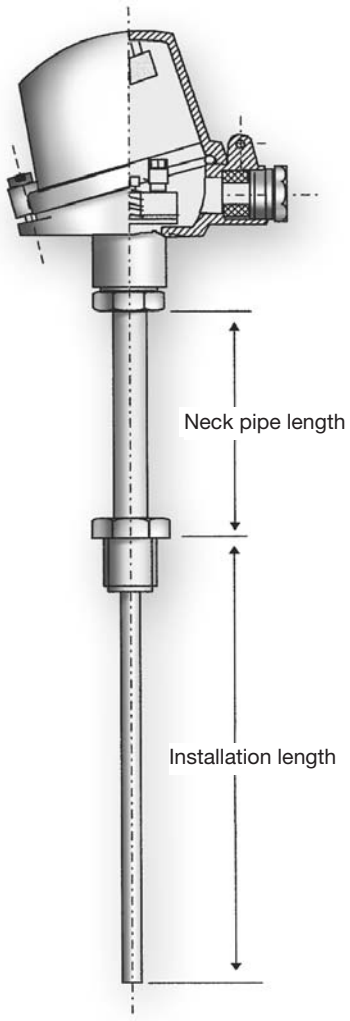
Order sample:

1 x Fe-CuNi/J welding-in thermocouple with a Type BUZ connection head and replaceable measuring insert as well as a sleeve made of stainless steel



Product group:	**12-THD**
Günther Art. No.:	**12-99120015-0070/0080**
Connection head:	Type BUZ (M24 x 1.5)
Protection tube:	Welding sleeve with M14 x1.5 female thread, mat. no. 1.4571, overall length = 70 mm, cone length = 25 mm
Neck pipe:	ø 11 x 1 x 80 mm, material no. 1.4571, M14 x 1.5
Measuring insert:	1 x Fe-CuNi/J ø 6.0 mm
Thermowell length:	70 mm
Temperature range:	0 - 400°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

2 x NiCr-Ni/K thermocouple with a Type BUZH connection head and a replaceable measuring transducer



Product group:	**12-THD**
Günther Art. No.:	**12-70020017-0325/0140**
Connection head:	Type BUZH (M24 x 1.5)
Neck tube:	11 x 2 mm, material no. 1.4571
Measuring insert:	2 x NiCr-Ni/K ø 6.0 mm, sheath made of Alloy 600
Installation length:	325 mm
Neck pipe length:	140 mm
Fastening:	M18x1.5 screw socket
Sensor tip:	Sheath measuring insert freely protruding
Temperatures:	0 - 800°C
Measuring transducer:	Günther PCP 4...20 mA
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

12 - THD // Welding-in thermocouples with a measuring insert and D-sleeves

Thermocouples, metal + sheath | 1 | 2 | - | | | | | | | | | - | | | | | / | | | | |

Installation length / Neck pipe length in mm

Connection head

B (M24 x 1.5)	**1**	BUSH	**6**
BUS	**2**	BUZH	**7**
BUZ	**3**		**8**
BBK	**4**		**9**

Blank flange in acc. with DIN 2527	St37-2	1.4571	C22.8	
DN 10 PN 16	**1 0**	**2 0**	**3 0**	None
DN 15 PN 16	**1 1**	**2 1**	**3 1**	
DN 20 PN 16	**1 2**	**2 2**	**3 2**	**0 0**
DN 25 PN 16	**1 3**	**2 3**	**3 3**	
DN 32 PN 16	**1 4**	**2 4**	**3 4**	
DN 40 PN 16	**1 5**	**2 5**	**3 5**	
DN 50 PN 16	**1 6**	**2 6**	**3 6**	Other
DN 65 PN 16	**1 7**	**2 7**	**3 7**	
DN 80 PN 16	**1 8**	**2 8**	**3 8**	**9 9**
DN 100 PN 16	**1 9**	**2 9**	**3 9**	

Neck tube in acc. with DIN 43767

With M24 x 1.5 / M18 x 1.5 screw fittings,	galvanised steel	1
With M24 x 1.5 / M18 x 1.5 screw fittings,	stainless steel	2
With M24 x 1.5 / M14 x 1.5 screw fittings,	galvanised steel	3
With M24 x 1.5 / M14 x 1.5 screw fittings,	stainless steel	4
None		0
Other		9

Welding-in protection tubes in acc. with DIN 43763

		1.7335	1.4571	1.5415
D1	Cone length = 65 mm, Shaft length = 50 mm, Thermowell length = 140 mm, ø 24 mm	**10**	**20**	**30**
D2	Cone length = 125 mm, Shaft length = 50 mm, Thermowell length = 200 mm, ø 24 mm	**11**	**21**	**31**
D4	Cone length = 65 mm, Shaft length = 110 mm, Thermowell length = 200mm, ø 24 mm	**12**	**22**	**32**
D5	Cone length = 125 mm, Shaft length = 110 mm, Thermowell length = 260 mm, ø 24 mm	**13**	**23**	**33**
DS	Cone length = 65 mm, Shaft length = 50 mm, Thermowell length = 140 mm, ø 18 mm	**15**	**25**	**35**
DS	Cone length = 40 mm, Shaft length = 50 mm, Thermowell length = 115 mm, ø 18 mm	**16**	**26**	**36**
No thermowell (sheath freely protruding)		**00**		
Other		**99**		

Sheath element (type/number of thermocouples/sheath material/diameter)

Thermocouple	**NiCr-Ni/K**		**Fe-CuNi/L**		**Fe-CuNi/J**		**Nicrosil-Nisil/N**	
Sheath material	**Alloy 600 2.4816**		**1.4541**		**1.4541**		**Alloy 600 2.4816**	
Mat. no.								
Sheath ø / mm	Standard	Double	Standard	Double	Standard	Double	Standard	Double
2	04	14	-	-	-	-	-	-
3	05	15	25	35	45	55	65	75
4.5	06	16	26	36	46	56	66	76
6	07	17	27	37	47	57	67	77
8	08	18	-	-	-	-	-	-
SG*: 3.5	09	19	-	-	-	-	-	-

* Special size/special material 00

Custom designs: | 1 | 2 | - | 9 | 9 | 1 | 2 | x | x | x | x | - | | | | | / | | | | |

Consecutive no. Installation length / Neck pipe length in mm

13 - TFL // Thermocouples with blank flanges welded on

13 - TFL // Thermocouples with blank flanges welded on

Thermocouples with a blank flange welded on are used for measuring temperatures in gaseous and in liquid or plastic media such as air, steam, water or oil.

A blank flange welded onto the thermocouple protection tube ensures that sensors of this kind can be securely fastened to the walls of pressure and vacuum equipment, for example in power plants and in chemical plants. The protection fittings at the place of installation can remain in place even if the measuring insert or the thermocouple needs to be replaced now and then. This ensures that operation does not need to be interrupted.

Most suitable areas of application:

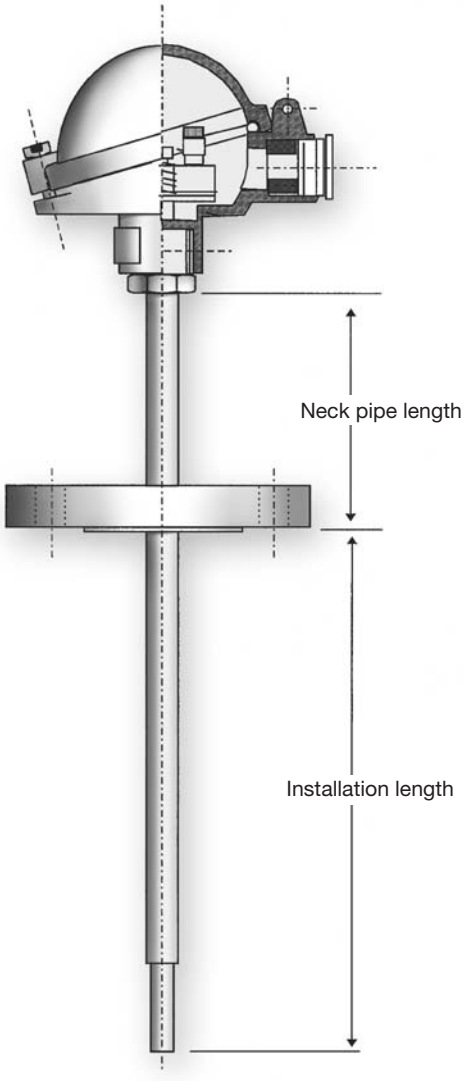
- Containers and pipings
- Apparatus and machines
- Laboratories
- Test ranges
- Process technology
- Energy production and heat distribution
- Food and beverages production
- Machine and plant construction

The thermoelectric voltages and limiting deviations of our thermocouples and sheath measuring inserts comply with Parts 1 and 2 of the DIN EN 60584 norm; thermocouples and sheath measuring inserts of Type L comply with the DIN 43710 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x NiCr-Ni/K straight flange thermocouple with a DN 25 PN 16 blank flange, Type C

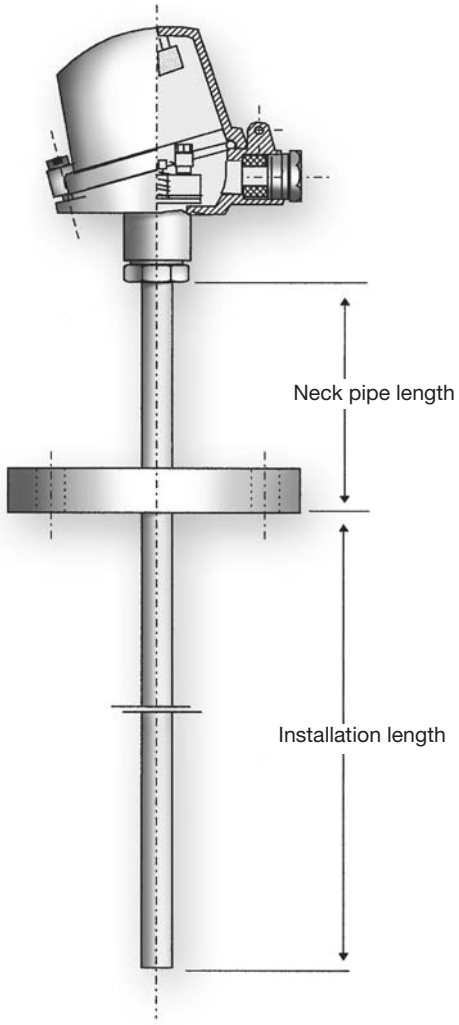


Product group:	**13-TFL**
Günther Art. No.:	**13-62333425-0500/0130**
Connection head:	Type BUZ (M24 x 1.5)
Neck pipe:	ø 15 x 2 mm, material no. 1.4841
Protection tube:	ø 15 x 2 mm, material no. 1.4841
Sensor tip:	ø 10 x 1.5 x 40 mm
Process connection:	DN 25 PN 16 blank flange, Style C 1.4571
	Welded onto a thermowell
Sheath element:	1 x NiCr-Ni/K ø 6.0 mm,
	sheath made of Alloy 600
Temperature range:	0 - 800°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

13 - TFL // Thermocouples with blank flanges welded on

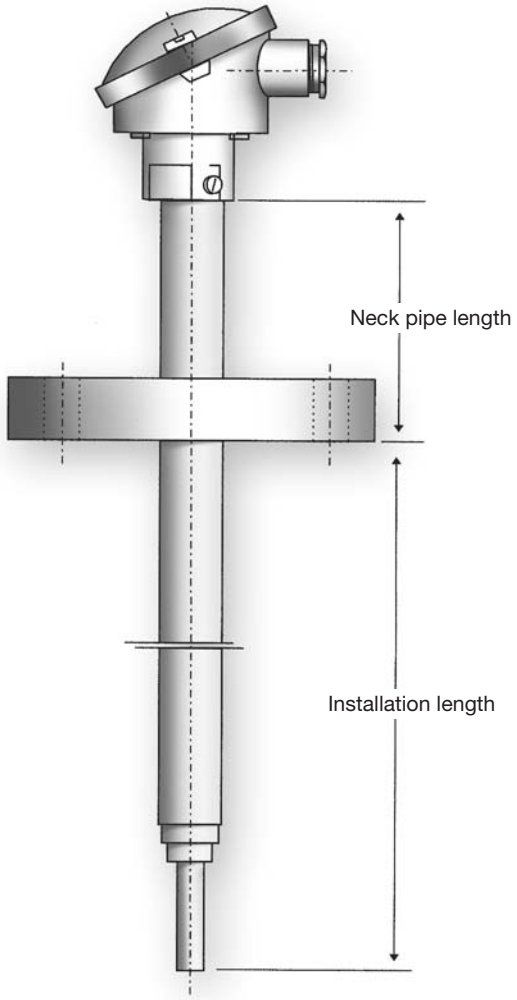
Order sample:

2 x NiCr-Ni/K flange thermocouple with a Type BUZH connection head and a blind flange



Product group:	**13-TFL**
Günther Art. No.:	**13-99130012-1200/0100**
Connection head:	Type BUZH (M24 x 1.5) with PG 13.5
Neck tube:	ø 15 x 3 mm, material no. 1.4571
Measuring insert:	2 x NiCr-Ni/K ø 6.0 mm, sheath made of Alloy 600
Installation length:	1200 mm
Neck pipe length:	100 mm
Fastening:	2" 200 lbs ANSI blank flange, mat. no. 1.4571
Sensor tip:	Not tapered, round plate welded in
Measuring insert length:	Installation length = 1200 + 100 mm + 35 mm Explosion-proof design
Temperature range:	0 - 800°C
Measuring transducer:	Digital, set acc. to instructions Output 4.. 20 mA, explosion-proof design
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

1 x NiCr-Ni/K thermocouple with a Type A connection head, tapered test probe and welded on blank flange



Product group:	**13-TFL**
Günther Art. No.:	**13-11733332-1150/0150**
Connection head:	Type A
Protection tube:	ø 22 x 2 mm, material no. 1.4762
Measuring insert:	1 x NiCr-Ni/K ø 6.0 mm, installation length = 1335 mm
Installation length:	1150 mm
Neck pipe length:	150 mm
Fastening:	DN65 PN16 blank flange, mat. no. 1.0305
Sensor tip:	18 x 15 / 15 x 10 / 12 x 50 mm Mat. no. 1.4762, offset
Temperature range:	0 - 1200°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

13 - TFL // Thermocouples with blank flanges welded on

Thermocouples with blank flanges | 1 | 3 | - | | | | | | | | - | | | | | / | | | | |

Installation length / Neck tube length in mm

Connection head

A	**1**	BUZ	(M24 x 1.5)	**6**
	2	BUSH	(M24 x 1.5)	**7**
	3	BUZH	(M24 x 1.5)	**8**
B (M24 x 1.5)	**4**	DL / MA	(M10 x 1)	**9**
BUS (M24 x 1.5)	**5**			**0**

Blank flange in acc. with DIN 2527	St37-2	1.4571	C22.8	Alloy C4	
DN 10 PN 16	**1 0**	**2 0**	**3 0**	**40**	None
DN 15 PN 16	**1 1**	**2 1**	**3 1**	**41**	
DN 20 PN 16	**1 2**	**2 2**	**3 2**	**42**	**0 0**
DN 25 PN 16	**1 3**	**2 3**	**3 3**	**43**	
DN 32 PN 16	**1 4**	**2 4**	**3 4**	**44**	
DN 40 PN 16	**1 5**	**2 5**	**3 5**	**45**	
DN 50 PN 16	**1 6**	**2 6**	**3 6**	**46**	Other
DN 65 PN 16	**1 7**	**2 7**	**3 7**	**47**	
DN 80 PN 16	**1 8**	**2 8**	**3 8**	**48**	**9 9**
DN 100 PN 16	**1 9**	**2 9**	**3 9**	**49**	

Thermocouple insulated in ceramic material

	Standard	Double
NiCr-Ni/K	11	21
Fe-CuNi/J	12	22
Fe-CuNi/L	13	23
NiCrSi-NiSi/N	14	24
PtRh10-Pt/S	15	25
PtRh13-Pt/R	16	26
PtRh30-PtRh6/B	17	27

Sheathed measuring insert

	NiCr-Ni Type KI		**Fe-CuNi** Type LV		**Fe-CuNi** Type JV		**Nicrosil-Nisil** Type NI	
ø / mm	Standard	Double	Standard	Double	Standard	Double	Standard	Double
3	**31**	**41**	**51**	**61**	**71**	**81**	**91**	**96**
4.5	**32**	**42**	**52**	**62**	**72**	**82**	**92**	**97**
6	**33**	**43**	**53**	**63**	**73**	**83**	**93**	**98**
8	**34**	**44**	-	-	-	-		

Outer protection tube / dimension — Other **99**

Material number

ø	1.0305	1.4571	1.4762	1.4841	Alloy 600	Kanthal	Alloy C4
6 x 0,75	**0 1**	**1 2**	**2 3**	**3 4**	**4 5**	**5 6**	**6 7**
8 x 1	**0 2**	**1 3**	**2 4**	**3 5**	**4 6**	**5 7**	**6 8**
9 x 1	**0 3**	**1 4**	**2 5**	**3 6**	**4 7**	**5 8**	**6 9**
10 x 1,5	**0 4**	**1 5**	**2 6**	**3 7**	**4 8**	**5 9**	**7 0**
11 x 1	**0 5**	**1 6**	**2 7**	**3 8**	**4 9**	**5 0**	**7 1**
11 x 2	**0 6**	**1 7**	**2 8**	**3 9**	**4 0**	**6 1**	**7 2**
12 x 1,5	**0 7**	**1 8**	**2 9**	**3 0**	**5 1**	**6 2**	**7 3**
12 x 2,5	**0 8**	**1 9**	**2 0**	**4 1**	**5 2**	**6 3**	**7 4**
15 x 2	**0 9**	**1 0**	**3 1**	**4 2**	**5 3**	**6 4**	**7 5**
15 x 3	**0 0**	**2 1**	**3 2**	**4 3**	**5 4**	**6 5**	**7 6**
22 x 2	**1 1**	**2 2**	**3 3**	**4 4**	**5 5**	**6 6**	**7 7**

Design

Standard	[protection tube tube not tapered]	**0**
Fast response	[protection tube tapered]	
Thermowell point	15 mm ø	**1**
Thermowell point	12 mm ø	**2**
Thermowell point	9 mm ø	**3**
Thermowell point	6 mm ø	**4**
Thermowell point	10 mm ø	**5**
Thermowell point	8 mm ø	**6**
	Other	**9**

Custom designs: | 1 | 3 | - | 9 | 9 | 1 | 3 | x | x | x | x | - | | | | | / | | | | |

Consecutive no.

Installation length / Neck tube length in mm

14 - TES // Screw-in thermocouples

14 - TES // Screw-in thermocouples

Screw-in thermocouples are used for standard temperature measurements in the low-pressure range for gaseous, liquid and plastic media, depending on the quality of the thermowell and the surrounding media, up to a temperature of 1200°C.

A screwed socket welded onto the thermowell ensures that the sensor of this assembly is securely connected to the process connection.

The protection fittings are generally made of seamlessly extruded stainless steel tubing with a welded in bottom base ronde.

Our screw-in thermocouples can be fitted with an additional ceramic inner tube if required, since this will markedly enhance the permanent stability and the electrical insulation of the sensing thermocouples in many types of applications.

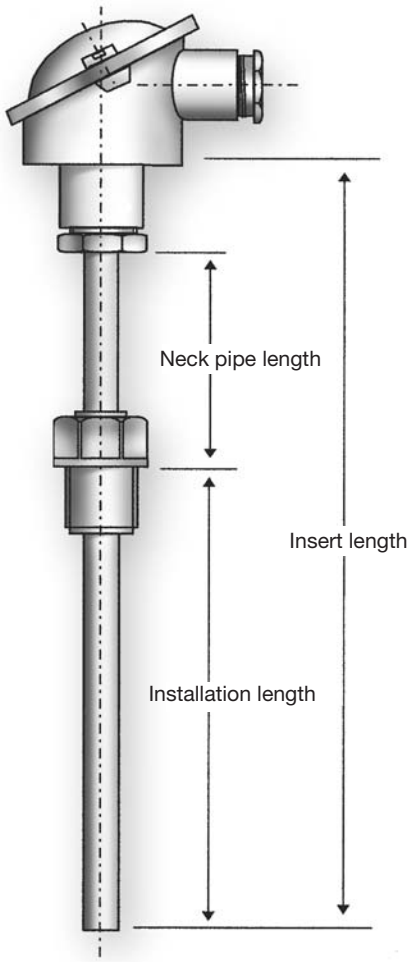
We recommend using sensors with a tapered thermowell point if changes in temperature need to be recorded very quickly.

The thermoelectric voltages and limiting deviations of our thermocouples and sheath measuring inserts comply with Parts 1 and 2 of the DIN EN 60584 norm; thermocouples and sheath measuring inserts of Type L comply with the DIN 43710 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x Fe-CuNi/L screw-in thermocouple with a G 1/2 A screw-in thread and a neck pipe

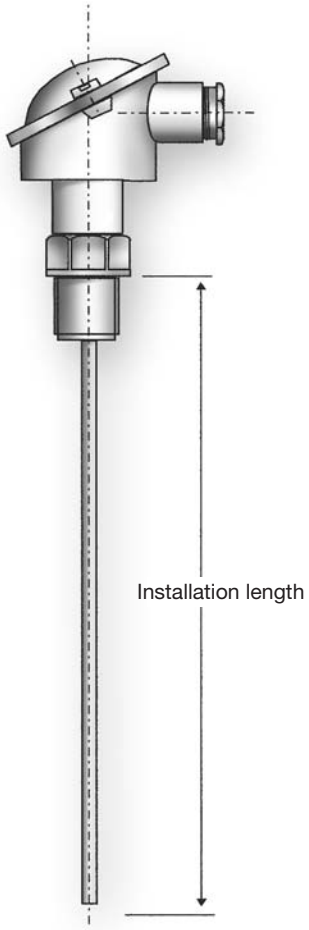


Product group:	**14-TES**
Günther Art. No.:	**14-14162701-0400/0140**
Connection head:	Type B (M24 x 1.5)
Protection tube:	ø 11 x 1 mm, material no. 1.4571
Measuring insert:	1 x Fe-CuNi/L ø 6.0 mm, installation length = 575 mm
Installation length:	400 mm
Neck pipe length:	140 mm
Fastening:	Screw-in-thread, mat. no. 1.4571 G 1/2 A
Sensor tip:	Not tapered, closed
Temperature range:	0 - 400°C
Limiting deviation:	1/2 DIN 43710

14 - TES // Screw-in thermocouples

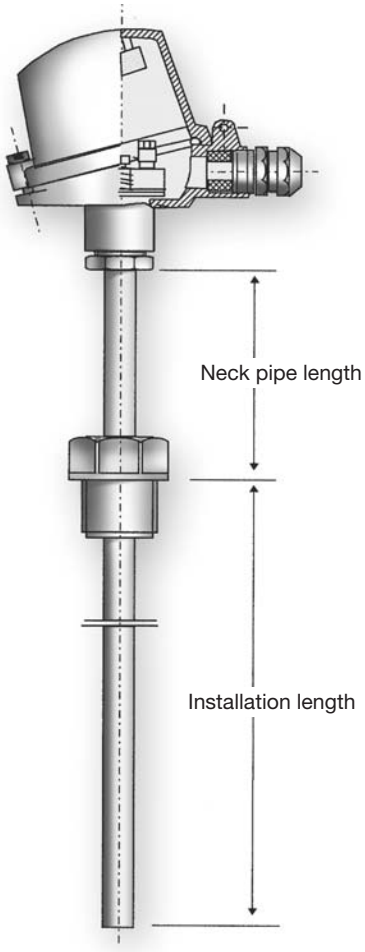
Order sample:

1 x NiCr-Ni/K screw-in thermocouple with a G 1/2 A screw-in thread, no protection tube



Product group:	**14-TES**
Günther Art. No.:	**14-11990500-0140**
Connection head:	Type B (M24 x 1.5)
Protection tube:	None
Measuring insert:	1 x NiCr-Ni/K ø 3.0 mm, resilient installation
	Measuring point insulated, freely protruding
	from the sleeve
Installation length:	140 mm
Fastening:	Screw-in-thread, mat. no. 1.4571 G 1/2 A
Temperature range:	0 - 1000°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

2 x NiCr-Ni/K screw-in thermocouple with a Type BUZH connection head and a M27 x 1.5 screw-in thread



Product group:	**14-TES**
Günther Art. No.:	**14-99140071-1000/0100**
Connection head:	Type BUZH (M24 x 1.5) with PG 13.5
Neck pipe:	ø 15 x 3 mm, material no. 1.4571
Measuring insert:	2 x NiCr-Ni/K ø 6.0 mm, sheath made
	of Alloy 600
Installation length:	1000 mm
Neck pipe length:	100 mm
Fastening:	M27 x 2 screwed socket made
	of stainless steel
Sensor tip:	Not tapered
Temperature range:	0 - 800°C
Measuring transducer:	Digital, set acc. to instructions
	Output 4 - 20 mA
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

14 - TES // Screw-in thermocouples

1	4	-								-					/				

Installation length / Neck pipe length in mm

Connection head

B (M24 x 1.5)	**1**	BUSH	**6**
BUS	**2**	BUZH	**7**
BUZ	**3**	NA	**8**
BBK	**4**	DL / MA (M10x1)	**9**
	5	Other	**0**

Screw-in-thread plug

Screwed plug, combined, M24 x 1.5 / G 1/2 A	**1**
Screwed plug, combined, M10 x 1 / G 1/2 A	**2**
Screwed plug G 1 A	**3**
Screwed plug G 1/2 A	**4**
Screwed plug M18x1.5	**5**
Screwed plug G 3/4 A	**6**
Screwed plug M20x1.5	**7**
Other	**0**

Outer protection tube Material / dimensions No thermowell **99**

ø	No.1.0305	No.1.4571	No.1.4762	No.14841	No.2.4816	Kanthal
6 x 0.75	**01**	**12**	**23**	**34**	**45**	**56**
8 x 1	**02**	**13**	**24**	**35**	**46**	**57**
9 x 1	**03**	**14**	**25**	**36**	**47**	**58**
10 x 1.5	**04**	**15**	**26**	**37**	**48**	**59**
11 x 1	**05**	**16**	**27**	**38**	**49**	**50**
11 x 2	**06**	**17**	**28**	**39**	**40**	**61**
12 x 1.5	**07**	**18**	**29**	**30**	**51**	**62**
12 x 2.5	**08**	**19**	**20**	**41**	**52**	**63**
15 x 2	**09**	**10**	**31**	**42**	**53**	**64**
15 x 3	**00**	**21**	**32**	**43**	**54**	**65**
22 x 2	**11**	**22**	**33**	**44**	**55**	**66**

Type/number of thermocouples / sheath material / diameter

		NiCr-Ni /K Alloy 600 2.4816		Fe-CuNi/L 1.4541		Fe-CuNi/J 1.4541		Nicrosil-Nisil / N Alloy 600 2.4816	
	mm	Standard	Double	Standard	Double	Standard	Double	Standard	Double
Sheath	1,5	**03**	**13**	**23**	**33**	**43**	**53**	**63**	**73**
measuring	2	**04**	**14**	**-**	**-**	**-**	**-**	**-**	**-**
insert	3	**05**	**15**	**25**	**35**	**45**	**55**	**65**	**75**
	4,5	**06**	**16**	**26**	**36**	**46**	**56**	**66**	**76**
	6	**07**	**17**	**27**	**37**	**47**	**57**	**67**	**77**
Thermocouple	1,0	**08**	**18**	**28**	**38**	**48**	**58**	**68**	**78**
	2,0	**09**	**19**	**29**	**39**	**49**	**59**	**69**	**79**
	3,0	**00**	**10**	**20**	**30**	**40**	**50**	**60**	**70**

Design

Straight	[protection tube not tapered]	**0**
Fast response	[protection tube tapered]	
Tube point	15 mm ø	**1**
Tube point	12 mm ø	**2**
Tube point	9 mm ø	**3**
Tube point	6 mm ø	**4**
Tube point	Other	**9**

Neck pipe No **0** Yes **1**

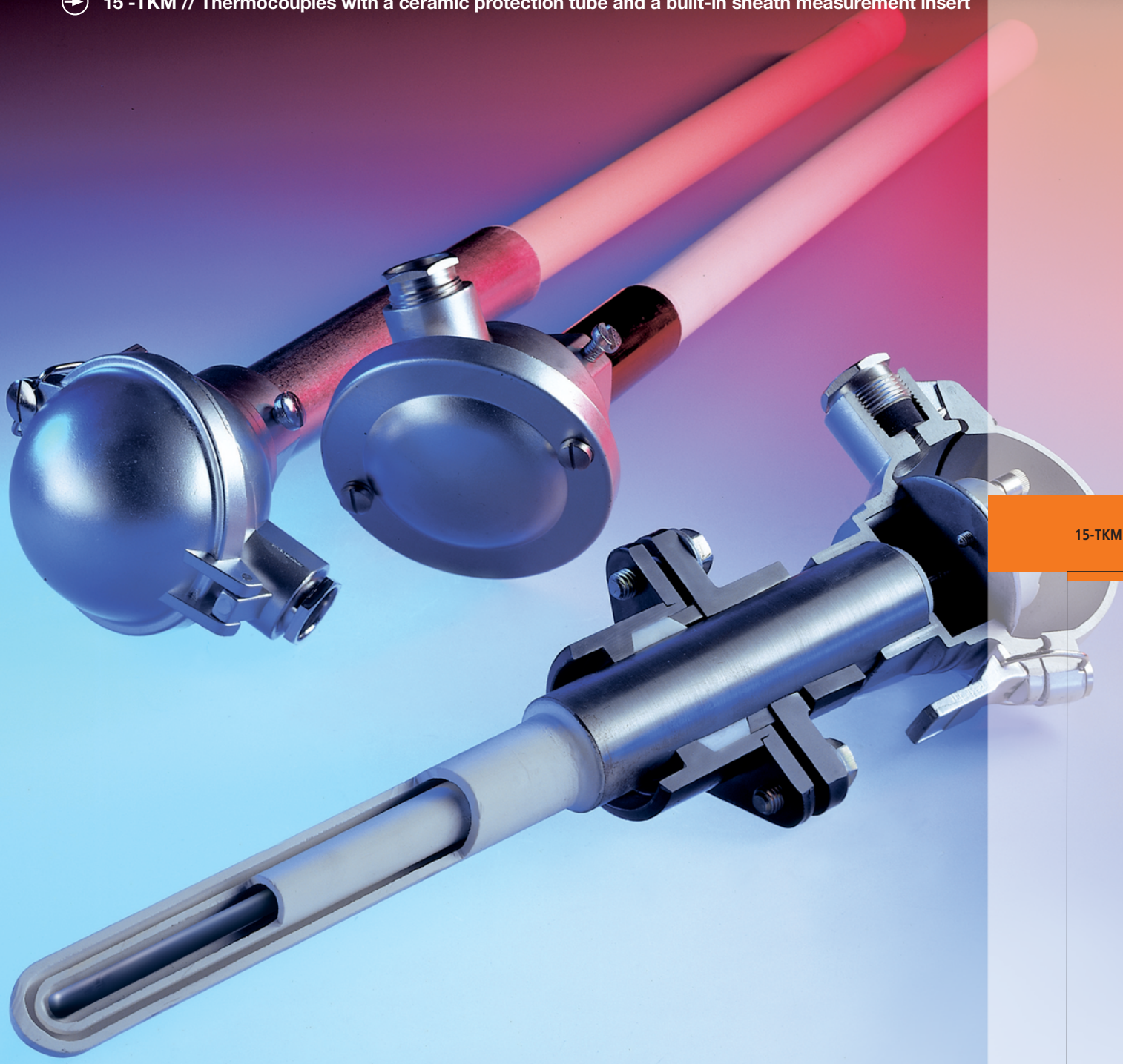
Custom designs:

1	4	-	9	9	1	4	x	x	x	x	-					/				

Consecutive no.

Installation length / Neck pipe length in mm

15 -TKM // Thermocouples with a ceramic protection tube and a built-in sheath measurement insert



15 -TKM // Thermocouples with a ceramic protection tube and a built-in sheath measurement insert

The number 15 product group comprises ready-to-install large and small straight thermocouples with ceramic protection tubes and built-in sheath measurement inserts. They are used for technical temperature measurements for temperatures ranging from 200°C to 1200°C at pressures of max. one bar.

Günther GmbH supplies any kind of standard straight thermocouple as well as special custom-made models.

The main difference between thermocouples with thermocouples insulated in ceramic material (product group 00-TMT) and thermocouples with sheath measurement inserts is that in the case of the latter the thermoelectric wires (internal conductors) are additionally protected by a metal sheath – usually made of Alloy 600.

Unlike thermocouples, sheath measurement inserts are easy to replace.

Properties of the most widely-used types of ceramic materials for thermowells and inner tubes in accordance with DIN 40685:

C 799 aluminium oxide
Gastight, highly fire-resistant, pure aluminium oxide > 99.7%, max. temp. of 1800°C

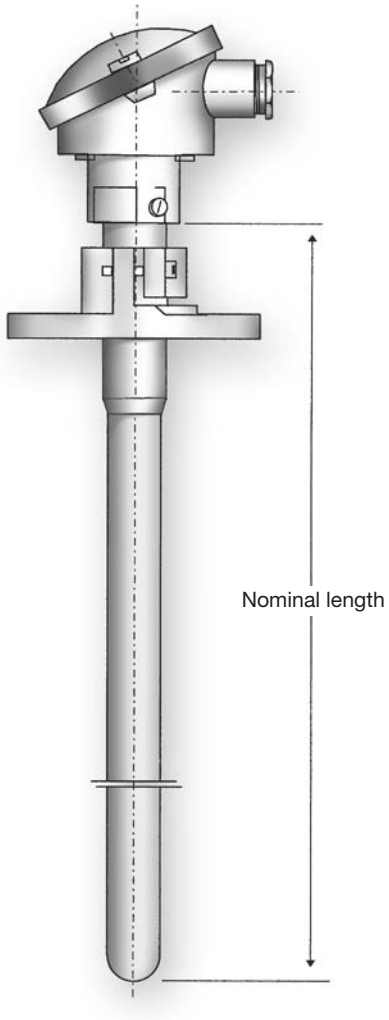
C 610 gastight ceramic
Gastight, high aluminium oxide content > 60%,
max temp. of 1450°C

C 530 porous ceramic material
Fine porosity, not gasproof, resistant to temperature change
High aluminium oxide content, max. temp. of 1500°C

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x NiCr-Ni/K thermal element with a Type A connection head and a stop flange, C 610 ceramic protection tube

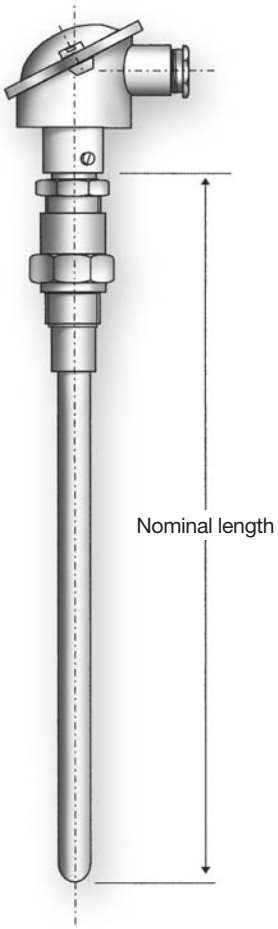


Product group:	**15-TKM**
Günther Art. No.:	**15-62211731-1000**
Connection head:	Type A
Holding tube:	ø 32 x 2 x 200 mm, material no. 1.0305
Protection tube:	ø 24 x 19 mm, C610
Inner tube:	ø 15 x 11 mm, C610
Measurement insert:	1 x NiCr-Ni/K ø 6.0 mm
	with a ø 6.5 mm borehole
Nominal length:	1000 mm
Fastening:	DIN 43734 stop flange
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

15 -TKM // Thermocouples with a ceramic protection tube and a built-in sheath measurement insert

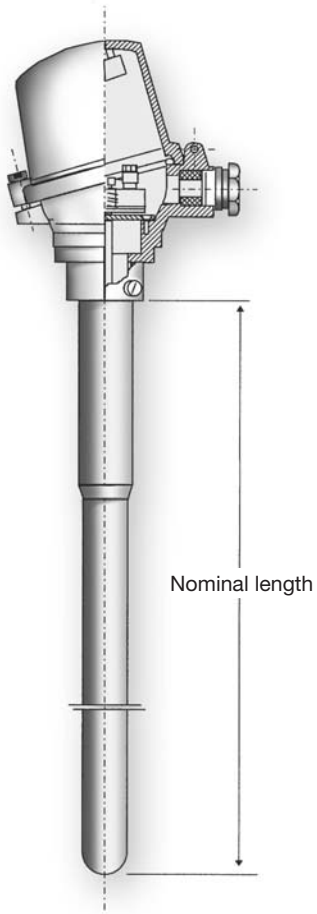
More order samples:

1 x Fe-CuNi/J thermal element with a Type B connection head, a ceramic protection tube and a gasproof mounting thread



Product group:	**15-TKM**
Günther Art. No.:	**15-23106592-0600**
Connection head:	Type B
Holding tube:	ø 15 x 2 x 200 mm, material no. 1.0305
Protection tube:	ø 10 x 6 mm, C799, gasproof
Measurement insert:	1 x Fe-CuNi/J ø 3.0 mm, Inconel sheath
Nominal length:	600 mm
Fastening:	Gastight mounting thread made of steel for ø 15 mm, G 3/4 A
Temperature range:	0 - 800°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

2 x NiCr-Ni/K thermal element with a Type AUZH connection head and a C 530 protection tube



Product group:	**15-TKM**
Günther Art. No.:	**15-82214860-2000**
Connection head:	Type AUZH
Holding tube:	ø 32 x 2 x 200 mm, material no. 1.0305
Protection tube:	ø 26 x 18 mm, C530
Inner tube:	ø 15 x 11 mm, C610
Measurement insert:	2 x NiCr-Ni/K ø 8.0 mm, testable
Nominal length:	2000 mm
Fastening:	None
Temperature range:	0 - 1200°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Feature:	Measuring transducer fitted in the head, 4 - 20 mA, equivalent to 0-1200°C

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

Günther GmbH will calibrate your thermocouple in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

15 -TKM // Thermocouples with a ceramic protection tube and a built-in sheath measurement insert

Ceramic protection tube + sheath	1	5	-									-				

Nominal length / mm

Protection tube (dimensions / material)	10 x 7	mm	C610	**1**
	10 x 6	mm	C799	**2**
	15 x 11	mm	C610	**3**
	15 x 10	mm	C799	**4**
	16 x 12	mm	C610	**5**
	24 x 19	mm	C610	**6**
	24 x 18	mm	C799	**7**
	26 x 18	mm	C530	**8**
	16 x 12	mm	C799	**9**

Inner tube	None		**0**
	C530	Porous ceramic material	**1**
	C610	Gastight ceramic	**2**
	C799	Aluminium oxide	**3**

Holding tube (visible length)		**1.0305**	**1.4571**	**1.4762**	**1.4841**
15x 2	50 mm	**05**	**75**	**-**	**-**
15 x 2	60 mm	**06**	**76**	**26**	**36**
15 x 2	80 mm	**07**	**77**	**27**	**37**
15 x 2	100 mm	**08**	**78**	**28**	**38**
15 x 2	150 mm	**09**	**79**	**29**	**39**
15 x 2	200 mm	**10**	**80**	**30**	**40**
22 x 2	100 mm	**11**	**81**	**31**	**41**
22 x 2	150 mm	**12**	**82**	**32**	**42**
22 x 2	200 mm	**13**	**83**	**33**	**43**
22 x 2	250 mm	**14**	**84**	**34**	**44**
22 x 2	300 mm	**15**	**85**	**35**	**45**
28.3 x 1.5	80 mm	**16**	**-**	**-**	**-**
28.3 x 1.5	180 mm	**17**	**-**	**-**	**-**
32 x 2	50 mm	**18**	**88**	**-**	**48**
32 x 2	100 mm	**19**	**89**	**-**	**49**
32 x 2	150 mm	**20**	**90**	**-**	**70**
32 x 2	200 mm	**21**	**91**	**-**	**71**
32 x 2	250 mm	**22**	**92**	**-**	**72**
Alloy 600 (mat. no. 2.4816)			**Kanthal**		
22 x 2	200 mm	**61**	15 x 1,3	100 mm	**51**
22 x 2	300 mm	**62**	15 x 1,3	150 mm	**52**
22 x 2	400 mm	**63**	15 x 1,3	200 mm	**53**
22 x 2	500 mm	**64**			
30 x 2,5	230 mm	**65**	Individual		**00**
30 x 2,5	400 mm	**66**	No holding tube		**99**

Connection head	A	**1**	B	**6**
	AUS	**2**	BUS	**7**
	AUZ	**3**	BUZ	**8**
	AUZH	**4**	BUZH	**9**
	AUSH	**5**	BBK	**0**

Sheath element (type/number of thermocouples/sheath material/diameter/verifiability)

	NiCr-Ni /K Alloy 600 2.4816					Fe-CuNi/L 1.4541				Fe-CuNi/J 1.4541				Nicrosil-Nisil/N 2.4816			
ø / mm	Standard testable	Double testable	Standard	Double	Triple	Standard testable	Double testable	Standard	Double	Standard testable	Double testable	Standard	Double	Standard testable	Double testable	Standard	Double
1.5	**25**	**26**	**27**	**28**	**-**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**10**	**11**	**12**	**13**
2	**37**	**38**	**39**	**40**	**-**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**14**	**15**	**16**	**17**
3	**49**	**50**	**51**	**52**	**90**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**18**	**19**	**20**	**21**
4.5	**61**	**62**	**63**	**64**	**91**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**22**	**23**	**24**	**94**
6	**73**	**74**	**75**	**76**	**92**	**77**	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**95**	**96**	**97**	**98**
8	**85**	**86**	**87**	**88**	**93**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Fastening	None	**0**	Mounting thread	**2**
	Stop flange	**1**	Flange/counter flange	**3**

Custom designs:	0	0	-	9	9	1	5	x	x	x	x	-				

Consecutive no.

Nominal length / mm

18 - TKL // Micro-thermocouples and laboratory thermocouples

18 - TKL // Micro-thermocouples and laboratory thermocouples

The 18-TKL product group comprises ready-to-install straight micro-thermocouples and laboratory thermocouples with ceramic protection tubes and built-in thermocouples.
These sensors are mainly used for technical temperature measurements for temperatures ranging from 200°C to 1800°C at pressures of max. one bar.

The highest permissible operation temperature of a selected thermocouple material or of the protection tube material determines the maximum operation temperature of the thermocouple.

Properties of the most widely-used types of ceramic materials for protection tubes and inner tubes in accordance with DIN 40685:

C799 aluminium oxide
Gastight, highly fire-resistant, 99.7% pure, maximum operation temperature of 1800°C

C610 gastight ceramic
Gastight, high aluminium oxide content > 60%, maximum operation temperature of 1450°C

C530 porous ceramic material
Not gastight, medium-fine structure, resistant to temperature change, high aluminium oxide content, maximum operation temperature of 1500°C

Micro-thermocouples have the following advantages:
- The small size enables temperatures to be measured in places which are difficult to access.
- Short response times as a result of a compact design

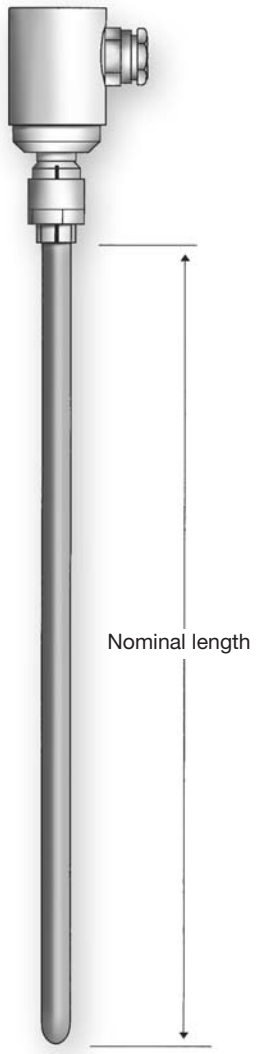
Limiting deviations of the micro-thermocouples supplied by Günther GmbH comply with the DIN EN 60584 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.

Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x PtRh10-Pt/S thermocouple with a Type L connection head and a bracket clamp, protection tube made of C799 ceramic material

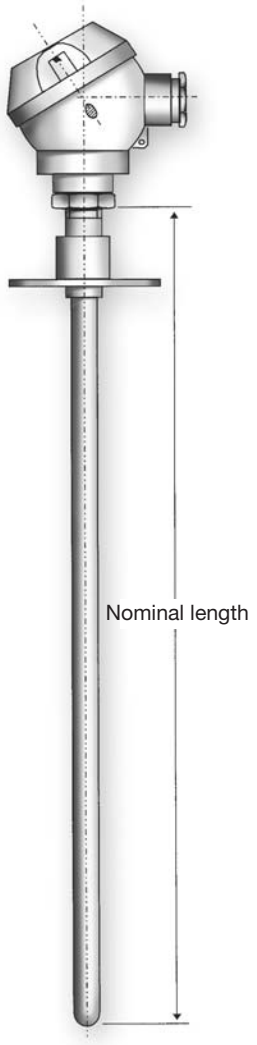


Günther Art. No.:	**18-91499210-0270**
Connection head:	Type L with an 8-mm bracket clamp
Holding tube:	None
Protection tube:	ø 8 x 5 mm, C799
Insulation rod:	ø 4.0 mm, C799
Thermocouple:	1 x PtRh10-Pt/S ø 0.5 mm
Nominal length:	270 mm
Fastening:	None
Temperature range:	0 - 1600°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

18 - TKL // Micro-thermocouples and laboratory thermocouples

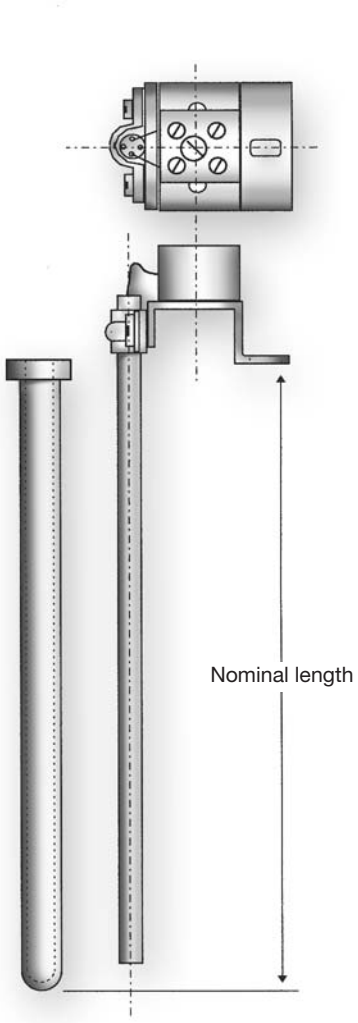
More order samples:

2 x NiCr-Ni/K thermocouple with a Type DL connection head



Günther Art. No.:	**18-61227421-0165**
Connection head:	Type DL with an M10 x 1 connection thread
Holding tube:	ø 10 x 1 mm, made of brass
Protection tube:	ø 7.5 x 4.5 mm, C610
Insulation rod:	ø 3.5 mm, C610
Thermocouple:	2 x NiCr-Ni/K ø 0.5 mm
Nominal length:	165 mm
Fastening:	50 mm attachment flange made of stainless steel
Temperature range:	0 - 800°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

1 x PtRh10-Pt/S micro-thermocouple with an angle bracket and ceramic insulating screw joint



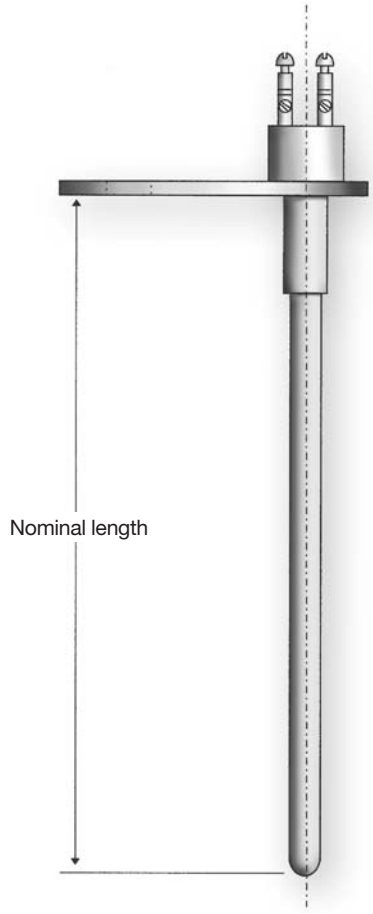
Günther Art. No.:	**18-99180291-0170**
Connection:	20 x 20 mm insulating screw joint, connections insulated with silicone hosing
Clamp:	ø 9 mm
Protection tube:	ø 10 x 7 mm, C799, with a cemented stop ring, ø 15 x 5 mm
Insulation rod:	ø 5.0 mm, C799
Thermocouple:	1 x PtRh10-Pt/S ø 0.3 mm
Nominal length:	170 mm (up to the stop ring)
Fastening:	Angle bracket
Temperature range:	0 - 1300°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

18 - TKL // Micro-thermocouples and laboratory thermocouples

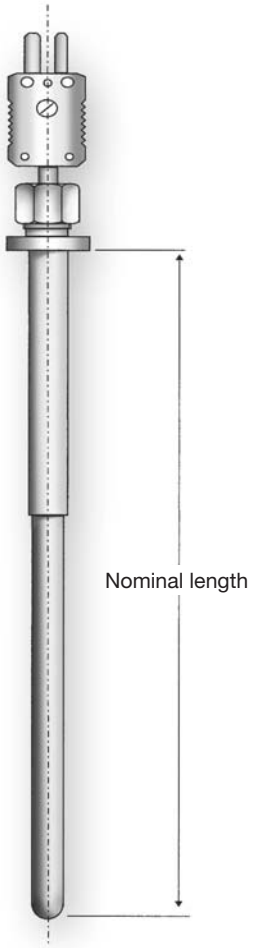
More order samples:

1xPtRh10-Pt/S laboratory thermocouple with a Type S base and connection clip



Günther Art. No.:	**18-23599210-0160**
Connection:	Base, Type S, dual-pole
Protection tube:	ø 6 x 4 mm, C799
Holding tube:	ø 8 x 0.5 x 30 mm, material no. 1.4301
Insulation rod:	ø 3.0 mm, C799
Thermocouple:	1 x PtRh10-Pt/S ø 0.3 mm
Nominal length:	160 mm
Fastening:	Connection clip, 55 x 20 mm
Temperature range:	0 - 1400°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

1 x WRe5-WRe26/C small thermocouple with a ceramic protection tube and a standard plug connected



Günther Art. No.:	**18-99180125-0460**
Connection:	Standard high-temperature plug
Protection tube:	ø 8 x 5 mm, C799
Holding tube:	ø 12 x 2 x 80 mm, made of brass
Insulation rod:	ø 5.5 mm, C799
Thermocouple:	1 x WRe5-WRe26/C ø 0.5 mm
Nominal length:	460 mm
Fastening:	None
Temperature range:	0 - 1700°C
Feature:	Thermowell filled with argon, gas-tight

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

18 - TKL // Micro-thermocouples and laboratory thermocouples

Ceramic protection tube + thermocouple: **1 8** - [ ][ ][ ][ ][ ][ ][ ][ ] - [ ][ ][ ][ ]

Nominal length / mm

Protection tube (dimensions / material)	6 x 4	mm	C610	**1**
	6 x 4	mm	C799	**2**
	7 x 4	mm	C799	**3**
	7 x 4.5	mm	C610	**4**
	7.5 x 5.5	mm	C610	**5**
	8 x 5	mm	C610	**6**
	10 x 7	mm	C610	**7**
	10 x 6	mm	C799	**8**
	8 x 5	mm	C799	**9**

Contact terminations

Head Type B 12.2 mm	**11**
Head Type DL with an M10 x 1 thread	**12**
Head Type L with a bracket clamp 7 mm	**13**
Head Type L with a bracket clamp 8 mm	**14**
Connection socket Type S with a bracket clamp 7 mm	**15**
Connection socket Type S with a bracket clamp 8 mm	**16**

The following contact terminations are fitted with holding tubes which have been permanently welded on:

Head Type L with tube 1.4571, 10 x 1 x 20 mm and a Type S connection socket	**31**
Head Type L with tube 1.4571, 9 x 1 x 20 mm and a Type S connection socket	**32**
Type S connection socket with a tube 1.4571, 10 x 0.5 x 24 mm	**33**
Type S connection socket with a tube 1.4571	**34**
Connection clip, 55 x 20mm, with a tube 1.4571, 8 x 0.5 x 30 mm and a Type S connection socket	**35**
Connection clip, 55 x 20mm, with a tube 1.4571, 10 x 0.5 x 24 mm and a Type S connection socket	**36**
Flanged plate, 60 x 60 mm with a holding tube 1.4571, 12 x 2 x 25 mm and a Type S connection socket	**37**

Holding tubes

	St. 35.8	Brass	1.4571	Alloy 600	
6 x 0.5	**1 0**	**2 0**	**3 0**	**4 0**	None
7 x 1.0	**1 1**	**2 1**	**3 1**	**4 1**	
8 x 0.5	**1 2**	**2 2**	**3 2**	**4 2**	**9 9**
8 x 1.0	**1 3**	**2 3**	**3 3**	**4 3**	
9 x 0.5	**1 4**	**2 4**	**3 4**	**4 4**	
9 x 1.0	**1 5**	**2 5**	**3 5**	**4 5**	
10 x 0.5	**1 6**	**2 6**	**3 6**	**4 6**	Other
10 x 1.0	**1 7**	**2 7**	**3 7**	**4 7**	
11 x 1.0	**1 8**	**2 8**	**3 8**	**4 8**	**0 0**
12 x 0.75	**1 9**	**2 9**	**3 9**	**4 9**	
12 x 1.0	**5 0**	**6 0**	**7 0**	**8 0**	

Thermocouple

Type R	PtRh13-Pt	**1**
Type S	PtRh10-Pt	**2**
Type B	PtRh30-PtRh6	**3**
Type K	NiCr-Ni	**4**
Type J	Fe-CuNi	**5**
Type L	Fe-CuNi	**6**
Type C	WRe5-WRe26	**7**
Type N	Nicrosil-Nisil	**8**
Type D	WRe3-WRe25	**9**

Thermocouple

Standard	**1**
Double	**3**
Triple	**5**

Fastening

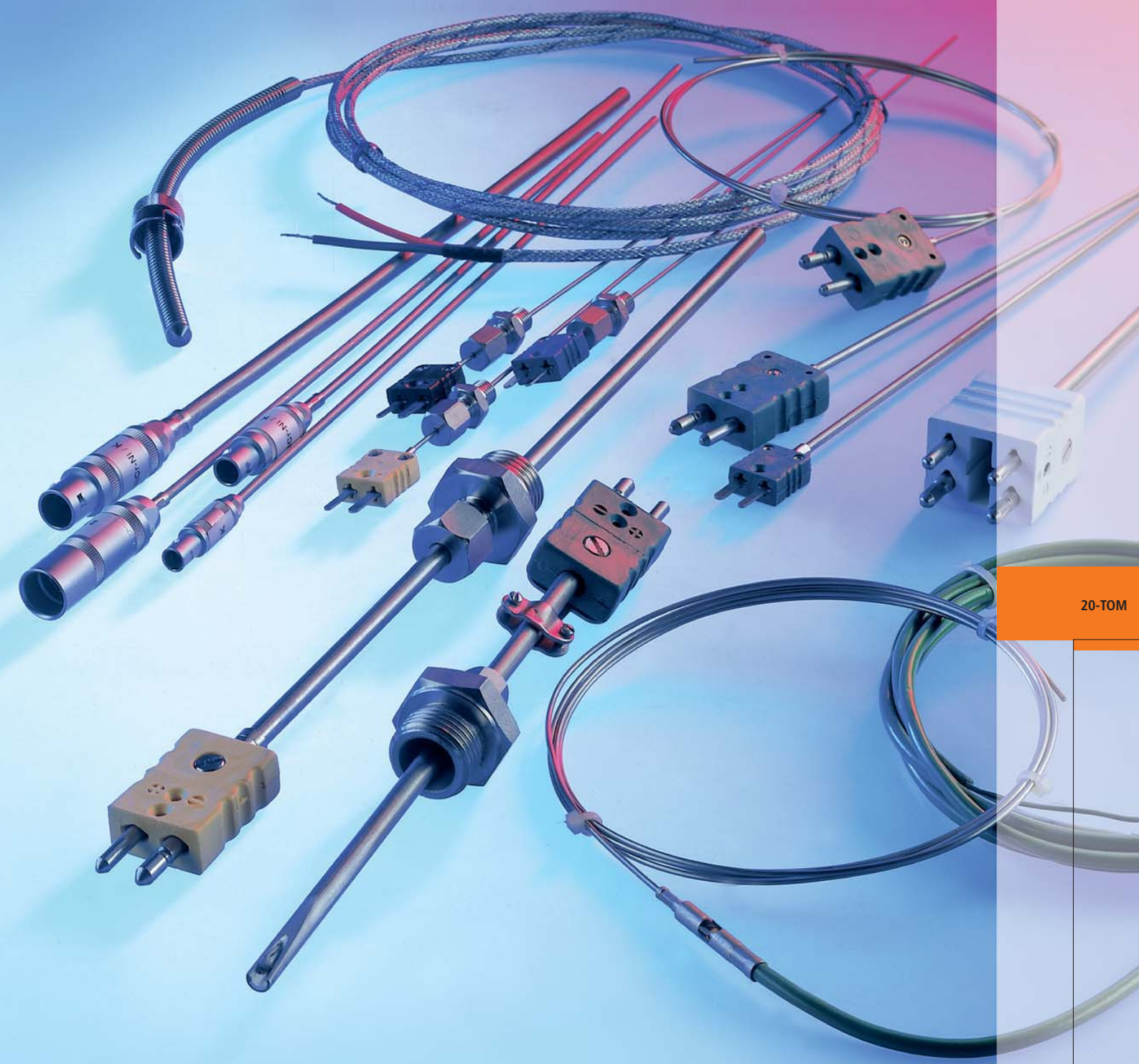
None	**0**
Stop flange	**1**
Mounting thread	**2**
Flange/counter flange	**3**

Custom designs: **1 8** - **9 9 1 8** x x x x - [ ][ ][ ][ ]

Consecutive no.

Nominal length / mm

20 - TOM // Sheath thermocouples without protection tube



20 - TOM // Sheath thermocouples without protection tube

Flexible sheath thermocouples are used in virtually all areas of industry. They are primarily used for measuring temperatures in pipe systems, containers, machines, furnaces, laboratories and all kinds of industrial equipment.
Sheath thermometers can be used in a variety of media, depending on the choice of dimensions and of the sheathing material.

Sheath thermocouples mainly comprise thermal wires (internal conductors) and a metal sheath, usually made of Alloy 600. Two internal conductors welded together form a thermocouple which is firmly pressed into insulating ceramic powder (generally magnesium oxide). A sheath thermocouple can hold up to three thermocouples.

The outer diameter of the sheath is between 0.5 mm and 8 mm (optional sizes on request).

Sheath thermocouples have numerous advantages:

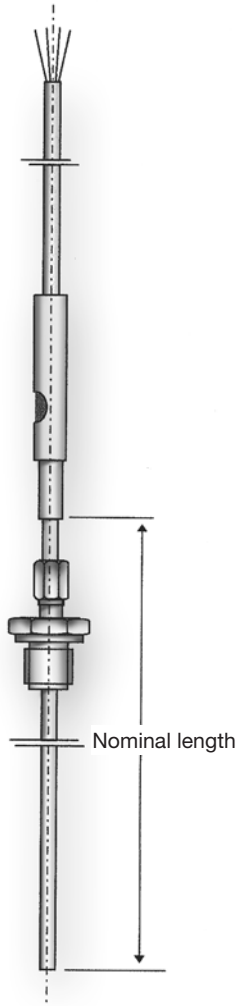
- The small size and a high degree of flexibility enable temperatures to be measured in places which are difficult to access.
- Response times are short as a result of a compact design.
- The outer sheath protects the thermal wires against oxidation, corrosion and chemical pollution.
- Sheath thermocouples are able to resist many types of mechanical stress.

Thermoelectric voltages and limiting deviations of the sheath thermocouples supplied by Günther GmbH comply either with the DIN 43710 norm or with the DIN EN 60584 norm (DIN 43710 has actually been withdrawn, but is still available).

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

2 x NiCr-Ni/K sheath thermocouple with a connected compensation cable and a cable transition sleeve

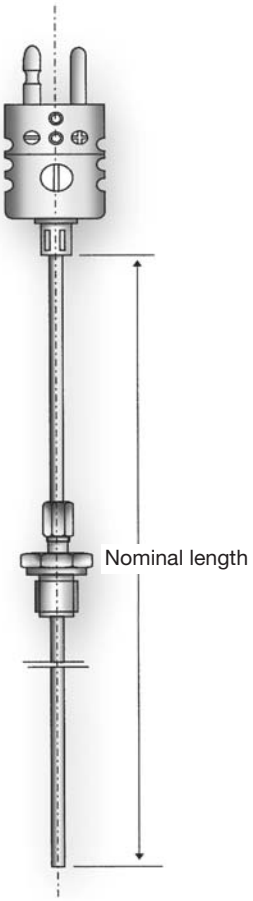


Product group:	**20-TOM**
Günther Art. No.:	**20-40151743-0500**
Connection:	Cable transition sleeve made of stainless steel
Protective system:	IP 65
Thermocouple:	2 x NiCr-Ni/K ø 6.0 mm
Sheath:	Alloy 600, mat. no. 2.4816
Fastening:	Movable screw joint made of stainless steel G 1/2 A, mat. no. 1.4571
Nominal length:	500 mm
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Compensation cable:	2 x 0.22 mm² conductors, individually and jointly silicon-insulated

20 - TOM // Sheath thermocouples without protection tube

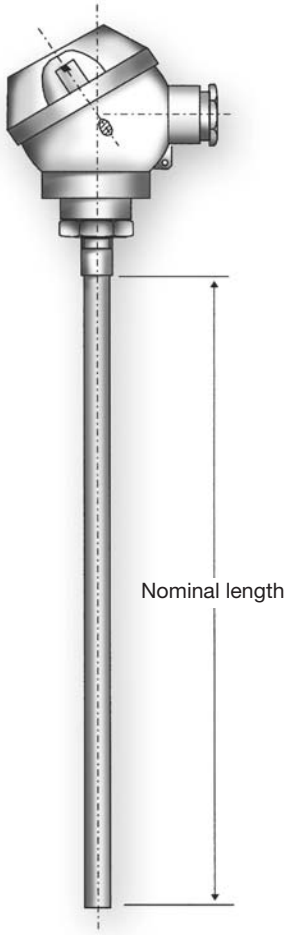
More order samples:

1 x Nicrosil-Nisil/N sheath thermocouple fitted with a standard plug



Product group:	**20-TOM**
Günther Art. No.:	**20-30308643-1355**
Connection:	Standard plug made of plastic, thermoelectrically disconnected
Thermocouple:	1 x Nicrosil-Nisil/N ø 4.5 mm
Sheath:	Inconel, mat. no. 2.4816
Fastening:	Movable screw joint made of stainless steel G 1/4 A, mat. no. 1.4571 with a Teflon clamping ring
Nominal length:	1355 mm
Temperature range:	0 - 1200°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

2 x Fe-CuNi/L sheath thermocouple with a Style DL connection head



Product group:	**20-TOM**
Günther Art. No.:	**20-20403699-0250**
Connection:	Style DL connection head with a M10 x 1 connection thread
Thermocouple:	2 x Fe-CuNi/L ø 4.5 mm
Sheath:	Stainless steel, mat. no. 1.4541
Fastening:	None
Nominal length:	250 mm
Temperature range:	0 - 800°C
Limiting deviation:	1/2 DIN 43710
Compensation cable:	None
Optional:	e.g. with a connected compensation cable 2 x 0.22 mm2 PVC-PVC

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

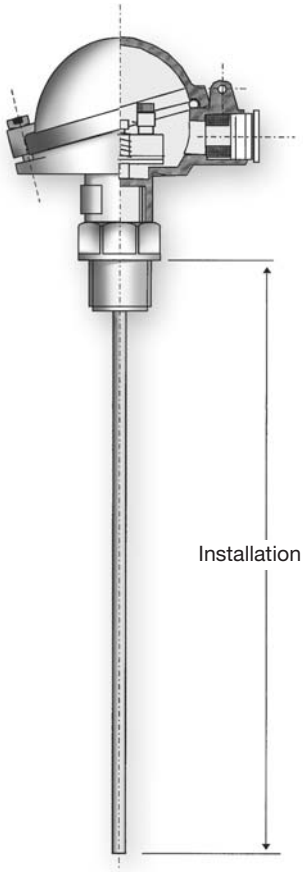
Sheath thermocouples are ideal test elements thanks to their compact structure.

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

20 - TOM // Sheath thermocouples without protection tube

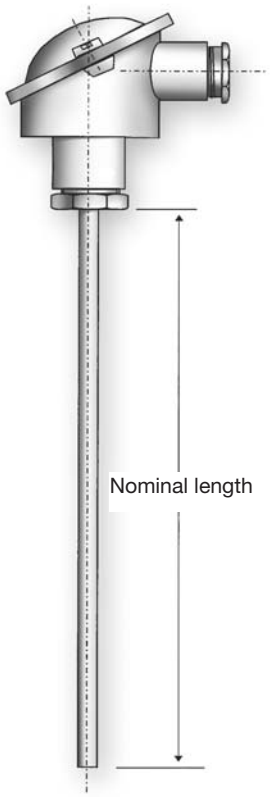
More order samples:

2 x Nicrosil-Nisil/N sheath thermocouple with a Type BUZ connection head and a combined screw socket



Product group:	**20-TOM**
Günther Art. No.:	**20-20259482-0315**
Connection:	Type BUZ connection head with a M24 x 1.5 connection thread
Thermocouple:	2xNicrosil-Nisil/N ø 2.0 mm
Sheath:	Stainless steel, mat. no. 1.4541
Fastening:	Combined screw socket made of stainless steel 1.4571 M24 x 1.5 / G 1/2 A
Installation length:	315 mm
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Feature:	Sheath firmly welded in the screw socket; thermocouple is welded to the sheath bottom

2 x Fe-CuNi/J sheath thermocouple with a Type B connection head and a counter-screw



Product group:	**20-TOM**
Günther Art. No.:	**20-20104799-0500**
Connection:	Type B connection head with a M24 x 1.5 connection thread
Thermocouple:	2 x Fe-CuNi/J ø 6.0 mm
Sheath:	Stainless steel, mat. no. 1.4541
Fastening:	None
Nominal length:	500 mm
Temperature range:	0 - 800°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2
Compensation cable:	None

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

Sheath thermocouples are ideal test elements thanks to their compact structure.

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions. All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

20 - TOM // Sheath thermocouples without protection tube

Sheath thermocouple | 2 | 0 | - | | | | | | | | | | - | | | | |

Nominal length / mm

Connection head with a connection thread			with a connection diameter of 15.3 mm	
B	(M24 x 1.5)	**20 10**	B	**25 10**
BUS	(M24 x 1.5)	**20 15**	BUS	**25 15**
BUSH	(M24 x 1.5)	**20 20**	BUSH	**25 20**
BUZ	(M24 x 1.5)	**20 25**	BUZ	**25 25**
BUZH	(M24 x 1.5)	**20 30**	BUZH	**25 30**
BBK	(M24 x 1.5)	**20 35**	BBK	**25 35**
DL (MA)	(M10 x1)	**20 40**	DL (MA)	**25 40**

Joining elements Plug			Coupler		
Lemo	Size 0	**30 10**	Lemo	Size 0	**35 10**
Lemo	Size 1	**30 15**	Lemo	Size 1	**35 15**
Lemo	Size 2	**30 20**	Lemo	Size 2	**35 20**
Lemo	Size 3	**30 25**	Lemo	Size 3	**35 25**
Standard		**30 30**	Standard		**35 30**
Miniature		**30 35**	Miniature		**35 35**
High-temp standard		**30 40**	High-temp standard		**35 40**
High-temp miniature		**30 45**	High-temp miniature		**35 45**
Ceramic standard		**30 50**	Ceramic standard		**35 50**
Ceramic miniature		**30 55**	Ceramic miniature		**35 55**

Cable transition sleeve + compensation cable **4X XX**
(XXX = length of the compensation cable in XX.X m)

Sheath element (type/number of thermocouples/sheath material/diameter)

Thermocouple	NiCr-Ni /K			Fe-CuNi/L		Fe-CuNi/J		PtRh-Pt/S		Nicrosil-Nisil/N	
Sheath material	Alloy 600 2.4816			1.4541/2.4816		1.4541/2.4816		Alloy 600 2.4816		Alloy 600 2.4816	
Sheath ø / mm	Standard	Double	Triple	Standard	Double	Standard	Double	Standard	Double	Standard	Double
0.5	**01**	-	-	-	-	-	-	-	-	-	-
1	**02**	-	-	**22**	-	**42**	-	**62**	-	**82**	-
1.5	**03**	**13**	-	**23**	**33**	**43**	**53**	**63**	**73**	**83**	**93**
2	**04**	**14**	-	**24**	**34**	**44**	**54**	**64**	**74**	**84**	**94**
3	**05**	**15**	**69**	**25**	**35**	**45**	**55**	**65**	**75**	**85**	**95**
4.5	**06**	**16**	**79**	**26**	**36**	**46**	**56**	**66**	**76**	**86**	**96**
6	**07**	**17**	**89**	**27**	**37**	**47**	**57**	**67**	**77**	**87**	**97**
8	**08**	**18**	**99**	-	-	-	-	-	-	-	-
3.2	**09**	**19**	-	-	-	-	-	-	-	-	-
Special size / Special material											**00**

Fastening:
Attachment screw joint: Material **Steel / Stainless steel**

(Tapered ring unit, mat. no. 1.4541)		
M 8 x 1 for sheath ø 1.0-3.0 mm	**11**	**21**
G 1/8 A for sheath ø 1.0-3.0 mm	**12**	**22**
G 1/4 A for sheath ø 4.5-8.0 mm	**13**	**23**
G 1/2 A for sheath ø 4.5-8.0 mm	**14**	**24**

(Tapered ring unit St. 35.8)			Screw joint	
M 8 x 1 for sheath ø 1,0-3,0 mm	**51**	**31**	G 1/4 A	**80**
G 1/8 A for sheath ø 1,0-3,0 mm	**52**	**32**	G 3/8 A	**81**
G 1/4 A for sheath ø 4,5-8,0 mm	**53**	**33**	G 1/2 A	**82**
G 1/2 A for sheath ø 4,5-8,0 mm	**54**	**34**	G 1 A	**83**
			M 20 x 1.5	**84**
			M 18 x 1.5	**85**
(Teflon thrust collar)			M 14 x 1.5	**86**
M 8 x 1 for sheath ø 1.0-3.0 mm	**61**	**41**		
G 1/8 A for sheath ø 1.0-3.0 mm	**62**	**42**	No fastening	**99**
G 1/4 A for sheath ø 4.5-8.0 mm	**63**	**43**		
G 1/2 A for sheath ø 4.5-8.0 mm	**64**	**44**	Other	**88**

Custom designs: | 2 | 0 | - | 9 | 9 | 2 | 0 | x | x | x | x | - | | | | |

Consecutive no. Nominal length / mm

30 - WTE // Angle thermocouples with a bolted central angle

35 - WGG // Angle thermocouples curved out of one segment
Angle thermocouples with welded together dip and carrier tube

30 - WTE // Angle thermocouples with a bolted central angle
35 - WGG // Angle thermocouples curved out of one segment
Angle thermocouples with welded together dip and carrier tube

The list contains ready-to-install angle thermocouples. These elements are divided into two product groups at Günther GmbH: a) 30-WTE angle thermocouples with a screwed tube bend b) 35-WGG angle thermocouples whose dip and carrier tubes are curved from one piece or are welded together. Angle thermocouples are primarily used for measuring and regulating temperatures in molten metals and in salt baths. The angular shape ensures that the connection head is not located right above the bath level so that it is not subjected to the high temperatures and aggressive steams present.

The materials for the thermocouple and the protection tube will need to be selected with a view to the operating conditions prevailing in order to ensure that the service life of the appliances is adequate.

Recommended protection tube materials for tused salt		
Tenifer	up to 600°C	Titan NT
Sodium nitrate, chloride and annealing, tempering and quenching baths		
containing cyanide	up to 1000°C	Pure iron
		1.4821 (SL25)
	up to 1300°C	Pure iron
For molten metal		
Aluminium		Grey cast iron
	up to 700°C	Graphite
Magnesium		
Al/Mg alloy	up to 700°C	Pure iron
Lead	up to 600°C	Grey cast iron
Zinc		Pure iron
	up to 600°C	Steel
Copper	up to 1200°C	1.4762
		Graphite
Brass	up to 900°C	1.4762
		Graphite

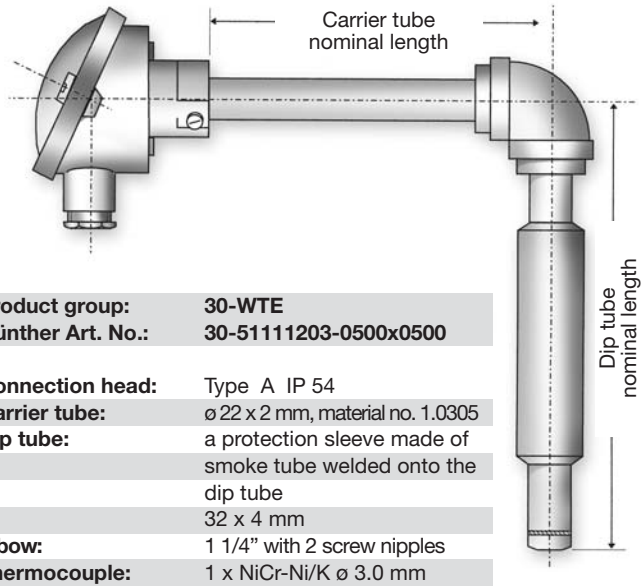
Information provided in this table is for information only and is without responsibility.

Thermoelectric voltages and limiting deviations of the angle thermocouples supplied by Günther GmbH comply either with the DIN 43710 norm or with the DIN EN 60584 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

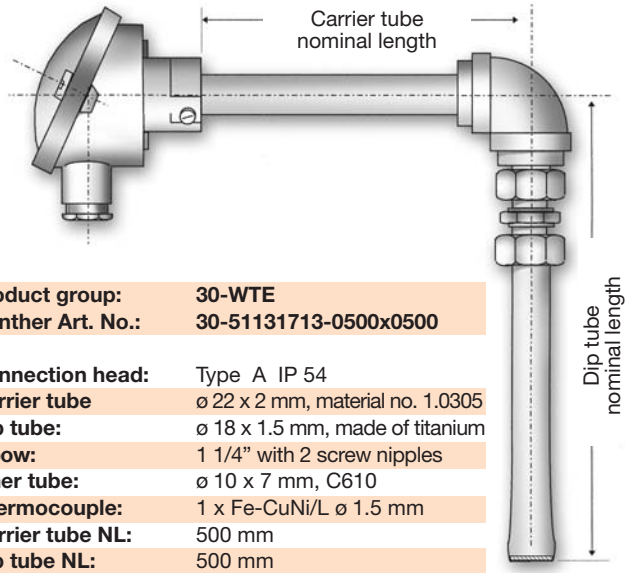
Order sample:

1 1/4”-1 x NiCr-Ni/K angle thermocouple with a Type A connection head, a pure iron dip tube with a protection sleeve welded onto the tube



Product group:	**30-WTE**
Günther Art. No.:	**30-51111203-0500x0500**
Connection head:	Type A IP 54
Carrier tube:	ø 22 x 2 mm, material no. 1.0305
Dip tube:	a protection sleeve made of
	smoke tube welded onto the
	dip tube
	32 x 4 mm
Elbow:	1 1/4” with 2 screw nipples
Thermocouple:	1 x NiCr-Ni/K ø 3.0 mm
Carrier tube NL:	500 mm
Dip tube NL:	500 mm
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

1 1/4”- 1 x Fe-CuNi/L angle thermocouple with a Type A connection head and titanium dip tube

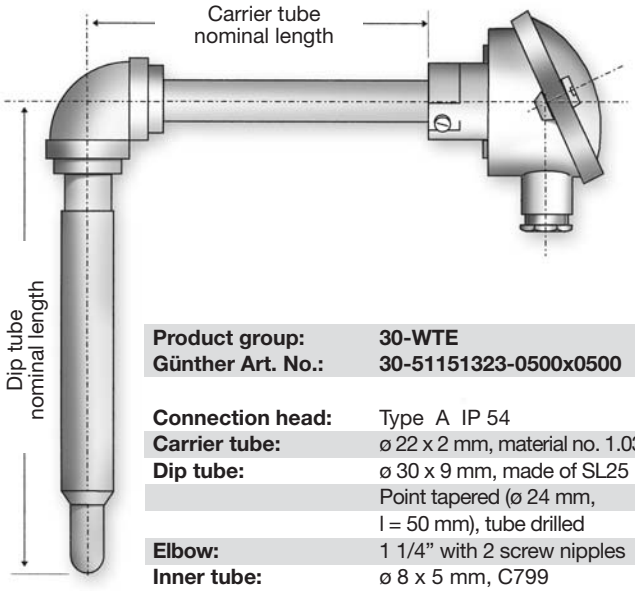


Product group:	**30-WTE**
Günther Art. No.:	**30-51131713-0500x0500**
Connection head:	Type A IP 54
Carrier tube	ø 22 x 2 mm, material no. 1.0305
Dip tube:	ø 18 x 1.5 mm, made of titanium
Elbow:	1 1/4” with 2 screw nipples
Inner tube:	ø 10 x 7 mm, C610
Thermocouple:	1 x Fe-CuNi/L ø 1.5 mm
Carrier tube NL:	500 mm
Dip tube NL:	500 mm
Temperature range:	0 - 600°C
Limiting deviation:	1/2 DIN 43710

30 - WTE // Angle thermocouples with a bolted central angle
35 - WGG // Angle thermocouples curved out of one segment
Angle thermocouples with welded together dip and carrier tube

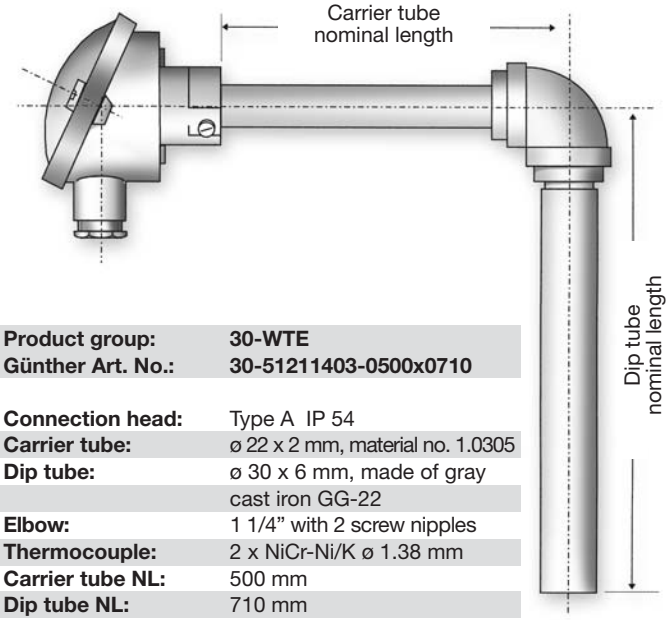
More order samples:

1 1/4"- 1 x PtRh10-Pt/S angle thermocouple with a Type A connection head and SL25 dip tube



Product group:	**30-WTE**
Günther Art. No.:	**30-51151323-0500x0500**
Connection head:	Type A IP 54
Carrier tube:	ø 22 x 2 mm, material no. 1.0305
Dip tube:	ø 30 x 9 mm, made of SL25
	Point tapered (ø 24 mm,
	l = 50 mm), tube drilled
Elbow:	1 1/4" with 2 screw nipples
Inner tube:	ø 8 x 5 mm, C799
Thermocouple:	1 x PtRh10-Pt/S ø 0.5 mm
Carrier tube NL:	500 mm
Dip tube NL:	500 mm
Temperature range:	0 - 1300°C
Limit deviation:	Class 1 acc. to DIN EN 60584-2

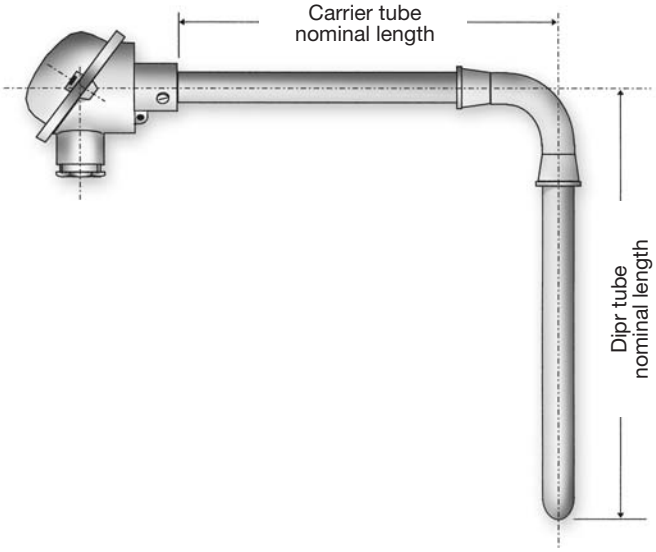
1 1/4" - 2 x NiCr-Ni/K angle thermocouple with a Type A connection head and an dip tube made of grey cast iron



Product group:	**30-WTE**
Günther Art. No.:	**30-51211403-0500x0710**
Connection head:	Type A IP 54
Carrier tube:	ø 22 x 2 mm, material no. 1.0305
Dip tube:	ø 30 x 6 mm, made of gray
	cast iron GG-22
Elbow:	1 1/4" with 2 screw nipples
Thermocouple:	2 x NiCr-Ni/K ø 1.38 mm
Carrier tube NL:	500 mm
Dip tube NL:	710 mm
Temperature range:	0 - 800°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

3/8" - 1 x NiCr-Ni/K angle thermocouple with a Type B connection head and a 1.4762 steel dip tube

Product group:	**30-WTE**
Günther Art. No.:	**30-16112302-0500x0500**
Connection head:	Type B IP 54
Carrier tube:	ø 15 x 2 mm, material no. 1.0305
Dip tube:	ø 15 x 2 mm, material no. 1.4762
Inner tube:	None
Elbow:	Tube bend 3/8"
Thermocouple:	1 x NiCr-Ni/K ø 1.38 mm
Carrier tube NL:	500 mm
Dip tube NL:	500 mm
Temperature range:	0 - 1100°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

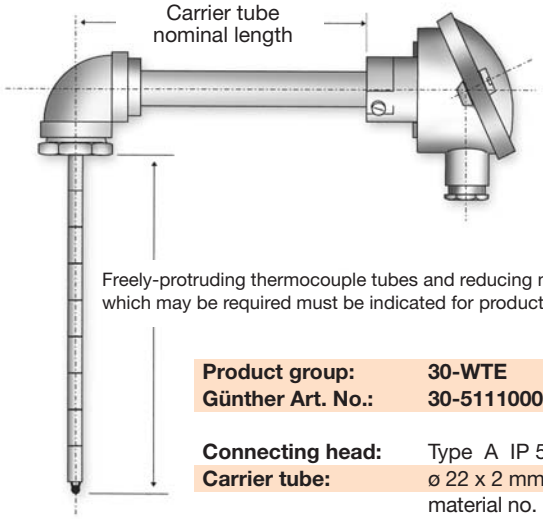


Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

30 - WTE // Angle thermocouples with a bolted central angle
35 - WGG // Angle thermocouples curved out of one segment
Angle thermocouples with welded together dip and carrier tube

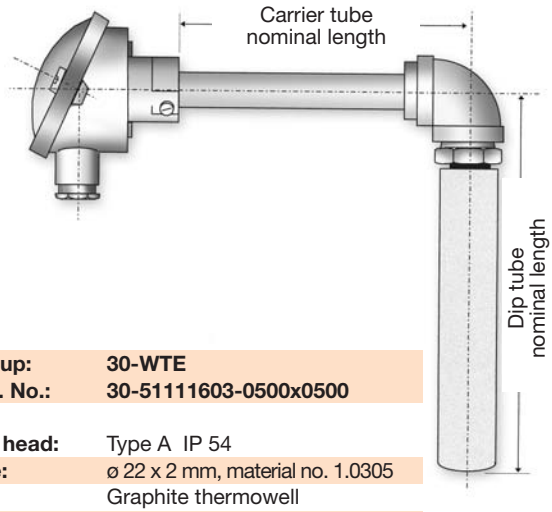
More order samples:

1 1/4" - 1 x NiCr-Ni/K angle thermocouple with a Type A connection head, no dip tube



Product group:	**30-WTE**
Günther Art. No.:	**30-51110003-0500x0500**
Connecting head:	Type A IP 54
Carrier tube:	ø 22 x 2 mm, material no. 1.0305
Dip tube:	None
Elbow:	1 1/4" with reducing nozzle
Thermocouple:	1 x NiCr-Ni/K ø 3.0 mm thermocouple 445 mm protruding 1 1/4"-3/4" out of a reducing nozzle
Carrier tube NL:	500 mm
Dip tube NL:	Suitable for 500 mm
Temperature range:	0 -1200°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

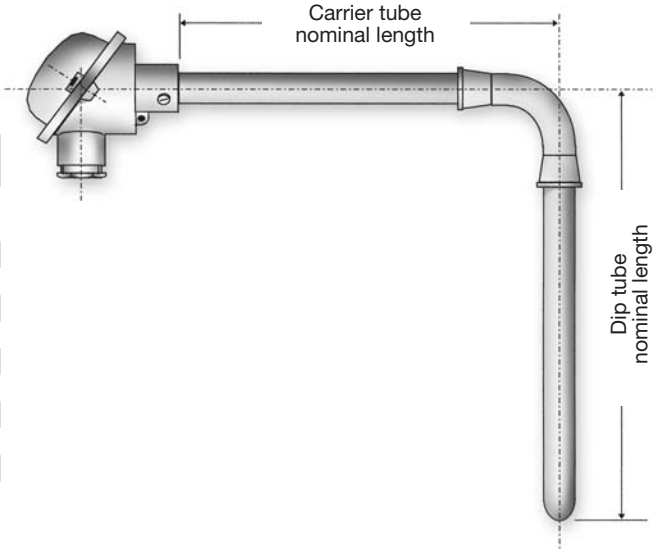
1 1/4" - 1 x NiCr-Ni/K angle thermocouple with a Type A connection head, graphite dip tube



Product group:	**30-WTE**
Günther Art. No.:	**30-51111603-0500x0500**
Connection head:	Type A IP 54
Carrier tube:	ø 22 x 2 mm, material no. 1.0305
Dip tube:	Graphite thermowell 50 x 25 mm with inner tube made of steel and R1/2" reducing nozzle 1 1/4"- 1/2"
Elbow:	1 1/4" with reducing nozzle
Inner tube:	None
Thermocouple:	1 x NiCrNi/K ø 2.0 mm
Carrier tube NL:	500 mm
Dip tube NL:	500 mm
Temperature range:	0 - 1200°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

3/8" - 1 x Fe-CuNi/L angle thermocouple with a Style B connection head, dip tube made of 1.4841 and a sheath measurement insert

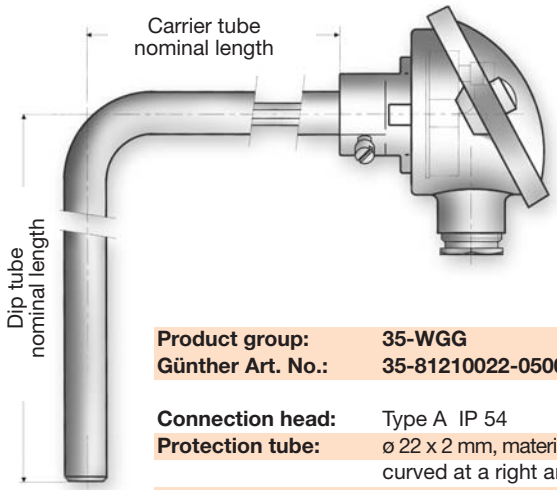
Product group:	**30-WGG**
Günther Art. No.:	**30-16512402-0500x0500**
Connection head:	Type B IP 54
Carrier tube:	ø 15 x 2 mm, material no. 1.0305
Dip tube:	ø 15 x 2 mm, material no. 1.4841
Inner tube:	None
Measurement insert:	1xFe-CuNi/L, ø 2.0 mm Measuring point welded to the base
Carrier tube NL:	500 mm
Dip tube NL:	500 mm
Temperature range:	0 - 1000°C
Limiting deviation:	1/2 DIN 43710
Elbow:	Tube bend 3/8"



30 - WTE // Angle thermocouples with a bolted central angle
35 - WGG // Angle thermocouples curved out of one segment
Angle thermocouples with welded together dip and carrier tube

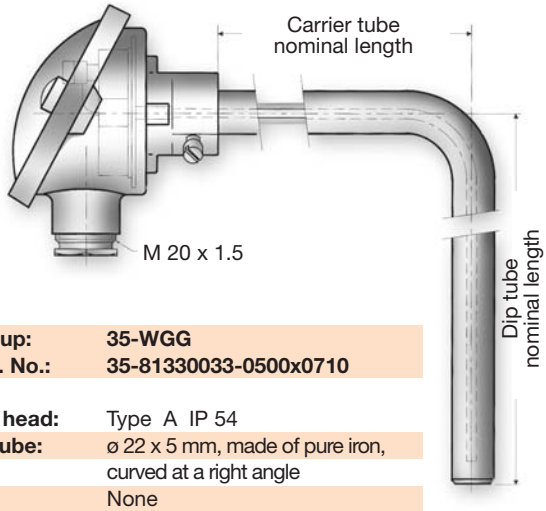
More order samples:

2 x Fe-CuNi/J angle thermocouple with a Type A connection head, 1.4571 protection tube, curved at a right angle



Product group:	**35-WGG**
Günther Art. No.:	**35-81210022-0500x0500**
Connection head:	Type A IP 54
Protection tube:	ø 22 x 2 mm, material no. 1.4571, curved at a right angle
Thermocouple:	2 x Fe-CuNi/J ø 3.0 mm, ceramic insulation
Carrier tube NL:	500 mm
Dip tube NL:	500 mm
Temperature range:	0 - 800°C
Limit deviation:	Class 1 acc. to DIN EN 60584-2

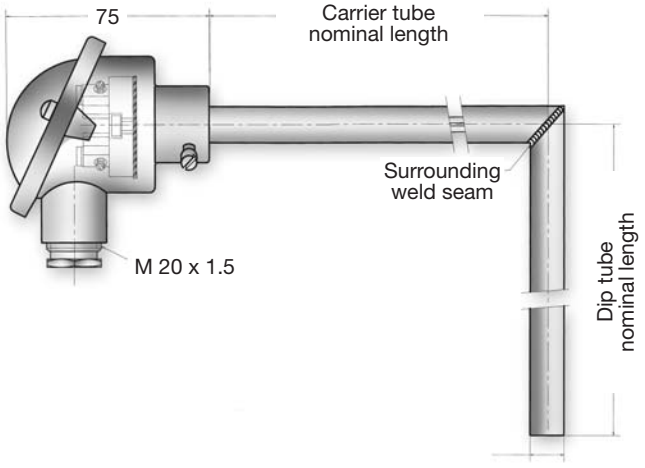
1 x NiCr-Ni/K angle thermocouple with a Type A connection head, pure iron protection tube, curved at a right angle



Product group:	**35-WGG**
Günther Art. No.:	**35-81330033-0500x0710**
Connection head:	Type A IP 54
Protection tube:	ø 22 x 5 mm, made of pure iron, curved at a right angle
Inner tube:	None
Measurement insert:	1 x NiCr-Ni/K ø 6.0 mm
Sheath material:	Inconel
Carrier tube NL:	500 mm
Dip tube NL:	710 mm
Temperature range:	0 - 1000°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2

2x Fe-CuNi/J angle thermocouple with a Type B connection head, dip and carrier tube material no. 1.4571, welded at a right angle

Product group:	**35-WGG**
Günther Art. No.:	**35-1110022-0400x0300**
Connection head:	Type B IP 54
Dip and carrier tube:	ø 15 x 2 mm, material no. 1.4571, welded at a right angle
Inner tube:	None
Thermocouple:	2 x Fe-CuNi/J ø 2.0 mm, ceramic insulation
Carrier tube NL:	400 mm
Dip tube NL:	300 mm
Temperature range:	0 - 800°C
Limiting deviation:	Class 1 acc. to DIN EN 60584-2



30 - WTE // Angle thermocouples with a bolted central angle

Metal protection tube + thermocouple: 3 0 - _ _ _ _ _ _ _ _ - _ _ _ _ x _ _ _ _

Nominal length Carrier tube (mm) | Nominal length Dip tube (mm)

Carrier tube (material / dimensions)	St 35.8	15 x 2	mm	**1**
	St 35.8	17 x 2.5	mm	**2**
	1.4571	15 x 2	mm	**3**
	1.4571	17 x 3	mm	**4**
	St 35.8	22 x 2	mm	**5**
	1.4571	22 x 2	mm	**6**

Head	A	**1**	B	**6**
	AUS	**2**	BUS	**7**
	AUZ	**3**	BUZ	**8**
	AUZH	**4**	BUZH	**9**
	AUSH	**5**	BBK	**0**

Thermocouple with ceramic insulation

	Standard	Double
NiCr-Ni/K	11	21
Fe-CuNi/J	12	22
Fe-CuNi/L	13	23
Nicrosil-Nisil/N	14	24
PtRh10-Pt/S	15	25
PtRh13-Pt/R	16	26
PtRh30-PtRh6/B	17	27

Sheath measurement insert

	NiCr-Ni Type KI		Fe-CuNi Type LV		Fe-CuNi Type JV		Nicrosil-Nisil Type NI	
ø / mm	Standard	Double	Standard	Double	Standard	Double	Standard	Double
3.0	**31**	**41**	**51**	**61**	**71**	**81**	**91**	**94**
4.5	**32**	**42**	**52**	**62**	**72**	**82**	**92**	**95**
6.0	**33**	**43**	**53**	**63**	**73**	**83**	**93**	**96**
8.0	**34**	**44**	-	-	-	-	-	-

Dip tube (material / dimensions)

None, thermocouples freely protruding	**0 0**
Pure iron (techn. pure), ø = 22 x 5 mm, seamless	**1 1**
Pure iron (techn. pure), ø = 22 x 5 mm, with a protection sleeve	**1 2**
Steel SL 25 ø = 30 x 9 mm; point tapered (ø = 24) to 50 mm length	**1 3**
Grey cast iron GG-22, ø = 30 x 6 mm	**1 4**
Graphite ø = 40 x 11 mm	**1 5**
Graphite ø = 50 x 25 mm	**1 6**
Titanium ø = 18 x 1.5 mm pressed and welded	**1 7**
Titanium ø = 18 x 1.0 mm, with a welded round base	**1 8**
Glassed steel ø = 22 x 2 mm	**1 9**

Material	**Number**	**Dimensions in mm**				
		15 x 2	17 x 2	22 x 2	22 x 2.5	22 x 4
Stainless steel	1.4541	-	**3 1**	**4 1**	-	-
Stainless steel	1.4571	**2 2**	**3 2**	**4 2**	**5 2**	**6 2**
X10CrAl 24	1.4762	**2 3**	**3 3**	**4 3**	-	-
X15CrNiSi 25 20	1.4841	**2 4**	**3 4**	**4 4**	-	-
Alloy 600	2.4816	**2 5**	**3 5**	**4 5**	-	-

Inner tube

None		**0**
C610	gastight ceramic	**1**
C799	Aluminium oxide	**2**

Elbow:

Curved angle	3/4"	**1**
Curved angle	3/8"	**2**
Curved angle	1 1/4"	**3**
Curved angle	1/2"	**4**

Custom designs: 3 0 - 9 9 3 0 x x x x - _ _ _ _ x _ _ _ _

Consecutive no. | Nominal length Carrier tube (mm) | Nominal length Dip tube (mm)

35 - WGG // Angle thermocouples curved out of one segment
Angle thermocouples with welded together dip and carrier tube

Article number: 3 5 - [ ][ ][ ][ ][ ][ ][ ][ ] - [ ][ ][ ][ ] x [ ][ ][ ][ ]

Carrier tube nominal length (mm) | Dip tube nominal length (mm)

Protection tube curved at a right angle, with a connection head

Protection tube 15 x 2 mm / mat. no.1.4571 / with connection head Type B	**811**	**100**
Protection tube 15 x 2 mm / mat. no.1.0305 / with connection head Type B	**811**	**200**
Protection tube 22 x 2 mm / mat. no.1.4571 / with connection head Type A	**812**	**100**
Protection tube 22 x 2 mm / mat. no.1.0305 / with connection head Type A	**812**	**200**
Protection tube 22 x 5 mm / pure iron / with connection head Type A	**813**	**300**

Protection tube welded at a right angle, with a connection head

Protection tube 15 x 2 mm / mat. no.1.4571 / with connection head Type B	**821**	**100**
Protection tube 15 x 2 mm / mat. no.1.0305 / with connection head Type B	**821**	**200**
Protection tube 22 x 2 mm / mat. no.1.4571 / with connection head Type A	**822**	**100**
Protection tube 22 x 2 mm / mat. no.1.0305 / with connection head Type A	**822**	**200**
Protection tube 22 x 5 mm / pure iron / with connection head Type A	**823**	**300**

The last two digits are replaced with “xx” for models without a connection head

Welded thermowell

Dimensions in [mm]	Material 1.0305	1.4571	1.4762	1.4841	2.4816
12 x 1	**11 xxxx**	**12 xxxx**	**13 xxxx**	**14 xxxx**	**15 xxxx**
12 x 1.5	**21 xxxx**	**22 xxxx**	**23 xxxx**	**24 xxxx**	**25 xxxx**
15 x 2	**31 xxxx**	**32 xxxx**	**33 xxxx**	**34 xxxx**	**35 xxxx**
15 x 3	**41 xxxx**	**42 xxxx**	**43 xxxx**	**44 xxxx**	**45 xxxx**
16 x 2	**51 xxxx**	**52 xxxx**	**53 xxxx**	**54 xxxx**	**55 xxxx**
22 x 2	**61 xxxx**	**62 xxxx**	**63 xxxx**	**64 xxxx**	**65 xxxx**

(xxxx = length of the compensation cable in mm)

Thermocouple (type / number)

Ceramic insulation

	Standard	Double
NiCr-Ni/K	**11**	**21**
Fe-CuNi/J	**12**	**22**
Fe-CuNi/L	**13**	**23**
Nicrosil-Nisil/N	**14**	**24**

Sheath measurement insert

	NiCr-Ni Type KI		Fe-CuNi Type LV		Fe-CuNi Type JV		Nicrosil-Nisil Type NI	
ø / mm	Standard	Double	Standard	Double	Standard	Double	Standard	Double
3.0	**31**	**41**	**51**	**61**	**71**	**81**	**91**	**94**
4.5	**32**	**42**	**52**	**62**	**72**	**82**	**92**	**95**
6.0	**33**	**43**	**53**	**63**	**73**	**83**	**93**	**96**
8.0	**34**	**44**	-	-	-	-	-	-

Custom designs: 3 5 - 9 9 3 5 x x x x - [ ][ ][ ][ ] x [ ][ ][ ][ ]

Consecutive no. | Carrier tube nominal length (mm) | Dip tube nominal length (mm)

50 - WMS // Straight resistance thermometers with a metal thermowell and a built-in measurement insert

50 - WMS // Straight resistance thermometers with a metal protection tube and a built-in measuring insert

The 50-WMS product group comprises ready-to-install large and small straight resistance thermometers with built-in measurement insert. Sensors of this kind are installed for standard temperature measurements in liquid and gaseous media. Refrigeration technology, air-conditioning systems, heating systems, furnaces, the manufacture of chemical equipment and the chemical industry are typical areas of application. Thermowells made of various materials protect the measurement insert against chemical corrosion and against mechanical damage. The choice of a suitable material for the thermowell will depend on prevailing conditions.
The measurement insert is fitted with a 1x or 2x Pt 100 in accordance with IEC 751 Class B two-wire circuit temperature sensor as a standard. Precision resistors with a tight tolerance and with a 500-ohm or 1000-ohm resistance are available on request. Connection can be made in three-wire or four-wire circuits if required. The resistance thermometers listed are examples of those that can be ordered.

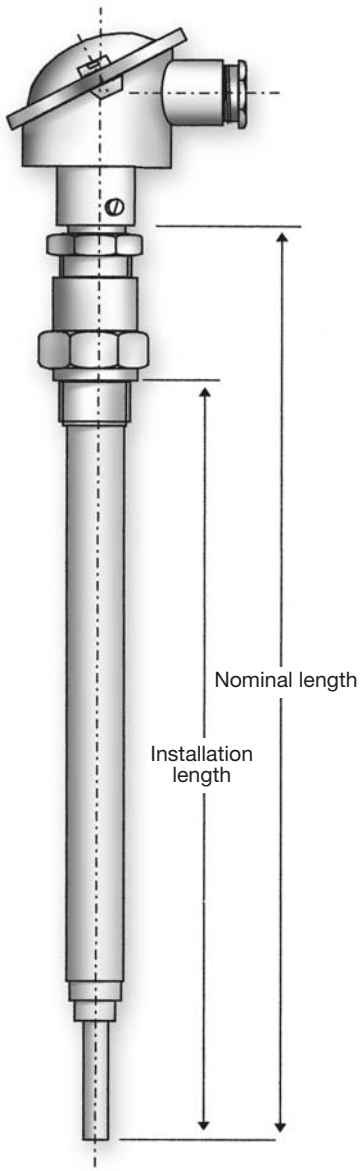
Repairs
Repairs on resistance thermometers are carried out at Günther GmbH; however, due to high assembly costs, such repairs are frequently uneconomical.

The fundamental values and limiting deviations of the resistance thermometers supplied by Günther GmbH comply with the DIN EN 60571 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x Pt 100 resistance thermometer with a Type B connection head and a G 3/4 A mounting thread

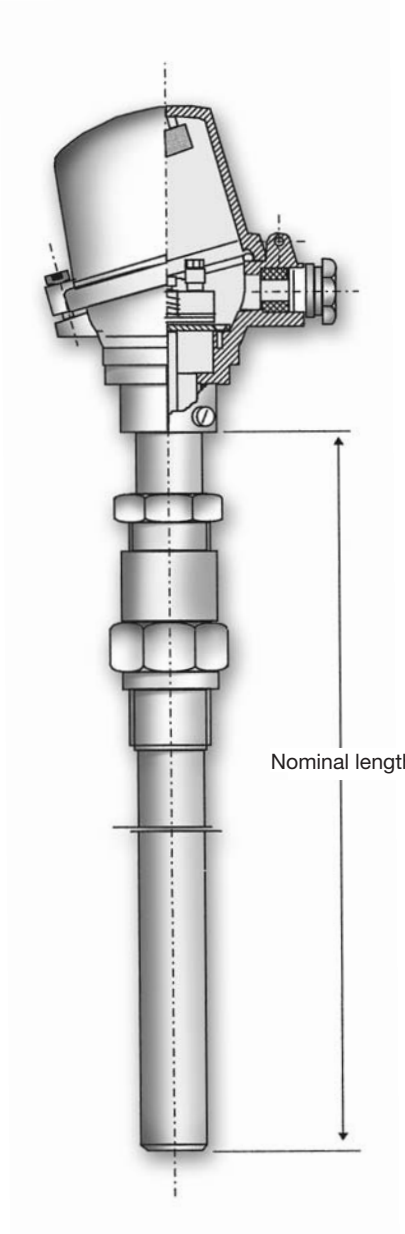


Product group:	**50- WMS**
Günther Art. No.:	**50-92046102-0750**
Connection head:	Type B
Protection tube:	ø 15 x 3 mm, material no. 1.4571
Measurement insert:	1 x Pt 100 two-wire circuit, ø 3.0 mm
Nominal length:	750 mm
Fastening:	G 3/4 A mounting thread, steel, zinc-coated
Sensor point:	Tapered, stainless steel, ø 6 x 60 mm
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751

50 - WMS // Straight resistance thermometers with a metal protection tube and a built-in measurement insert

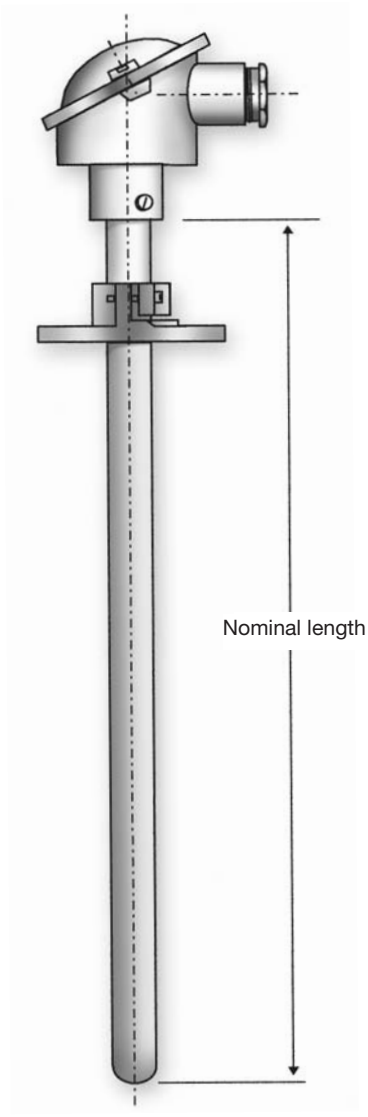
More order samples:

1 x Pt 100 three-wire circuit resistance thermometer with a Type AUZH connection head and a G 1 A mounting thread



Product group:	**50-WMS**
Günther Art. No.:	**50-20004312-0600.V1**
Connection head:	Type AUZH
Protection tube:	ø 22 x 2 mm, material no. 1.4571
Measurement insert:	1 x Pt 100 3-wire circuit, ø 6.0 mm, inst. length=535 mm
Nominal length:	600 mm
Fastening:	G 1 A gasproof mounting thread made of steel
Temperature range:	0 - 400°C
Limiting deviation	Class B in accordance with DIN EN 60751
Feature:	Built-in head transmitter, analogue 4 - 20 mA

1 x Pt 100 two-wire circuit resistance thermometer with a Type B connection head and a stop flange

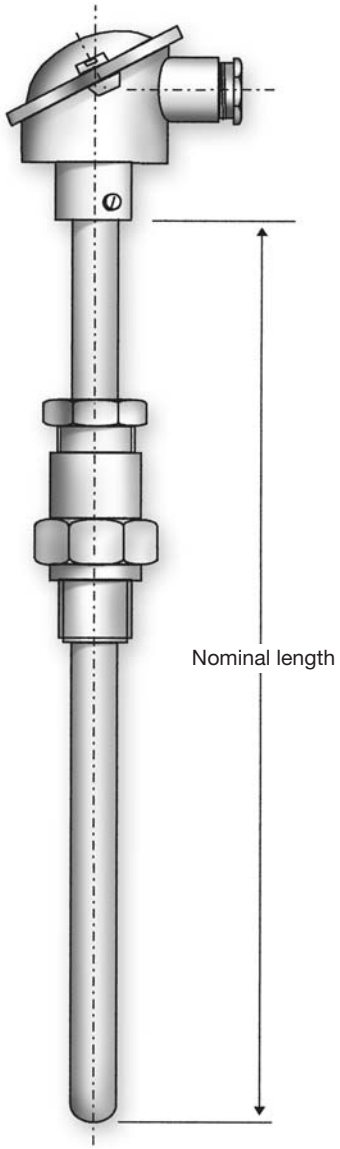


Product group:	**50-WMS**
Günther Art. No.:	**50-39006401-1300**
Connection head:	Type B
Protection tube:	ø 15 x 2 mm, material no. 1.4762
Measurement insert:	1 x Pt 100 two-wire circuit, ø 6.0 mm, reinforced
Nominal length:	1300 mm
Fastening:	Stop flange, ø 15 mm
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751

50 - WMS // Straight resistance thermometers with a metal protection tube and a built-in measurement insert

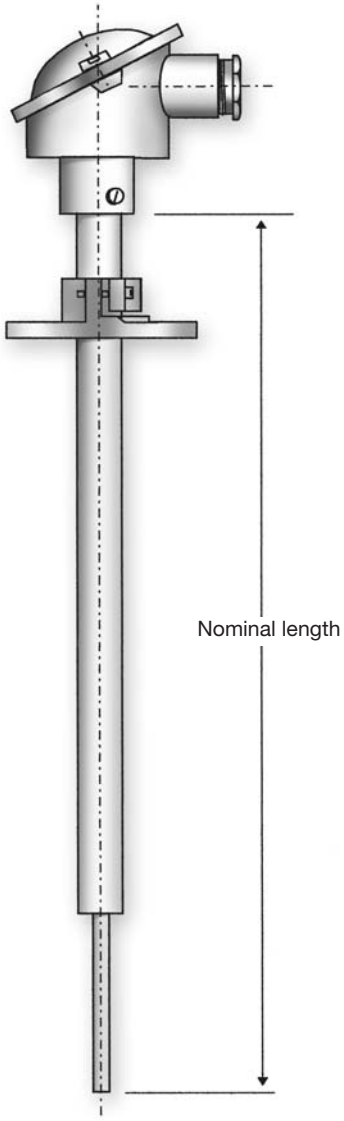
More order samples:

1 x Pt 100 two-wire circuit resistance thermometer with a Type B connection head and mounting thread, enamelled protection tube



Product group:	**50-WMS**
Günther Art. No.:	**50-99500084-0710**
Connection head:	Type B
Protection tube:	ø 15 x 2 mm, steel (fire-enamelled)
Measurement insert:	1 x Pt 100 two-wire circuit, ø 6.0 mm, installation length=735 mm
Nominal length:	710 mm
Fastening:	G 1/2 A gasproof mounting thread made of steel
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751

1 x Pt 100 two-wire circuit resistance thermometer with a Type B connection head and a stop flange, measurement insert freely protruding



Product group:	**50-WMS**
Günther Art. No.:	**50-99500073-0500**
Connection head:	Type B
Protection tube:	ø 15 x 2 x 430 mm, material no. 1.0305
Measurement insert:	1 x Pt 100 two-wire circuit, ø 6.0 mm (protruding freely 70 mm from the bored base of the thermowell)
Nominal length:	500 mm
Fastening:	Stop flange, ø 15 mm
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751

50 - WMS // Straight resistance thermometers with a metal protection tube and a built-in measurement insert

Pt 100 ohm, metal + sheath | 5 | 0 | - | | | | | | | | | - | | | | |

Nominal length / mm

Outer protection tube material / dimensions

	Material number				
ø [mm]	1.0305	1.4571	1.4893	1.4762	1.4841
9 x 1	**01**	**11**	**21**	**31**	**41**
9 x 1.5	**02**	**12**	**22**	**32**	**42**
10 x 1	**03**	**13**	**23**	**33**	**43**
10 x 1.5	**04**	**14**	**24**	**34**	**44**
11 x 1	**05**	**15**	**25**	**35**	**45**
11 x 1.5	**06**	**16**	**26**	**36**	**46**
12 x 1	**07**	**17**	**27**	**37**	**47**
12 x 2.5	**08**	**18**	**28**	**38**	**48**
15 x 2	**09**	**19**	**39**	**39**	**49**
22 x 2	**10**	**20**	**30**	**40**	**50**
15 x 3	**91**	**92**	**94**	**95**	**96**

Inner tube			
	None		**0**
	C530	ceramic material	**1**
	C610	gastight ceramic	**2**
	C799	Aluminium oxide	**3**

Sensor point

Not tapered	**0**	Tapered to 10 mm	**5**
Tapered to 15 mm	**1**	Tapered to 8 mm	**6**
Tapered to 12 mm	**2**		
Tapered to 9 mm	**3**		
Tapered to 6 mm	**4**	Tapered other	**9**

Head

A	**1**	B	**6**
AUS	**2**	BUS	**7**
AUZ	**3**	BUZ	**8**
AUZH	**4**	BUZH	**9**
AUSH	**5**	BBK	**0**

Sheath measurement insert — **Rigid model**

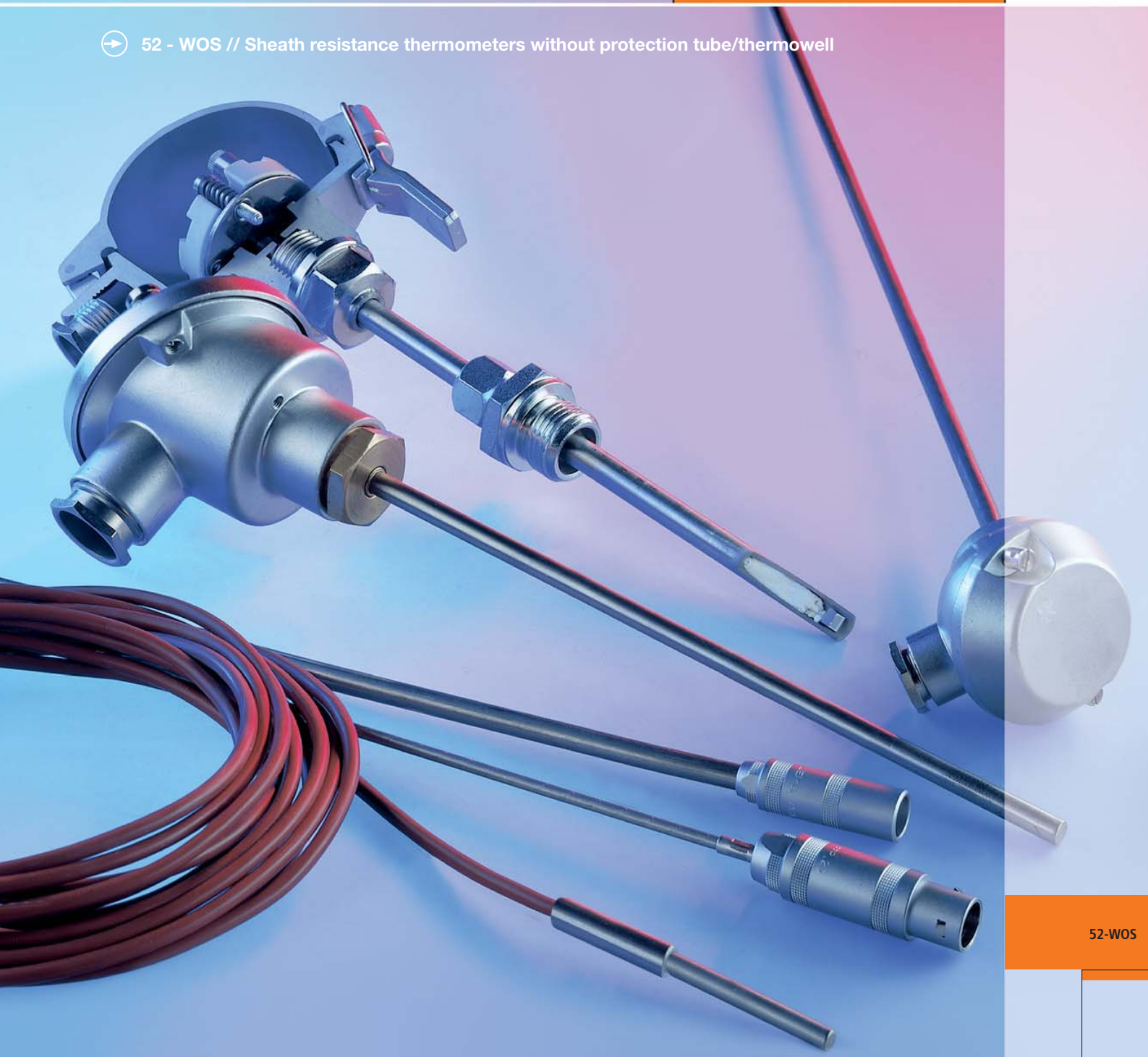
Sheath ø [mm]	2,0	3,0	4,5	6,0	6,0	6,0	8,0	8,0	
Point ø [mm]	2,0	3,0	4,5	6,0	8,0	10,0	8,0	10,0	
Circuit									
1xPt100 Ohm 2-wire	**00**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**
1xPt100 Ohm 3-wire	**01**	**11**	**21**	**31**	**41**	**51**	**61**	**71**	**81**
1xPt100 Ohm 4-wire	**02**	**12**	**22**	**32**	**42**	**52**	**62**	**72**	**82**
2xPt100 Ohm 2-wire	**03**	**13**	**23**	**33**	**43**	**53**	**63**	**73**	**83**
2xPt100 Ohm 3-wire	**04**	**14**	**24**	**34**	**44**	**54**	**64**	**74**	**84**
3xPt100 Ohm 2-wire	**05**	**15**	**25**	**35**	**45**	**55**	**65**	**75**	**85**
2xPt100 Ohm 4-wire	**06**	**16**	**26**	**36**	**46**	**56**	**66**	**76**	**86**

Fastening		
	Stop flange	**1**
	Mounting thread	**2**
	Stop flange/counter flange	**3**
	None	**0**

Custom designs: | 5 | 0 | - | 9 | 9 | 5 | 0 | x | x | x | x | - | | | | |

Consecutive no. — Nominal length / mm

52 - WOS // Sheath resistance thermometers without protection tube/thermowell



52 - WOS // Sheath resistance thermometers without protection tube/thermowell

Sheath resistance thermometers are used in virtually all areas of industry.
They are primarily used for measuring temperatures in pipe systems, containers, machines, furnaces, laboratories and plants and are very often the ideal solution for problems, depending on the choice of size and type.

For sensors of this type the resistor (1 x Pt 100 ohm or 2 x Pt 100 ohm) is connected by means of 2, 4 or 6 supply lines (inner conductors) which are firmly pressed into ceramic powder. The outer protective sheath is usually made of stainless steel with a diameter of 1.6 to 6.0 mm.

Sheath resistance thermometers have numerous advantages thanks to their design:

- The small size and their flexibility enable temperatures to be measured in places which are difficult to access.
- Response times are short as a result of a compact design.
- Flexibility over the length of the sheathed cable, except for the sensor point.

Electric properties

- leakage resistance ≥ 1000 M / / testing voltage 500 V DC (for 3.0 mm to 6.0mm)
- leakage resistance ≤ 50M / test voltage 100 V DC (for 1.6 mm and 2.0 mm)

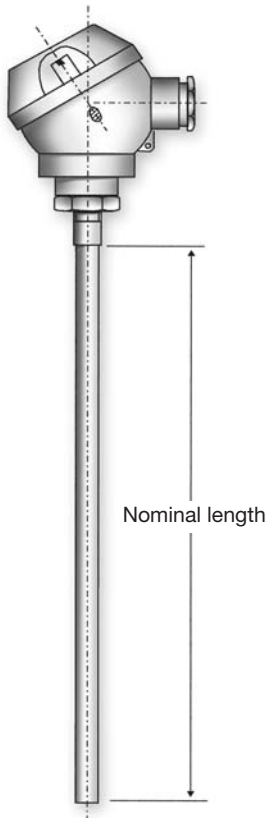
Sheath resistance thermometers are thermoelectric voltage-free, i.e. the thermoelectric voltage is ≤10 µV at 200°C.

The resistance values and limiting deviations of the resistance thermometers supplied by Günther GmbH comply with the DIN EN 60751 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

2 x Pt 100 2-wire circuit sheath resistance thermometer with a Type DL connection head

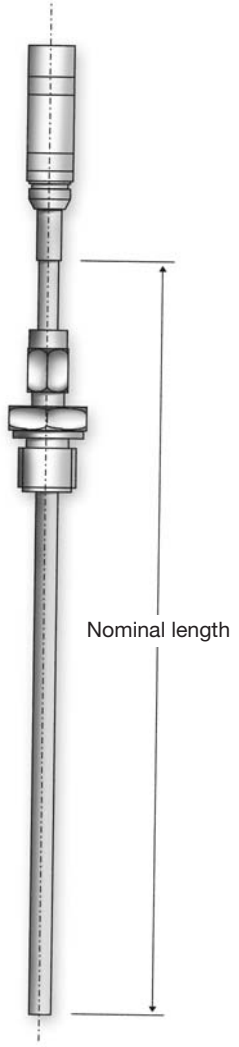


Günther Art. No.:	**52-20402399-0250**
Connection head:	Type DL with an M10 x 1 / IP 65 connection thread
Resistance:	2 x Pt 100 2-wire circuit
Sheath:	Stainless steel 1.4541, ø 4.5 mm
Fastening:	None
Nominal length:	250 mm
Temperature range:	-40 +400°C
Limiting deviation:	Class B in accordance with DIN EN 60751
Option:	With a supply line connected, 4 x 0.22 mm2 PVC-PVC

52 - WOS // Sheath resistance thermometers without protection tube/thermowell

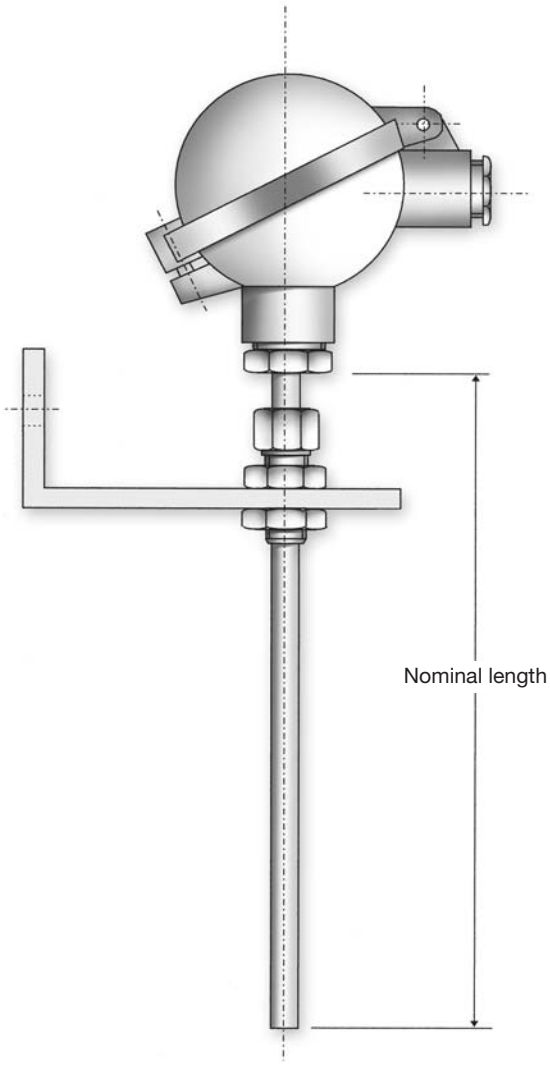
More order samples:

1 x Pt 100 2-wire circuit sheath resistance thermometer with a Lemo coupler connected



Günther Art. No.:	**52-35151041-0500**
Connection:	Lemo coupler, size 1, gold-plated contacts
Resistance:	1 x Pt 100 2-wire circuit
Sheath:	Stainless steel 1.4541, ø 3.0 mm
Fastening:	M8x1 1.4571 screw fastening with a Teflon thrust collar
Nominal length:	500 mm
Temperature range:	-200 +600°C
Limiting deviation:	Class B in accordance with DIN EN 60751
Feature:	None

Resistance thermometer with a Type NA connection head and a 1 x Pt100 2-wire circuit measurement insert and a screw fastening and an angle plate



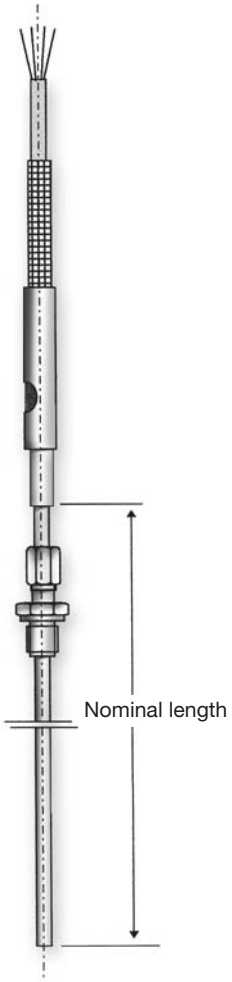
Günther Art. No.:	**52-99520115-0300**
Connection head:	Type NA
Protection tube:	None
Resistance:	1 x Pt 100 2-wire circuit
Sheath:	Stainless steel 1.4541, ø 6.0 mm
Nominal length:	300 mm
Fastening:	1.4571 G 1/4 A screw fastening with a Teflon ring and counter-nut, retaining plate made of 1.4571, 60 x 35 mm
Temperature range:	-30 +150°C
Limiting deviation:	Class B in accordance with DIN EN 60751
Feature:	Digital measuring transducer fitted in the head, OUT 4 - 20 mA for -30 - 150°C

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

52 - WOS // Sheath resistance thermometers without protection tube/thermowell

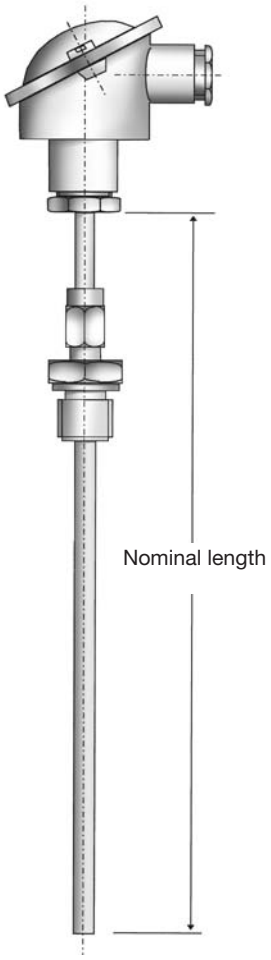
More order samples:

1 x Pt 100 4-wire circuit sheath resistance thermometer with a Copper supply line connected



Günther Art. No.:	**52-40151241-2000**
Connection:	Cable transition sleeve made of stainless steel and 1.5 m supply line 4x0.22 mm^2, Silicone insulated
Resistance:	1 x Pt 100 4-wire circuit
Sheath:	Stainless steel 1.4541, ø 3.0 mm
Fastening:	M8x1 screw fastening made of 1.4571 with a Teflon thrust collar
Nominal length:	2000 mm
Temperature range:	-40 +400°C
Limiting deviation:	Class B in accordance with DIN EN 60751
Feature:	Anti-kink spring made of stainless steel fastened at the cable transition

2 x Pt 100 3-wire circuit sheath resistance thermometer with a Type B connection head



Günther Art. No.:	**52-20103499-0500**
Connection head:	Type B with a M24 x 1.5 connection thread + counter-screw
Resistance:	2 x Pt 100 3-wire circuit
Sheath:	Stainless steel 1.4541, ø 6.0 mm
Fastening:	G 1/2 A screw fastening, made of 1.4571 with a Teflon thrust collar
Nominal length:	500 mm
Temperature range:	-200 +600°C
Limiting deviation:	Class B in accordance with DIN EN 60751

Plug-in connections, connections, screw joints, compensation cables and accessories can be found in the catalogue under 99-EZT.

52 - WOS // Sheath resistance thermometers without protection tube/thermowell

Sheath resistance thermometer	5	2	-									-				
													Nominal length / mm			

Contact terminations:

Connection head with a connection thread			**Connection head with a connecting diameter of 15.3 mm**	
B	(M24 x 1.5)	**20 10**	B	**25 10**
BUS	(M24 x 1.5)	**20 15**	BUS	**25 15**
BUSH	(M24 x 1.5)	**20 20**	BUSH	**25 20**
BUZ	(M24 x 1.5)	**20 25**	BUZ	**25 25**
BUZH	(M24 x 1.5)	**20 30**	BUZH	**25 30**
BBK	(M24 x 1.5)	**20 35**	BBK	**25 35**
DL (MA)	(M10 x1)	**20 40**		

Joining elements

Plug			**Coupler**		
Lemo	Size 0	**30 10**	Lemo	Size 0	**35 10**
Lemo	Size 1	**30 15**	Lemo	Size 1	**35 15**
Lemo	Size 2	**30 20**	Lemo	Size 2	**35 20**
Lemo	Size 3	**30 25**	Lemo	Size 3	**35 25**
Standard		**30 30**	Standard		**35 30**
Miniature		**30 35**	Miniature		**35 35**
High-temp standard		**30 40**	High-temp standard		**30 40**
High-temp miniature		**30 45**	High-temp miniature		**30 45**

Cable transition sleeve + compensation circuit **4X XX**
(XXX = length of the compensation circuit in XX.X m)

Sheath measurement inserts

Sheath ø [mm]	2.0	3.0	4.5	6.0	6.0	6.0	8.0	8.0
Point ø [mm]	2.0	3.0	4.5	6.0	8.0	10.0	8.0	10.0
Circuit								
1xPt100 ohm 2-wire	**00**	**10**	**20**	**30**	**40**	**50**	**60**	**70**
1xPt100 ohm 3-wire	**01**	**11**	**21**	**31**	**41**	**51**	**61**	**71**
1xPt100 ohm 4-wire	**02**	**12**	**22**	**32**	**42**	**52**	**62**	**72**
2xPt100 ohm 2-wire	**03**	**13**	**23**	**33**	**43**	**53**	**63**	**73**
2xPt100 ohm 3-wire	**04**	**14**	**24**	**34**	**44**	**54**	**64**	**74**
3xPt100 ohm 2-wire	**05**	**15**	**25**	**35**	**45**	**55**	**65**	**75**
2xPt100 ohm 4-wire	**06**	**16**	**26**	**36**	**46**	**56**	**66**	**76**

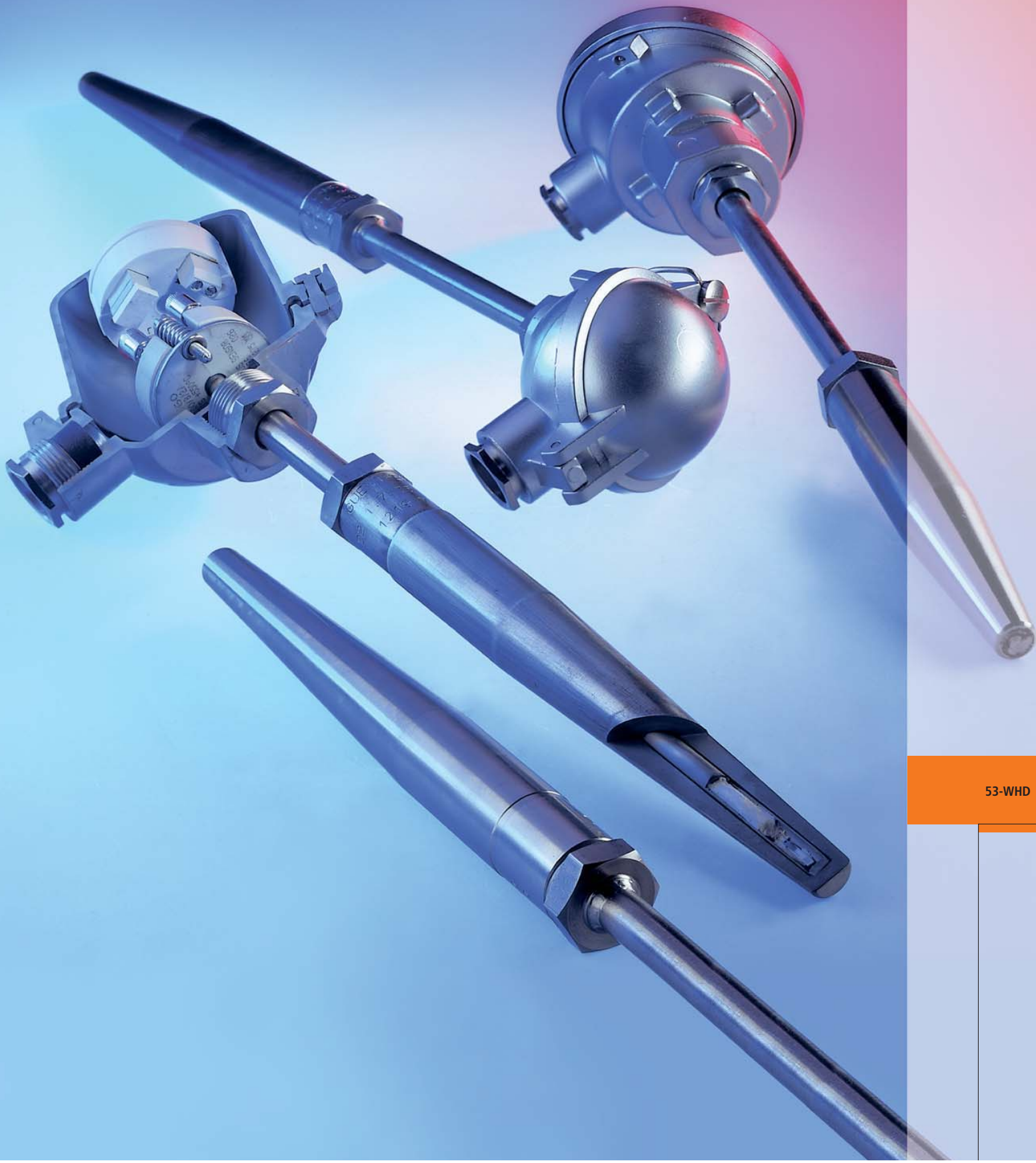
Fastening
Attachment screw fastening: **Made of** **Steel / Stainless steel**

(Tapered ring, mat. no. 1.4541)		
M 8 x 1 for sheath ø 1.0-3.0 mm	**11**	**21**
G 1/8 A for sheath ø 1.0-3.0 mm	**12**	**22**
G 1/4 A for sheath ø 4.5-8.0 mm	**13**	**23**
G 1/2 A for sheath ø 4.5-8.0 mm	**14**	**24**

(Tapered ring unit St. 35.8)			**Screwed socket combined**	
M 8 x 1 for sheath ø 1.0-3.0 mm	**51**	**31**	G 1/4 A	**80**
G 1/8 A for sheath ø 1.0-3.0 mm	**52**	**32**	G 3/8 A	**81**
G 1/4 A for sheath ø 4.5-8.0 mm	**53**	**33**	G 1/2 A	**82**
G 1/2 A for sheath ø 4.5-8.0 mm	**54**	**34**	G 1 A	**83**
			M 20 x 1.5	**84**
			M 18 x 1.5	**85**
(Teflon thrust collar)			M 14 x 1.5	**86**
M 8 x 1 for sheath ø 1.0-3.0 mm	**61**	**41**		
G 1/8 A for sheath ø 1.0-3.0 mm	**62**	**42**	No fastening	**99**
G 1/4 A for sheath ø 4.5-8.0 mm	**63**	**43**		
G 1/2 A for sheath ø 4.5-8.0 mm	**64**	**44**	Other	**88**

Custom designs:	5	2	-	9	9	5	2	x	x	x	x	-				
								Consecutive no.					Nominal length / mm			

53 - WHD // Weld in resistance thermometers with a D-type protective sleeve



53 - WHD // Weld in resistance thermometers with a D-type protective sleeve

Resistance thermometers with welded sleeves are used for measuring temperatures in gaseous and in liquid media such as air, steam, water, oil, etc. at high flow velocities and high pressures.
Special welded sleeves are suitable for pressures of up to 700 bar. The fittings of this assembly are equipped with replaceable sheath sensors.
The most significant component is a protective sleeve made of high-quality, solid metallic material which is welded into the respective system. In this case the protective sleeve and the system should be made of the same material.
Available space at the place of use and stress levels to be expected will determine the choice of the most suitable protective sleeve. The service life of the protective sleeve depends on numerous factors such as temperature, pressure, the respective medium for use, installation position (horizontal/vertical), thermowell material and the flow past situation.

Guidelines for the working stability of the protective sleeves in terms of pressure and temperature can be seen in the DIN 43772 load diagrams.

It is particularly the question of chemical stability that will need to be checked on carefully for each individual situation. Frequently it is only after operation tests have been carried out that information is gained, since even minor impurities in the surrounding media can have a considerable effect on the behaviour of the protective sleeves.

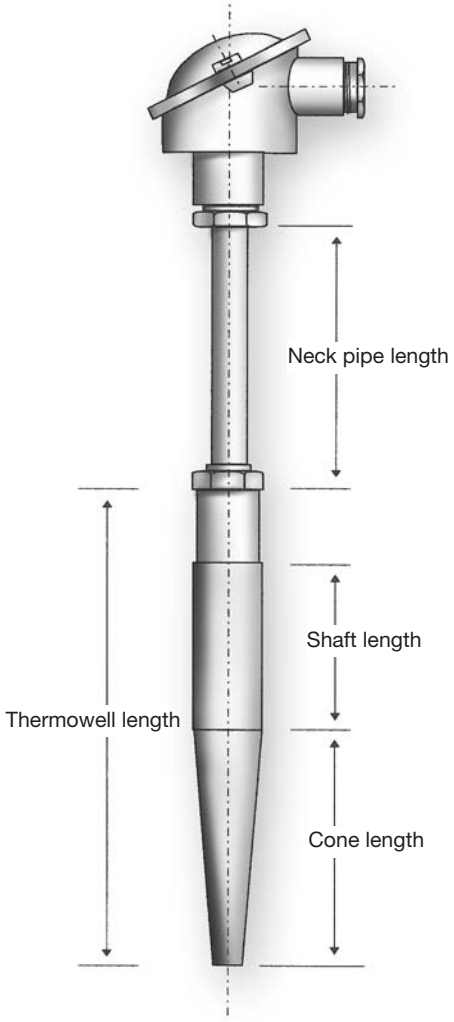
Most suitable areas of application:

- Containers and pipings
- Apparatus and machines
- Laboratories
- Test ranges
- Process technology
- Energy production and heat distribution
- Food and beverages production
- Machines and plant construction

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

2 x Pt 100 three-wire circuit welded resistance thermometers with a Type B connection head, M18 x 1.5 connection thread and a D2-type welded sleeve

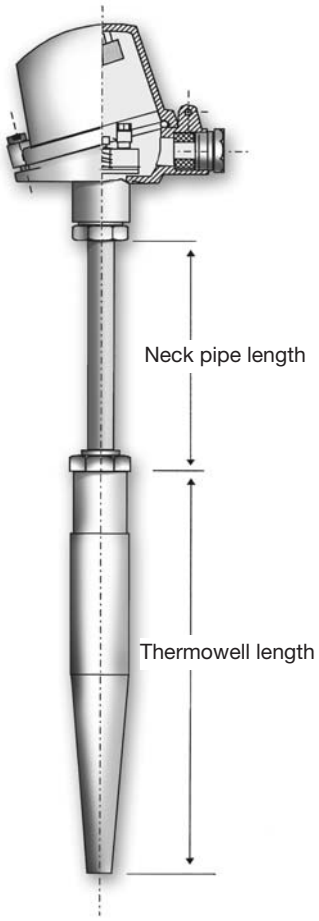


Product group:	**53-WHD**
Günther Art. No.:	**53-10022134-0200/0140**
Connection head:	Type B (M24 x 1.5)
Thermowell:	D2 welding sleeve, mat. no. 1.4571
Neck pipe:	ø 11 x 2 x 140 mm, material no. 1.4571
Measurement insert:	2 x Pt 100 three-wire circuit, ø 6.0 mm
Thermowell length:	200 mm
Fastening:	None
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751

53 - WHD // Weld in resistance thermometers with a D-type protective sleeve

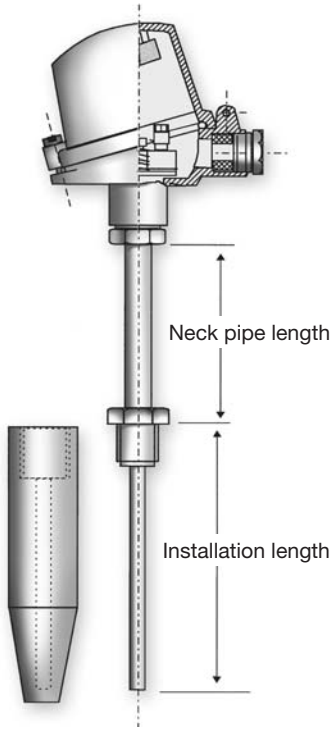
More order samples:

1 x Pt 100 3-wire circuit resistance thermometer with a Type BUZH connection head, neck tube and a D4-type weld in sleeve made of heat-resisting steel



Product group:	**53-WHD**
Günther Art. No.:	**53-70011231-0200/0140**
Connection head:	Type BUZH (M24 x 1.5)
Protective sleeve:	D4 welding sleeve, mat. no. 1.7335
Neck pipe:	ø 11 x 2 x 140 mm, material no. 1.0305, zinc-coated
Measurement insert:	1 x Pt 100 three-wire circuit, ø 6.0 mm
Installation length:	200 mm
Fastening:	None
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751
Feature:	Digital measuring transducer fitted in the head, 4 - 20 mA, equivalent to 0 - 400°C

1 x Pt 100 4-wire circuit resistance thermometer with a Type BUZH connection head, neck tube and a welded sleeve made of stainless steel



Product group:	**53-WHD**
Günther Art. No.:	**53-99530021-0070/0080**
Connection head:	Type BUZH (M24 x 1.5)
Protection tube:	Welding sleeve, mat. no. 1.4571 with IG M14 x1,5, overall length = 70 mm, cone length = 25 mm
Neck pipe:	ø 11 x 1 x 80 mm, material no. 1.4571
Measurement insert:	1 x Pt 100 four-wire circuit, ø 6.0 mm
Installation length:	70 mm
Fastening:	None
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751
Feature:	Digital measuring transducer fitted in the head, 4 - 20 mA, equivalent to 0 - 100°C

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

53 - WHD // Weld in resistance thermometers with a D-type protective sleeve

Pt 100 Ω, metal + sheath | 5 | 3 | - | | | | | | | | | - | | | | | / | | | | |

Installation length / Neck pipe length in mm

Connection head

B (M24 x 1.5)	**1**	BUSH	**6**
BUS	**2**	BUZH	**7**
BUZ	**3**	NA	**8**
BBK	**4**	DL / MA (M10 x 1)	**9**
Other	**5**		**0**

Blank flange in acc. with DIN 2527	St37-2	1.4571	C22.8	
DN 10 PN 16	**1 0**	**2 0**	**3 0**	None
DN 15 PN 16	**1 1**	**2 1**	**3 1**	
DN 20 PN 16	**1 2**	**2 2**	**3 2**	**0 0**
DN 25 PN 16	**1 3**	**2 3**	**3 3**	
DN 32 PN 16	**1 4**	**2 4**	**3 4**	
DN 40 PN 16	**1 5**	**2 5**	**3 5**	
DN 50 PN 16	**1 6**	**2 6**	**3 6**	Other
DN 65 PN 16	**1 7**	**2 7**	**3 7**	
DN 80 PN 16	**1 8**	**2 8**	**3 8**	**9 9**
DN 100 PN 16	**1 9**	**2 9**	**3 9**	

Neck pipe in acc. with DIN 43767

With M24 x 1.5 / M18 x 1.5	screw fittings	Galvanised steel	1
With M24 x 1.5 / M18 x 1.5	screw fittings	Stainless steel	2
With M24 x 1.5 / M14 x 1.5	screw fittings	Galvanised steel	3
With M24 x 1.5 / M14 x 1.5	screw fittings	Stainless steel	4
None			0
Other			9

Welded protection tubes in acc. with DIN 43763		1.7335	1.4571	1.5415
D1	Cone length = 65 mm, Shaft length = 50 mm, Thermowell length = 140 mm, ø 24 mm	**10**	**20**	**30**
D2	Cone length = 125 mm, Shaft length = 50 mm, Thermowell length = 200 mm, ø 24 mm	**11**	**21**	**31**
D4	Cone length = 65 mm, Shaft length = 110 mm, Thermowell length = 200 mm, ø 24 mm	**12**	**22**	**32**
D5	Cone length = 125 mm, Shaft length = 110 mm, Thermowell length = 260 mm, ø 24 mm	**13**	**23**	**33**
DS	Cone length = 65 mm, Shaft length = 50 mm, Thermowell length = 140 mm, ø 18 mm	**15**	**25**	**35**
DS	Cone length = 40 mm, Shaft length = 50 mm, Thermowell length = 115 mm, ø 18 mm	**16**	**26**	**36**
No thermowell (sheath freely protruding)		**00**		
Other		**99**		

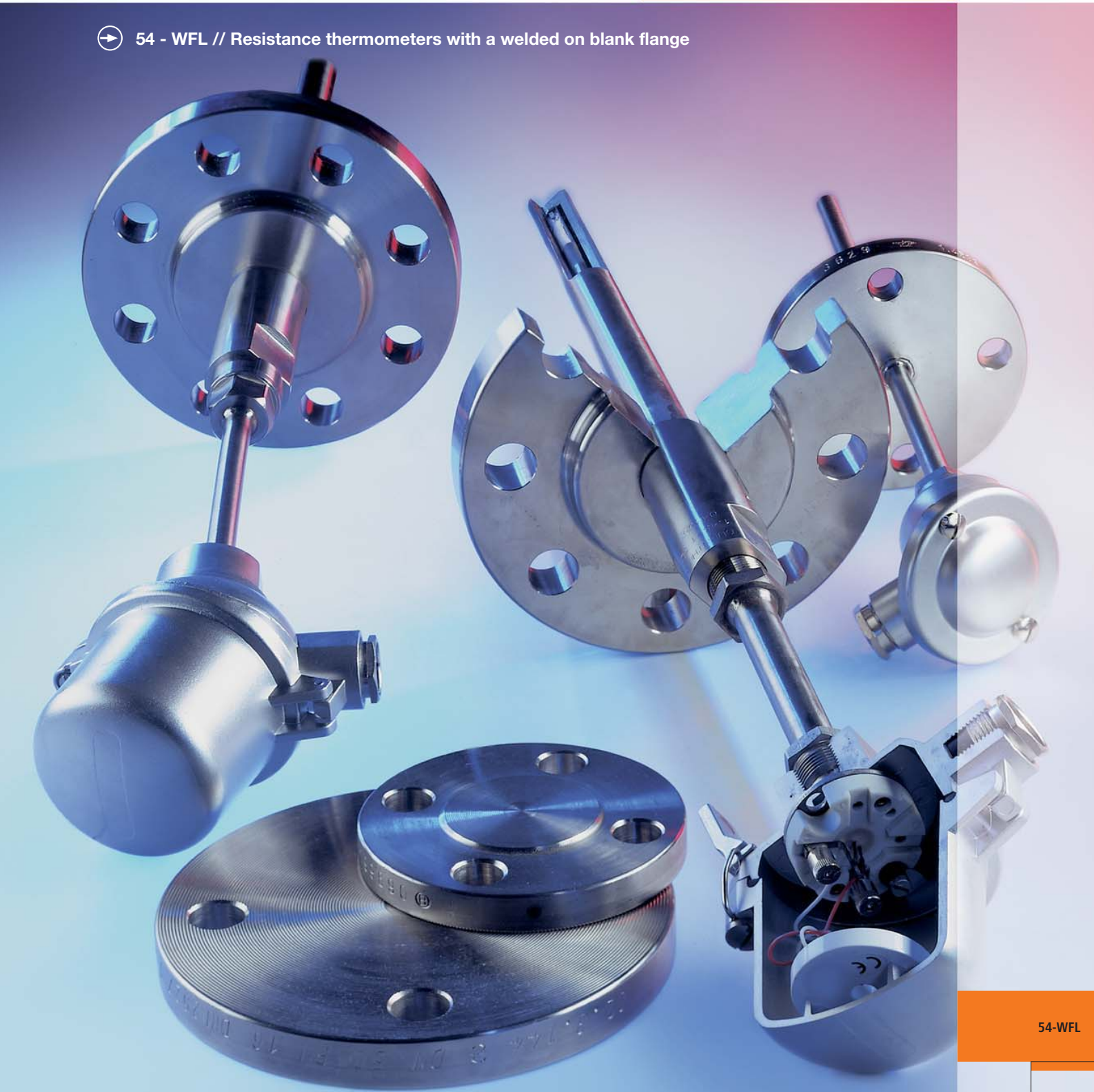
Sheath measurement inserts									**Rigid design:**
Sheath ø [mm]	2.0	3.0	4.5	6.0	6.0	6.0	8.0	8.0	
Point ø [mm]	2.0	3.0	4.5	6.0	8.0	10.0	8.0	10.0	
Circuit									
1xPt100 Ω 2-wire	**00**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**
1xPt100 Ω 3-wire	**01**	**11**	**21**	**31**	**41**	**51**	**61**	**71**	**81**
1xPt100 Ω 4-wire	**02**	**12**	**22**	**32**	**42**	**52**	**62**	**72**	**82**
2xPt100 Ω 2-wire	**03**	**13**	**23**	**33**	**43**	**53**	**63**	**73**	**83**
2xPt100 Ω 3-wire	**04**	**14**	**24**	**34**	**44**	**54**	**64**	**74**	**84**
3xPt100 Ω 2-wire	**05**	**15**	**25**	**35**	**45**	**55**	**65**	**75**	**85**
2xPt100 Ω 4-wire	**06**	**16**	**26**	**36**	**46**	**56**	**66**	**76**	**86**

Custom designs: | 5 | 3 | - | 9 | 9 | 5 | 3 | x | x | x | x | - | | | | | / | | | | |

Consecutive no.

Installation length / neck pipe length in mm

54 - WFL // Resistance thermometers with a welded on blank flange



54 - WFL // Resistance thermometers with a welded on blank flange

Resistance thermometers with a welded on blank flange are used for measuring temperatures in gaseous and in liquid or plastic media such as air, steam, water or oil.

A blank flange welded onto the thermowell ensures that sensors of this kind can be securely fastened to the walls of pressure and vacuum equipment, for example in power plants and in chemical plants. The protection fittings at the place of installation can remain in place even if the sensor probe needs to be replaced now and then. This ensures that operation does not need to be interrupted.

Changes in temperature can be detected very quickly if sensors with a tapered thermowell point are used.

Most suitable areas of application:

- Containers and pipings
- Apparatus and machines
- Laboratories
- Test ranges
- Process technology
- Energy production and heat distribution
- Food and beverages production
- Machines and plant construction

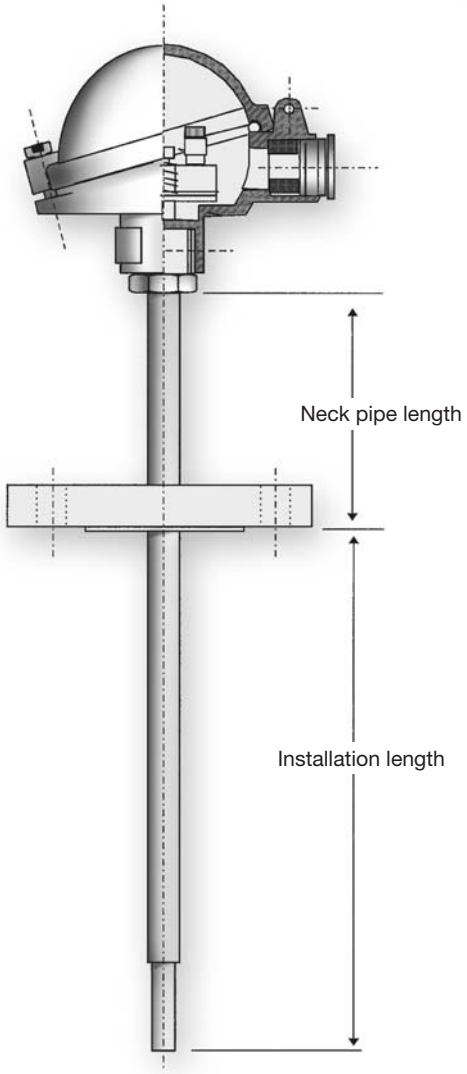
Precision resistors with a tight tolerance (e.g. 1/3 DIN, 1/10 DIN or Class A in accordance with DIN EN 60751) are used for special applications (precision, long-term stability, etc.).

The resistance values and limiting deviations of our resistance thermometers comply with the DIN EN 60751 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x Pt 100 3-wire circuit straight flanged resistance thermometer with a DN 25 PN 16 blank flange, Type C

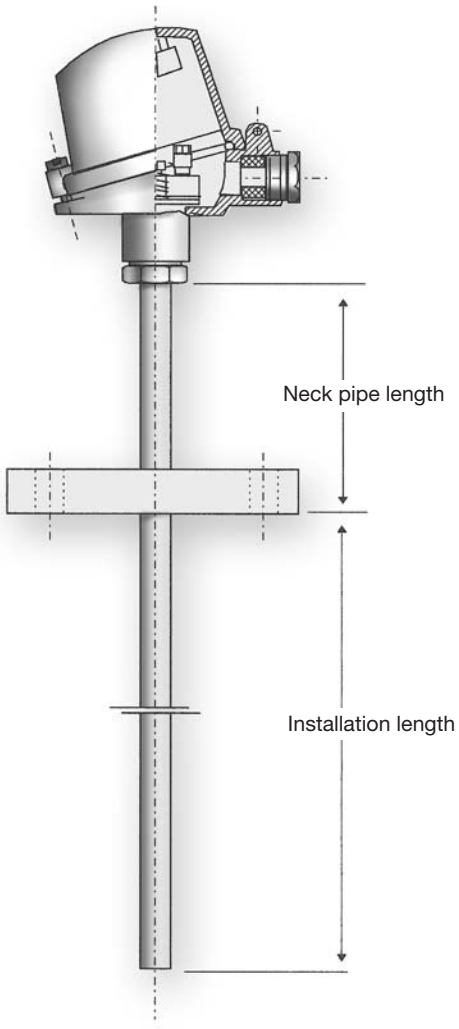


Product group:	**54-WFL**
Günther Art. No.:	**54-63123105-0500/0130**
Connection head:	Type BUZ (M24 x 1.5)
Neck tube:	ø 15 x 2 mm, material no. 1.4571
Protection tube:	ø 15 x 2 mm, material no. 1.4571
Sensor point:	ø 10 x 1.5 x 40 mm
Process connection:	DN 25 PN 16 blank flange, Type C, 1.4571, welded onto the thermowell
Measurement insert:	1 x Pt 100 three-wire circuit, ø 6.0 mm
Temperature range:	0 - 600°C
Limiting deviation:	Class B in accordance with DIN EN 60751

54 - WFL // Resistance thermometers with a welded on blank flange

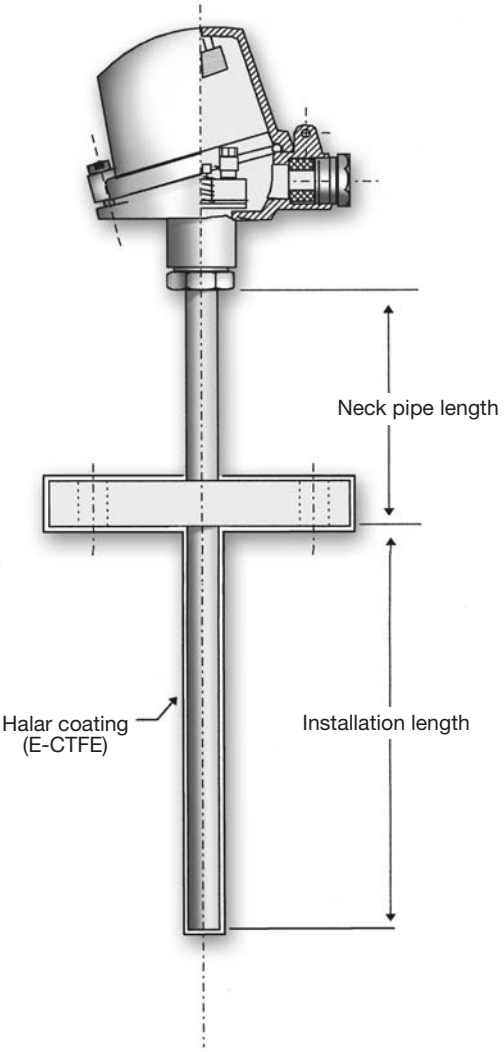
More order samples:

2 x Pt 100 2-wire circuit resistance thermometer with a Type BUZH connection head and a blank flange welded on



Product group:	**54-WFL**
Günther Art. No.:	**54-83315070-0200/0150**
Connection head:	Style BUZH (M24 x 1.5)
Protection tube:	ø 12 x 1.5 mm, material no. 1.0305
Sensor point:	Not tapered
Process connection:	DN 40 PN 16 blank flange, mat. no. 1.0037
Installation length:	200 mm
Neck pipe length:	150 mm
Measurement insert:	2 x Pt 100 two-wire circuit, ø 6.0 mm
Temperature range:	0 - 600°C
Limiting deviation:	Class B in accordance with DIN EN 60751

1 x Pt 100 3-wire circuit resistance thermometer with a Type BUZH connection head and a DN 25 PN 16 blank flange welded on



Product group:	**54-WFL**
Günther Art. No.:	**54-99540054-0100/0120**
Connection head:	Style BUZH (M24 x 1.5)
Protection tube:	ø 11 x 2 mm, material no. 1.4571
Sensor point:	Not tapered
Process connection:	DN 25 PN 16 blank flange, mat. no. 1.4571
Installation length:	100 mm
Neck pipe length:	120 mm
Measurement insert:	1 x Pt 100 three-wire circuit, ø 6.0 mm
Temperature range:	0 - 180°C
Feature:	Halar coating (E-CTFE)
Limiting deviation:	Class B in accordance with DIN EN 60571

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

54 - WFL // Resistance thermometers with a welded on blank flange

Pt 100 Ω with a blank flange | 5 | 4 | - | | | | | | | | | - | | | | | / | | | | |

Installation length / neck pipe length in mm

Connection head			
A	1	BUZ (M24 x 1.5)	6
	2	BUSH (M24 x 1.5)	7
BBK (M24 x 1.5)	3	BUZH (M24 x 1.5)	8
B (M24 x 1.5)	4	DL / MA (M10 x 1)	9
BUS (M24 x 1.5)	5		0

Sheath measurement inserts									Rigid design
Sheath ø [mm]	2.0	3.0	4.5	6.0	6.0	6.0	8.0	8.0	
Point ø [mm]	2.0	3.0	4.5	6.0	8.0	10.0	8.0	10.0	
Circuit									
1xPt100 Ω 2-wire	**00**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**
1xPt100 Ω 3-Leiter	**01**	**11**	**21**	**31**	**41**	**51**	**61**	**71**	**81**
1xPt100 Ω 4-wire	**02**	**12**	**22**	**32**	**42**	**52**	**62**	**72**	**82**
2xPt100 Ω 2-Leiter	**03**	**13**	**23**	**33**	**43**	**53**	**63**	**73**	**83**
2xPt100 Ω 3-wire	**04**	**14**	**24**	**34**	**44**	**54**	**64**	**74**	**84**
3xPt100 Ω 2-wire	**05**	**15**	**25**	**35**	**45**	**55**	**65**	**75**	**85**
2xPt100 Ω 4-wire	**06**	**16**	**26**	**36**	**46**	**56**	**66**	**76**	**86**

Blank flange in acc. with DIN 2527	St37-2	1.4571	C22.8	Alloy C4	
DN 10 PN 16	**10**	**20**	**30**	**67**	None
DN 15 PN 16	**11**	**21**	**31**	**68**	
DN 20 PN 16	**12**	**22**	**32**	**69**	**00**
DN 25 PN 16	**13**	**23**	**33**	**70**	
DN 32 PN 16	**14**	**24**	**34**	**71**	
DN 40 PN 16	**15**	**25**	**35**	**72**	
DN 50 PN 16	**16**	**26**	**36**	**73**	Other
DN 65 PN 16	**17**	**27**	**37**	**74**	
DN 80 PN 16	**18**	**28**	**38**	**75**	**99**
DN 100 PN 16	**19**	**29**	**39**	**76**	

Outer protection tube material / dimensions							Other **99**
	1.0305	1.4571	1.4762	1.4841	2.4816	Kanthal	C4 alloy
6 x 0.75	**01**	**12**	**23**	**34**	**45**	**56**	**67**
8 x 1	**02**	**13**	**24**	**35**	**46**	**57**	**68**
9 x 1	**03**	**14**	**25**	**36**	**47**	**58**	**69**
10 x 1.5	**04**	**15**	**26**	**37**	**48**	**59**	**70**
11 x 1	**05**	**16**	**27**	**38**	**49**	**50**	**71**
11 x 2	**06**	**17**	**28**	**39**	**40**	**61**	**72**
12 x 1.5	**07**	**18**	**29**	**30**	**51**	**62**	**73**
12 x 2.5	**08**	**19**	**20**	**41**	**52**	**63**	**74**
15 x 2	**09**	**10**	**31**	**42**	**53**	**64**	**75**
15 x 3	**00**	**21**	**32**	**43**	**54**	**65**	**76**
22 x 2	**11**	**22**	**33**	**44**	**55**	**66**	**77**

Design					
Standard	[protection tube not tapered]	**0**			
Fast response	[protection tube tapered]				
Tube point	15 mm ø	**1**	Tube point	10 mm ø	**5**
Tube point	12 mm ø	**2**	Tube point	8 mm ø	**6**
Tube point	9 mm ø	**3**			
Tube point	6 mm ø	**4**	Other		**9**

Custom designs: | 5 | 4 | - | 9 | 9 | 5 | 4 | x | x | x | x | - | | | | | / | | | | |

Consecutive no.

Installation length / neck pipe length in mm

55 - WES // Screw-in resistance thermometers

55 - WES // Screw-in resistance thermometers

Screw-in resistance thermometers are used for standard temperature measurements in the low-pressure range for gaseous, liquid and plastic media, depending on the quality of the thermowell and the surrounding media, up to a temperature of 850°C.

A screwed connecting piece welded onto the thermowell ensures a stable process alignment of the sensors of this assembly.

The protective fittings are generally made of seamlessly extruded stainless steel tubing with a welded in bottom round plate.

Changes in temperature can be detected very quickly if sensors with a tapered thermowell point are used.

Most suitable areas of application:

- Containers and pipings
- Apparatus and machines
- Laboratories
- Test ranges
- Process technology
- Energy production and heat distribution
- Food and beverages production
- Machines and plant construction

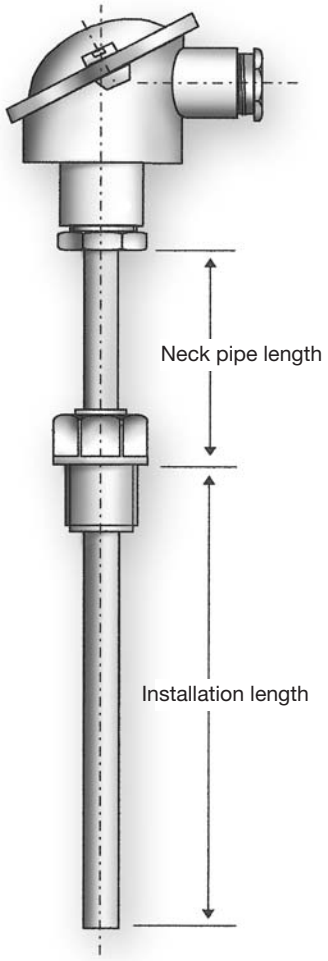
Precision resistors with a tight tolerance (e.g. 1/3 DIN, 1/10 DIN or Class A in accordance with DIN EN 60751) are used for special applications (precision, long-term stability, etc.).

The resistance values and limiting deviations of our resistance thermometers comply with the DIN EN 60751 norm.

The examples of products available for ordering shown in this catalogue are a selection of appliances frequently used in practice. The numerical code indicated on the back of the individual components can be used to draw up the respective order number of a standard thermal sensor, although not all of the possible combinations of numbers and materials are useful or technically viable.
Special numbers are developed by us for special thermal sensors whose construction and components require technical clarification. Please contact us if any specific problems concerning material and assembly occur during use. The many years of experience we have gained should enable us to find the best possible solution for your specific problem.

Order sample:

1 x Pt 100 2-wire circuit resistance thermometer with a G 1/2 A screw-in thread

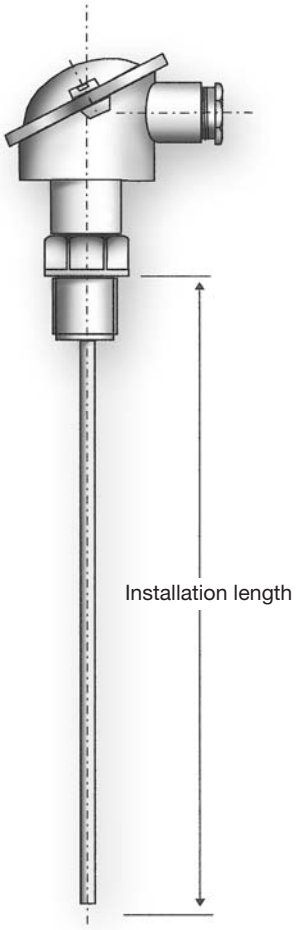


Product group:	**55-WES**
Günther Art. No.:	**55-13041701-0400/0140**
Connection head:	Type B (M24 x 1.5)
Protection tube:	ø 11 x 2 mm, material no. 1.4571
Measurement insert:	1 x Pt 100 two-wire circuit, ø 6 mm
Installation length:	400 mm
Neck pipe length:	140 mm
Fastening:	G 1/2 A screwed socket, mat. no. 1.4571
Sensor point:	Not tapered, closed
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751

55 - WES // Screw-in resistance thermometers

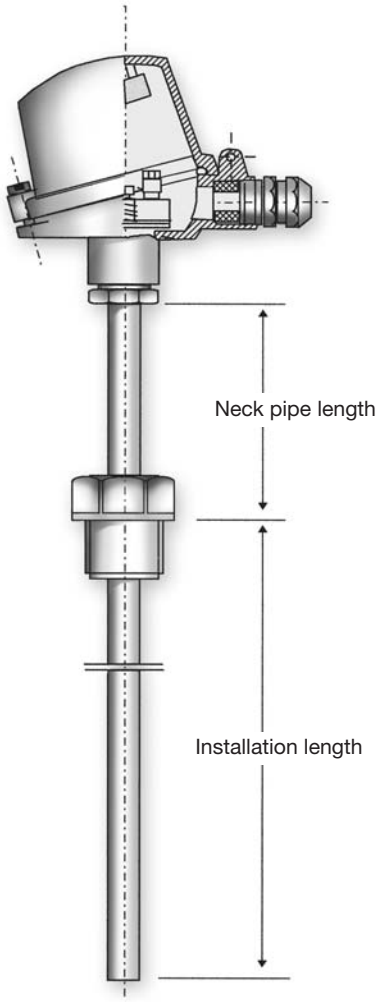
More order samples:

2 x Pt 100 3-wire circuit resistance thermometer with a G 1/2 A screw-in thread, no protection tube



Product group:	**55-WES**
Günther Art. No.:	**55-13419900-1200**
Connection head:	Type B (M24 x 1.5)
Protection tube:	None
Measurement insert:	2 x Pt 100 3-wire circuit, ø 6mm, resilient installation, protruding freely from the socket
Installation length:	1200 mm
Fastening:	G 1/2 A screwed socket, mat. no. 1.4571
Temperature range:	0 - 400°C
Limiting deviation:	Class B in accordance with DIN EN 60751
Feature:	Not pressure sealed at the head

2 x Pt 100 2-wire circuit resistance thermometer with a BUZH head and a G3/4A screw-in thread



Product group:	**55-WES**
Günther Art. No.:	**55-73362101-0800/0100**
Connection head:	Type BUZH (M24 x 1.5) with PG 13.5 (blue f.EX)
Protection tube:	ø 15 x 3 mm, material no. 1.4571
Measurement insert:	2 x Pt 100 2 two-wire circuit, ø 6.0 mm
Installation length:	800 mm
Neck pipe length:	100 mm
Fastening:	G 3/4 A screwed socket, mat. no. 1.4571
Sensor point:	Not tapered
Temperature range:	-200° - 600°C
Measuring transducer:	Digital, set according to instructions, 4 - 20 mA output
Limiting deviation:	Class B in accordance with DIN EN 60751

Günther GmbH will calibrate your thermocouples in the company's own calibration laboratory at favourable conditions.
All calibrations are traceable to the national norms of the German Federal Physical-Technical Institute.

55 - WES // Screw-in resistance thermometers

Pt 100 Ω, metal + sheath

5	5	-									-					/				

Installation length / neck pipe length in mm

Connection head

B (M24 x 1.5)	**1**	BUSH	**6**
BUS	**2**	BUZH	**7**
BUZ	**3**	NA	**8**
BBK	**4**	DL / MA (M10 x 1)	**9**
BFS	**5**		**0**

Sheath measurement inserts

									Rigid design
Sheath ø [mm]	2.0	3.0	4.5	6.0	6.0	6.0	8.0	8.0	
Point ø [mm]	2.0	3.0	4.5	6.0	8.0	10.0	8.0	10.0	
Circuit									
1xPt100 Ω 2-wire	**00**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**
1xPt100 Ω 3-wire	**01**	**11**	**21**	**31**	**41**	**51**	**61**	**71**	**81**
1xPt100 Ω 4-wire	**02**	**12**	**22**	**32**	**42**	**52**	**62**	**72**	**82**
2xPt100 Ω 2-wire	**03**	**13**	**23**	**33**	**43**	**53**	**63**	**73**	**83**
2xPt100 Ω 3-wire	**04**	**14**	**24**	**34**	**44**	**54**	**64**	**74**	**84**
3xPt100 Ω 2-wire	**05**	**15**	**25**	**35**	**45**	**55**	**65**	**75**	**85**
2xPt100 Ω 4-wire	**06**	**16**	**26**	**36**	**46**	**56**	**66**	**76**	**86**

Screwed plug

Screw joint, combined, M24 x 1.5 / G 1/2 A	**1**
Screw joint, combined, M10 x 1 / G 1/2 A	**2**
Screw joint G 1 A	**3**
Screw joint G 1/2 A	**4**
Screw joint M18x1,5	**5**
Screw joint G 3/4 A	**6**
Screw joint M20x1,5	**7**
Other	**9**

Outer protection tube material / dimensions

	1.0305	1.4571	1.4762	1.4841	2.4816	Kanthal
6 x 0.75	**01**	**12**	**23**	**34**	**45**	**56**
8 x 1	**02**	**13**	**24**	**35**	**46**	**57**
9 x 1	**03**	**14**	**25**	**36**	**47**	**58**
10 x 1.5	**04**	**15**	**26**	**37**	**48**	**59**
11 x 1	**05**	**16**	**27**	**38**	**49**	**50**
11 x 2	**06**	**17**	**28**	**39**	**40**	**61**
12 x 1.5	**07**	**18**	**29**	**30**	**51**	**62**
12 x 2.5	**08**	**19**	**20**	**41**	**52**	**63**
15 x 2	**09**	**10**	**31**	**42**	**53**	**64**
15 x 3	**00**	**21**	**32**	**43**	**54**	**65**
22 x 2	**11**	**22**	**33**	**44**	**55**	**66**
No protection tube		**99**		Other		**88**

Design

Standard	[protection tube not tapered]	**0**			
Fast response	[protection tube tapered]				
Protection tube point	15 mm ø	**1**	Protection tube point	10 mm ø	**5**
Protection tube point	12 mm ø	**2**	Protection tube point	8 mm ø	**6**
Protection tube point	9 mm ø	**3**			
Protection tube point	6 mm ø	**4**	Other		**9**

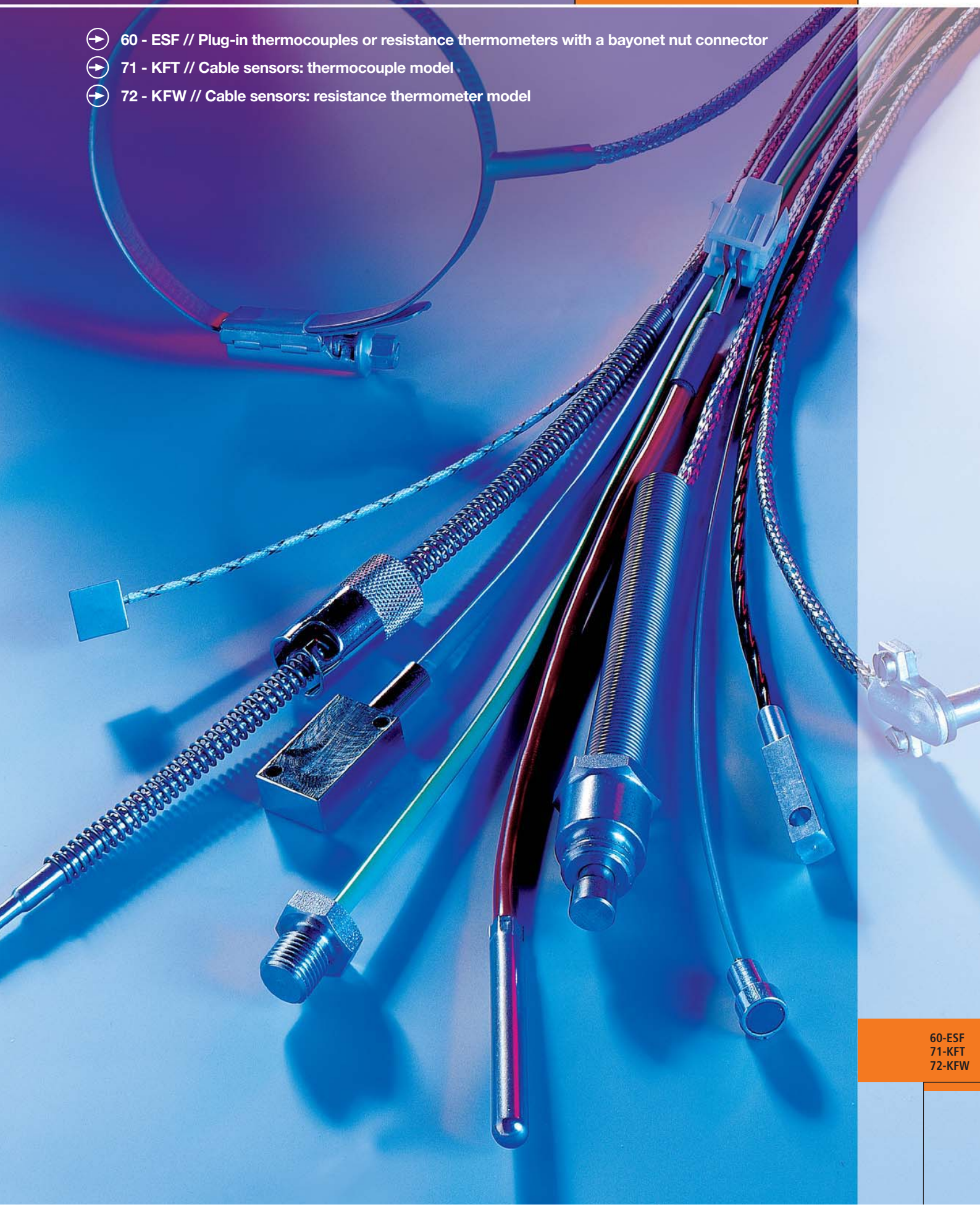
Neck pipe	None	**0**	Present	**1**

Custom designs:

5	5	-	9	9	5	5	x	x	x	x	-					/				

Consecutive no.

Installation length / Neck pipe length in mm



60 - ESF // Plug-in thermocouples or resistance thermometers with a bayonet nut connector
71 - KFT // Cable sensors: thermocouple model
72 - KFW // Cable sensors: resistance thermometer model

The constructive design of the three product groups specified above are determined by user-related requirements, particularly since the design is almost freely configurable.

Examples of applications are:
measuring temperatures in pipelines, on the walls of containers, in or on machines and units, in injection moulds, in cold storages, in fluids and in any kind of semi-solid substance.

These temperature sensors are named in accordance with their design, the type of fastening or where they are used: e.g. Bayonet sensors, plug-in sensors, screw-in sensors, insertion sensors, weld sensors, ambient sensors, surface sensors, contact sensors, pipe clamp sensors, acid sensors, etc.

Since a multitude of various products is available in this group of products, we do not indicate any number codes for drawing up respective order numbers, since the technical details of these products will generally need to be clarified in advance.

We kindly ask you to provide us with your specific requirements, such as:
type of sensor, required limiting deviations, quality and dimensions of the protective sleeve or the process connection, length of cable, operation temperature, connection thread if available, size of the cable, surrounding media, etc.

The many years of experience we have gained will enable us to find the best possible solution for your specific measuring task.

92 - THL // Thermoelectric cables
93 - AGL // Compensation cables

Thermoelectric cables and compensation cables are essentially differentiated on the basis of the materials they are made of.

Thermoelectric cables are made of the respective original thermocouple materials or of materials which have the same nominal chemical composition as the corresponding thermocouples. For this reason thermoelectric cables are suitable for use as trailing thermocouples after a measuring point has been completed. They are named in accordance with the distinguishing letter of the respective thermocouple followed by an “X” (e.g. KX).

Compensation cables are made of replacement materials which are not identical with the original thermocouple materials; however, up to a certain authorised temperature range, they do have the same thermoelectric properties. They are named in accordance with the identification letter of the respective thermocouple followed by a “C” (e.g. KC).

Cable structure:

Thermoelectric cables are produced both as stranded conductors and as solid conductors, generally with cross-sections of 0.22 mm² to 1.50 mm² or with diameters of 0.2 mm to 1.0 mm. Compensation cables are produced as stranded conductors, generally with cross-sections of 0.22 mm² to 1.50 mm².

Tolerances, limiting deviations and colour marking:

Cables for thermal conductors and compensation conductors comply with DIN 43713. Thermoelectric voltages within an authorised temperature range comply with DIN EN 60584-1. Limiting deviations for thermal and compensation conductors are stipulated in DIN 43722. Precision category 1 applies for thermoelectric cables and category 2 applies for thermoelectric cables and for compensation cables (apart from thermocouple types U and L in accordance with DIN 43710, equivalent to ± 3°C). The colour codes for cables which Günther-GmbH has in stock comply with DIN 43722 (except for thermocouple types U and L – in accordance with DIN 43714).

Selection criteria for thermoelectric cables and compensation cables:

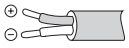
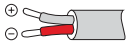
A suitable choice of cable for a specific application depends greatly on influencing factors and on ambient conditions.

For example:
thermal stability, stress, flexibility, resistance to moisture or aggressive media, cross-section of conductors, outer dimensions, flammability, electromagnetic compatibility (sheath) and many more. We suggest that you speak to us about your specific application. We will gladly give you advice and endeavour to offer you a conductor suitable for your particular application.

Product range:

Günther-Gmbh supplies almost all of the widely-used thermal and compensation cables from stock. Special dimensions or designs can generally be procured at short notice. The article numbers for cables from our standard range are all listed in **bold print** on the following pages.

Colour index for compensation and thermoelectric cables and for thermal plugs

Thermocouple type	IEC 584	DIN 43714	ANSI MC 96.1
NiCr-Ni / K	 + green / - white Sheath: green	 + red / - green Sheath: green	 + yellow / - red Sheath: yellow
Fe-CuNi / L	—	 + red / - blue Sheath: blue	—
Fe-CuNi /J	 + black / - white Sheath: black	—	 + white / - red Sheath: black
Pt10Rh-Pt / S	 + orange / - white Sheath: orange	 + red / - white Sheath: white	 + black / - red Sheath: green
Pt13Rh-Pt / R	 + orange / - white Sheath: orange	 + red / - white Sheath: white	 + black / - red Sheath: green
Pt30Rh-Pt6Rh / B	 + grey / - white Sheath: grey	—	 + grey / - red Sheath: grey
NiCrosil-Nisil / N	 + pink / - white Sheath: pink	—	—
Cu-CuNi / U	—	 + red / - brown Sheath: brown	—
Cu-CuNi / T	 + brown / - white Sheath: brown	—	—

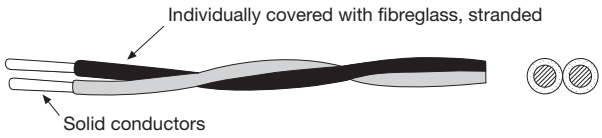
The basic data for the individual thermocouples is the same for all of the specifications indicated. Thermocouples U and L are only normed in DIN 43710/1985. For new equipment and for retrofits we recommend that only thermocouples in accordance with IEC 584 be used (T instead of U and J instead of L). J and T type thermocouples are not identical with types L and U.

Limiting deviations in accordance with EN 60584-2 (comparison point 0°C)

Code letter	Range	Class 1	Range	Class 2
J	-40 ... 750°C	±1,5°C or 0,004·(t)	-40 ... 750°C	±2,5°C or 0,0075·(t)
K	-40 ... 1000°C	±1,5°C or 0,004·(t)	-40 ... 1200°C	±2,5°C or 0,0075·(t)
T	-40 ... 350°C	±0,5°C or 0,004·(t)	-40 ... 350°C	±1,0°C or 0,0075·(t)
E	-40 ... 800°C	±1,5°C or 0,004·(t)	-40 ... 900°C	±2,5°C or 0,0075·(t)
S / R	0 ... 1600°C	±1,0°C or [1,0+0,003(t-1100)]°C	0 ... 1600°C	±1,5°C or 0,0025·(t)
N	-40 ... 1000°C	±1,5°C or 0,004·(t)	-40 ... 1200°C	±2,5°C or 0,0075·(t)
B			600 ... 1700°C	±1,5°C or 0,0025·(t)

The higher figure applies (t = number for the temperature in °C)

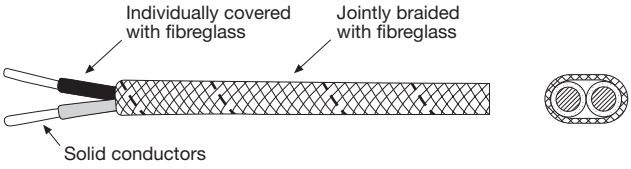
92 - THL // Thermoelectric cables



Thermoelectric cable (impregnated coating) Covered with fibreglass G, stranded

- Thermal stability of the insulation material -40°C to +400°C
- Use in dry rooms at a low degree of mechanical stress

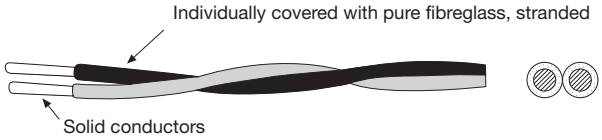
Cable	Shape	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3
2 x 0.2 mm ø	round, stranded	92-30202018-G	92-40202028-G	92-50202018-G	92-60202018-G
2 x 0.5 mm ø	round, stranded	92-30205018-G	92-40205028-G	92-50202018-G	92-60205018-G
2 x 1.0 mm ø	round, stranded	92-30210018-G	92-40210028-G	92-50210018-G	92-60210018-G



Thermoelectric cable (impregnated coating) Covered with fiberglass - Braided with fibreglass GG, oval

- Thermal stability of the insulation material -40°C to +400°C
- Use in dry rooms at a low degree of mechanical stress

Cable	Shape	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3
2 x 0.2 mm ø	oval	**92-30202015-GG**	**92-40202025-GG**	92-50202015-GG	92-60202015-GG
2 x 0.5 mm ø	oval	**92-30205015-GG**	**92-40205025-GG**	**92-50205015-GG**	92-60205015-GG
2 x 1.0 mm ø	oval	92-30210015-GG	92-40210025-GG	92-50210015-GG	92-60210015-GG

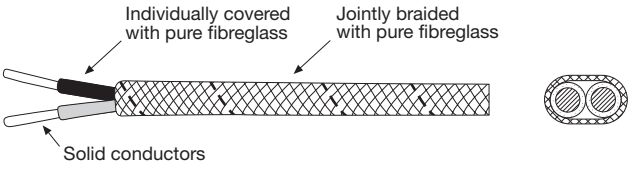


Thermoelectric cable (impregnated coating) Covered with pure fibreglass R, stranded

- Thermal stability of the insulation material -40°C to +700°C
- Use in dry rooms at a low degree of mechanical stress

Cable	Shape	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3
2 x 0.2 mm ø	round, stranded	92-30202018-R	92-40202028-R	92-50202018-R	92-60202018-R
2 x 0.5 mm ø	round, stranded	92-30205018-R	92-40205028-R	92-50205018-R	92-60205018-R
2 x 1.0 mm ø	round, stranded	**92-30210018-R**	92-40210028-R	92-50210018-R	92-60210018-R

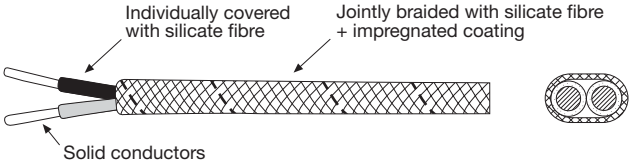
92 - THL // Thermoelectric cables



Thermoelectric cable (impregnated coating) Covered with pure fibreglass -Braided with pure fibreglass RR, oval

- Thermal stability of the insulation material -40°C to +700°C
- Use in dry rooms at a low degree of mechanical stress

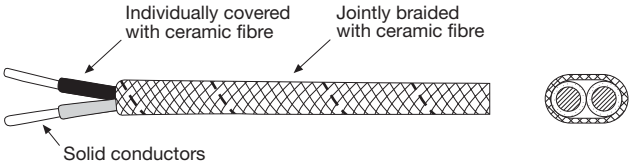
Cable	Shape	NiCr-Ni/K +green - white IEC 584/3	Fe-CuNi/L +red - blue DIN 43710	Fe-CuNi/J -black - white IEC 584/3	Nicrosil-Nisil/N +pink - white IEC 584/3
2 x 0.2 mm ø	oval	92-30202015-RR	92-40202025-RR	92-50202015-RR	92-60202015-RR
2 x 0.5 mm ø	oval	**92-30205015-RR**	92-40205025-RR	92-50205015-RR	92-60205015-RR
2 x 1.0 mm ø	oval	**92-30210015-RR**	92-40210025-RR	92-50210015-RR	92-60210015-RR



Thermoelectric cable (impregnated coating) Covered with silicate fibre -Braided with silicate fibre LL, oval

- Thermal stability of the insulation material -40°C to +1000°C
- Use in dry rooms at a low degree of mechanical stress

Cable	Shape	NiCr-Ni/K +green - white IEC 584/3	Fe-CuNi/L +red - blue DIN 43710	Fe-CuNi/J -black - white IEC 584/3	Nicrosil-Nisil/N +pink - white IEC 584/3
2 x 0.2 mm ø	oval	92-30202015-LL	92-40202025-LL	92-50202015-LL	92-60202015-LL
2 x 0.5 mm ø	oval	92-30205015-LL	92-40205025-LL	92-50205015-LL	92-60205015-LL
2 x 1.0 mm ø	oval	**92-30210015-LL**	92-40210025-LL	92-50210015-LL	92-60210015-LL

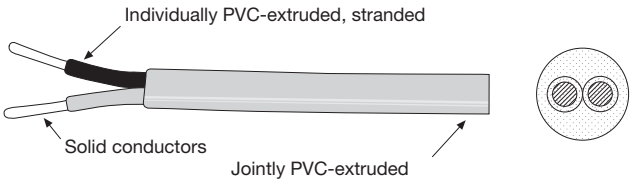


Thermoelectric cable Covered with ceramic fibre -Braided with ceramic fibre KK, oval

- Thermal stability of the insulation material -40°C to +1200°C temporarily up to +1400°C
- Use in dry rooms at a low degree of mechanical stress

Cable	Shape	NiCr-Ni/K +green - white IEC 584/3	Fe-CuNi/L +red - blue DIN 43710	Fe-CuNi/J -black - white IEC 584/3	Nicrosil-Nisil/N +pink - white IEC 584/3
2 x 0.2 mm ø	oval	92-30202015-KK	92-40202025-KK	92-50202015-KK	92-60202015-KK
2 x 0.5 mm ø	oval	92-30205015-KK	92-40205025-KK	92-50205015-KK	92-60205015-KK
2 x 1.0 mm ø	oval	**92-30210015-KK**	92-40210025-KK	92-50210015-KK	92-60210015-KK

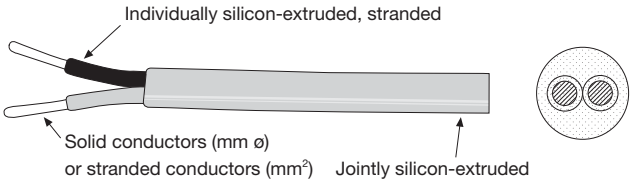
92 - THL // Thermoelectric cables



Thermoelectric cable Individually PVC-extruded - Jointly PVC-extruded Ground

- Thermal stability of the insulation material -10°C to +105°C
- Use in a damp environment at a medium degree of mechanical stress

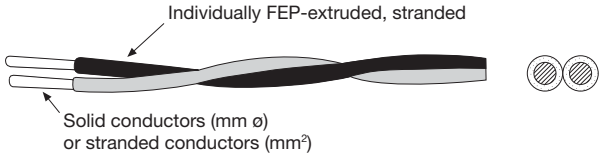
Cable	Shape	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3
2 x 0.2 mm ø	round, stranded	92-30202018-JJ	92-40202028-JJ	92-50202018-JJ	92-60202018-JJ
2 x 0.5 mm ø	round, stranded	92-30205018-JJ	92-40205028-JJ	92-50205018-JJ	92-60205018-JJ
2 x 1.0 mm ø	round, stranded	92-30210018-JJ	92-40210028-JJ	92-50210018-JJ	92-60210018-JJ



Thermoelectric cable Individually silicone-extruded - Jointly silicone-extruded SS, round

- Thermal stability of the insulation material -45°C to +180°C
- Use in a damp environment and at a medium degree of mechanical stress

Cable	Shape	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3
2 x 0.2 mm ø	round, stranded	92-30202018-SS	92-40202028-SS	92-50202018-SS	92-60202018-SS
2 x 0.5 mm ø	round, stranded	92-30205018-SS	92-40205028-SS	92-50205018-SS	92-60205018-SS
2 x 1.0 mm ø	round, stranded	92-30210018-SS	92-40210028-SS	92-50210018-SS	92-60210018-SS
2 x 0.22 mm²	round, stranded	92-30202214-SS	**92-40202224-SS**	**92-50202214-SS**	92-60202214-SS
2 x 0.5 mm²	round, stranded	92-30205014-SS	92-40205024-SS	92-50205014-SS	92-60205014-SS
2 x 1.0 mm²	round, stranded	92-30210014-SS	92-40210024-SS	92-50210014-SS	92-60210014-SS

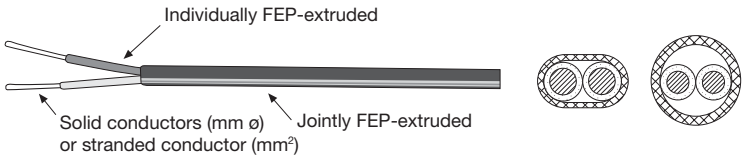


Thermoelectric cable Insulated with Teflon (FEP) and stranded E, stranded

- Thermal stability of the insulation material -200°C to +205°C
- Use in a damp environment and for special requirements concerning resistance to chemicals

Cable	Shape	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3
2 x 0.2 mm ø	round, stranded	92-30202018-E	92-40202028-E	92-50202018-E	92-60202018-E
2 x 0.5 mm ø	round, stranded	92-30205018-E	92-40205028-E	92-50205018-E	92-60205018-E
2 x 1.0 mm ø	round, stranded	92-30210018-E	92-40210028-E	92-50210018-E	92-60210018-E
2 x 0.22 mm²	round, stranded	92-30202214-E	92-40202224-E	**92-50202214-E**	92-60202214-E
2 x 0.5 mm²	round, stranded	92-30205014-E	92-40205024-E	92-50205014-E	92-60205014-E
2 x 1.0 mm²	round, stranded	92-30210014-E	92-40210024-E	92-50210014-E	92-60210014-E

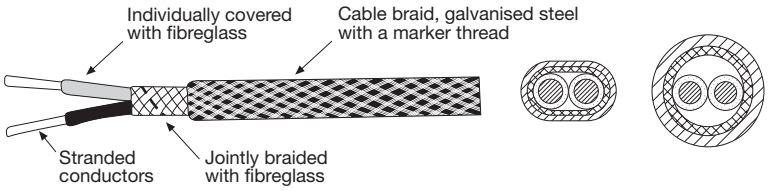
92 - THL // Thermoelectric cables



Thermoelectric cable
Individually Teflon FEP-extruded - Jointly FEP-extruded
EE, oval and round models, stranded

- Thermal stability of the insulation material -200°C to +205°C
- Use in a damp environment and for special requirements concerning resistance to chemicals

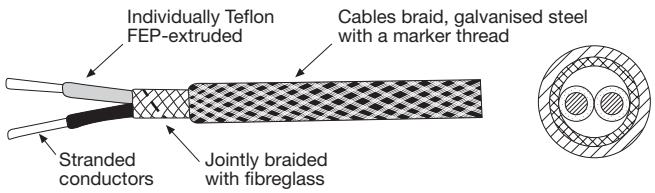
Cable	Shape	NiCr-Ni/K +green - white IEC 584/3	Fe-CuNi/L +red - blue DIN 43710	Fe-CuNi/J +black - white IEC 584/3	Nicrosil-Nisil/N +pink - white IEC 584/3
2 x 0.2 mm ø	round, stranded	92-30202018-EE	92-40202028-EE	92-50202018-EE	92-60202018-EE
2 x 0.5 mm ø	oval	92-30205015-EE	92-40205025-EE	**92-50205015-EE**	92-60205015-EE
2 x 1.0 mm ø	round, stranded	92-30210018-EE	92-40210028-EE	92-50210018-EE	92-60210018-EE
2 x 0.22 mm²	round, stranded	92-30202014-EE	92-40202024-EE	92-50202014-EE	92-60202014-EE
2 x 0.5 mm²	oval	**92-30205011-EE**	**92-40205021-EE**	92-50205011-EE	92-60205011-EE
2 x 1.0 mm²	round, stranded	92-30210014-EE	92-40210024-EE	92-50210014-EE	92-60210014-EE



Thermoelectric cable
Fibreglass - Fibreglass - Wire braid
GGP, oval and round models, stranded

- Thermal stability of the insulation material -200°C to +400°C
- Use in a dry environment and at high mechanical stress

Cable	Shape	NiCr-Ni/K +green - white IEC 584/3	Fe-CuNi/L +red - blue DIN 43710	Fe-CuNi/J +black - white IEC 584/3	Nicrosil-Nisil/N +pink - white IEC 584/3
2 x 0.22 mm²	oval	**92-30202011-GGP**	92-40202021-GGP	92-50202011-GGP	92-60202011-GGP
2 x 0.5 mm²	round, stranded	**92-30205014-GGP**	**92-40205024-GGP**	**92-50205014-GGP**	92-60205014-GGP
2 x 1.0 mm²	round, stranded	92-30210014-GGP	92-40210024-GGP	92-50210014-GGP	92-60210014-GGP

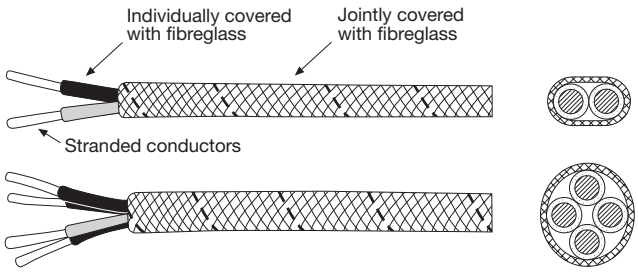


Thermoelectric cable
Teflon FEP - Fibreglass - Wire braid
EGP, round

- Thermal stability of the insulation material -200°C to +205°C
- Use in a dry environment and at high mechanical stress

Cable	Shape	NiCr-Ni/K +green - white IEC 584/3	Fe-CuNi/L +red - blue DIN 43710	Fe-CuNi/J +black - white IEC 584/3	Nicrosil-Nisil/N +pink - white IEC 584/3
2 x 0.22 mm²	round, stranded	92-30202014-EGP	92-40202024-EGP	92-50202014-EGP	92-60202014-EGP
2 x 0.5 mm²	round, stranded	**92-30205014-EGP**	**92-40205024-EGP**	92-50205014-EGP	92-60205014-EGP
2 x 1.0 mm²	round, stranded	92-30210014-EGP	92-40210024-EGP	92-50210014-EGP	92-60210014-EGP

93 - AGL // Compensation cables

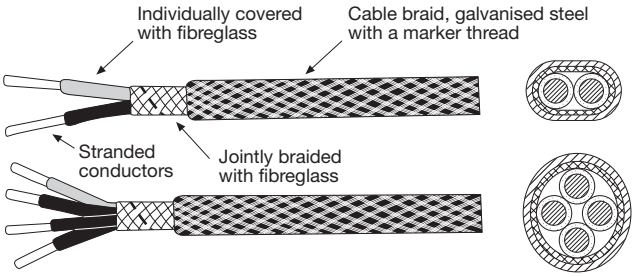


Compensation cable Fibreglass - Fibreglass GG, oval and round models, stranded

- Thermal stability of the insulation material up to 200°C
- Use in dry rooms at a low degree of mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 1.5 mm²	oval	**93-10215011-GG**	**93-20215011-GG**	**93-30215011-GG**	93-40215021-GG
4 x 1.5 mm²	round	93-10415011-GG	93-20415011-GG	93-30415011-GG	93-40415021-GG

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 1.5 mm²	oval	93-50215011-GG	93-60215011-GG	93-70215041-GG	93-80215041-GG
4 x 1.5 mm²	round	93-50415011-GG	93-60415011-GG	93-70415041-GG	93-80415041-GG



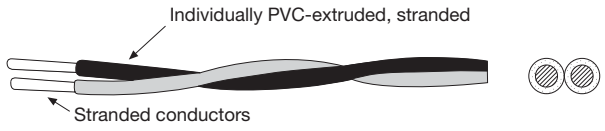
Compensation cable Fibreglass -Fibreglass -We braid GGP, oval and round models, stranded

- Thermal stability of the insulation material up to 400°C
- Use in dry rooms at high mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.22 mm²	round	93-10202214-GGP	93-20202214-GGP	**93-30202214-GGP**	**93-40202224-GGP**
2 x 0.5 mm²	round	93-10205014-GGP	93-20205014-GGP	93-30205014-GGP	93-40205024-GGP
2 x 0.5 mm²	oval	93-10205011-GGP	93-20205011-GGP	**93-30205011-GGP**	93-40205021-GGP
2 x 0.75 mm²	round	93-10207514-GGP	93-20207514-GGP	93-30207514-GGP	93-40207524-GGP
2 x 0.75 mm²	oval	93-10207511-GGP	93-20207511-GGP	93-30207511-GGP	93-40207521-GGP
2 x 1.5 mm²	oval	**93-10215011-GGP**	**93-20215011-GGP**	**93-30215011-GGP**	93-40215021-GGP
4 x 0.5 mm²	round	93-10405014-GGP	93-20405014-GGP	**93-30405014-GGP**	93-40405024-GGP
4 x 1.5 mm²	round	93-10415014-GGP	93-20415014-GGP	93-30415014-GGP	93-40415024-GGP

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.22 mm²	round	93-50202214-GGP	93-60202214-GGP	93-70202244-GGP	93-80202244-GGP
2 x 0.5 mm²	round	93-50205014-GGP	93-60205014-GGP	93-70205044-GGP	93-80205044-GGP
2 x 0.5 mm²	oval	93-50205011-GGP	93-60205011-GGP	93-70205041-GGP	93-80205041-GGP
2 x 0.75 mm²	round	93-50207514-GGP	93-60207514-GGP	93-70207544-GGP	93-80207544-GGP
2 x 0.75 mm²	oval	93-50207511-GGP	93-60207511-GGP	93-70207541-GGP	93-80207541-GGP
2 x 1.5 mm²	oval	93-50215011-GGP	93-60215011-GGP	93-70215041-GGP	93-80215041-GGP
4 x 0.5 mm²	round	93-50405014-GGP	93-60405014-GGP	93-70405044-GGP	93-80405044-GGP
4 x 1.5 mm²	round	93-50415014-GGP	93-60415014-GGP	93-70415044-GGP	93-80415044-GGP

93 - AGL // Compensation cables

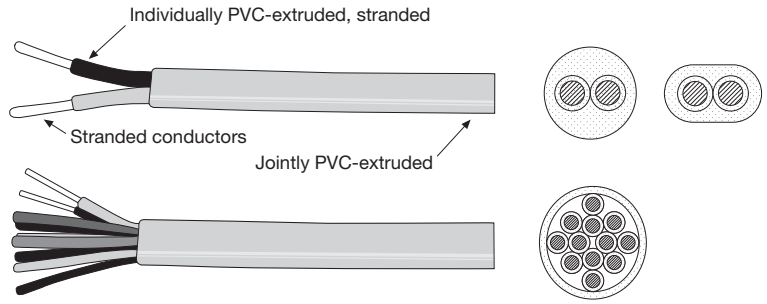


Compensation cable PVC Jstranded

- Thermal stability of the insulation material -10°C to +105°C
- Use in a damp environment at a low degree of mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.5 mm²	round	**93-10205014-J**	93-20205014-J	**93-30205014-J**	93-40205024-J
2 x 0.75 mm²	round	93-10207514-J	93-20207514-J	**93-30207514-J**	93-40207524-J
2 x 1.0 mm²	round	93-10210014-J	93-20210014-J	93-30210014-J	93-40210024-J
2 x 1.5 mm²	round	**93-10215014-J**	93-20215014-J	**93-30215014-J**	93-40215024-J

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.5 mm²	round	93-50205014-J	93-60205014-J	93-70205044-J	93-80205044-J
2 x 0.75 mm²	round	93-50207514-J	93-60207514-J	93-70207544-J	93-80207544-J
2 x 1.0 mm²	round	93-50210014-J	93-60210014-J	93-70210044-J	93-80210044-J
2 x 1.5 mm²	round	93-50215014-J	93-60215014-J	93-70215044-J	93-80215044-J



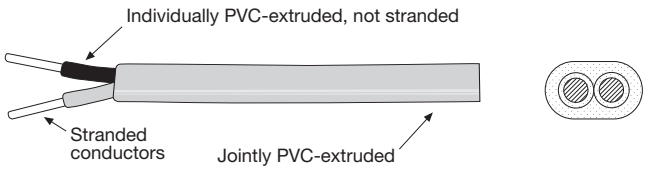
Compensation cable PVC - PVC Joval and round models, stranded

- Thermal stability of the insulation material -10°C to +105°C
- Use in a damp environment at a low degree of mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.22 mm²	round	**93-10202214-J**	**93-20202214-J**	**93-30202214-J**	**93-40202224-J**
2 x 0.5 mm²	round	**93-10205014-J**	93-20205014-JJ	**93-30205014-J**	93-40205024-JJ
2 x 0.75 mm²	round	**93-10207514-J**	93-20207514-JJ	**93-30207514-J**	93-40207524-JJ
2 x 1.5 mm²	oval	93-10215011-JJ	93-20215011-JJ	93-30215011-JJ	93-40215021-JJ
4 x 0.22 mm²	round	**93-10402214-J**	93-20402214-JJ	**93-30402214-J**	93-40402224-JJ
4 x 0.5 mm²	round	93-10405014-JJ	93-20405014-JJ	93-30405014-JJ	93-40405024-JJ
4 x 0.75 mm²	round	93-10407514-JJ	93-20407514-JJ	93-30407514-JJ	93-40407524-JJ
4 x 1.5 mm²	round	**93-10415014-J**	93-20415014-JJ	**93-30415014-J**	93-40415024-JJ

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.22 mm²	round	**93-50202214-J**	**93-60202214-J**	93-70202244-JJ	93-80202244-JJ
2 x 0.5 mm²	round	93-50205014-JJ	93-60205014-JJ	93-70205044-JJ	93-80205044-JJ
2 x 0.75 mm²	round	93-50207514-JJ	93-60207514-JJ	93-70207544-JJ	93-80207544-JJ
2 x 1.5 mm²	round	93-50215014-JJ	93-60215014-JJ	93-70215044-JJ	93-80215044-JJ
4 x 0.22 mm²	round	93-50402214-JJ	93-60402214-JJ	93-70402244-JJ	93-80402244-JJ
4 x 0.5 mm²	round	93-50405014-JJ	93-60405014-JJ	93-70405044-JJ	93-80405044-JJ
4 x 0.75 mm²	round	93-50407514-JJ	93-60407514-JJ	93-70407544-JJ	93-80407544-JJ
4 x 1.5 mm²	round	93-50415014-JJ	93-60415014-JJ	93-70415044-JJ	93-80415044-JJ

93 - AGL // Compensation cables

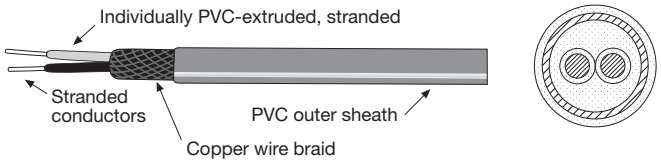


Compensation cable PVC - PVC Joval

- Thermal stability of the insulation material -10°C to +105°C
- Use in a damp environment at a medium degree of mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 1.5 mm²	oval	**93-10215011-J**	93-20215011-JJ	**93-30215011-J**	**93-40215021-J**

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 1.5 mm²	oval	**93-50215011-J**	93-60215011-JJ	93-70215041-JJ	93-80215041-JJ



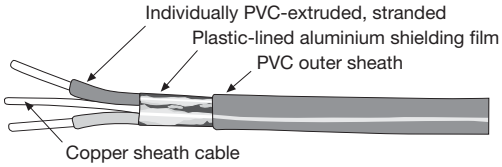
Compensation cable PVC -copper wire braid - PVC CJround

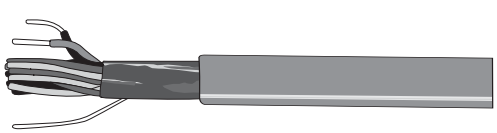
- Thermal stability of the insulation material -10°C to +105°C
- Use in a damp environment at a medium degree of mechanical stress
- Shield against electromagnetic interference

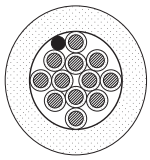
Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.22 mm²	round	**93-10202214-CJ**	**93-20202214-CJ**	**93-30202214-CJ**	**93-40202224-CJ**
2 x 0.5 mm²	round	**93-10205014-CJ**	93-20205014-JCJ	93-30205014-JCJ	93-40205024-JCJ
2 x 0.75 mm²	round	93-10207514-JCJ	93-20207514-JCJ	93-30207514-JCJ	93-40207524-JCJ
2 x 1.5 mm²	round	**93-10215014-CJ**	93-20215014-JCJ	**93-30215014-CJ**	**93-40215024-CJ**
4 x 0.22 mm²	round	**93-10402214-CJ**	93-20402214-JCJ	**93-30402214-CJ**	**93-40402224-CJ**
4 x 0.5 mm²	round	93-10405014-JCJ	93-20405014-JCJ	93-30405014-JCJ	93-40405024-JCJ
4 x 0.75 mm²	round	**93-10407514-CJ**	93-20407514-JCJ	93-30407514-JCJ	93-40407524-JCJ
4 x 1.5 mm²	round	93-10415014-JCJ	93-20415014-JCJ	**93-30415014-CJ**	93-40415024-JCJ

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.22 mm²	round	**93-50202214-CJ**	**93-60202214-CJ**	93-70202244-JCJ	93-80202244-JCJ
2 x 0.5 mm²	round	93-50205014-JCJ	93-60205014-JCJ	93-70205044-JCJ	93-80205044-JCJ
2 x 0.75 mm²	round	93-50207514-JCJ	93-60207514-JCJ	93-70207544-JCJ	93-80207544-JCJ
2 x 1.5 mm²	round	93-50215014-JCJ	93-60215014-JCJ	93-70215044-JCJ	93-80215044-JCJ
4 x 0.22 mm²	round	93-50402214-JCJ	**93-60402214-CJ**	93-70402244-JCJ	93-80402244-JCJ
4 x 0.5 mm²	round	93-50405014-JCJ	93-60405014-JCJ	93-70405044-JCJ	93-80405044-JCJ
4 x 0.75 mm²	round	93-50407514-JCJ	93-60407514-JCJ	93-70407544-JCJ	93-80407544-JCJ
4 x 1.5 mm²	round	93-50415014-JCJ	93-60415014-JCJ	93-70415044-JCJ	93-80415044-JCJ

93 - AGL // Compensation cables







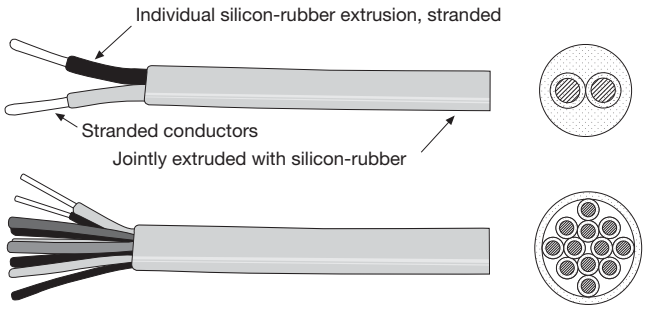
Compensation cable PVC -Aluminium foil, sheath cable - PVC ,round

- Thermal stability of the insulation material -10°C to +105°C
- Use in a damp environment at a medium degree of mechanical stress
- Extra shielding against electromagnetic interference, earth cable

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.22 mm²	round	**93-10202214-FJ**	93-20202214-JFJ	**93-30202214-FJ**	93-40202224-JFJ
2 x 0.5 mm²	round	93-10205014-JFJ	93-20205014-JFJ	**93-30205014-FJ**	93-40205024-JFJ
2 x 0.75 mm²	round	**93-10207514-FJ**	93-20207514-JFJ	**93-30207514-FJ**	93-40207524-JFJ
2 x 1.5 mm²	round	**93-10215014-FJ**	**93-20215014-FJ**	**93-30215014-FJ**	93-40215024-JFJ
4 x 0.22 mm²	round	**93-10402214-FJ**	93-20402214-JFJ	**93-30402214-FJ**	93-40402224-JFJ
4 x 0.5 mm²	round	**93-10405014-FJ**	93-20405014-JFJ	**93-30405014-FJ**	93-40405024-JFJ
4 x 0.75 mm²	round	**93-10407514-FJ**	93-20407514-JFJ	**93-30407514-FJ**	93-40407524-JFJ
4 x 1.5 mm²	round	**93-10415014-FJ**	93-20415014-JFJ	**93-30415014-FJ**	**93-40415024-FJ**

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.22 mm²	round	93-50202214-JFJ	93-60202214-JFJ	93-70202244-JFJ	93-80202244-JFJ
2 x 0.5 mm²	round	93-50205014-JFJ	93-60205014-JFJ	93-70205044-JFJ	93-80205044-JFJ
2 x 0.75 mm²	round	93-50207514-JFJ	93-60207514-JFJ	**93-70207544-FJ**	**93-80207544-FJ**
2 x 1.5 mm²	round	**93-50215014-FJ**	93-60215014-JFJ	93-70215044-JFJ	93-80215044-JFJ
4 x 0.22 mm²	round	93-50402214-JFJ	93-60402214-JFJ	93-70402244-JFJ	93-80402244-JFJ
4 x 0.5 mm²	round	93-50405014-JFJ	93-60405014-JFJ	93-70405044-JFJ	93-80405044-JFJ
4 x 0.75 mm²	round	93-50407514-JFJ	**93-60407514-FJ**	93-70407544-JFJ	93-80407544-JFJ
4 x 1.5 mm²	round	93-50415014-JFJ	93-60415014-JFJ	93-70415044-JFJ	93-80415044-JFJ

93 - AGL // Compensation cables

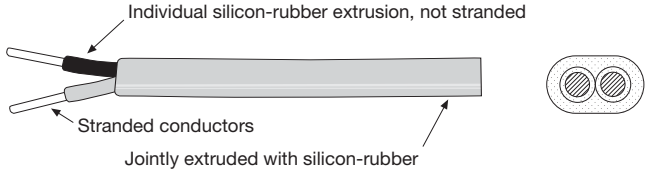


Compensation cable Silicon - Silicon SLSL, round

- Thermal stability of the insulation material -60°C to +180°C
- Use in a damp environment at a medium degree of mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.22 mm²	rund	**93-10202214-SS**	**93-20202214-SS**	**93-30202214-SS**	**93-40202224-SS**
2 x 0.5 mm²	rund	93-10205014-SS	93-20205014-SS	**93-30205014-SS**	93-40205024-SS
2 x 0.75 mm²	rund	93-10207514-SS	93-20207514-SS	**93-30207514-SS**	93-40207524-SS
2 x 1.0 mm²	rund	93-10210014-SS	93-20210014-SS	93-30210014-SS	93-40210024-SS
2 x 1.5 mm²	rund	93-10215014-SS	93-20215014-SS	93-30215014-SS	93-40215024-SS
4 x 0.22 mm²	rund	**93-10402214-SS**	93-20402214-SS	**93-30402214-SS**	93-40402224-SS
4 x 0.5 mm²	rund	93-10405014-SS	93-20405014-SS	**93-30405014-SS**	93-40405024-SS
4 x 0.75 mm²	rund	93-10407514-SS	93-20407514-SS	93-30407514-SS	93-40407524-SS
4 x 1.5 mm²	rund	**93-10415014-SS**	93-20415014-SS	**93-30415014-SS**	93-40415024-SS

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.22 mm²	rund	**93-50202214-SS**	**93-60202214-SS**	93-70202244-SS	93-80202244-SS
2 x 0.5 mm²	rund	93-50205014-SS	93-60205014-SS	93-70205044-SS	93-80205044-SS
2 x 0.75 mm²	rund	93-50207514-SS	93-60207514-SS	93-70207544-SS	93-80207544-SS
2 x 1.0 mm²	rund	93-50210014-SS	93-60210014-SS	93-70210044-SS	93-80210044-SS
2 x 1.5 mm²	rund	93-50215014-SS	93-60215014-SS	93-70215044-SS	93-80215044-SS
4 x 0.22 mm²	rund	93-50402214-SS	93-60402214-SS	93-70402244-SS	93-80402244-SS
4 x 0.5 mm²	rund	93-50405014-SS	93-60405014-SS	93-70405044-SS	93-80405044-SS
4 x 0.75 mm²	rund	93-50407514-SS	93-60407514-SS	93-70407544-SS	93-80407544-SS
4 x 1.5 mm²	rund	93-50415014-SS	93-60415014-SS	93-70415044-SS	93-80415044-SS



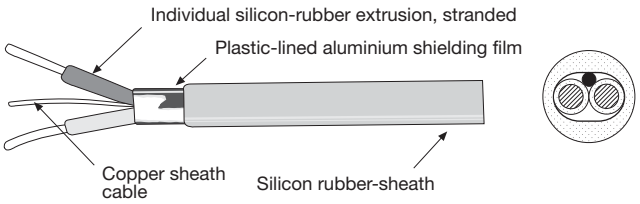
Compensation cable Silicon - Silicon SLSL, oval

- Thermal stability of the insulation material -60°C to +180°C
- Use in a damp environment at a medium degree of mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 1.5 mm²	oval	**93-10215011-SS**	**93-20215011-SS**	**93-30215011-SS**	**93-40215021-SS**

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 1.5 mm²	oval	**93-50215011-SS**	93-60215011-SS	93-70215041-SS	93-80215041-SS

93 - AGL // Compensation cables

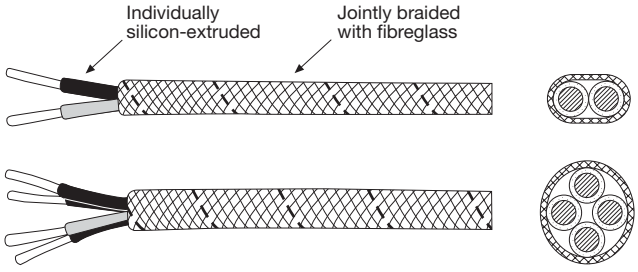


Compensation cable
Silicon -Aluminium foil, sheath cable - Silicon
SLFSL, round

- Thermal stability of the insulation material -60°C to +180°C
- Use in a damp environment at a medium degree of mechanical stress
- Extra shielding against electromagnetic interference, earth cable

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.5 mm²	round	93-10205014-SFS	93-20205014-SFS	93-30205014-SFS	93-40205024-SFS
2 x 0.75 mm²	round	**93-10207514-SFS**	93-20207514-SFS	**93-30207514-SFS**	93-40207524-SFS
2 x 1.0 mm²	round	93-10210014-SFS	93-20210014-SFS	93-30210014-SFS	93-40210024-SFS
2 x 1.5 mm²	round	93-10215014-SFS	93-20215014-SFS	**93-30215014-SFS**	93-40215024-SFS
4 x 0.75 mm²	round	**93-10407514-SFS**	93-20407514-SFS	**93-30407514-SFS**	93-40407524-SFS

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.5 mm²	round	93-50205014-SFS	93-60205014-SFS	93-70205044-SFS	93-80205044-SFS
2 x 0.75 mm²	round	93-50207514-SFS	**93-60207514-SFS**	93-70207544-SFS	93-80207544-SFS
2 x 1.0 mm²	round	93-50210014-SFS	93-60210014-SFS	93-70210044-SFS	93-80210044-SFS
2 x 1.5 mm²	round	93-50215014-SFS	93-60215014-SFS	93-70215044-SFS	93-80215044-SFS
4 x 0.75 mm²	round	93-50407514-SFS	93-60407514-SFS	93-70407544-SFS	93-80407544-SFS



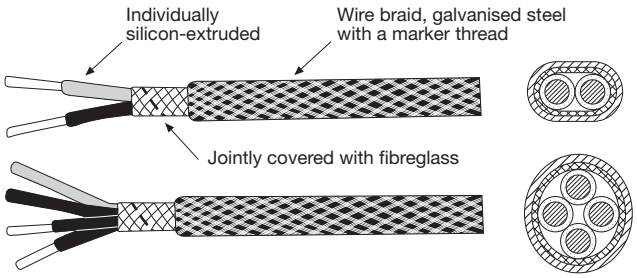
Compensation cable
Silicon - Fibreglass
SG, oval and round models, stranded

- Thermal stability of the insulation material up to 180°C
- Use in a damp environment at a low degree of mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 1.5 mm²	oval	**93-10215011-SG**	**93-20215011-SG**	**93-30215011-SG**	**93-40215021-SG**
4 x 1.5 mm²	round	**93-10415011-SG**	93-20415011-SG	**93-30415011-SG**	93-40415021-SG

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 1.5 mm²	oval	93-50215011-SG	**93-60215011-SG**	93-70215041-SG	93-80215041-SG
4 x 1.5 mm²	round	93-50415011-SG	93-60415011-SG	93-70415041-SG	93-80415041-SG

93 - AGL // Compensation cables

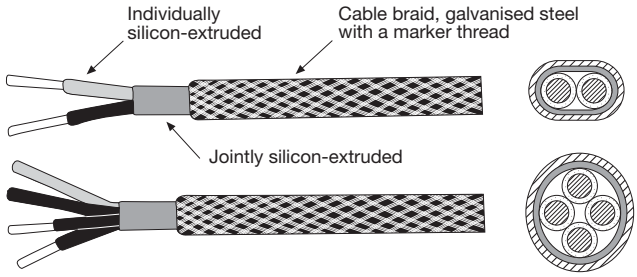


Compensation cable
Silicon -Fibreglass -Cable braid
SGP, oval and round models, stranded

- Thermal stability of the insulation material up to 180°C
- Use in a damp environment at high mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.75 mm²	oval	93-10207511-SGP	93-20207511-SGP	**93-30207511-SGP**	93-40207521-SGP
2 x 1.5 mm²	oval	**93-10215011-SGP**	93-20215011-SGP	**93-30215011-SGP**	**93-40215021-SGP**
4 x 0.5 mm²	round	93-10405014-SGP	93-20405014-SGP	**93-30405014-SGP**	93-40405024-SGP
4 x 1.5 mm²	round	**93-10415014-SGP**	93-20415014-SGP	**93-30415014-SGP**	**93-40415024-SGP**

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.75 mm²	oval	93-50207511-SGP	93-60207511-SGP	93-70207541-SGP	93-80207541-SGP
2 x 1.5 mm²	oval	93-50215011-SGP	93-60215011-SGP	93-70215041-SGP	93-80215041-SGP
4 x 0.5 mm²	round	93-50405014-SGP	93-60405014-SGP	93-70405044-SGP	93-80405044-SGP
4 x 1.5 mm²	round	93-50415014-SGP	93-60415014-SGP	93-70415044-SGP	93-80415044-SGP



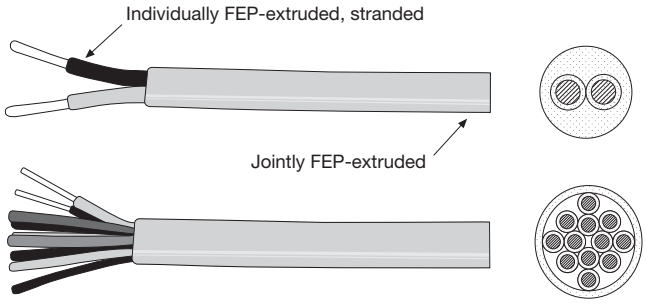
Compensation cable
Silicon -Silicon -Cable braid
SSP, oval and round models, stranded

- Thermal stability of the insulation material up to 180°C
- Use in a damp environment at high mechanical stress

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.75 mm²	oval	93-10207511-SSP	93-20207511-SSP	**93-30207511-SSP**	93-40207521-SSP
2 x 1.5 mm²	oval	**93-10215011-SSP**	**93-20215011-SSP**	**93-30215011-SSP**	**93-40215021-SSP**
4 x 0.5 mm²	round	93-10405014-SSP	93-20405014-SSP	**93-30405014-SSP**	93-40405024-SSP
4 x 1.5 mm²	round	93-10415014-SSP	93-20415014-SSP	93-30415014-SSP	93-40415024-SSP

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.75 mm²	oval	93-50207511-SSP	93-60207511-SSP	93-70207541-SSP	93-80207541-SSP
2 x 1.5 mm²	oval	93-50215011-SSP	93-60215011-SSP	93-70215041-SSP	93-80215041-SSP
4 x 0.5 mm²	round	93-50405014-SSP	93-60405014-SSP	93-70405044-SSP	93-80405044-SSP
4 x 1.5 mm²	round	93-50415014-SSP	93-60415014-SSP	93-70415044-SSP	93-80415044-SSP

93 - AGL // Compensation cables

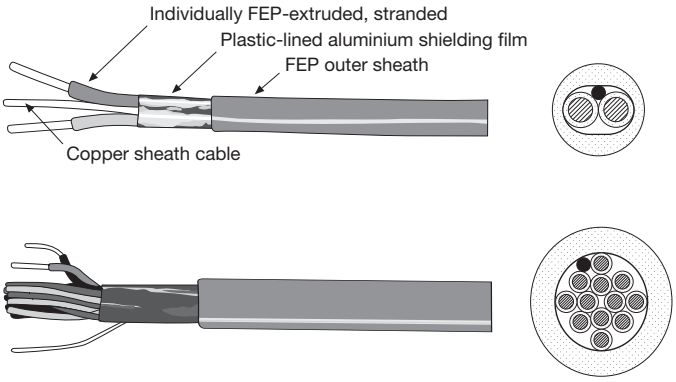


Compensation cable Teflon FEP - Teflon FEP EE, round

- Thermal stability of the insulation material -200°C to +205°C
- Use in a damp environment at high temperatures and for special requirements concerning resistance to chemicals

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.5 mm²	round	93-10205014-EE	93-20205014-EE	93-30205014-EE	93-40205024-EE
2 x 0.75 mm²	round	93-10207514-EE	93-20207514-EE	93-30207514-EE	93-40207524-EE
2 x 1.0 mm²	round	93-10210014-EE	93-20210014-EE	93-30210014-EE	93-40210024-EE

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.5 mm²	round	93-50205014-EE	93-60205014-EE	93-70205044-EE	93-80205044-EE
2 x 0.75 mm²	round	93-50207514-EE	93-60207514-EE	93-70207544-EE	93-80207544-EE
2 x 1.0 mm²	round	93-50210014-EE	93-60210014-EE	93-70210044-EE	93-80210044-EE



Compensation cable Teflon FEP -Aluminium foil, Sheath cable - Teflon FEP EFE, round

- Thermal stability of the insulation material -200°C to +205°C
- Use in a damp environment at high temperatures special requirements concerning resistance to chemicals
- Extra shielding against electromagnetic interference, earth cable

Cable	Shape	PtRh-Pt/S R orange - white IEC 584/3	Pt30Rh-Pt6Rh/B grey - white IEC 584/3	NiCr-Ni/K green - white IEC 584/3	Fe-CuNi/L red - blue DIN 43710
2 x 0.5 mm²	round	93-10205014-EFE	93-20205014-EFE	93-30205014-EFE	93-40205024-EFE
2 x 0.75 mm²	round	93-10207514-EFE	93-20207514-EFE	**93-30207514-EFE**	93-40207524-EFE
2 x 1.0 mm²	round	93-10210014-EFE	93-20210014-EFE	93-30210014-EFE	93-40210024-EFE

Cable	Shape	Fe-CuNi/J black - white IEC 584/3	Nicrosil-Nisil/N pink - white IEC 584/3	W3Re-W25Re/D red - white	W5Re-W26Re/C red - white
2 x 0.5 mm²	round	93-50205014-EFE	93-60205014-EFE	93-70205044-EFE	93-80205044-EFE
2 x 0.75 mm²	round	93-50207514-EFE	93-60207514-EFE	93-70207544-EFE	93-80207544-EFE
2 x 1.0 mm²	round	93-50210014-EFE	93-60210014-EFE	93-70210044-EFE	93-80210044-EFE