MAVIS

Nový Bor s.r.o.

RESISTANCE TEMPERATURE SENSORS

Product Catalog

MTR

2025-01

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Content

General Information

Glossary of terms (Table T1)

Hysteresis	A property of the sensor that causes the output value (resistance) to vary depending on the direction of the sequence in which the input values (temperature of the medium to be measured) are received.
Max. working temperature	The upper temperature limit at which the correct function of the sensor, or the part of the sensor being described, is still guaranteed.
Max. temperature resistance	The upper temperature limit at which the material does not lose its necessary properties.
MIMS	MIMS means "Mineral insulated metal-sheathed". It is a mineral insulated metal sheathed design.
IPRT	IPRT means "Industrial platinum resistance thermometer". It is a thermometer with a thin-film platinum resistor.
SPRT	SPRT stands for "Standard platinum resistance thermometer". It is a thermometer with a resistor made of wound platinum wire.
RTD	RTD stands for "Resistance Temperature Detector". It refers to the resistance itself (resistance body) that is used in the temperature sensor.

Accuracy classes of resistance temperature sensors with thin-film resistor according to EN 60751 (Table T2)

Accuracy class	Range [°C]	Tolerance [±°C]
AA*	0 .. +150	0,1 + 0,0017 ·|t|
A*	-30 .. +300	0,15 + 0,002 ·|t|
B	-50 .. +500	0,3 + 0,005 ·|t|
C	-50 .. +600	0,6 + 0,01 ·|t|

Notes: (*) Not possible in a two-wire connection.

Accuracy classes of resistance temperature sensors with wire-wound resistor acc. to EN 60751 (Table T3)

Accuracy class	Range [°C]	Tolerance [±°C]
AA*	-50 .. +250	0,1 + 0,0017 ·|t|
A*	-100 .. +450	0,15 + 0,002 ·|t|
B	-196 .. +600	0,3 + 0,005 ·|t|
C	-196 .. +600	0,6 + 0,01 ·|t|

Notes: (*) Not possible in a two-wire connection.

Cable insulation materials (Table T4)

Insulation designation	Material	Temperature resistance	Moisture resistance
Y	PVC	-10 °C ... 70 °C	YES
J	PVC	-10 °C ... 105 °C	YES
SL	silicone	-60 °C ... 180 °C	YES
T	Teflon FEP	-200 °C ... 205 °C	YES
TW	Teflon PTFE	-70 °C ... 205 °C	YES
GL	Fibreglass	-25 °C ... 400 °C	NO
GH	Fibreglass	-40 °C ... 600 °C	NO
KF	Ceramic fibre	-40 °C ... 1200 °C	NO

MTR Series Overview

Series	RTD type	Design	Outter Ø
MTR8J	Pt100, Pt500, Pt1000	Measuring insert, into thermowells	3 - 6 mm
MTR9	Pt100, Pt500, Pt1000	Measuring insert and protection tube	14 mm
MTR10	Pt100, Pt500, Pt1000	Sheathed sensor	3 - 6 mm
MTR10K	Pt100, Pt500, Pt1000	Sheathed sensor with connector	3 - 6 mm
MTR11	Pt100, Pt500, Pt1000	Sheathed sensor with extension cable	3 - 6 mm
MTR11R	Pt100, Pt500, Pt1000	Sheathed sensor with handle	3 - 6 mm
MTR11F	Pt100, Pt500, Pt1000	Sheathed sensor with head F	3 - 6 mm
MTR11FS	Pt100, Pt500, Pt1000	Sheathed sensor with head F for screwing in	4,5 - 6 mm
MTR11H	Pt100, Pt500, Pt1000	Sheathed sensor with head B	4,5 - 6 mm
MTR11HS	Pt100, Pt500, Pt1000	Sheathed sensor with head B for screwing in	3 - 6 mm
MTR12	Pt100, Pt500, Pt1000	Cable sensor	3 - 8 mm
MTR12M	Pt100, Pt500, Pt1000	Cable sensor up to 180 °C	5 mm
MTR12U	Pt100, Pt500, Pt1000	Cable sensor angled	6 mm
MTR12F	Pt100, Pt500, Pt1000	Cable sensor with protection tube and head F up to 200 °C	6 mm
MTR12FS	Pt100, Pt500, Pt1000	Cable sensor with protection tube and head F up to 200 °C, for screwing in	6 mm
MTR12H	Pt100, Pt500, Pt1000	Cable sensor with protection tube and head B up to 200 °C	6 mm
MTR12HS	Pt100, Pt500, Pt1000	Cable sensor with protection tube and head B up to 200 °C, for screwing in	6 mm
MTR13	Pt100, Pt500, Pt1000	Cable sensor with bayonet	6 - 8 mm
MTR13T	Pt100, Pt500, Pt1000	Cable sensor with threaded fitting	6 mm
MTR14	Pt100, Pt500, Pt1000	Measuring insert and protection tube	11 mm
MTR15	Pt100, Pt500, Pt1000	Measuring insert	3 - 6 mm
MTR16	Pt100, Pt500, Pt1000	Measuring insert and protection tube	8 mm
MTR16S	Pt100, Pt500, Pt1000	Measuring insert and protection tube for screwing in	8 mm
MTR16N	Pt100, Pt500, Pt1000	Measuring insert and protection tube for screwing in	8 mm

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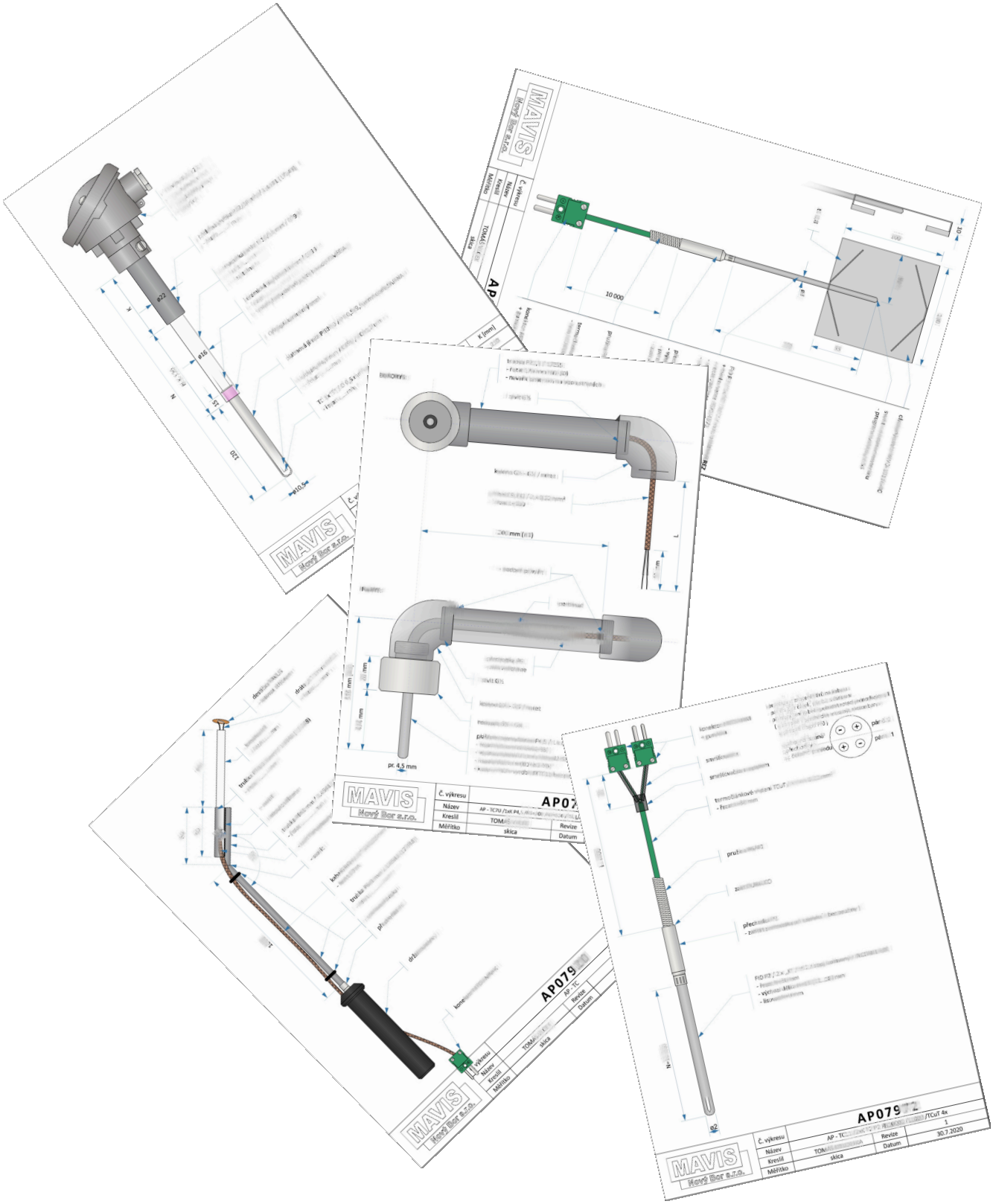
AP

ATYPICAL DESIGN OF TEMPERATURE SENSORS

Some applications have special design requirements that are not coveredby the MTR product lines. For this purpose, an atypical design (AP) can be created according to the customer specification.

The simplest form of request is to refer to the most similar sensor from the MTR product line (E.g. Our sensor is similar to MTR11... but we need a different diameter ....).



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MTR8J

RESISTANCE TEMPERATURE SENSORS INTO THERMOWELL

MTR8J series resistance temperature sensors are designed for installation into thermowells.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of an assembly and a replaceable measuring insert. The assembly consists of a head and an cooling neck with a welded fitting. The head is equipped with a cable gland for connecting the cable.

General Information (Table 8J.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length U+K)
①	**Measuring insert**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Threaded fitting**	
	Material	Stainless steel
③	**Cooling neck**	
	Material	Stainless steel
	Outer / inner diameter	14 / 10 mm
④	**Head**	
	Material	Aluminium alloy
	Cable gland	M20 x 1,5

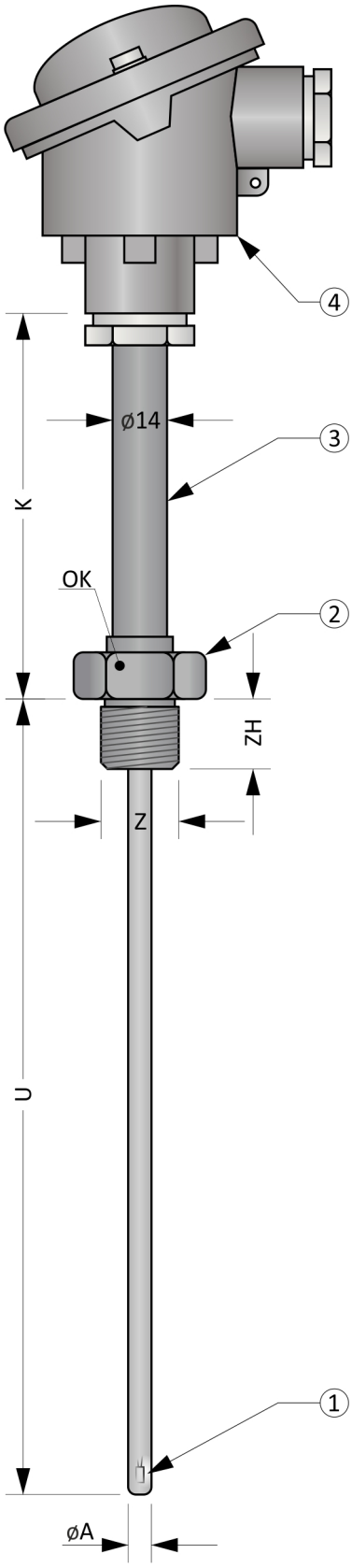


Figure 8J.1: MTR8J

Optional Parameters Including the Creation of an Order Code (Table 8J.2)

Pos.	Code	MTR08J - ❶❷❸ - ❹ - ❺ - ❻❼❽	
❶	**Type of measuring insert**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, three-wire connection (2x3W)	Not possible for ø A = 3 mm and ø A = 5 mm.
	B	2 x Pt500, three-wire connection (2x3W)	Not possible for ø A = 3 mm and ø A = 5 mm.
	C	2 x Pt1000, three-wire connection (2x3W)	Not possible for ø A = 3 mm and ø A = 5 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 and Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 and Pt1000.
❸	**Measuring insert diameter A [mm]**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Immersion depth U [mm]**		
	xxx	Selectable range from 30 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	
❺	**Cooling neck length K [mm]**		
	xxx	Selectable range from 80 to 1500 mm (in 10 mm increments)	
❻	**Threaded fitting**		
	0	Welded threaded fitting Z = M27 x 2, ZH = 26 mm, WAF 36 (OK)	
	1	Welded threaded fitting Z = M20 x 1,5, ZH = 17 mm, WAF 30 (OK)	
	2	Welded threaded fitting Z = G½“, ZH = 17 mm, WAF 30 (OK)	
❼	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❽	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR08J-032-300-100-200

... 1 x Pt100, four-wire connection
... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C
... Measuring insert diameter A = 4,5 mm
... Immersion depth U = 300 mm
... Cooling neck length K = 100 mm
... Welded threaded fitting G½
... Head B
... Without transmitter

Approximate weight of the product: MTR08J-032-300-100-300 ... 0,8 kg

Length Tolerances (Table 8J.3)

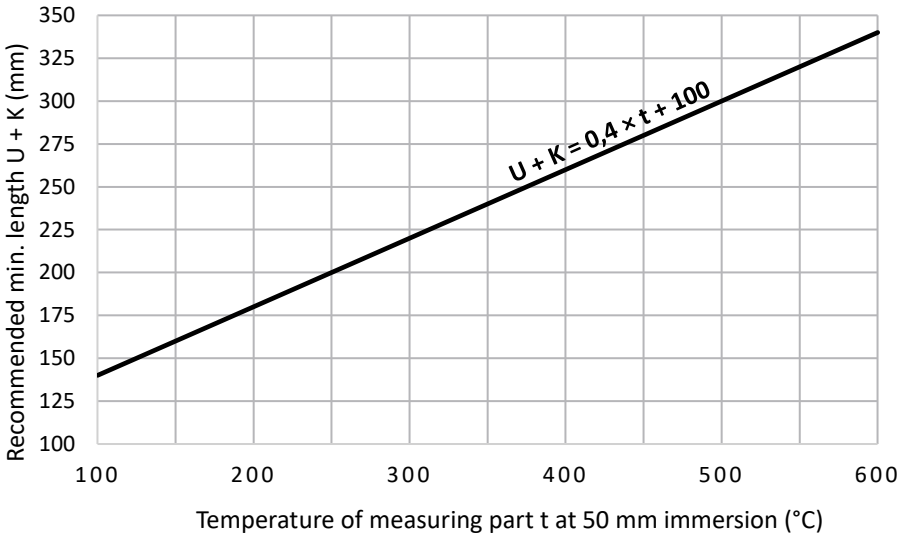
Length	Length tolerance U	Length tolerance K
≤ 1500 mm	± 2 mm	± 2 mm
1500 mm < Length ≤ 2500 mm	± 3 mm	---
2500 mm < Length ≤ 5000 mm	± 10 mm	---
> 5000 mm	± 20 mm	---

Diameter Tolerances (Table 8J.5)

Diameter Tolerance A
± 0,1 mm

Recommended min. length U (graf 8J.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 8J.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Cooling neck, threaded fitting	See working range from table 8J.2	---
Measuring end	See working range from table 8J.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Heads

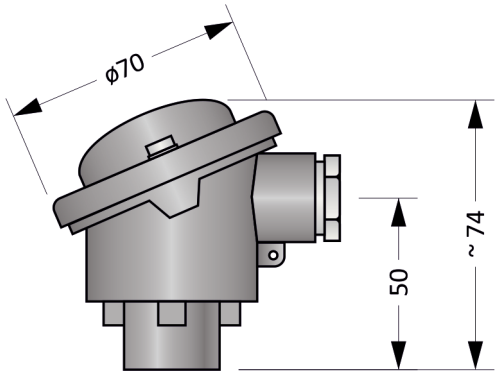


Figure 8J.2: Head B

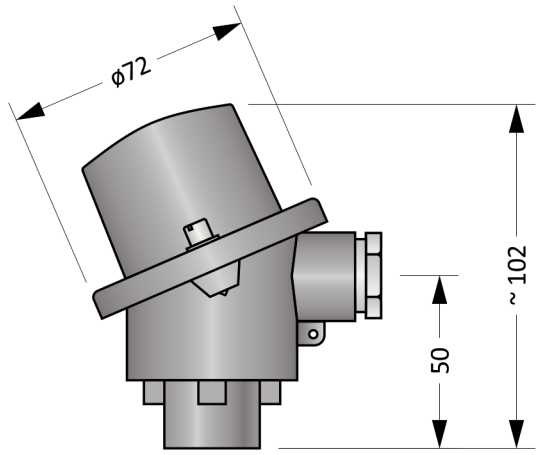


Figure 8J.3: Head BH

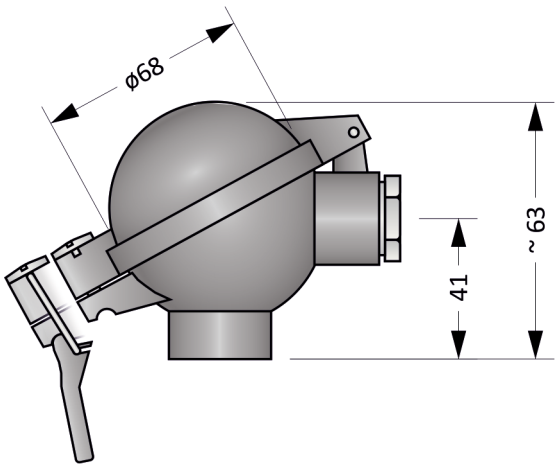


Figure 8J.4: Head BUZ

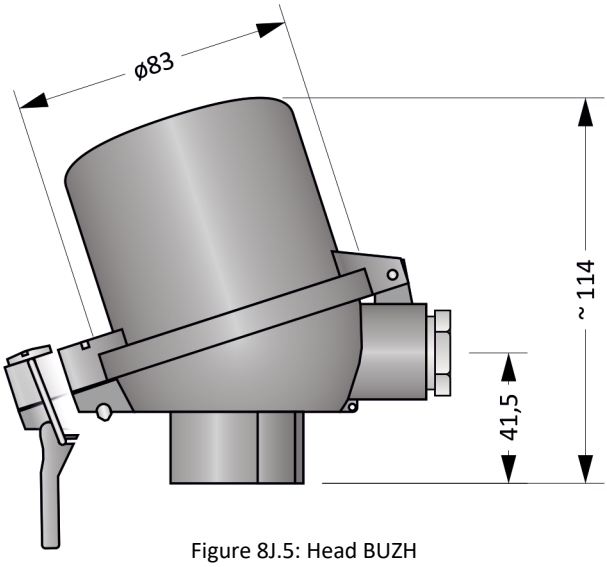


Figure 8J.5: Head BUZH

Head Mounted Transmitters (Table 8J.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Installation And Operating Instructions

A threaded fitting is used for mounting the sensor, which is screwed into the thermowell. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 8J.6.

The electrical connection of sensor with the transmitter is shown in Figure 8J.9.

Electrical connection of the sensor without transmitter is shown in the Figures 8J.7 a 8J.8. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

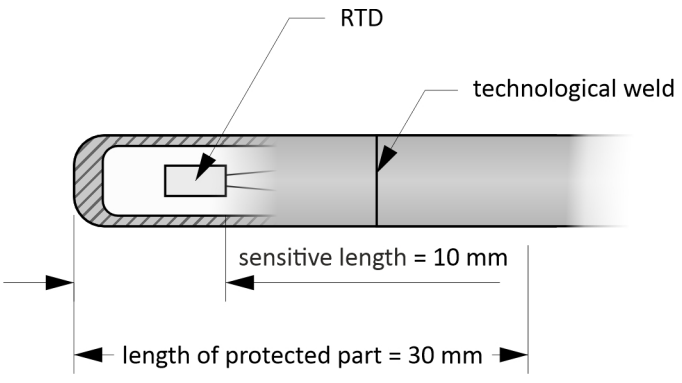


Figure 8J.6: Measuring end detail

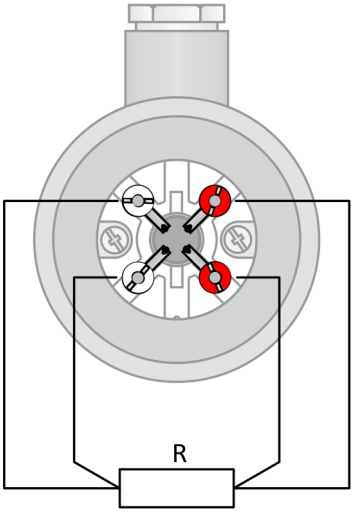


Figure 8J.7: Four-wire RTD wiring diagram

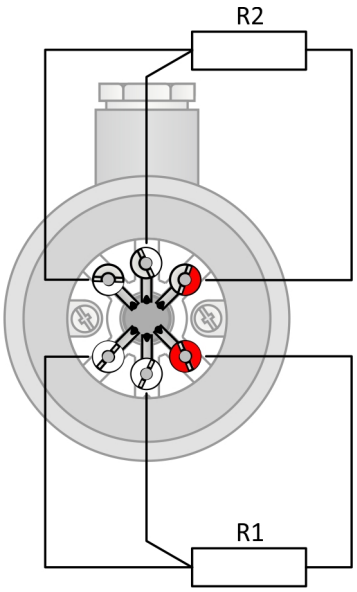


Figure 8J.8: Three-wire 2 x RTD wiring diagram

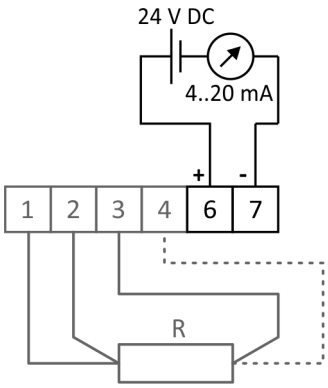


Figure 8J.9: Trasmitter wirring diagram

MTR9

RESISTANCE TEMPERATURE SENSORS WITH PROTECTION TUBE

MTR9 series temperature sensors are designed for applications with operating temperatures up to 600 °C and a requirement for high mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of an assembly and a replaceable measuring insert. The assembly consists of a head and a protection tube. The head is equipped with a cable gland for connecting the cable.

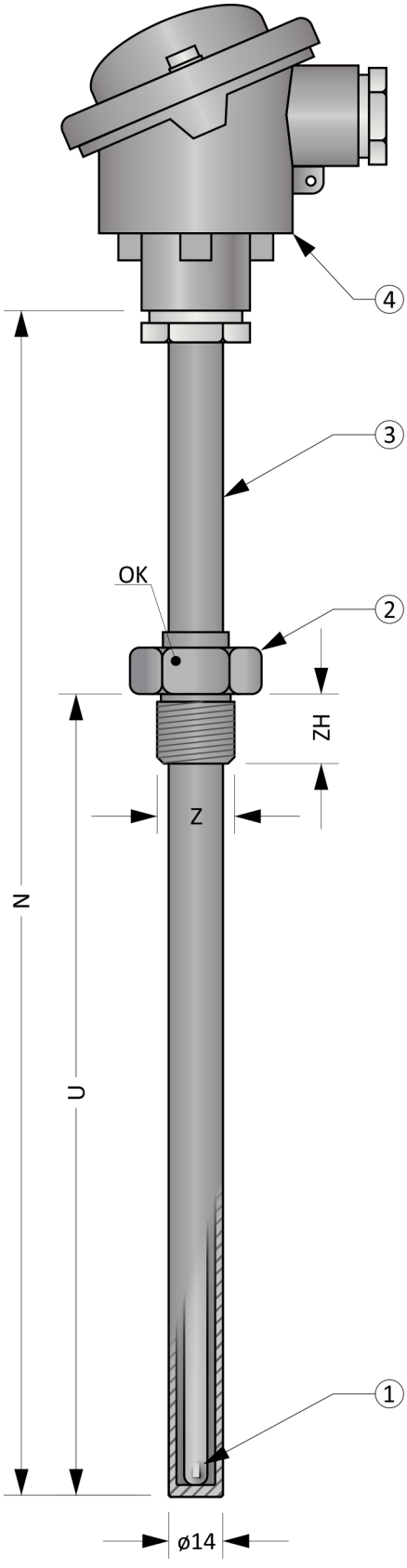


Figure 9.1: MTR9

General Information (Table 9.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
	Max. overpressure	16 bar
①	**Measuring insert**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath diameter	6 mm
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
②	**Threaded fitting**	
	Material	Stainless steel
③	**Protection tube**	
	Outer / inner diameter	14 / 10 mm
④	**Head**	
	Material	Aluminium alloy
	Cable gland	M20 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 9.2)

Pos.	Code	MTR09 - ❶❷ - ❸❹ - ❺ - ❻❼❽	
❶	**Type of measuring insert**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, three-wire connection (2x3W)	
	B	2 x Pt500, three-wire connection (2x3W)	
	C	2 x Pt1000, three-wire connection (2x3W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
❸	**Material of protection tube**		
	A	Stainless steel 1.4541	
	B	Stainless steel 1.4841	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 150 to 2500 mm (in 10 mm increments)	
❺	**Immersion length U [mm]**		
	0	Without fitting	
	xxx	Selectable range from 50 to (N-100) mm (in 5 mm increments)	
❻	**Threaded fitting**		
	0	Without fitting	
	1	Welded threaded fitting Z = M27 x 2, ZH = 26 mm, WAF 36 (OK), incl. sealing ring	
	2	Welded threaded fitting Z = M20 x 1,5, ZH = 17 mm, WAF 30 (OK), incl. sealing ring	
	3	Welded threaded fitting Z = G½“, ZH = 17 mm, WAF 30 (OK)	
❼	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❽	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR09-01-A500-100-300

... 1 x Pt100, four-wire connection
... Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C
... Tube material 1.4541
... Nominal length N = 500 mm
... Immersion depth U = 100 mm
... Welded threaded fitting G½
... Head B
... Without transmitter

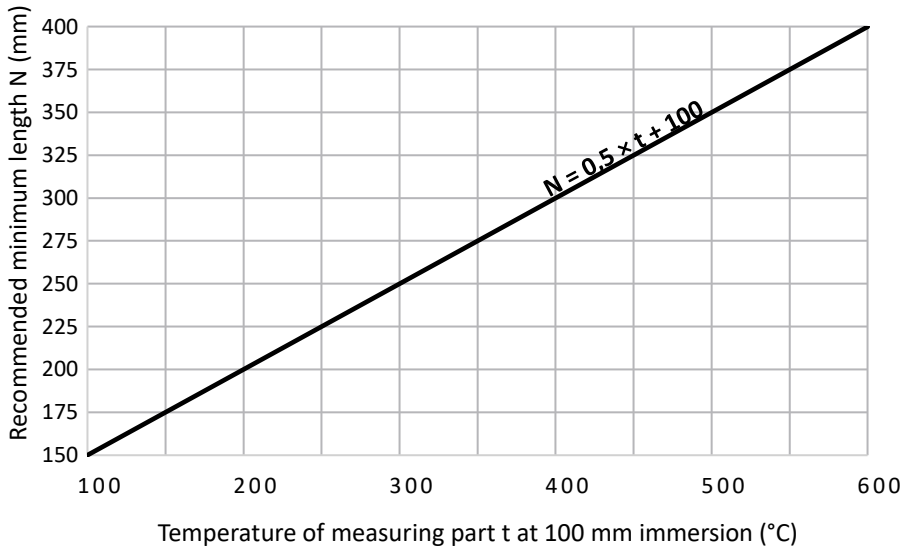
Approximate weight of the product: MTR09-01-A500-100-300 ... 1,0 kg

Length Tolerances (Table 9.3)

Length	Length tolerance N	Length tolerance U
≤ 1500 mm	± 2 mm	± 2 mm
> 1500 mm	± 3 mm	± 3 mm

Recommended Min. Sensor Length N (Chart 9.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 9.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Protection tube, threaded fitting	See working range from table 9.2	---
Measuring end	See working range from table 9.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Head Mounted Transmitters (Table 9.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Heads

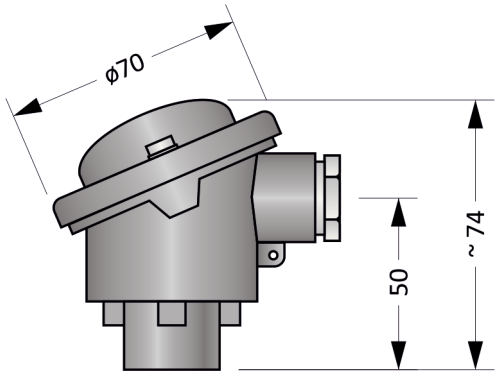


Figure 9.2: Head B

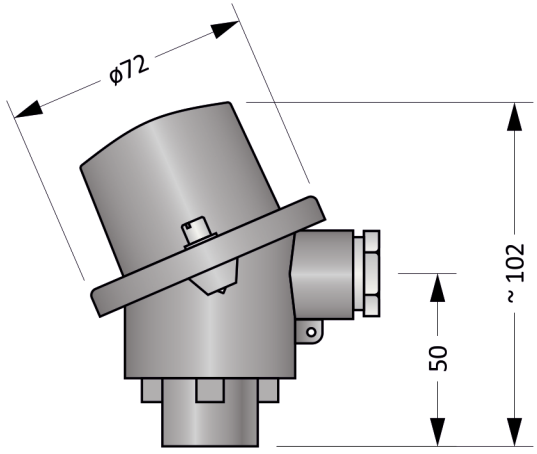


Figure 9.3: Head BH

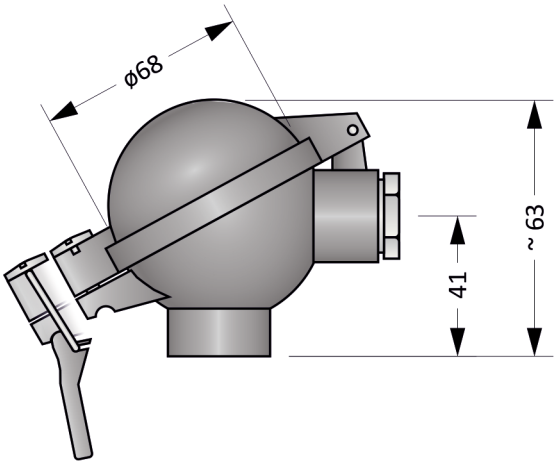


Figure 9.4: Head BUZ

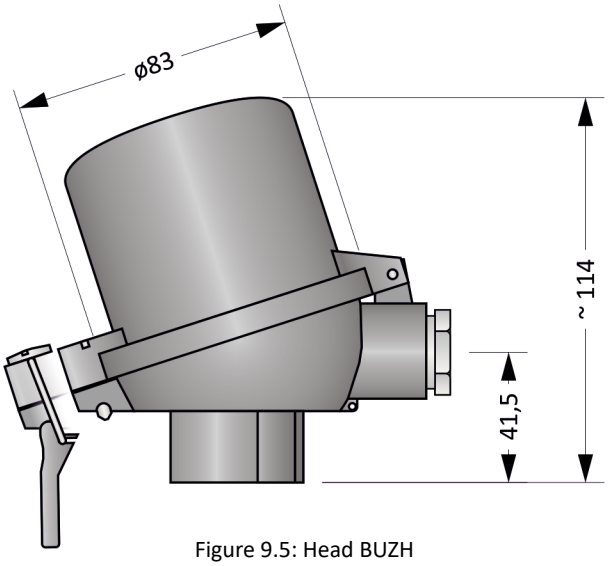


Figure 9.5: Head BUZH

Installation And Operating Instructions

A protection tubeor or welded fitting is used for mounting. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical connection of sensor with the transmitter is shown in Figure 9.8.

Electrical connection of the sensor without transmitter is shown in the Figures 9.6 a 9.7. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

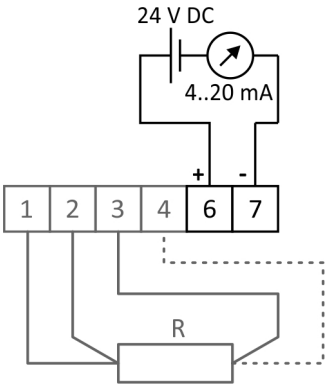


Figure 9.8: Trasmitter wirring diagram

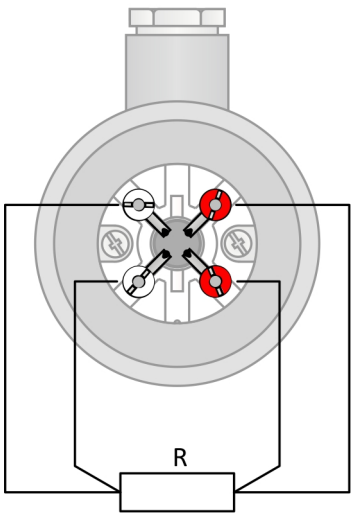


Figure 9.6: Four-wire RTD wiring diagram

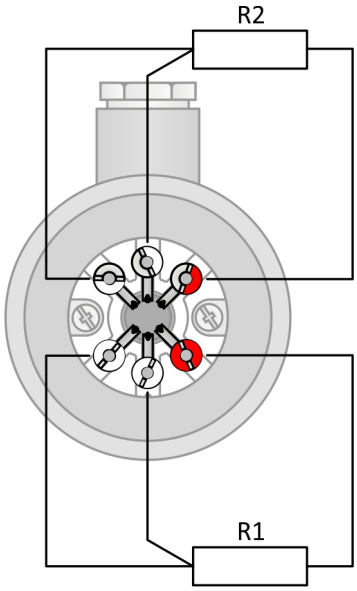


Figure 9.7: Three-wire 2 x RTD wiring diagram

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MTR10

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

MTR10 series consists of simple but robust sensors suitable for industrial applications.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable. The sensor is flexible and can be easily positioned to the measurement location.

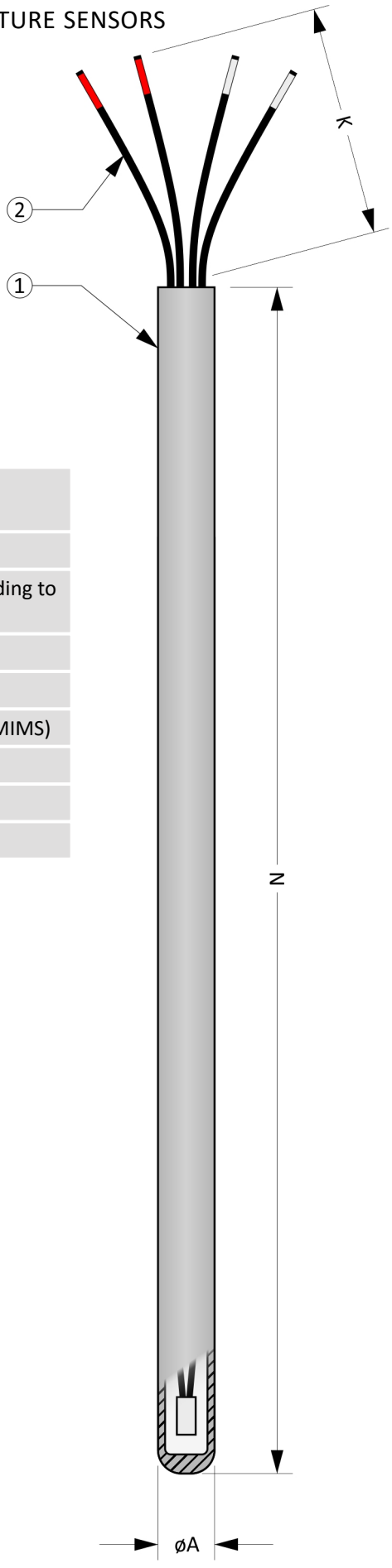


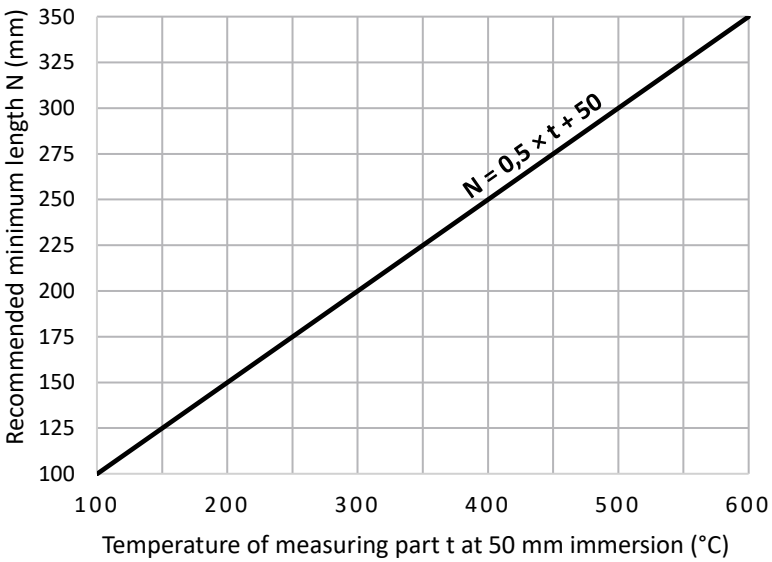
Figure 10.1: MTR10

General Information (Table 10.1)

	Insulation class acc. ČSN EN 60529	IP00 (loose conductors) IP68 (measuring part in length N)
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Loose conductors**	

Recommended Min. Sensor Length N (Chart 10.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the cold end. If the length is not observed, there is a risk of overheating.



Optional Parameters Including the Creation of an Order Code (Table 10.2)

Pos.	Code	MTR010 - ❶❷❸ - ❹ - ❺	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, two-wire connection (2W)	
	7	1 x Pt500, two-wire connection (2W)	
	8	1 x Pt1000, two-wire connection (2W)	
	A	2 x Pt100, three-wire connection (2x3W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	B	2 x Pt500, three-wire connection (2x3W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	C	2 x Pt1000, three-wire connection (2x3W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	D	2 x Pt100, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	E	2 x Pt500, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	F	2 x Pt1000, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W.
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W, ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for 2x2W, 2W, ø A = 5 mm, Pt500, Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 50 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	
❺	**Loose conductor length K [mm]**		
	xxx	Selectable range from 10 to 200 mm (in 5 mm increments)	

Order code example: MTR010-030-500-20

... 1 x Pt100, four-wire connection

... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C

... A = 6,0 mm

... Nominal length N = 500 mm

... Loose conductor length K = 20 mm

Approximate weight of the product: MTR010-030-500-20 ... 0,1 kg

Length Tolerances (Table 10.3)

Length	Length tolerance N	Length tolerance K
≤ 1500 mm	± 2 mm	± 1 mm
1500 mm < length ≤ 2500 mm	± 3 mm	---
2500 mm < length ≤ 5000 mm	± 10 mm	---
> 5000 mm	± 20 mm	---

Diameter Tolerances (Table 10.4)

Diameter Tolerance A
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts (Table 10.5)

Sensor part	Continuous operation	Short-term operation
loose conductors	< 100 °C	---
Measuring end	See working range from table 10.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Installation And Operating Instructions

The sensor stem is used for mechanical mounting, e.g. for fixing with a compression fitting.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 10.2.

The electrical wiring of the sensor is shown in the Figures 10.3 to 10.7. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

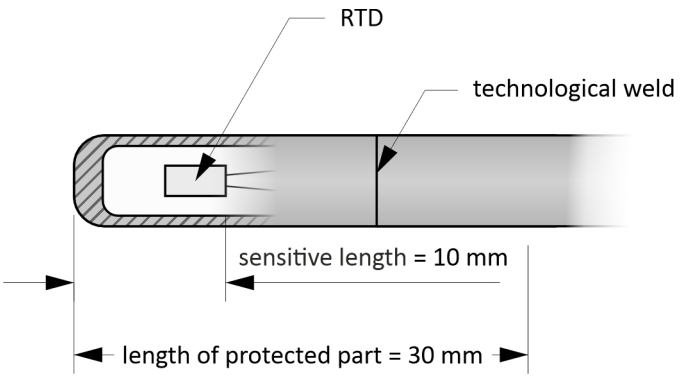


Figure 10.2: Measuring end detail

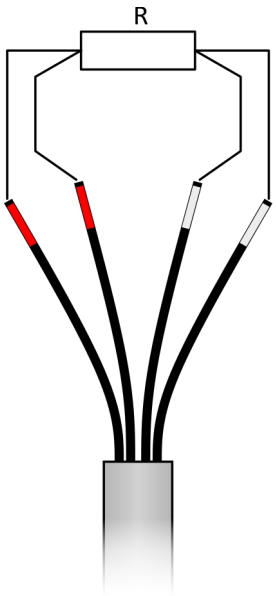


Figure 10.3: Four-wire RTD wiring diagram

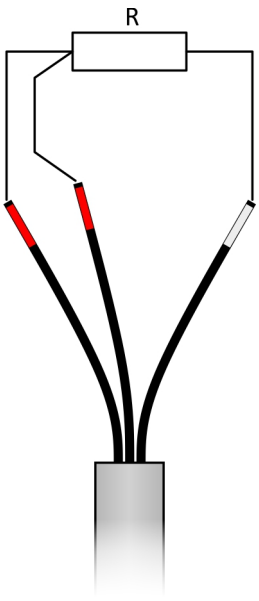


Figure 10.4: Three-wire RTD wiring diagram

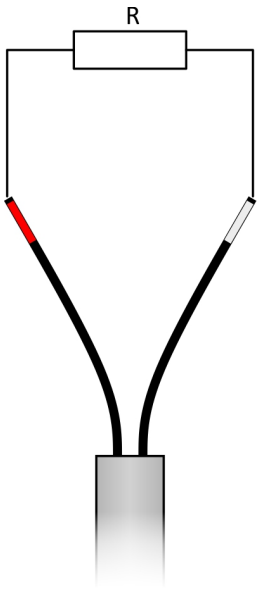


Figure 10.5: Two-wire RTD wiring diagram

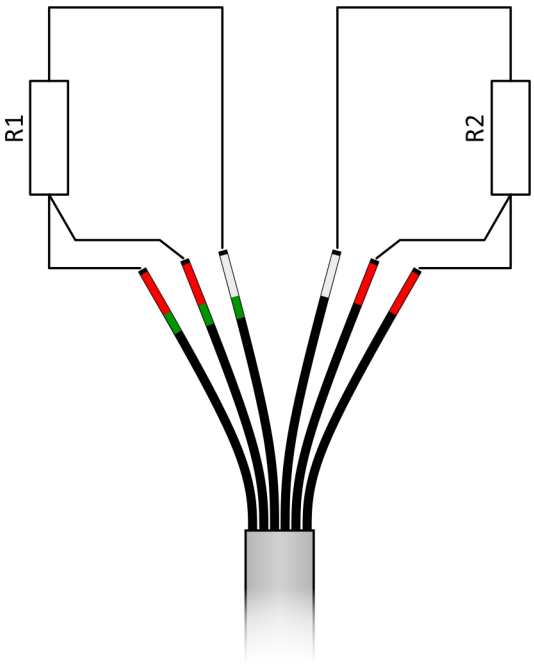


Figure 10.6: Three-wire 2 x RTD wiring diagram

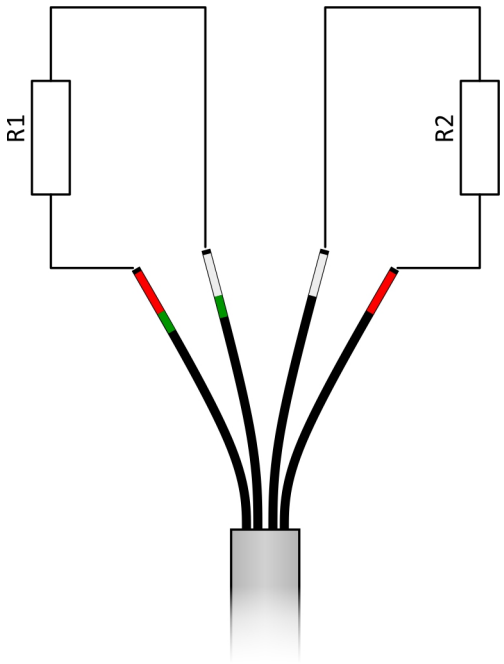


Figure 10.7: Two-wire 2 x RTD wiring diagram

MTR10K

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

MTR10K series consists of simple but robust sensors suitable for industrial applications.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable. The sensor is flexible and can be easily positioned to the measurement location.

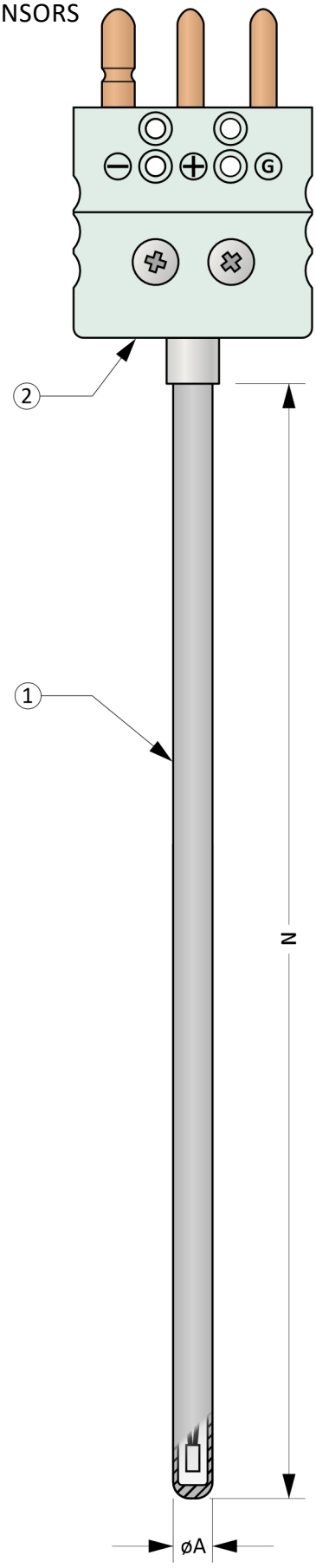


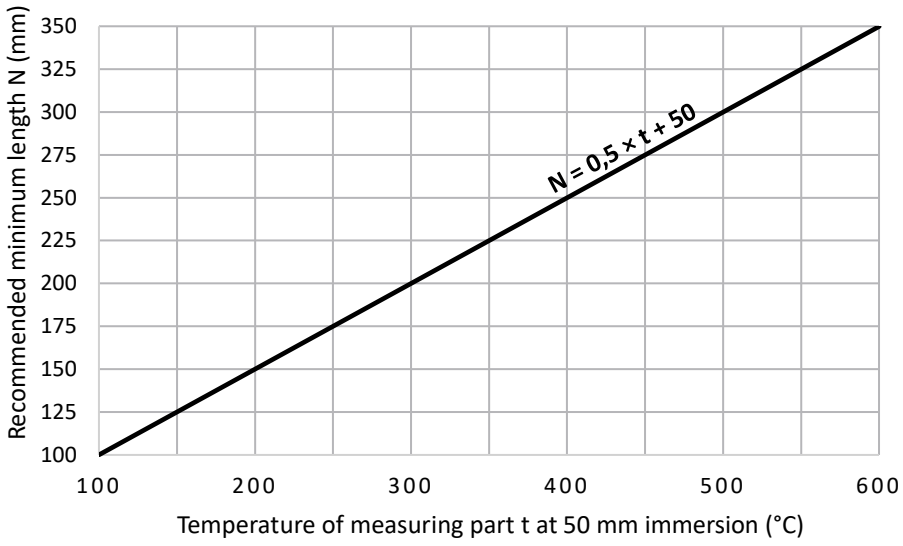
Figure 10K.1: MTR10K

General Information (Table 10K.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector) IP68 (measuring part in length N)
	Sheathed sensor	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
①	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Connector**	

Recommended Min. Sensor Length N (Chart 10K.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the connector. If the length is not observed, there is a risk of overheating.



Optional Parameters Including the Creation of an Order Code (Table 10K.2)

Pos.	Code	MTR010K - ❶❷❸ - ❹ - ❺	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, two-wire connection (2W)	
	7	1 x Pt500, two-wire connection (2W)	
	8	1 x Pt1000, two-wire connection (2W)	
	D	2 x Pt100, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	E	2 x Pt500, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	F	2 x Pt1000, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W.
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W, ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for 2x2W, 2W, ø A = 5 mm, Pt500, Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 50 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	
❺	**Cold end**		
	1	Standard 2-pin connector, type MTCK-S, plug	Not possible for 3W, 4W.
	2	Standard 2-pin connector, type MTCK-S, plug + socket	Not possible for 3W, 4W.
	3	Standard ceramic 2-pin connector, type MTCK-CS, plug	Not possible for 3W, 4W.
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket	Not possible for 3W, 4W.
	5	Miniature 2-pin connector, type MTCK-M, plug	Not possible for 3W, 4W.
	6	Miniature 2-pin connector, type MTCK-M, plug + socket	Not possible for 3W, 4W.
	A	Standard 3-pin connector, type MTCK-3S, plug	Not possible for 2W, 4W, 2x2W.
	B	Standard 3-pin connector, type MTCK-3S, plug + socket	Not possible for 2W, 4W, 2x2W.
	C	Miniature 3-pin connector, type MTCK-3M, plug	Not possible for 2W, 4W, 2x2W, A = 3 mm.
	D	Miniature 3-pin connector, type MTCK-3M, plug + socket	Not possible for 2W, 4W, 2x2W, A = 3 mm.
	E	Standard 4-pin connector, type MTCK-DS, plug	Not possible for 2W, 3W.
	F	Standard 4-pin connector, type MTCK-DS, plug + socket	Not possible for 2W, 3W.

Continuarion of table 10K.2 on the next page

Continuarion of table 10K.2 from the previous page		
Pos.	Code	**MTR010K - ❶❷❸ - ❹ - ❺**
	G	Miniature 4-pin connector, type MTCK-DM, plug — Not possible for 2W, 3W.
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket — Not possible for 2W, 3W.

Order code example: MTR010K-030-500-E

... 1 x Pt100, four-wire connection

... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C

... A = 6,0 mm

... Nominal length N = 500 mm

... Standard 4-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR010K-030-500-E ... 0,2 kg

Length Tolerances (Table 10K.3)

Length	Length tolerance N
≤ 1500 mm	± 2 mm
1500 mm < Length ≤ 2500 mm	± 3 mm
2500 mm < Length ≤ 5000 mm	± 10 mm
> 5000 mm	± 20 mm

Diameter Tolerances (Table 10K.4)

Diameter Tolerance A
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts (Table 10K.5)

Sensor part	Continuous operation	Short-term operation
Connector MTCK-M, MTCK-S	< 160 °C	---
Ceramic connector MTCK-CS	< 600 °C*	---
Measuring end	See table 10K.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

(*) Once the cold junction is exposed to temperatures above 120 °C, the sensor will no longer be resistant to moisture penetration.

Connectors

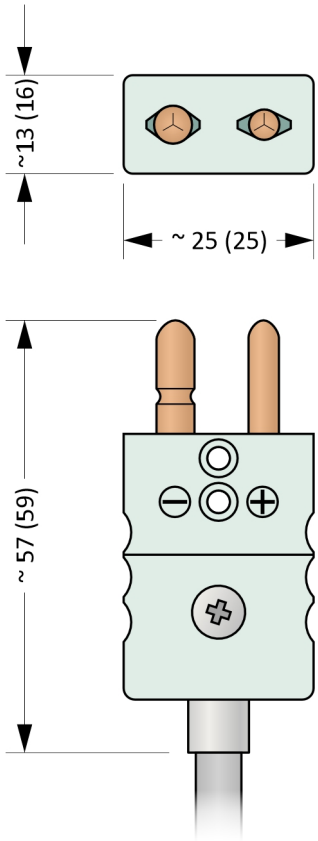


Figure 10K.2: MTCK-S (MTCK-CS)

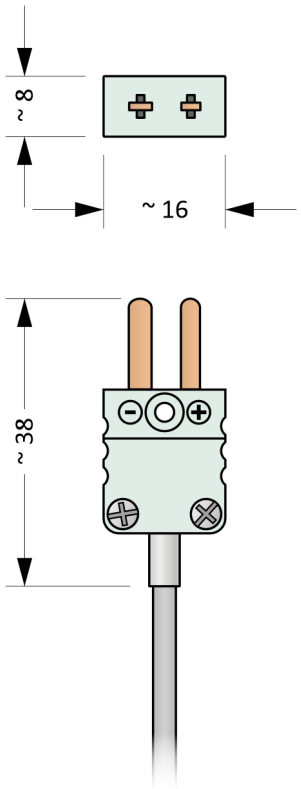


Figure 10K.3: MTCK-M

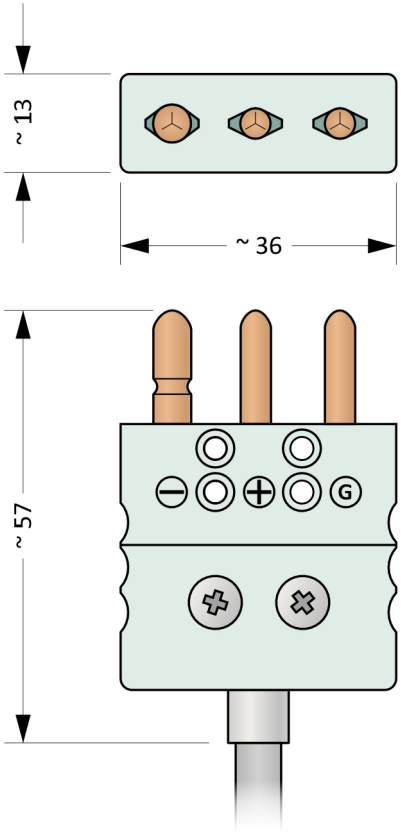


Figure 10K.4: MTCK-3S

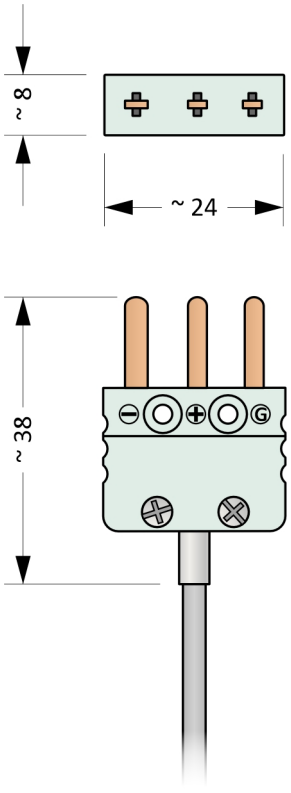


Figure 10K.5: MTCK-3M

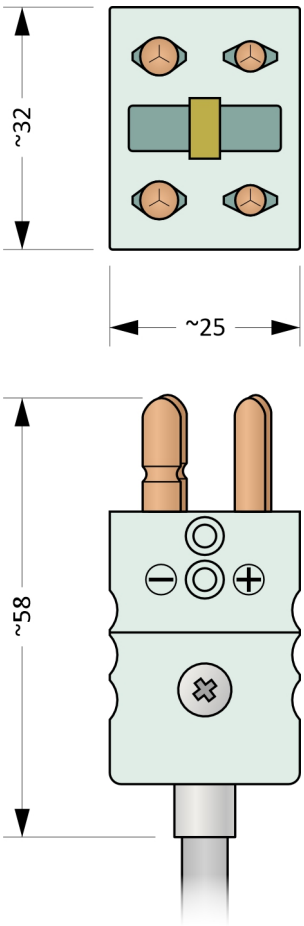


Figure 10K.6: MTCK-4S

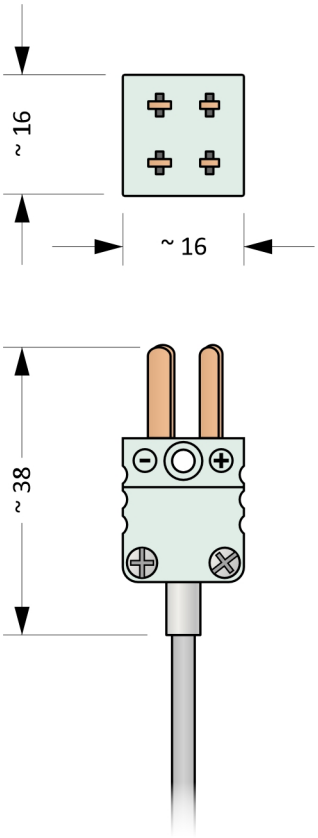


Figure 10K.7: MTCK-4M

Installation And Operating Instructions

The sensor stem is used for mechanical mounting, e.g. for fixing with a compression fitting.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 10K.8.

The electrical wiring of the sensor is shown in the Figures 10K.9 to 10K.16. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

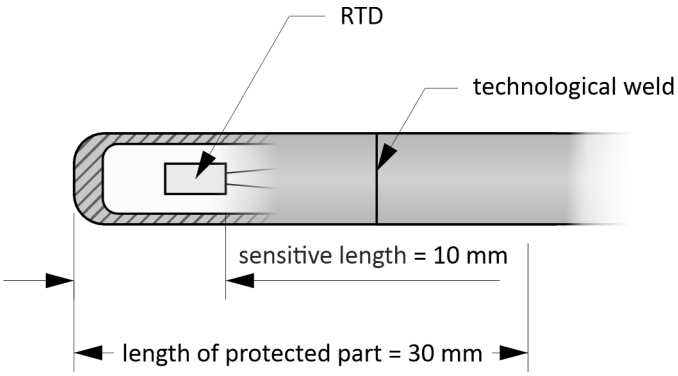


Figure 10K.8: Measuring end detail

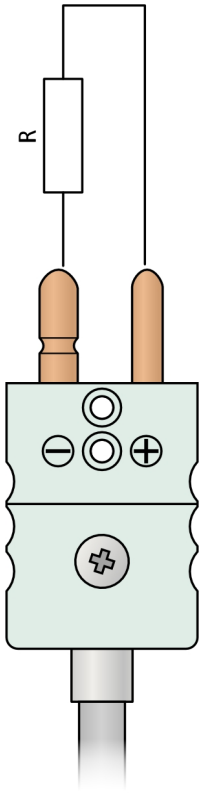


Figure 10K.9: Two-wire RTD wiring diagram with connector

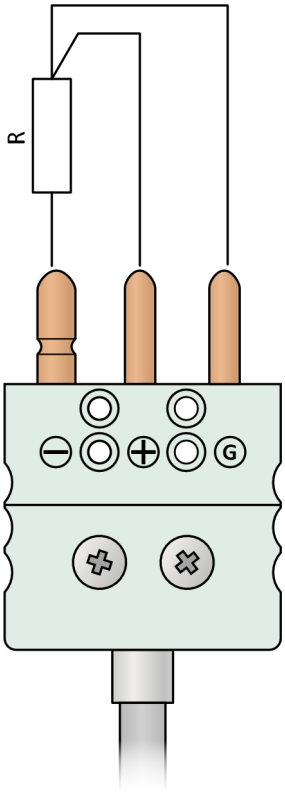


Figure 10K.10: Three-wire RTD wiring diagram with connector

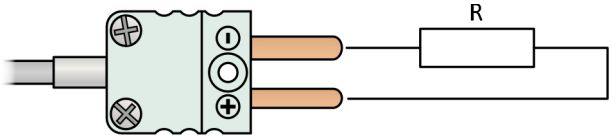


Figure 10K.11: Two-wire RTD wiring diagram with miniature connector

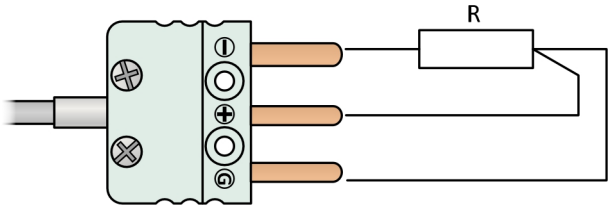


Figure 10K.12: Three-wire RTD wiring diagram with miniature connector

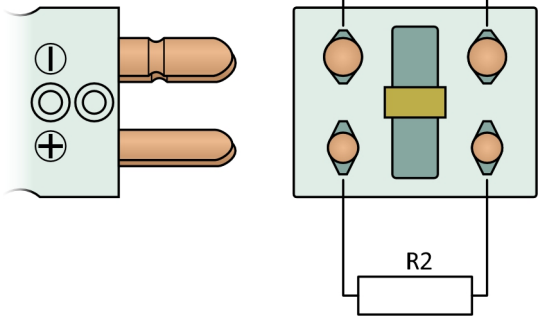


Figure 10K.13: Two-wire 2 x RTD wiring diagram with connector

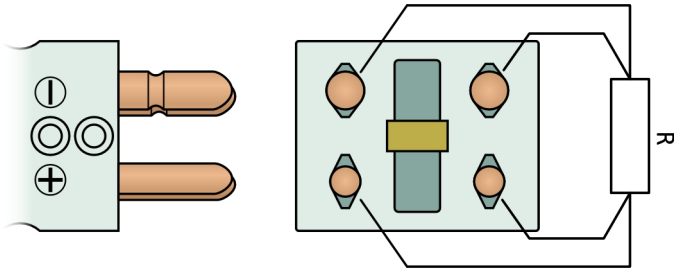


Figure 10K.14: Four-wire RTD wiring diagram with connector

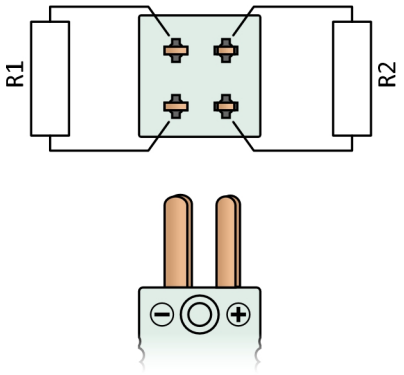


Figure 10K.15: Two-wire 2 x RTD wiring diagram with miniature connector

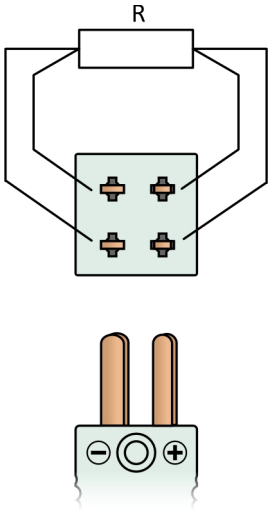


Figure 10K.16: Four-wire RTD wiring diagram with miniature connector

MTR11

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

MTR11 series consists of simple but robust sensors suitable for industrial applications.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable and extension cable. The sensor is flexible and can be easily positioned to the measurement location.

General Information (Table 11.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (loose conductors) IP6X (cable with transition part) IP68 (measuring part in length N)
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Transition piece**	
③	**Spring**	
④	**Extension cable**	
	Min. bending radius	15 × extension cable diameter
⑤	**Additional armor protection**	
⑥	**Individual insulated conductors**	
⑦	**Loose conductors**	
⑧	**Connector**	

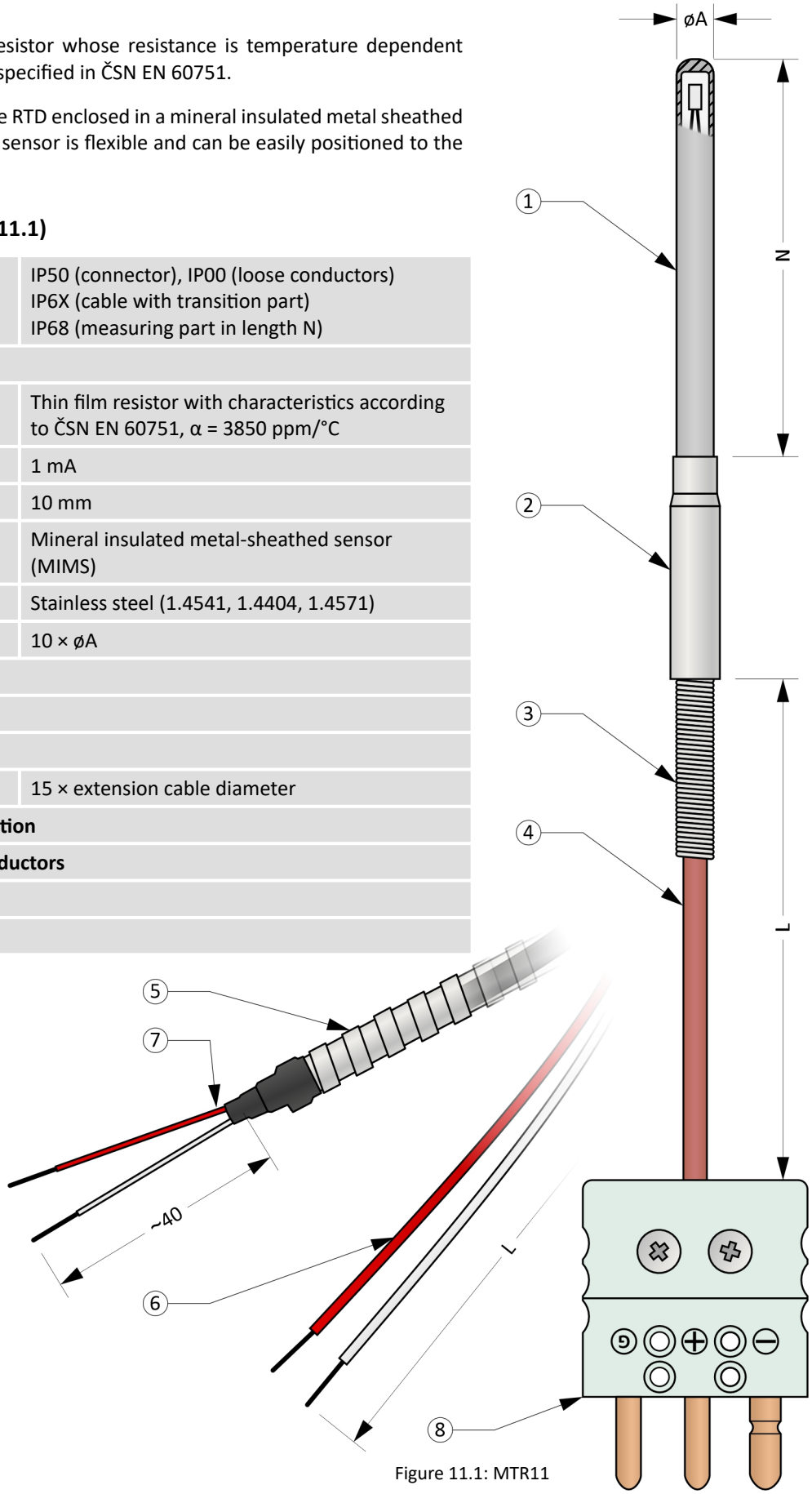


Figure 11.1: MTR11

Optional Parameters Including the Creation of an Order Code (Table 11.2)

Pos.	Code	MTR011 - ❶❷❸ - ❹ - ❺ - ❻❼	
❶	**RTD type**		
	0	1 x Pt100, two-wire connection (2W)	
	1	1 x Pt500, two-wire connection (2W)	
	2	1 x Pt1000, two-wire connection (2W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, four-wire connection (4W)	
	7	1 x Pt500, four-wire connection (4W)	
	8	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, two-wire connection (2x2W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	B	2 x Pt500, two-wire connection (2x2W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	C	2 x Pt1000, two-wire connection (2x2W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	D	2 x Pt100, three-wire connection (2x3W)	Not possible for ø A = 3 mm.
	E	2 x Pt500, three-wire connection (2x3W)	Not possible for ø A = 3 mm.
	F	2 x Pt1000, three-wire connection (2x3W)	Not possible for ø A = 3 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W.
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W, ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for 2x2W, 2W, ø A = 5 mm, Pt500, Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 50 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	
❺	**Extension cable length L [cm]**		
	SLxxx	Individual insulated conductors, selectable range from 10 to 100 cm (in 1 cm increments)	Only this combination is possible for this option: ❻ ... S ❼ ... 0
	xxx	Selectable range from 10 to 450 cm (in 1 cm increments)	
	xxx	Selectable range from 450 to 3000 cm (in 10 cm increments)	
	Axxx	Cable with additional armor protection, selectable range from 10 to 450 cm (in 1 cm increments)	
	Axxx	Cable with additional armor protection, selectable range from 450 to 600 cm (in 10 cm increments)	

Continuarion of table 11.2 on the next page

Continuarion of table 11.2 from the previous page

Pos.	Code	MTR011 - ❶❷❸ - ❹ - ❺ - ❻❼	
❻	**Extension cable**		
	S	Vodiče Cu, izolované teflonem (FEP)	
	0	Cable TGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	1	Cable GLGLV 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	2	Cable GLGLV 4 x 0,25 mm², Copper wires	Not possible for 2x2W a 2x3W.
	3	Cable TSL 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	4	Cable TSL 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	5	Cable TWT 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	6	Cable TCuT 4 x 0,22 mm², Copper wires	Not possible for 2W and 2x3W.
	7	Cable TT 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
	8	Cable GLGLV 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
❼	**Cold end**		
	0	Loose conductors, length 40 mm	
	1	Standard 2-pin connector, type MTCK-S, plug	Not possible for 3W, 4W and 2x3W.
	2	Standard 2-pin connector, type MTCK-S, plug + socket	Not possible for 3W, 4W and 2x3W.
	3	Standard ceramic 2-pin connector, type MTCK-CS, plug	Not possible for 3W, 4W and 2x3W.
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket	Not possible for 3W, 4W and 2x3W.
	5	Miniature 2-pin connector, type MTCK-M, plug	Not possible for 3W, 4W and 2x3W.
	6	Miniature 2-pin connector, type MTCK-M, plug + socket	Not possible for 3W, 4W and 2x3W.
	A	Standard 3-pin connector, type MTCK-3S, plug	Not possible for 2W, 4W, 2x2W.
	B	Standard 3-pin connector, type MTCK-3S, plug + socket	Not possible for 2W, 4W, 2x2W.
	C	Miniature 3-pin connector, type MTCK-3M, plug	Not possible for 2W, 4W, 2x2W.
	D	Miniature 3-pin connector, type MTCK-3M, plug + socket	Not possible for 2W, 4W, 2x2W.
	E	Standard 4-pin connector, type MTCK-DS, plug	Not possible for 2W, 3W a 2x3W.
	F	Standard 4-pin connector, type MTCK-DS, plug + socket	Not possible for 2W, 3W a 2x3W.
	G	Miniature 4-pin connector, type MTCK-DM, plug	Not possible for 2W, 3W a 2x3W.
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket	Not possible for 2W, 3W a 2x3W.

Order code example: MTR011-030-500-100-11

... 1 x Pt100, four-wire connection

... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C

... A = 6,0 mm

... Nominal length N = 500 mm

... Extension cable length L = 100 cm

... Cable GLGLV 2 x 0,25 mm², Copper wires

... Standard 2-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR011-030-500-100-11 ... 0,1 kg

Length Tolerances (Table 11.3)

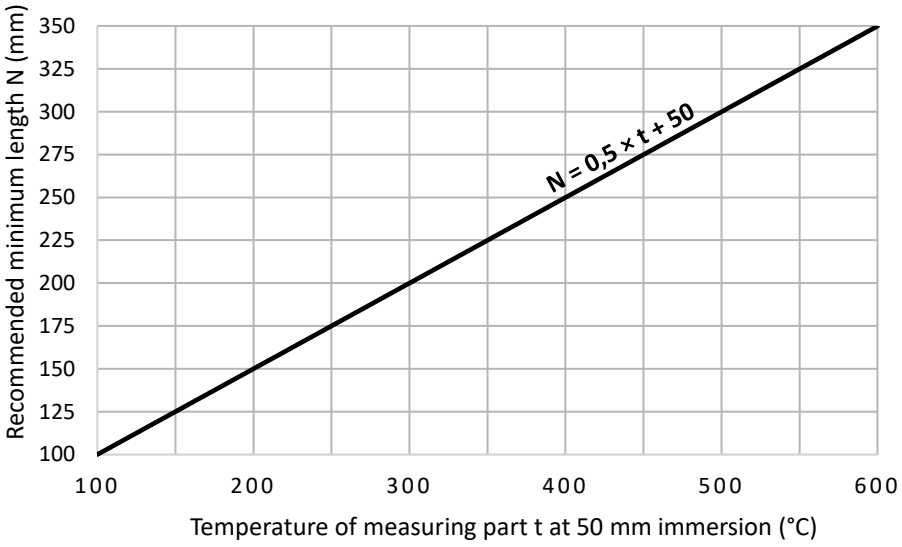
Length	Length tolerance N	Length tolerance L
≤ 1500 mm	± 2 mm	± 10 mm
1500 mm < Length ≤ 2500 mm	± 3 mm	± 10 mm
2500 mm < Length ≤ 5000 mm	± 10 mm	± 15 mm
> 5000 mm	± 20 mm	± 0,5 % z L

Diameter Tolerances (Table 11.4)

Diameter Tolerance A
± 0,1 mm

Recommended Min. Sensor Length N (Chart 11.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the transition piece. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts(Table 11.5)

Sensor part	Cable insulation	Continuous operation
Connector MTCK-M, MTCK-S		See cable insulation, max. 220 °C
Ceramic connector MTCK-CS		See cable insulation
Transition piece		-40 ... 165 °C
Extension cable	SL nebo TSL	-60 ... 180 °C
	TWT	-70 ... 205 °C
	TT, TGLV nebo TCuT	-200 ... 205 °C
	GLGLV	< 400 °C
Measuring end		See table 11.2

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Extension cables (Table 11.6)

Insulation	Number x cross-section / dia. of wires	Outer cable diameter	Pros and cons
FEP	1 x 0,25 mm² (+) 1 x 0,25 mm² (-)	~ 1,2 mm	Individual conductors
TSL	2 x 0,25 mm² 4 x 0,25 mm²	~ 3,8 mm ~ 4,3 mm	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
TWT	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TCuT	4 x 0,22 mm²	~ 3,7 mm	↗ Moisture resistant
TT	6 x 0,15 mm²	~ 3,5 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TGLV	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant, high mechanical resistance
GLGLV	2 x 0,25 mm² 4 x 0,25 mm² 6 x 0,15 mm²	~ 3,0 mm ~ 3,2 mm ~ 3,5 mm	↗ High mechanical resistance, suitable for higher temperatures ↘ Low moisture resistance

Design of the transition part (Table 11.2)

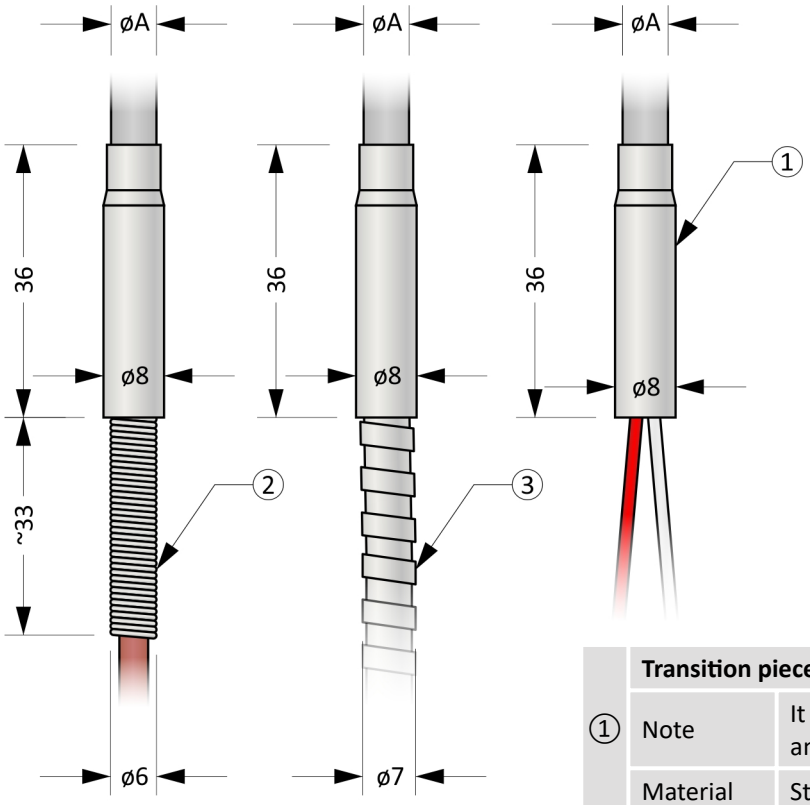


Figure 11.2: Transition part options

①	**Transition piece**	
	Note	It allows the connection of the sheathed sensor and the extension cable.
	Material	Stainless steel
②	**Spring**	
	Note	It reduces the wear of the cable at the point of exit from the trasition piece.
	Material	Stainless steel
③	**Additional armor protection**	
	Note	Increases the mechanical durability of the cable.
	Material	Stainless steel
	Properties	Flexible, does not prevent the ingress of moisture

Connectors

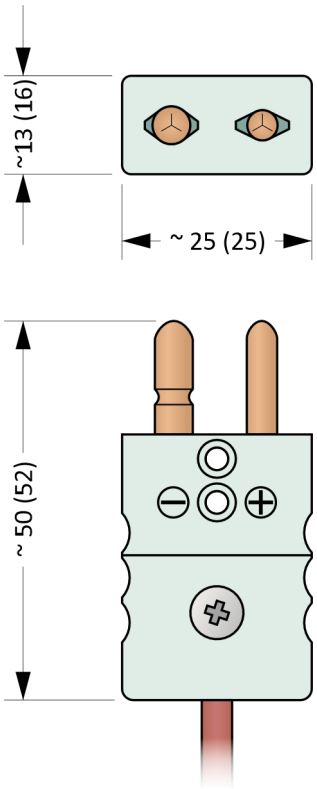


Figure 11.3: MTCK-S (MTCK-CS)

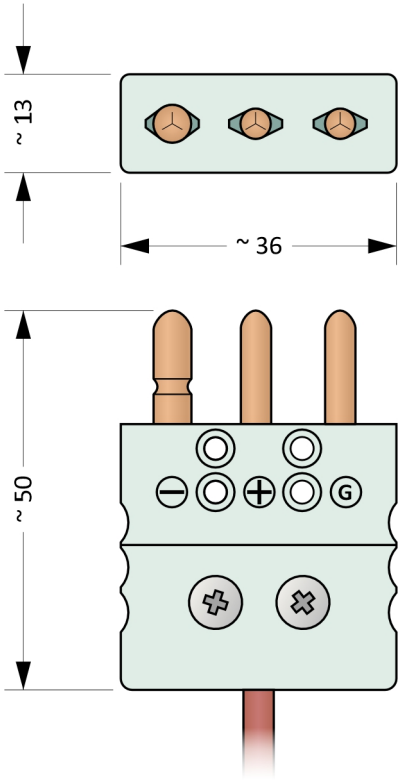


Figure 11.4: MTCK-3S

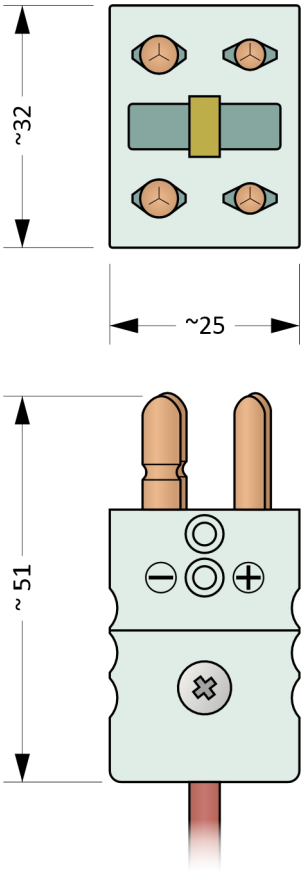


Figure 11.5: MTCK-DS

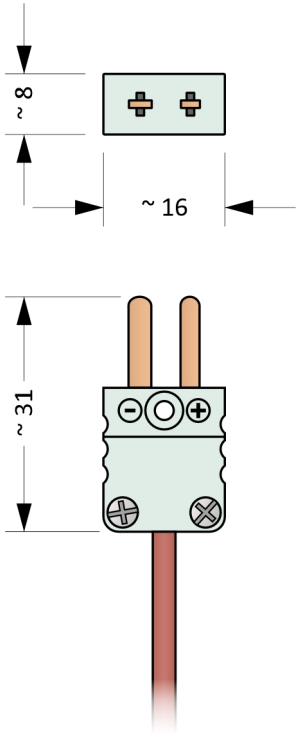


Figure 11.6: MTCK-M

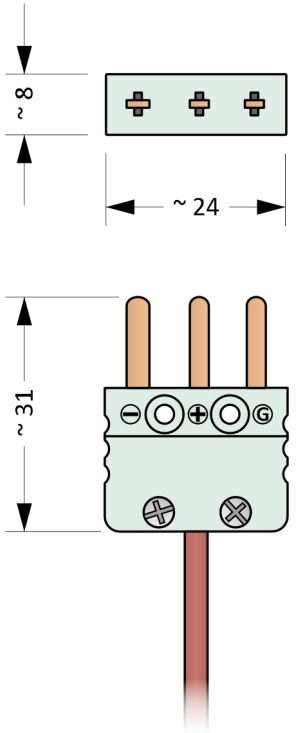


Figure 11.7: MTCK-3M

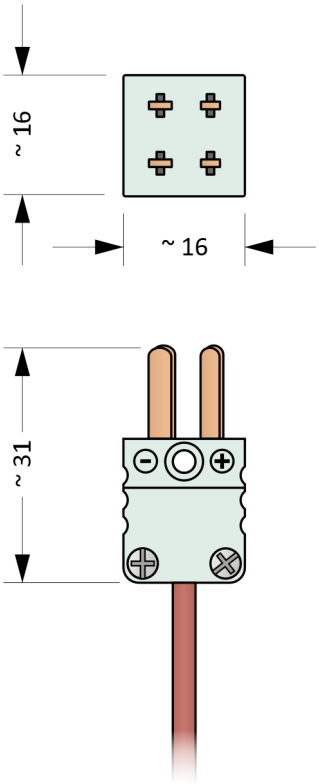


Figure 11.8: MTCK-DM

Installation And Operating Instructions

The sensor stem is used for mechanical mounting, e.g. for fixing with a compression fitting.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 10.2.

The electrical wiring of the sensor is shown in the Figures 11.10 to 11.24. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

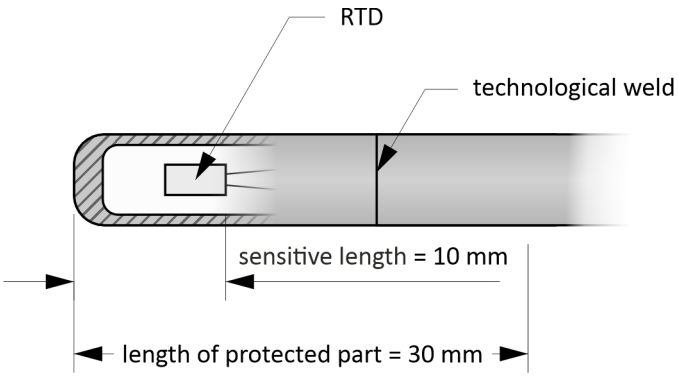


Figure 11.9: Measuring end detail

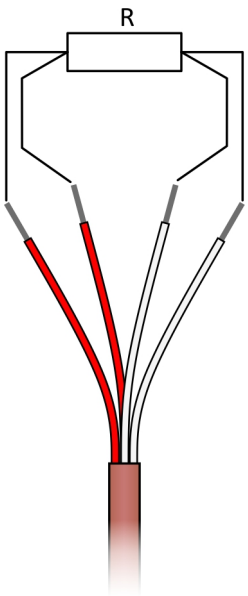


Figure 11.10: Four-wire RTD wiring diagram

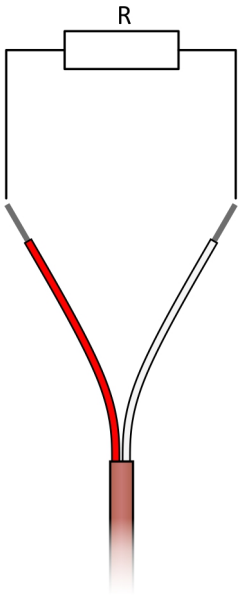


Figure 11.11: Two-wire RTD wiring diagram

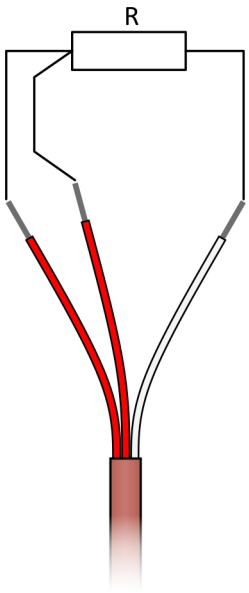


Figure 11.12: Three-wire RTD wiring diagram

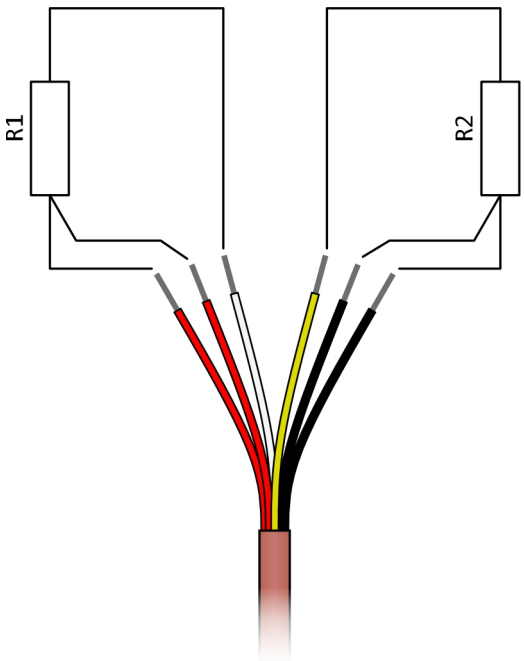


Figure 11.13: Three-wire 2 x RTD wiring diagram

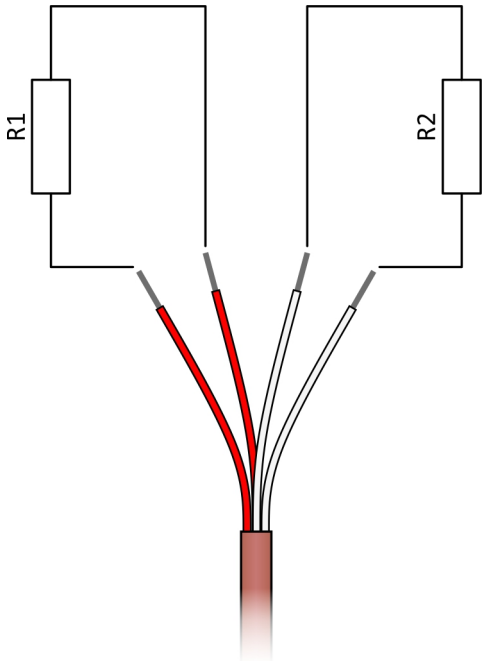


Figure 11.14: Two-wire 2 x RTD wiring diagram

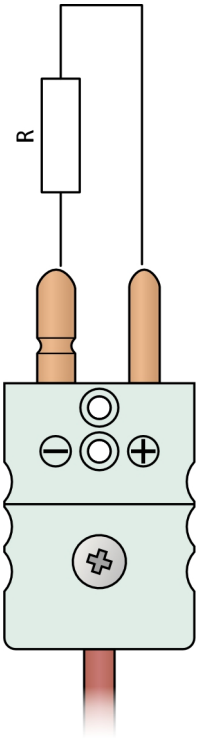


Figure 11.15: Two-wire RTD wiring diagram with connector

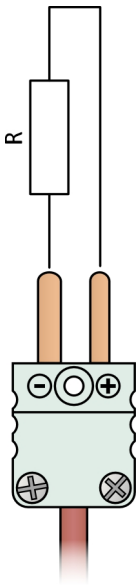


Figure 11.16: Two-wire RTD wiring diagram with miniature connector

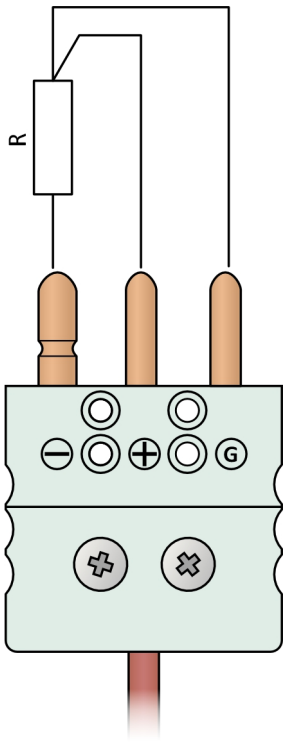


Figure 11.17: Three-wire RTD wiring diagram with connector

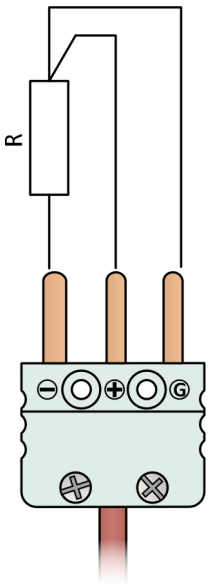
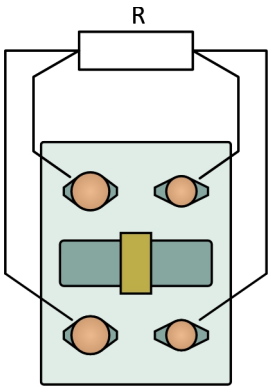


Figure 11.18: Three-wire RTD wiring diagram with miniature connector



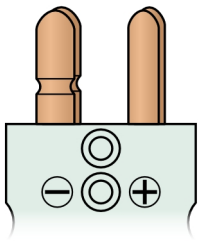
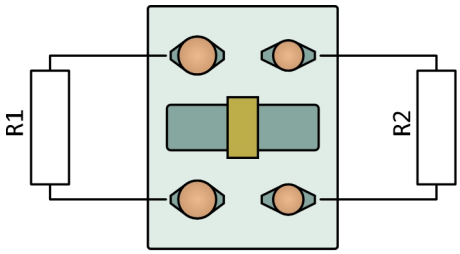


Figure 11.19: Four-wire RTD wiring diagram with connector



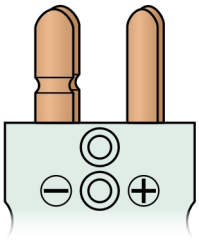


Figure 11.20: Two-wire 2 x RTD wiring diagram with connector

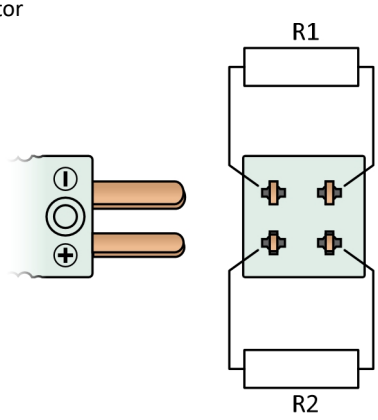
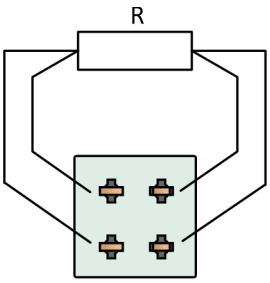


Figure 11.21: Two-wire 2 x RTD wiring diagram with miniature connector



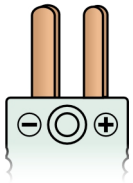


Figure 11.22: Four-wire RTD wiring diagram with miniature connector

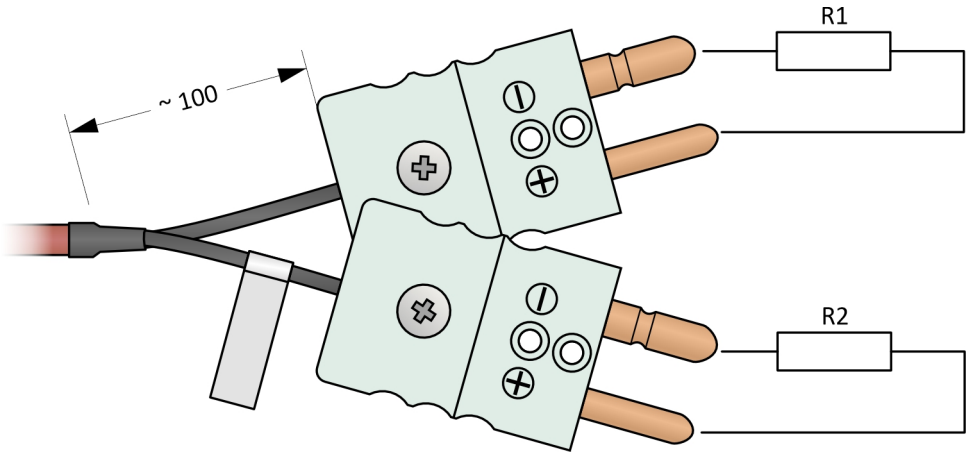


Figure 11.23: Two-wire 2 x RTD wiring diagram with connectors

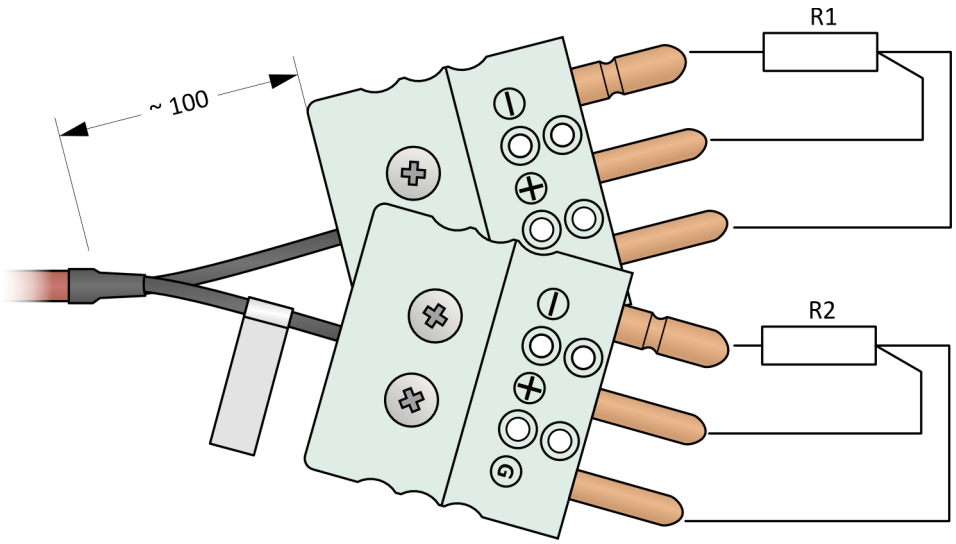


Figure 11.24: Three-wire 2 x RTD wiring diagram with connectors

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MTR11R

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

The MTR11R series temperature sensors are heavy-duty sensors designed for use as portable handheld probes.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable, handle and extension cable . The sensor is flexible and can be easily positioned to the measurement location.

General Information (Table 11R.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (loose conductors) IP6X (cable with transition part) IP68 (measuring part in length N)
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Handle**	
	Material	Silon
③	**Extension cable**	
	Min. bending radius	15 × extension cable diameter
④	**Loose conductors**	
⑤	**Connector**	

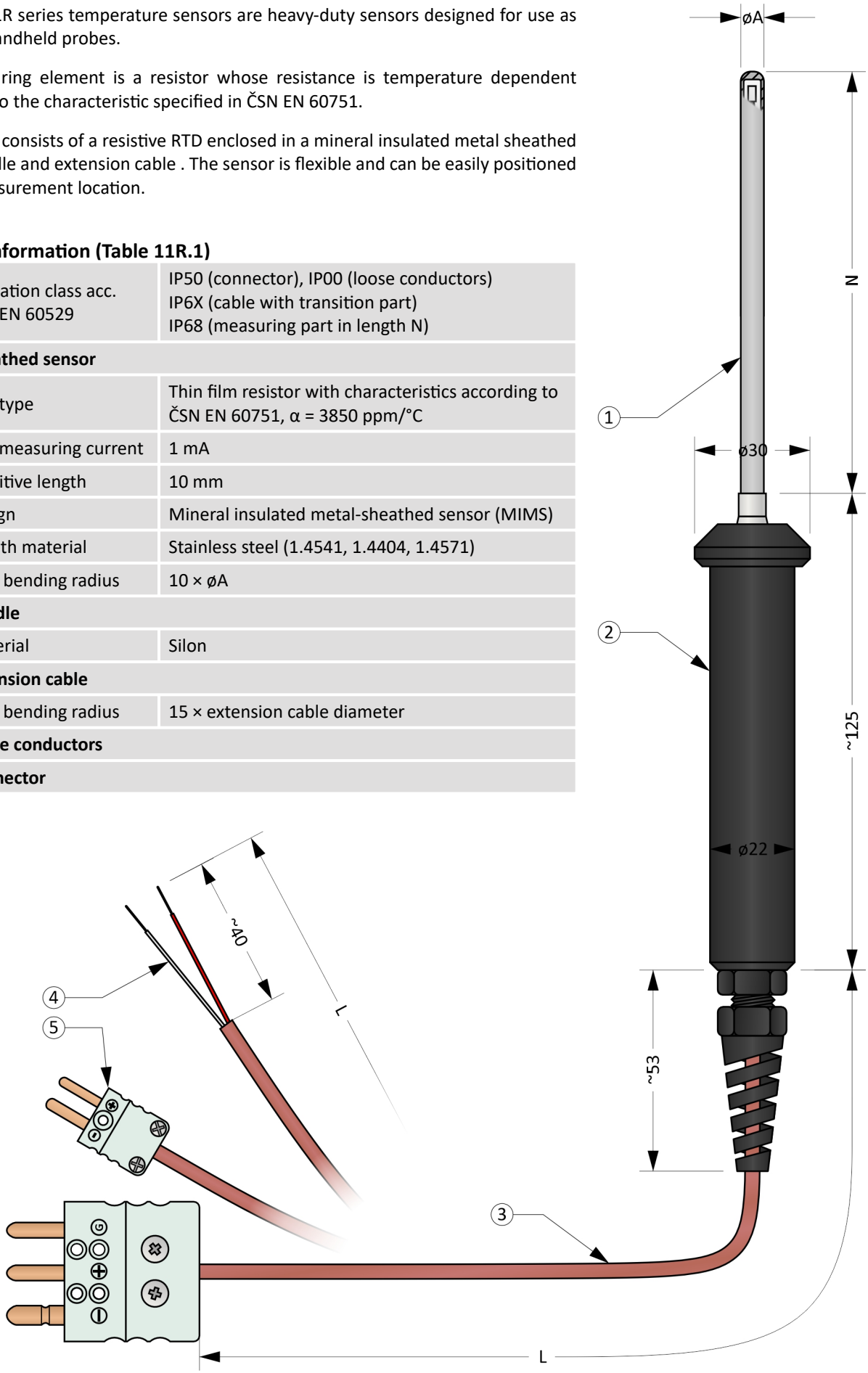


Figure 11R.1: MTR11R

Optional Parameters Including the Creation of an Order Code (Table 11R.2)

Pos.	Code	MTR011R - ❶❷❸❹ - ❺ - ❻ - ❼❽	
❶	**RTD type**		
	0	1 x Pt100, two-wire connection (2W)	
	1	1 x Pt500, two-wire connection (2W)	
	2	1 x Pt1000, two-wire connection (2W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, four-wire connection (4W)	
	7	1 x Pt500, four-wire connection (4W)	
	8	1 x Pt1000, four-wire connection (4W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W.
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W, ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for 2x2W, 2W, ø A = 5 mm, Pt500, Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Measuring length design**		
	0	Blunt tip (standard)	
	1	Sharp tip	
❺	**Nominal length N [mm]**		
	xxx	Selectable range from 150 to 1500 mm (in 1 mm increments)	
❻	**Extension cable length L [mm]**		
	xxx	Selectable range from 20 to 450 cm (in 1 cm increments)	
	xxx	Selectable range from 450 to 3000 cm (in 10 cm increments)	
❼	**Extension cable**		
	0	Cable TGLV 4 x 0,25 mm², Copper wires	Not possible for 2W.
	1	Cable GLGLV 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W.
	2	Cable GLGLV 4 x 0,25 mm², Copper wires	Not possible for 2W.
	3	Cable TSL 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W.
	4	Cable TSL 4 x 0,25 mm², Copper wires	Not possible for 2W.
	5	Cable TWT 4 x 0,25 mm², Copper wires	Not possible for 2W.
	6	Cable TCuT 4 x 0,22 mm², Copper wires	Not possible for 2W.

Continuarion of table 11R.2 on the next page

Continuarion of table 11R.2 from the previous page

Pos.	Code	MTR011R - ❶❷❸❹ - ❺ - ❻ - ❼❽	
❽	**Cold end**		
	0	Loose conductors, length 40 mm	
	1	Standard 2-pin connector, type MTCK-S, plug	Not possible for 3W, 4W.
	2	Standard 2-pin connector, type MTCK-S, plug + socket	Not possible for 3W, 4W.
	3	Standard ceramic 2-pin connector, type MTCK-CS, plug	Not possible for 3W, 4W.
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket	Not possible for 3W, 4W.
	5	Miniature 2-pin connector, type MTCK-M, plug	Not possible for 3W, 4W.
	6	Miniature 2-pin connector, type MTCK-M, plug + socket	Not possible for 3W, 4W.
	A	Standard 3-pin connector, type MTCK-S, plug	Nelze pro 2W a 4W.
	B	Standard 3-pin connector, type MTCK-S, plug + socket	Nelze pro 2W a 4W.
	C	Miniature 3-pin connector, type MTCK-M, plug	Nelze pro 2W a 4W.
	D	Miniature 3-pin connector, type MTCK-M, plug + socket	Nelze pro 2W a 4W.
	E	Standard 4-pin connector, type MTCK-S, plug	Not possible for 2W, 3W.
	F	Standard 4-pin connector, type MTCK-S, plug + socket	Not possible for 2W, 3W.
	G	Miniature 4-pin connector, type MTCK-DM, plug	Not possible for 2W, 3W.
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket	Not possible for 2W, 3W.

Order code example: MTR011R-0300-500-100-11

... 1 x Pt100, four-wire connection
... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C
... A = 6,0 mm
... Blunt tip
... Nominal length N = 500 mm
... Extension cable length L = 100 cm
... Cable GLGLV 2 x 0,25 mm², Copper wires
... Standard 2-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR011R-0300-500-100-11 ... 0,3 kg

Length Tolerances (Table 11R.3)

Length	Length tolerance N	Length tolerance L
≤ 1500 mm	± 2 mm	± 10 mm
1500 mm < length ≤ 2500 mm	± 3 mm	± 10 mm
2500 mm < length ≤ 5000 mm	± 10 mm	± 15 mm
> 5000 mm	± 20 mm	± 0,5 % z L

Diameter Tolerances (Table 11R.4)

Diameter Tolerance A
± 0,1 mm

Provedení měřicího konce

Figure 11R.2: Blunt tip (standard)

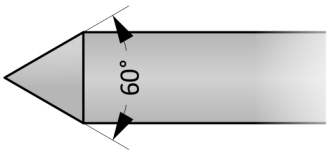
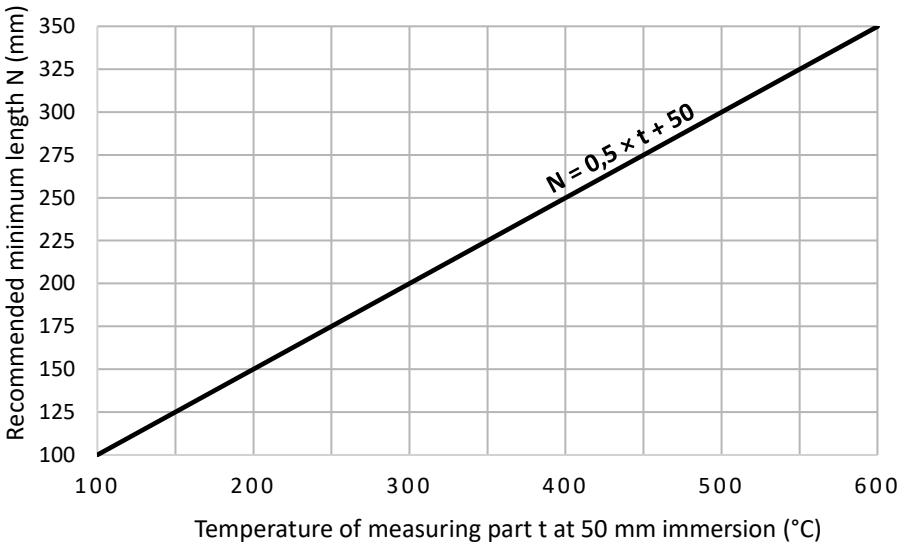


Figure 11R.3: Sharp tip

Recommended Min. Sensor Length N (Chart 11R.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the transition piece. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts(Table 11R.5)

Sensor part	Cable insulation	Continuous operation
Connector MTCK-M, MTCK-S		See cable insulation, max. 220 °C
Ceramic connector MTCK-CS		See cable insulation
Transition piece		-40 ... 165 °C
Extension cable	SL nebo TSL	-60 ... 180 °C
	TWT	-70 ... 205 °C
	TT, TGLV nebo TCuT	-200 ... 205 °C
	GLGLV	< 400 °C
Measuring end		See table 11R.2

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Cables (Table 11R.6)

Insulation	Number x cross-section / dia. of wires	Outer cable diameter	Pros and cons
SL	1 x 0,25 mm² (+) 1 x 0,25 mm² (-)	~ 1,2 mm	Individual conductors
TSL	2 x 0,25 mm² 4 x 0,25 mm²	~ 3,8 mm ~ 4,3 mm	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
TWT	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant
TCuT	4 x 0,22 mm²	~ 3,7 mm	↗ Moisture resistant ↘ Low mechanical resistance
TGLV	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant, high mechanical resistance
GLGLV	2 x 0,25 mm² 4 x 0,25 mm²	~ 3,0 mm ~ 3,2 mm	↗ High mechanical resistance, suitable for higher temperatures ↘ Low moisture resistance

Connectors

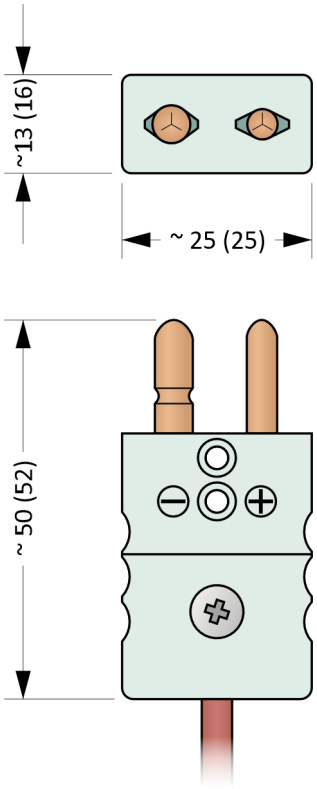


Figure 11R.4: MTCK-S (MTCK-CS)

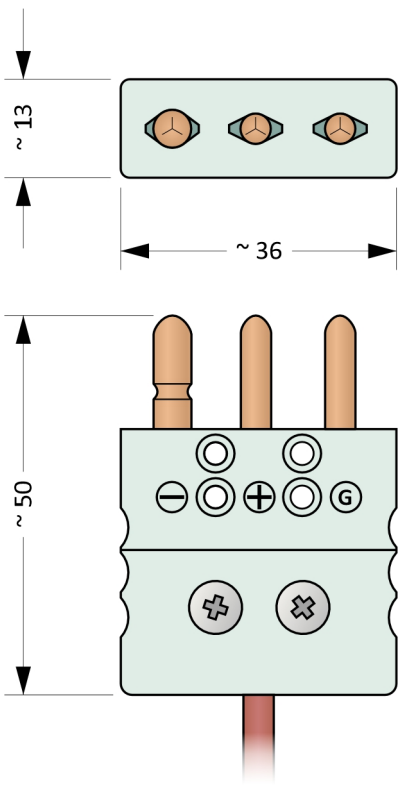


Figure 11R.5: MTCK-3S

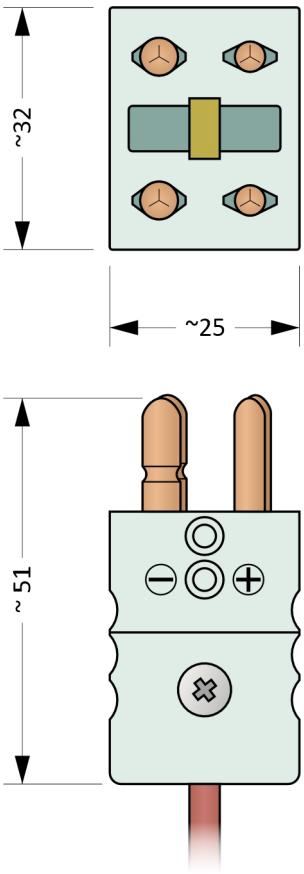


Figure 11R.6: MTCK-DS

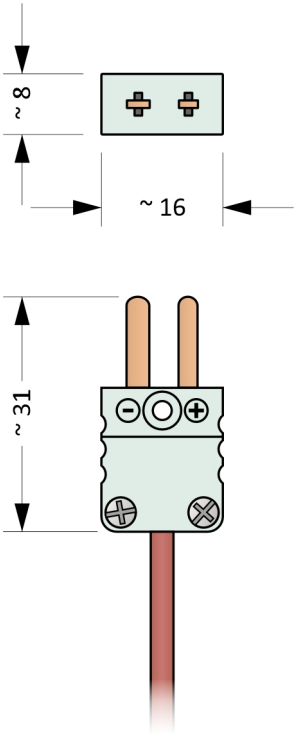


Figure 11R.7: MTCK-M

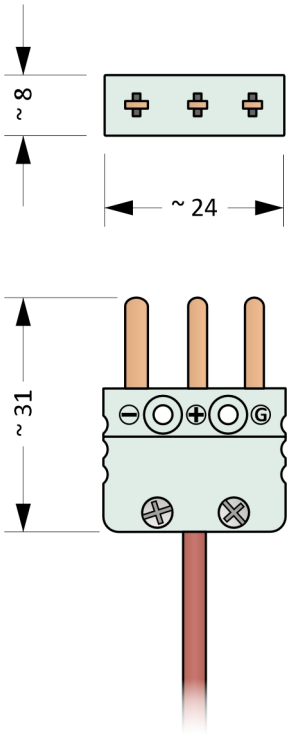


Figure 11R.8: MTCK-3M

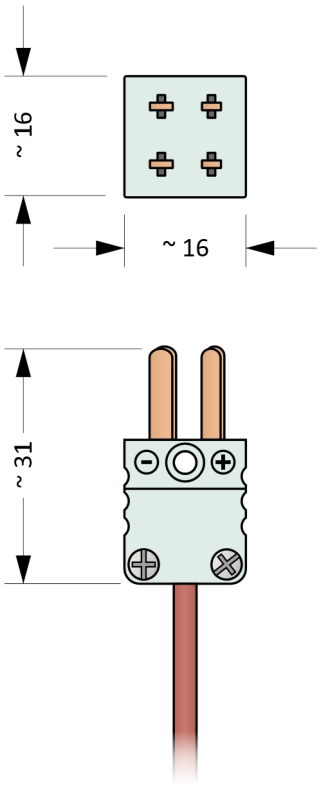


Figure 11R.9: MTCK-DM

Installation And Operating Instructions

The sensor is held in the hand during measurement. The measuring end is inserted into the medium to be measured.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 11R.10.

The electrical wiring of the sensor is shown in the Figures 11R.11 to 11R.18. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

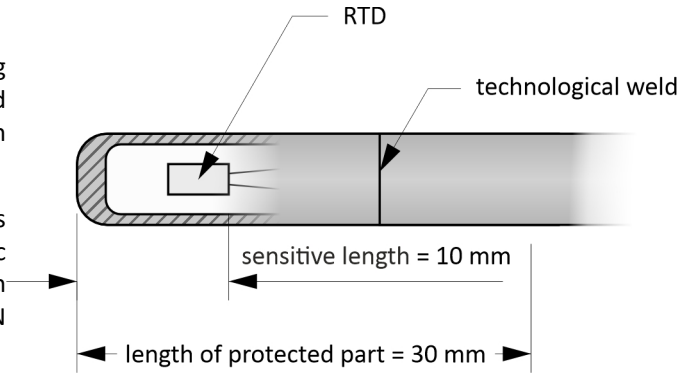


Figure 11R.10: Measuring end detail

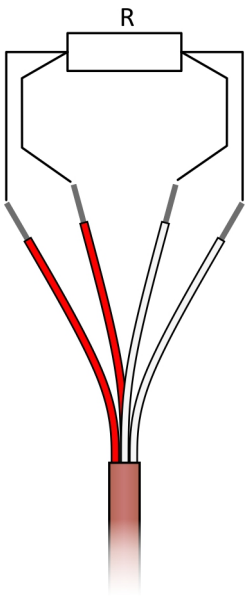


Figure 11R.11: Four-wire RTD wiring diagram

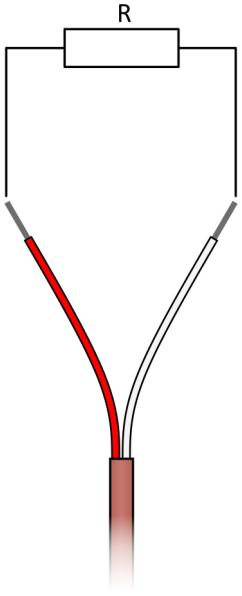


Figure 11R.12: Two-wire RTD wiring diagram

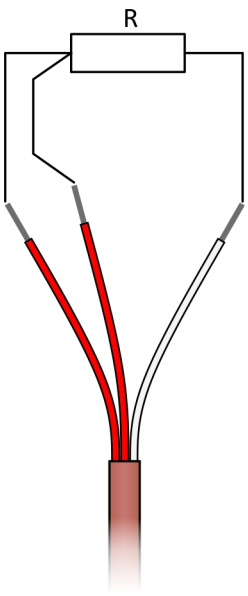


Figure 11R.13: Three-wire RTD wiring diagram

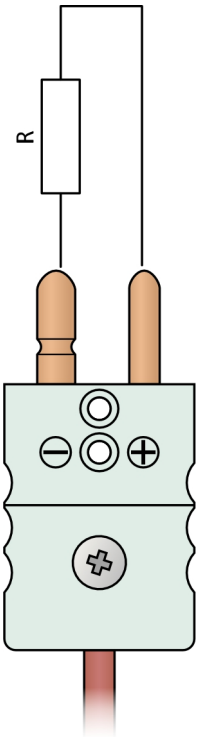


Figure 11R.14: Two-wire RTD wiring diagram with connector

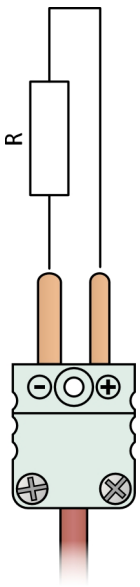


Figure 11R.15: Two-wire RTD wiring diagram with miniature connector

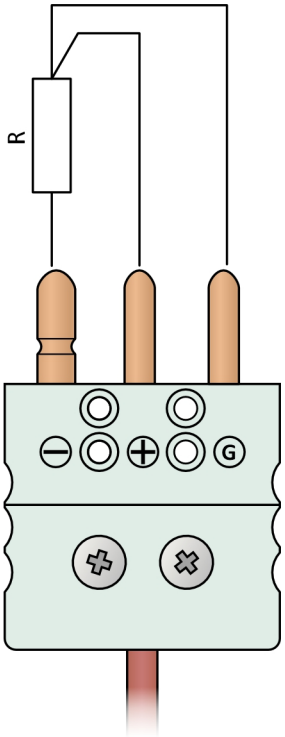


Figure 11R.16: Three-wire RTD wiring diagram with connector

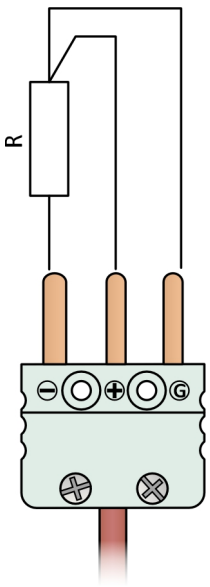


Figure 11R.17: Three-wire RTD wiring diagram with miniature connector

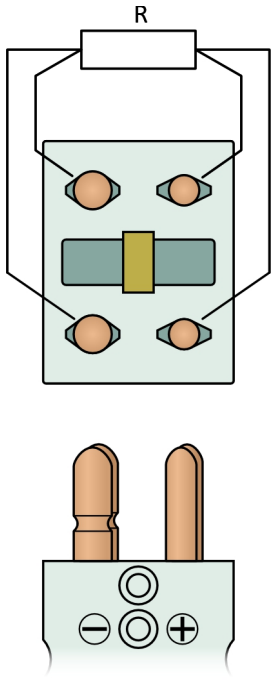


Figure 11R.18: Four-wire RTD wiring diagram with connector

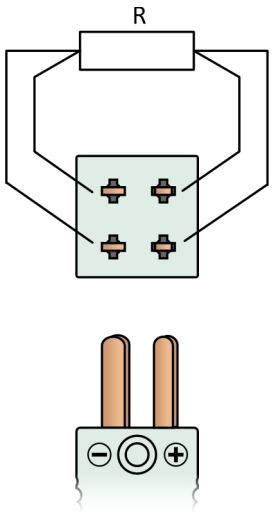


Figure 11R.19: Four-wire RTD wiring diagram with miniature connector

MTR11F

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

The MTR11F series temperature sensors are simple in design and robust at the same time. The small head size allows for use in locations with limited installation space.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable. The sensor is flexible and can be easily positioned to the measurement location.

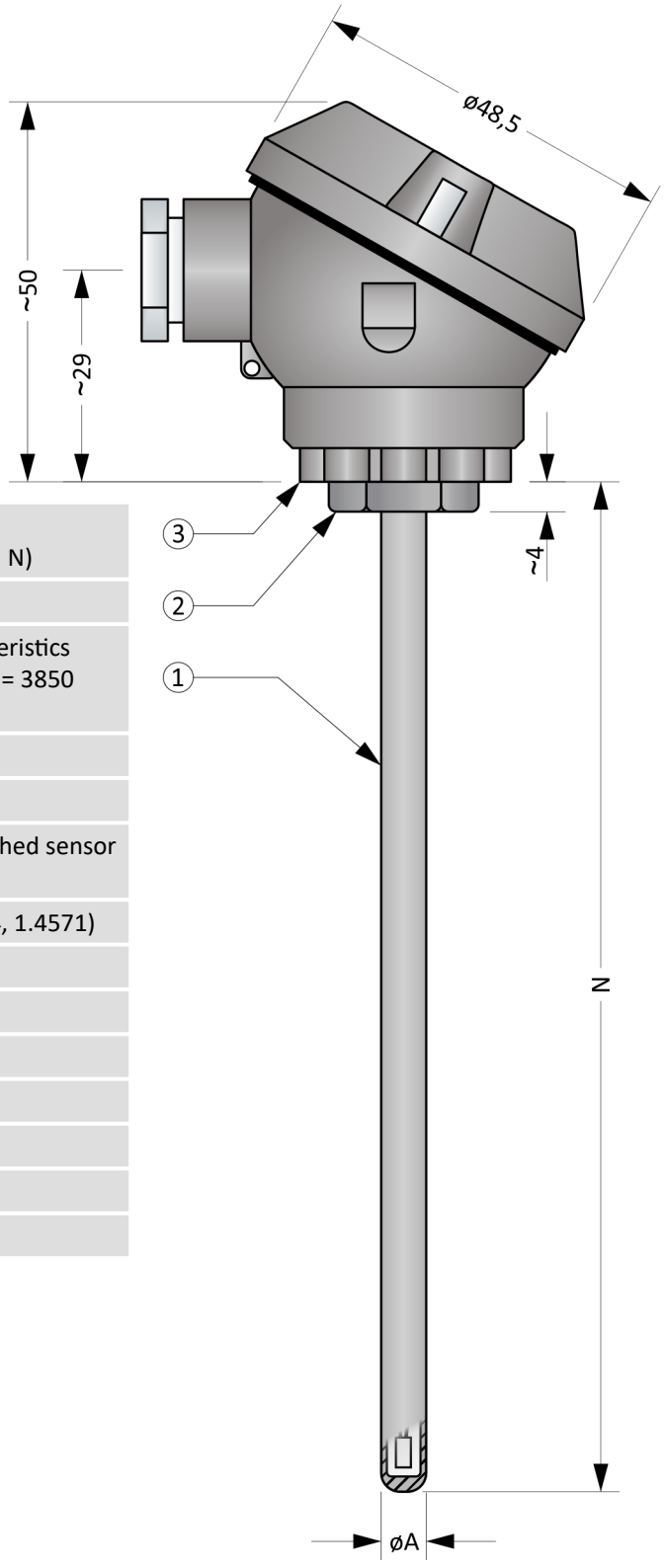


Figure 11F.1: MTR11F

General Information (Table 11F.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Cable gland**	
	Material	Stainless steel
③	**Head**	
	Type	F
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 11F.2)

Pos.	Code	MTR011F - ❶❷❸ - ❹	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	2 x Pt100, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	4	2 x Pt500, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	5	2 x Pt1000, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W.
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W, ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for 2x2W, 2W, ø A = 5 mm, Pt500, Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 70 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	

Order code example: MTR011F-030-500

... 1 x Pt100, four-wire connection

... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C

... A = 6,0 mm

... Nominal length N = 500 mm

Approximate weight of the product: MTR011F-030-500 ... 0,2 kg

Length Tolerances (Table 11F.3)

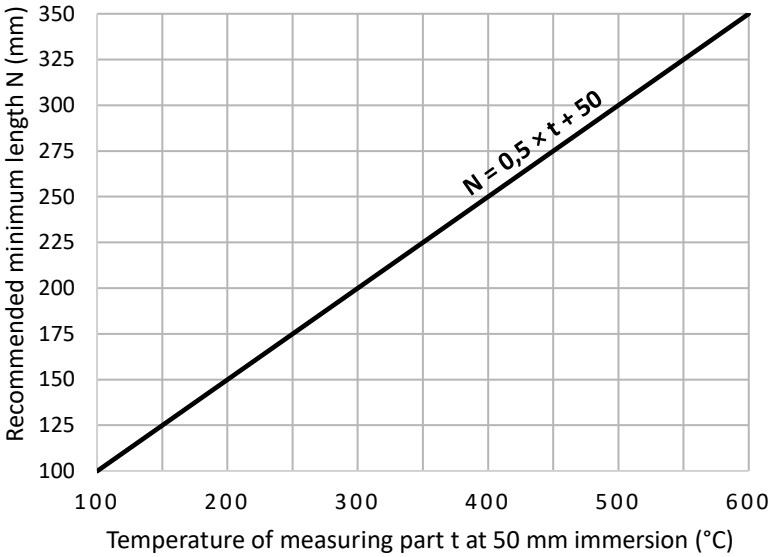
Length	Length tolerance N
≤ 1500 mm	± 2 mm
1500 mm < Length ≤ 2500 mm	± 3 mm
2500 mm < Length ≤ 5000 mm	± 10 mm
> 5000 mm	± 20 mm

Diameter Tolerances (Table 11F.4)

Diameter Tolerance A
± 0,1 mm

Recommended Min. Sensor Length N (Chart 11F.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the head. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 11F.5)

Sensor part	Continuous operation	Short-term operation
Head	< 100 °C	---
Measuring end	See working range from table 11F.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Installation And Operating Instructions

The sensor stem is used for mechanical mounting, e.g. for fixing with a compression fitting. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 11F.2.

The electrical wiring of the sensor is shown in the Figures 11F.3 a 11F.4. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

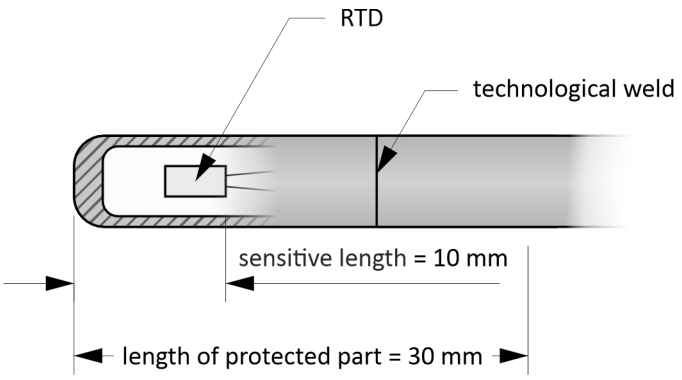


Figure 11F.2: Measuring end detail

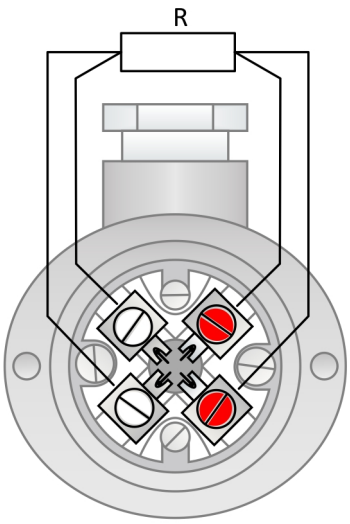


Figure 11F.3: Four-wire RTD wiring diagram

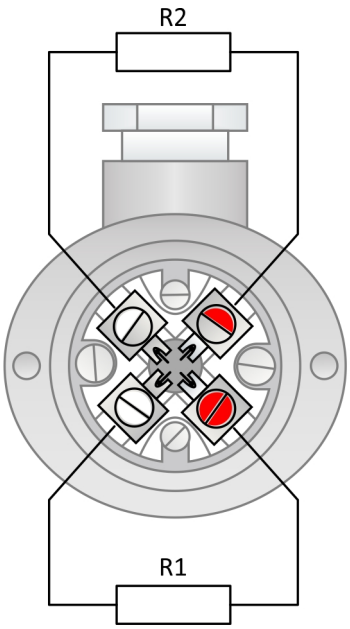


Figure 11F.4: Two-wire 2 x RTD wiring diagram

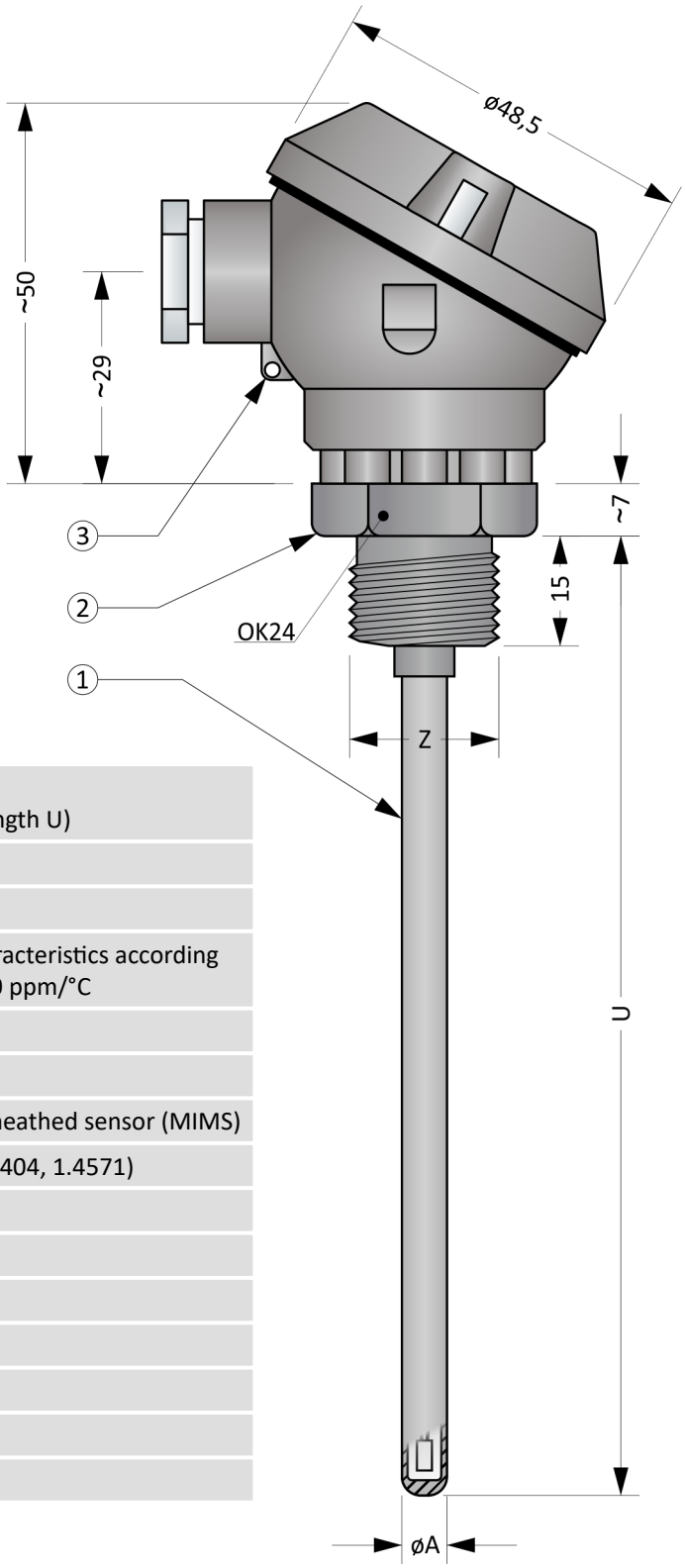
MTR11FS

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

The MTR11FS series temperature sensors are simple in design and robust at the same time. The small head size allows for use in locations with limited installation space.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable, head and threaded fitting. The sensor is flexible and can be easily positioned to the measurement location.



General Information (Table 11F.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length U)
	Max. overpressure	3 bar (if sealed)
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Threaded fitting**	
	Material	Stainless steel
③	**Head**	
	Type	F
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Figure 11FS.1: MTR11FS

Optional Parameters Including the Creation of an Order Code (Table 11FS.2)

Pos.	Code	MTR011FS - ❶❷❸ - ❹ - ❺	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	2 x Pt100, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	4	2 x Pt500, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
	5	2 x Pt1000, two-wire connection (2x2W)	Not possible for ø A = 3 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W.
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W, ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for 2x2W, 2W, ø A = 5 mm, Pt500, Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Immersion depth U [mm]**		
	xxx	Selectable range from 70 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	
❺	**Type of thread Z**		
	0	Thread Z = G½“, unsealed	
	1	Thread Z = G½“, sealed	
	2	Thread Z = M20 x 1,5, unsealed	
	3	Thread Z = M20 x 1,5, sealed	

Order code example: MTR011FS-030-500-0

... 1 x Pt100, four-wire connection

... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C

... A = 6,0 mm

... Immersion depth U = 500 mm

... Thread Z = G½“, unsealed

Approximate weight of the product: MTR011FS-030-500-0 ... 0,2 kg

Length Tolerances (Table 11FS.3)

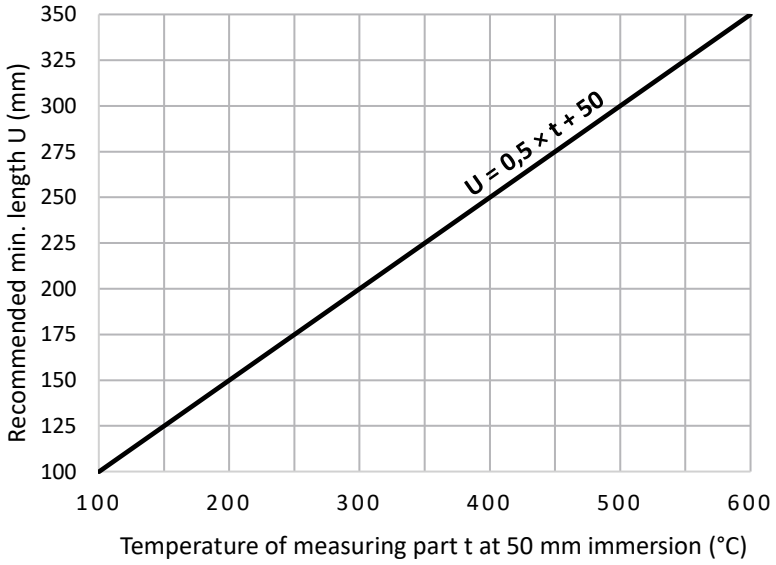
Length	Length tolerance N
≤ 1500 mm	± 2 mm
1500 mm < Length ≤ 2500 mm	± 3 mm
2500 mm < Length ≤ 5000 mm	± 10 mm
> 5000 mm	± 20 mm

Diameter Tolerances (Table 11FS.4)

Diameter Tolerance A
± 0,1 mm

Recommended Min. Sensor Length N (Chart 11FS.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the head. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 11FS.5)

Sensor part	Continuous operation	Short-term operation
Head	< 100 °C	---
Measuring end	See working range from table 11FS.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Installation And Operating Instructions

For mounting the sensor, a fitting is used, which is screwed into the weld-on piece. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 11FS.2.

The electrical wiring of the sensor is shown in the Figures 11FS.3 a 11FS.4. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

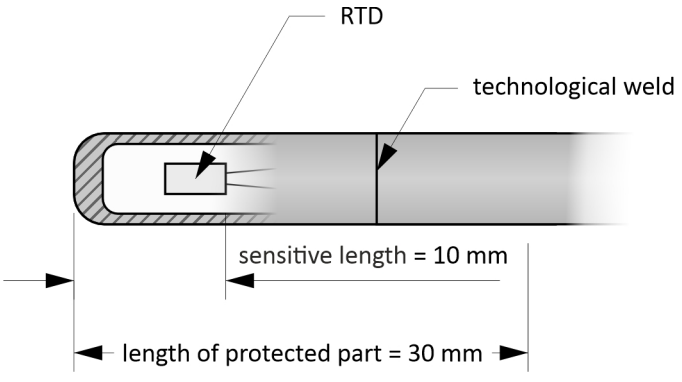


Figure 11FS.2: Measuring end detail

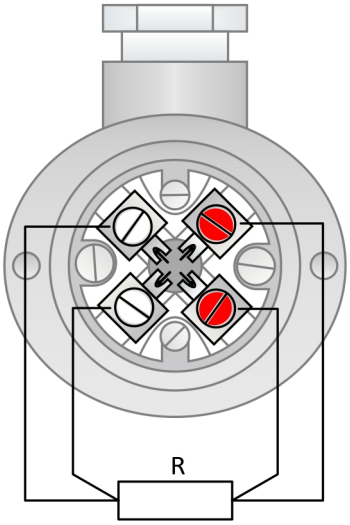


Figure 11FS.3: Four-wire RTD wiring diagram

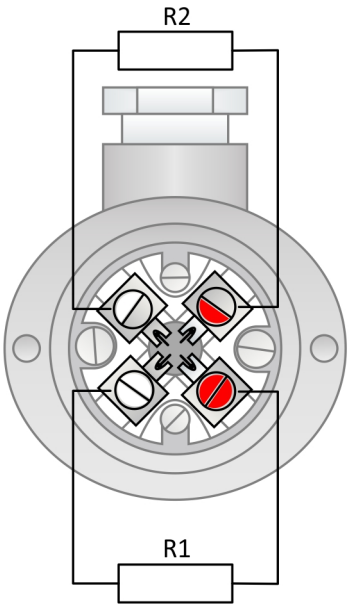


Figure 11FS.4: Two-wire 2 x RTD wiring diagram

MTR11H

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

The MTR11H series temperature sensors are simple in design and robust at the same time. The type B head allows the installation of a unified signal transmitter.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable. The sensor is flexible and can be easily positioned to the measurement location.

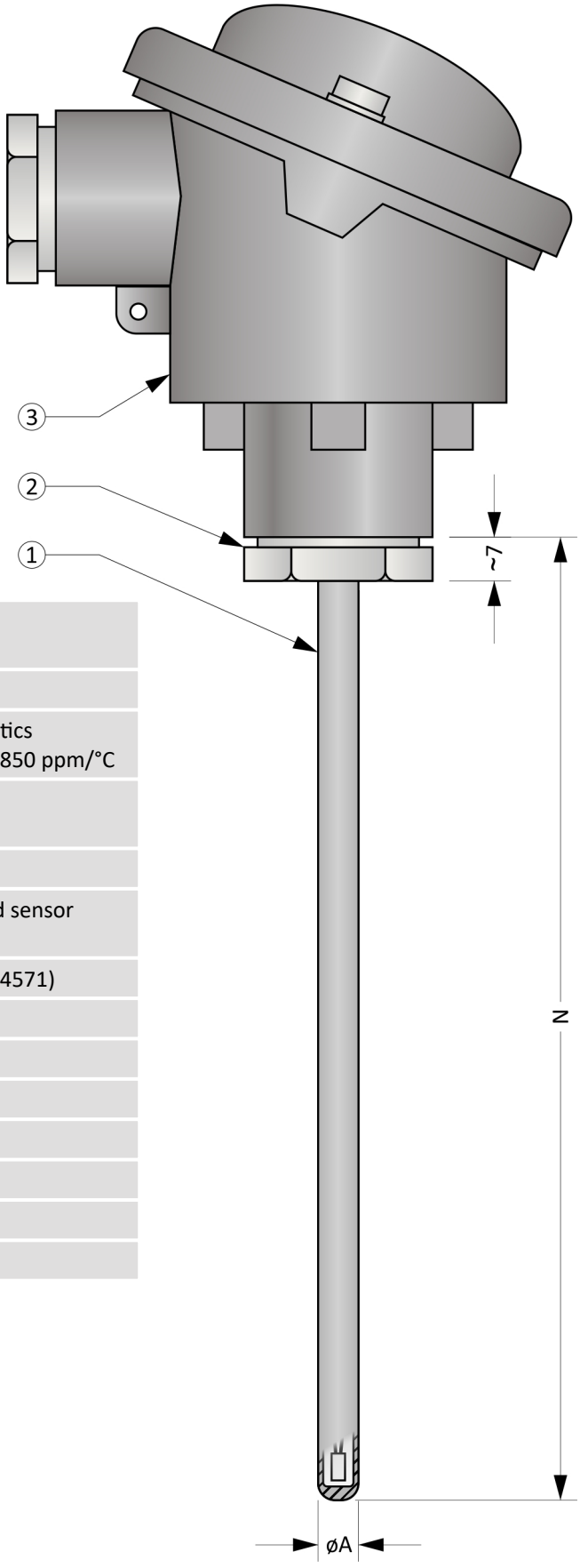


Figure 11H.1: MTR11H

General Information (Table 11H.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Cable gland**	
	Material	Stainless steel
③	**Head**	
	Type	B
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 11H.2)

Pos.	Code	MTR011H - ❶❷❸ - ❹ - ❺❻	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	2 x Pt100, three-wire connection (2x3W)	Not possible for ø A = 5 mm.
	4	2 x Pt500, three-wire connection (2x3W)	Not possible for ø A = 5 mm.
	5	2 x Pt1000, three-wire connection (2x3W)	Not possible for ø A = 5 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 and Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 70 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	
❺	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❻	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR011H-012-300-00

... 1 x Pt100, four-wire connection
... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C
... Outer sheath diameter A = 4,5 mm
... Nominal length N = 300 mm
... Head B
... Without transmitter

Approximate weight of the product: MTR011H-012-300-00 ... 0,2 kg

Length Tolerances (Table 11H.3)

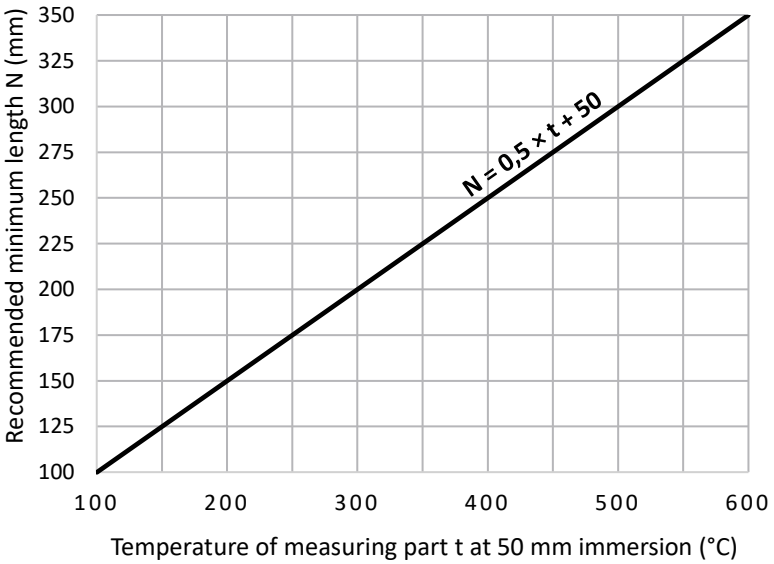
Length	Length tolerance U	Length tolerance K
≤ 1500 mm	± 2 mm	± 2 mm
1500 mm < Length ≤ 2500 mm	± 3 mm	---
2500 mm < Length ≤ 5000 mm	± 10 mm	---
> 5000 mm	± 20 mm	---

Diameter Tolerances (Table 11H.5)

Diameter Tolerance A
± 0,1 mm

Recommended min. length N (graf 11H.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 11H.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Cooling neck, threaded fitting	See working range from table 11H.2	---
Measuring end	See working range from table 11H.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Heads

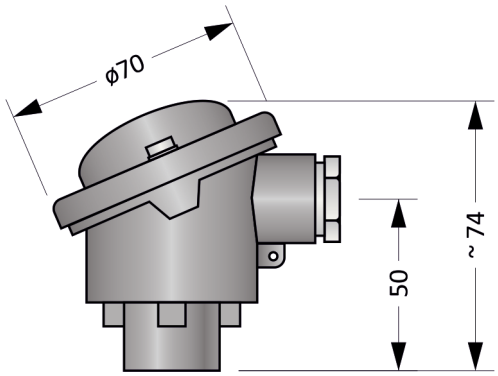


Figure 11H.2: Head B

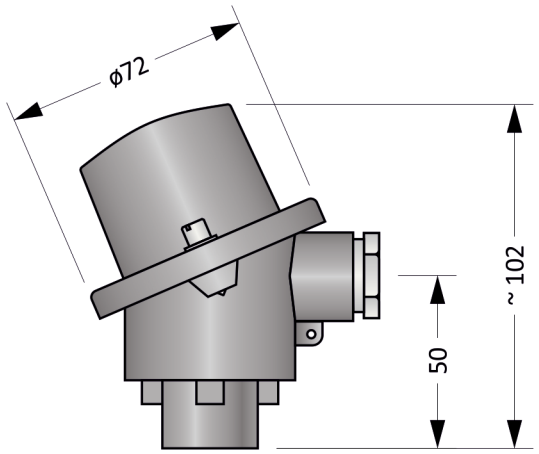


Figure 11H.3: Head BH

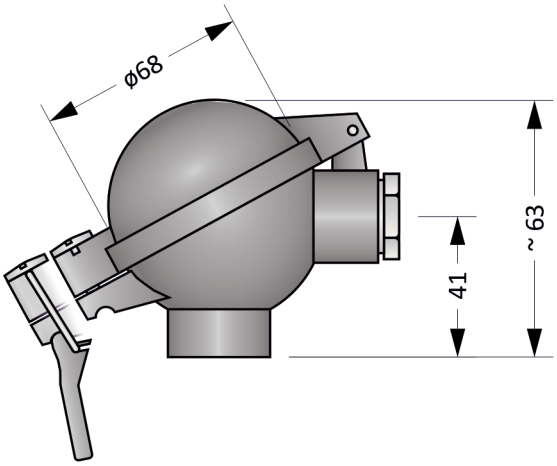


Figure 11H.4: Head BUZ

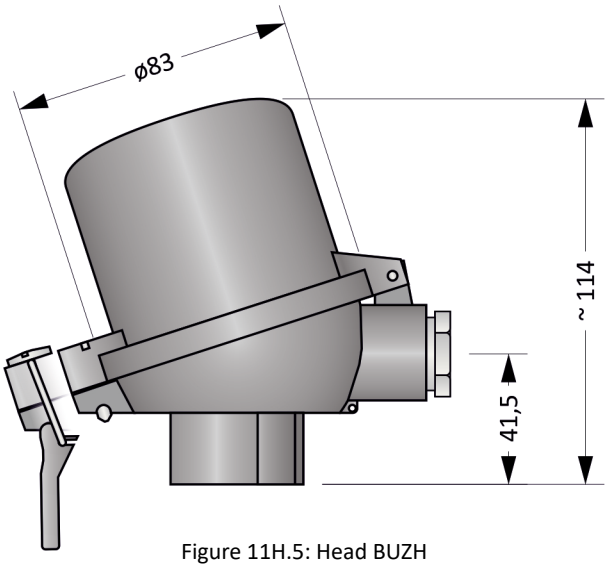


Figure 11H.5: Head BUZH

Head Mounted Transmitters (Table 11H.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Installation And Operating Instructions

The sensor stem is used for mechanical mounting, e.g. for fixing with a compression fitting. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 11H.6.

The electrical connection of sensor with the transmitter is shown in Figure 11H.9.

Electrical connection of the sensor without transmitter is shown in the Figures 11H.7 a 11H.8. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

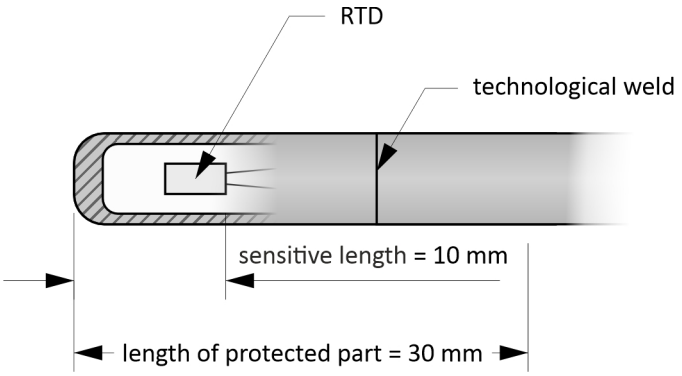


Figure 11H.6: Measuring end detail

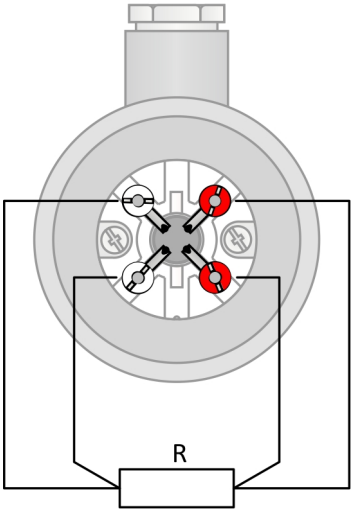


Figure 11H.7: Four-wire RTD wiring diagram

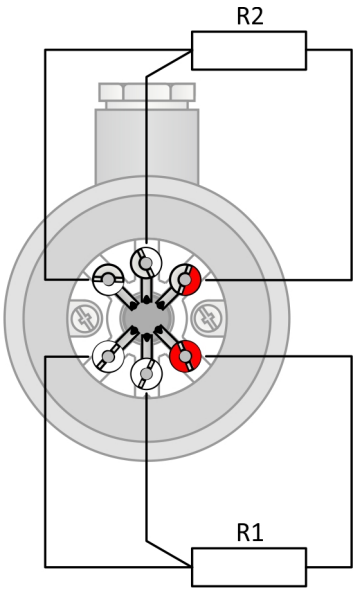


Figure 11H.8: Three-wire 2 x RTD wiring diagram

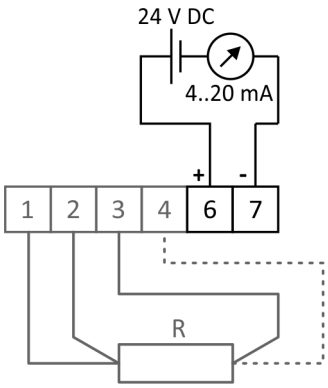


Figure 11H.9: Trasmitter wirring diagram

MTR11HS

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

The MTR11HS series temperature sensors are simple in design and robust at the same time. The type B head allows the installation of a unified signal transmitter.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable, head and threaded fitting. The sensor is flexible and can be easily positioned to the measurement location.

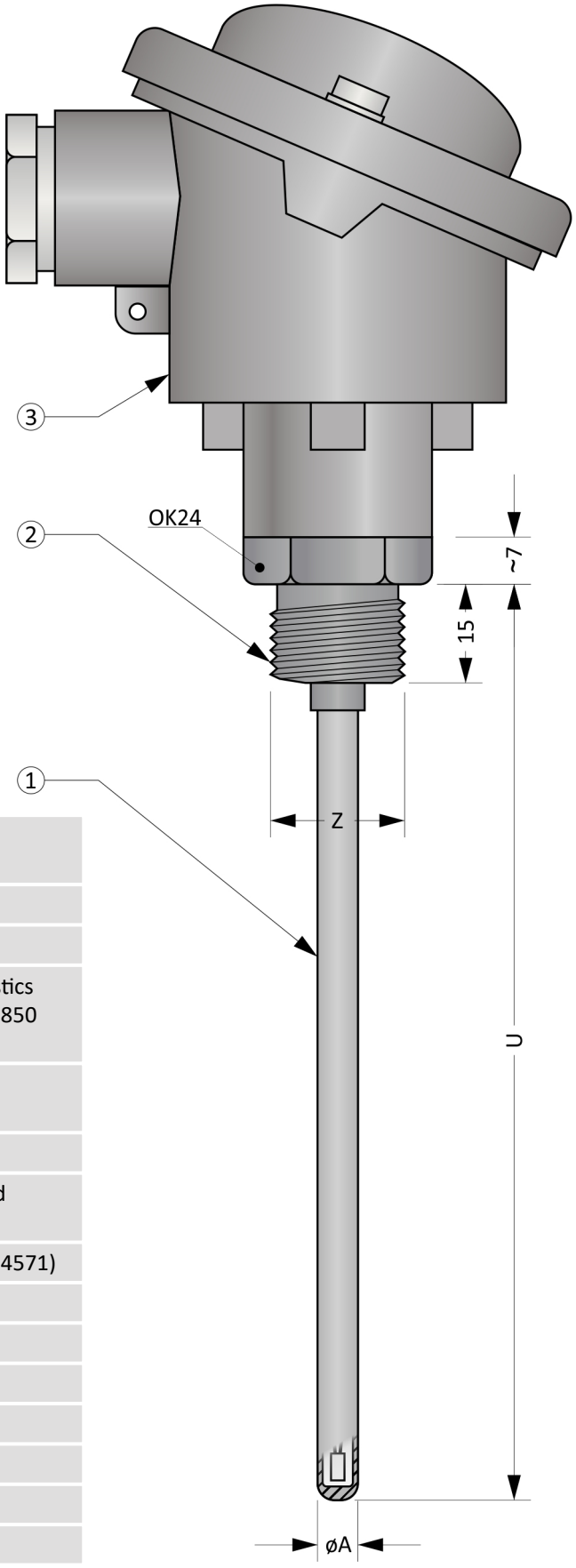


Figure 11HS.1: MTR11HS

General Information (Table 11HS.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length U)
	Max. overpressure	3 bar
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Threaded fitting**	
	Material	Stainless steel
③	**Head**	
	Type	B
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 11HS.2)

Pos.	Code	MTR011HS - ❶❷❸ - ❹ - ❺❻❼	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	2 x Pt100, three-wire connection (2x3W)	Not possible for ø A = 5 mm.
	4	2 x Pt500, three-wire connection (2x3W)	Not possible for ø A = 5 mm.
	5	2 x Pt1000, three-wire connection (2x3W)	Not possible for ø A = 5 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
❹	**Immersion depth U [mm]**		
	xxx	Selectable range from 70 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 100 mm increments)	
❺	**Type of thread Z**		
	0	Thread Z = G½“, OK24	
	1	Thread Z = M20 x 1,5, OK24	
❻	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❼	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR011HS-012-300-000

... 1 x Pt100, four-wire connection
... Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C
... Outer sheath diameter A = 4,5 mm
... Immersion depth U = 300 mm
... Thread Z = G½“
... Head B
... Without transmitter

Approximate weight of the product: MTR011HS-012-300-000 ... 0,2 kg

Length Tolerances (Table 11HS.3)

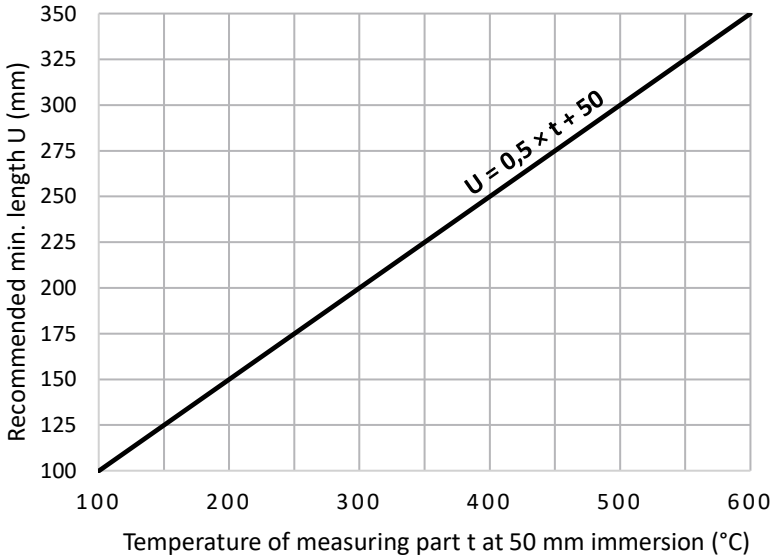
Length	Length tolerance U	Length tolerance K
≤ 1500 mm	± 2 mm	± 2 mm
1500 mm < Length ≤ 2500 mm	± 3 mm	---
2500 mm < Length ≤ 5000 mm	± 10 mm	---
> 5000 mm	± 20 mm	---

Diameter Tolerances (Table 11HS.5)

Diameter Tolerance A
± 0,1 mm

Recommended min. length U (graf 11HS.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 11HS.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Cooling neck, threaded fitting	See working range from table 11HS.2	---
Measuring end	See working range from table 11HS.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Heads

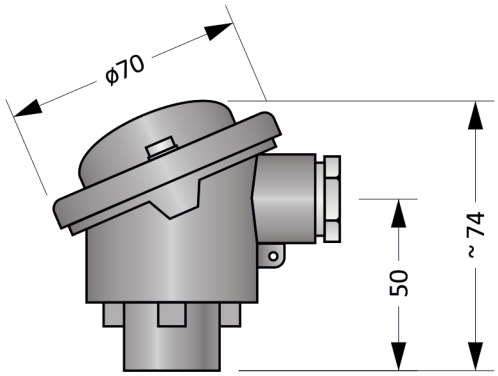


Figure 11HS.2: Head B

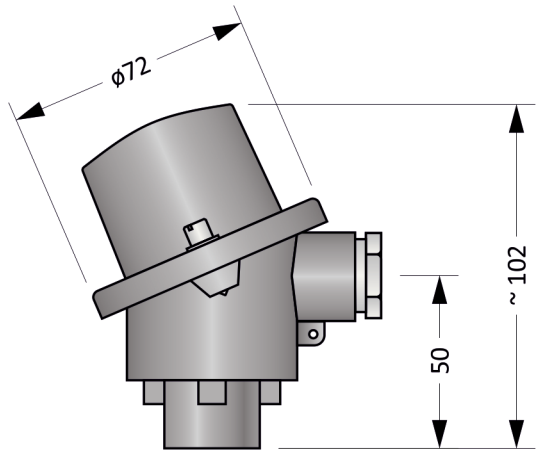


Figure 11HS.3: Head BH

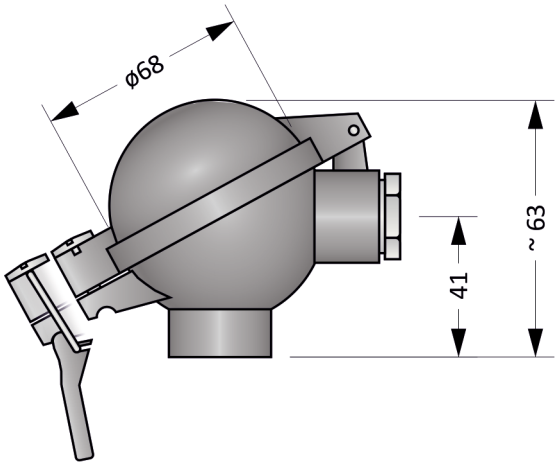


Figure 11HS.4: Head BUZ

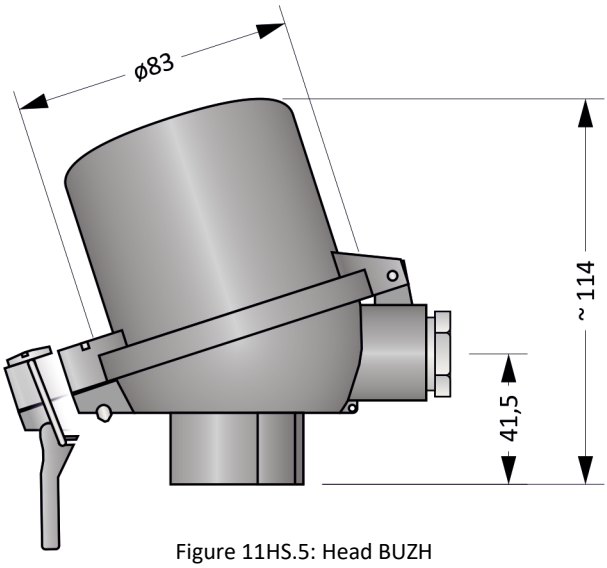


Figure 11HS.5: Head BUZH

Head Mounted Transmitters (Table 11HS.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Installation And Operating Instructions

For mounting the sensor, a fitting is used, which is screwed into the weld-on piece. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 11HS.6.

The electrical connection of sensor with the transmitter is shown in Figure 11HS.9.

Electrical connection of the sensor without transmitter is shown in the Figures 11HS.7 a 11HS.8. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

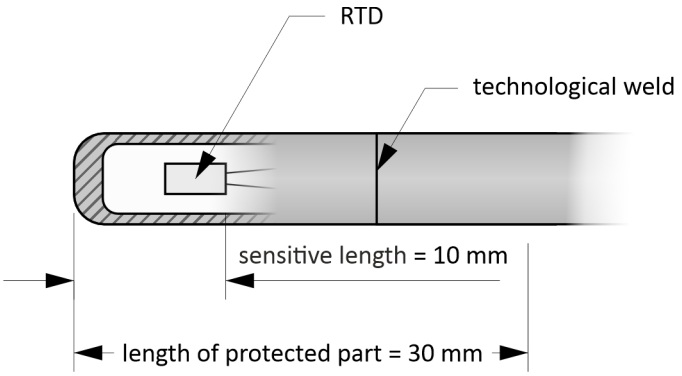


Figure 11HS.6: Measuring end detail

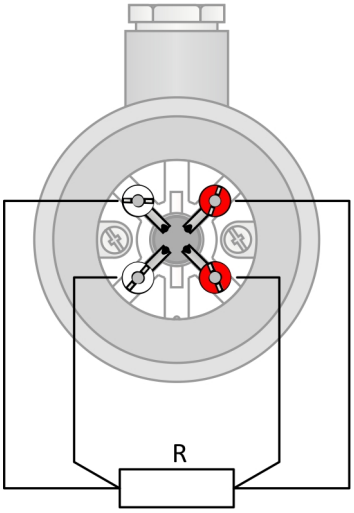


Figure 11HS.7: Four-wire RTD wiring diagram

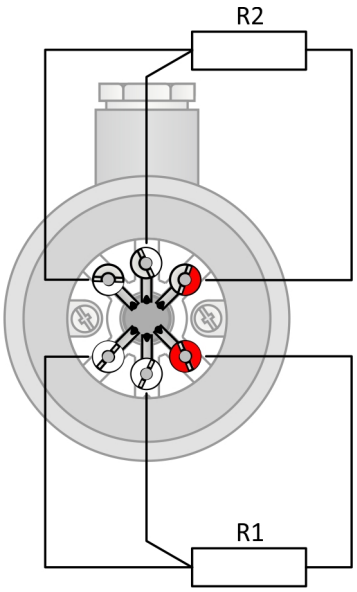


Figure 11HS.8: Three-wire 2 x RTD wiring diagram

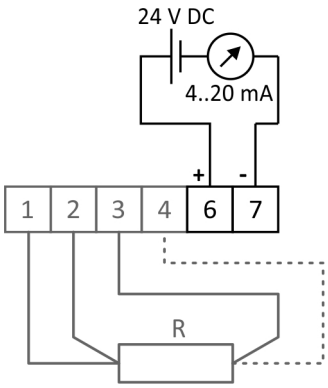


Figure 11HS.9: Trasmitter wirring diagram

MTR12

CABLE RESISTANCE TEMPERATURE SENSORS

MTR12 series consists of cable temperature sensors with a protective tube. They represent a cost-effective solution at the price of some compromises in sensor performance.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistance temperature element protected by a protective tube and a cable.

General Information (Table 12.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (loose conductors) IP50 (cable) IP68 (measuring part in length N)
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Protection tube**	
	Material	Stainless steel
③	**Cable**	
	Min. bending radius	15 × extension cable diameter
④	**Connector**	
⑤	**Loose conductors**	

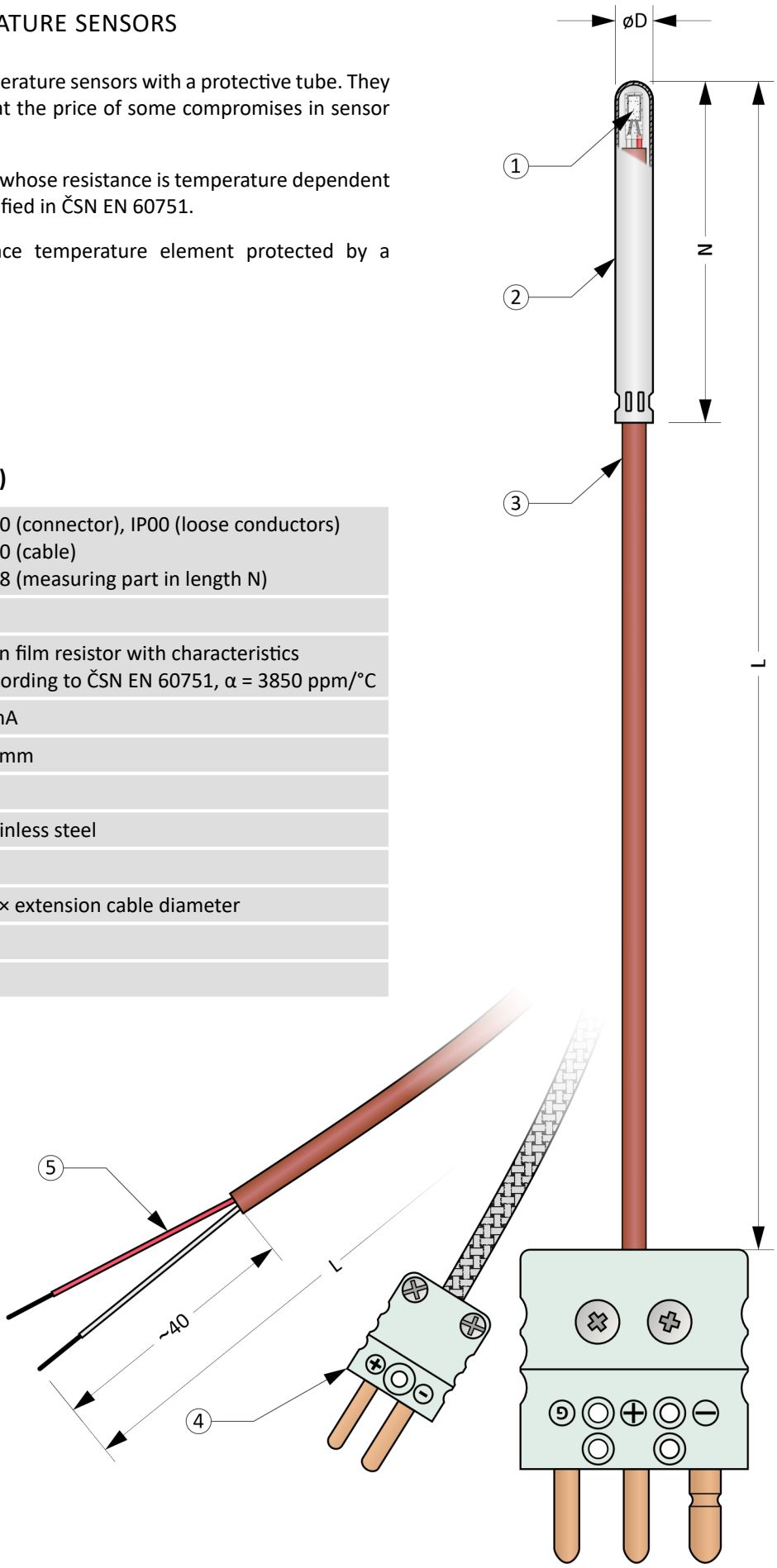


Figure 12.1: MTR12

Optional Parameters Including the Creation of an Order Code (Table 12.2)

Pos.	Code	MTR012 - ❶❷❸ - ❹ - ❺ - ❻❼	
❶	**RTD type**		
	0	1 x Pt100, two-wire connection (2W)	
	1	1 x Pt500, two-wire connection (2W)	
	2	1 x Pt1000, two-wire connection (2W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, four-wire connection (4W)	
	7	1 x Pt500, four-wire connection (4W)	
	8	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, two-wire connection (2x2W)	
	B	2 x Pt500, two-wire connection (2x2W)	
	C	2 x Pt1000, two-wire connection (2x2W)	
	D	2 x Pt100, three-wire connection (2x3W)	
	E	2 x Pt500, three-wire connection (2x3W)	
	F	2 x Pt1000, three-wire connection (2x3W)	
❷	**Accuracy class according to ČSN EN 60751**		
	0	Accuracy class B in range -50 ... +400 °C	
	1	Accuracy class A in range -30 ... +300 °C	Not possible for 2x2W, 2W.
❸	**Cable**		
	0	Cable TGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	1	Cable GLGLV 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	2	Cable GLGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	3	Cable TSL 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	4	Cable TSL 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	5	Cable TWT 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	6	Cable TCuT 4 x 0,22 mm², Copper wires	Not possible for 2W and 2x3W.
	7	Cable TT 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
	8	Cable GLGLV 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
	9	Cable TWTW 4 x 0,14 mm², Copper wires	Not possible for 2x2W and 2x3W.
❹	**Cable length L [cm]**		
	xxx	Selectable range from 20 to 450 cm (in 1 cm increments)	
	xxx	Selectable range from 451 to 3000 cm (in 10 cm increments)	
❺	**Protection tube length N [mm]**		
	xxx	Selectable range from 30 to 500 mm (in 5 mm increments)	For tube diameters of 3.0, 4.0 and 5.0 mm, the length is limited to 150 mm from above
❻	**Protection tube diameter D [mm]**		
	4	D = 3,0 mm	Only for ❸ ... 9
	3	D = 4,0 mm	Only for ❸ ... 1 or 9
	2	D = 5,0 mm	Not for ❸ ... 9
	0	D = 6,0 mm	Not for ❸ ... 9
	1	D = 8,0 mm	Not for ❸ ... 9

Continuarion of table 12.2 on the next page

Continuarion of table 12.2 from the previous page

Pos.	Code	MTR012 - ❶❷❸ - ❹ - ❺ - ❻❼	
❼	**Cold end**		
	0	Loose conductors, length 40 mm	
	1	Standard 2-pin connector, type MTCK-S, plug	Not possible for 3W, 4W and 2x3W.
	2	Standard 2-pin connector, type MTCK-S, plug + socket	Not possible for 3W, 4W and 2x3W.
	3	Standard ceramic 2-pin connector, type MTCK-CS, plug	Not possible for 3W, 4W and 2x3W.
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket	Not possible for 3W, 4W and 2x3W.
	5	Miniature 2-pin connector, type MTCK-M, plug	Not possible for 3W, 4W and 2x3W.
	6	Miniature 2-pin connector, type MTCK-M, plug + socket	Not possible for 3W, 4W and 2x3W.
	A	Standard 3-pin connector, type MTCK-S, plug	Not possible for 2W, 4W, 2x2W.
	B	Standard 3-pin connector, type MTCK-S, plug + socket	Not possible for 2W, 4W, 2x2W.
	C	Miniature 3-pin connector, type MTCK-M, plug	Not possible for 2W, 4W, 2x2W.
	D	Miniature 3-pin connector, type MTCK-M, plug + socket	Not possible for 2W, 4W, 2x2W.
	E	Standard 4-pin connector, type MTCK-S, plug	Not possible for 2W, 3W a 2x3W.
	F	Standard 4-pin connector, type MTCK-S, plug + socket	Not possible for 2W, 3W a 2x3W.
	G	Miniature 4-pin connector, type MTCK-DM, plug	Not possible for 2W, 3W.
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket	Not possible for 2W, 3W.

Order code example: MTR012-612-500-100-0E

... 1 x Pt100, four-wire connection
... accuracy class A in range -30 ... +300 °C
... Cable GLGLV 4 x 0,25 mm², Copper wires
... Cable length L = 500 mm
... Tube length N = 100 cm
... D = 6,0 mm
... Standard 4-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR012-612-500-100-0E ... 0,1 kg

Length tolerance L (Table 12.3)

Length L	Length tolerance L
20 ≤ L ≤ 250 cm	± 1 cm
250 cm < L ≤ 500 cm	± 1,5 cm
500 cm < L ≤ 3000 cm	± 0,5 % z L

Length tolerance N (Table 12.4)

Length tolerance N
± 1 mm

Diameter tolerances (Table 12.5)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts(Table 12.6)

Sensor part	Cable insulation	Continuous operation
Connector MTCK-M, MTCK-S		See cable insulation, max. 220 °C
Ceramic connector MTCK-CS		See cable insulation
Measuring end incl. cable	SL nebo TSL	-60 ... 180 °C
	TWT	-60 ... 205 °C
	TT, TGLV nebo TCuT	-60 ... 205 °C
	GLGLV	< 400 °C
	TWTW	-60 ... 260 °C

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Cables (Table 12.7)

Insulation	Number x cross-section / dia. of wires	Outer cable diameter	Pros and cons
TSL	2 x 0,25 mm² 4 x 0,25 mm²	~ 3,8 mm ~ 4,3 mm	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
TWT	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TWTW	4 x 0,14 mm²	~ 2,5 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TCuT	4 x 0,22 mm²	~ 3,7 mm	↗ Moisture resistant
TT	6 x 0,15 mm²	~ 3,5 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TGLV	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant, high mechanical resistance
GLGLV	2 x 0,25 mm² 4 x 0,25 mm² 6 x 0,15 mm²	~ 3,0 mm ~ 3,2 mm ~ 3,5 mm	↗ High mechanical resistance, suitable for higher temperatures ↘ Low moisture resistance

Connectors

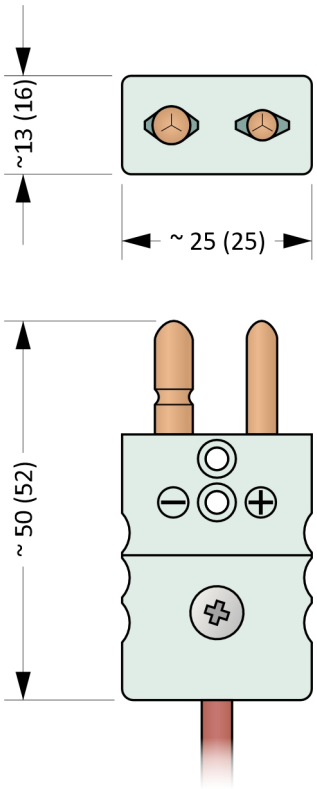


Figure 12.2: MTCK-S (MTCK-CS)

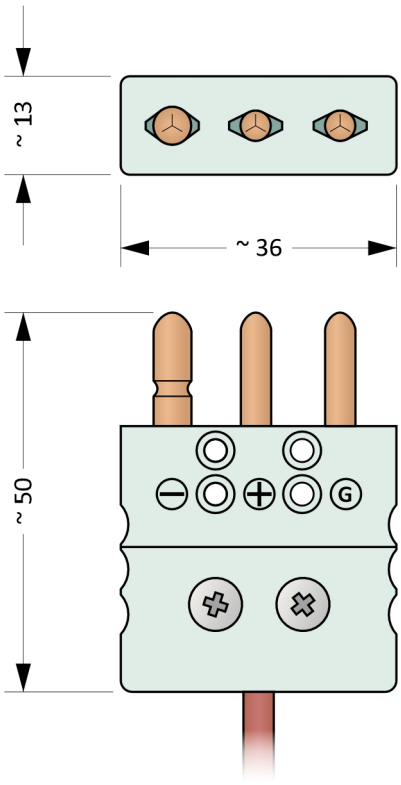


Figure 12.3: MTCK-3S

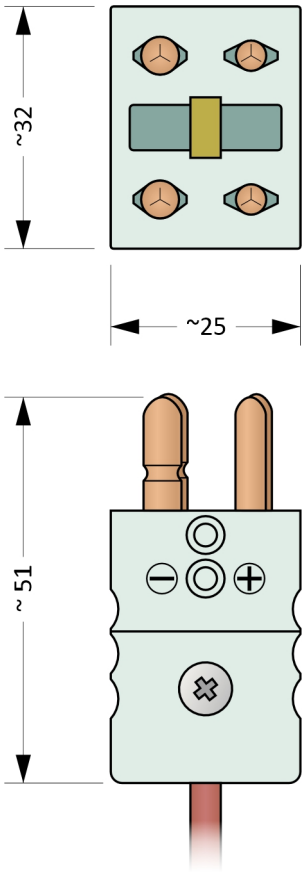


Figure 12.4: MTCK-DS

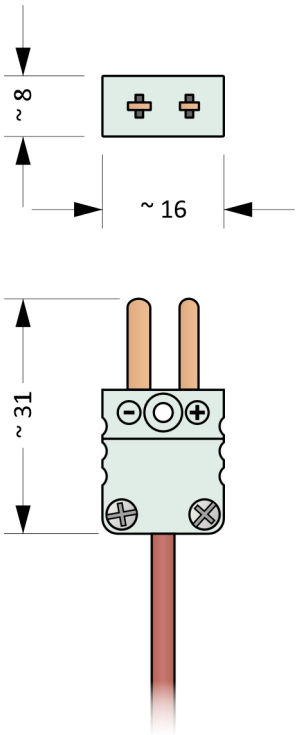


Figure 12.5: MTCK-M

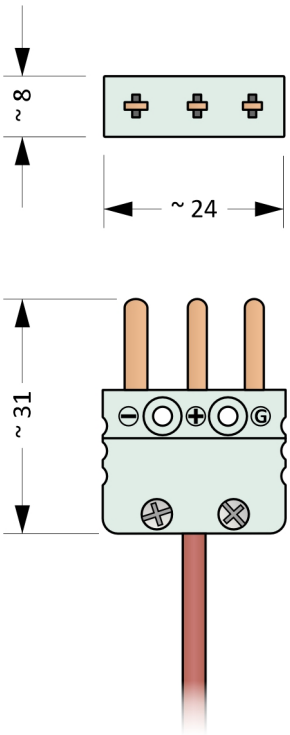


Figure 12.6: MTCK-3M

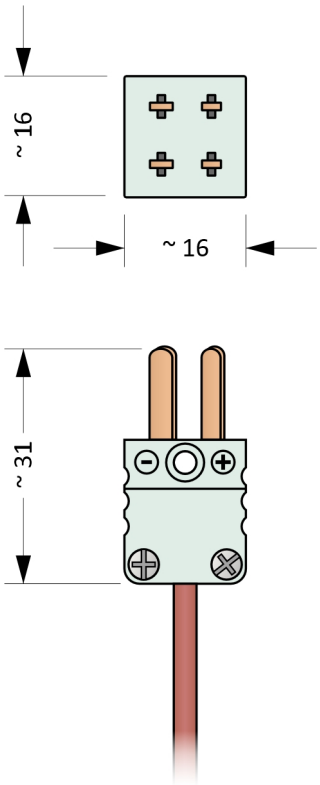


Figure 12.7: MTCK-DM

Installation And Operating Instructions

The sensor stem is used for mounting.

The electrical wiring of the sensor is shown in the Figures 12.8 to 12.20. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

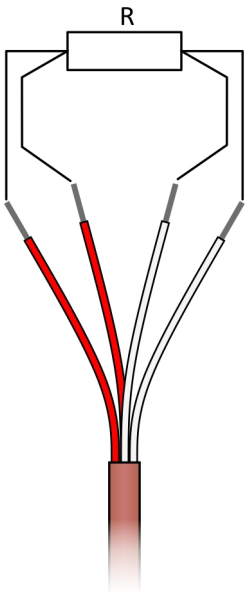


Figure 12.8: Four-wire RTD wiring diagram

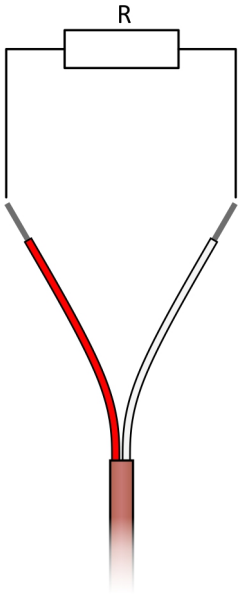


Figure 12.9: RTD v dvouvodičovém zapojení

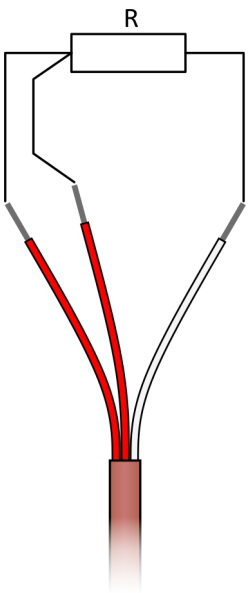


Figure 12.10: Three-wire RTD wiring diagram

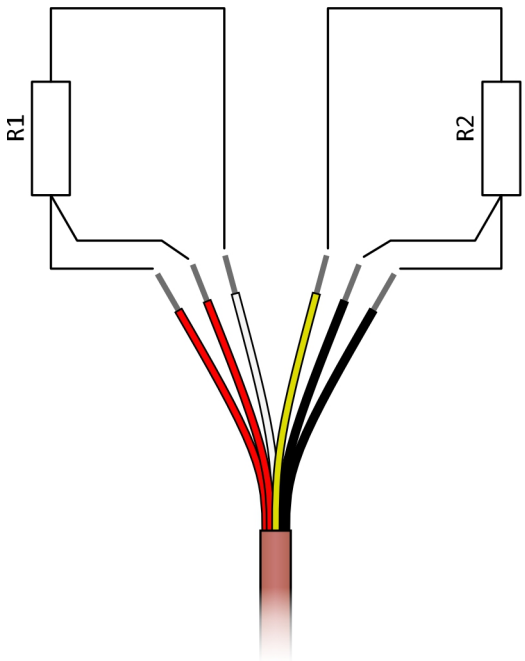


Figure 12.11: Three-wire 2 x RTD wiring diagram

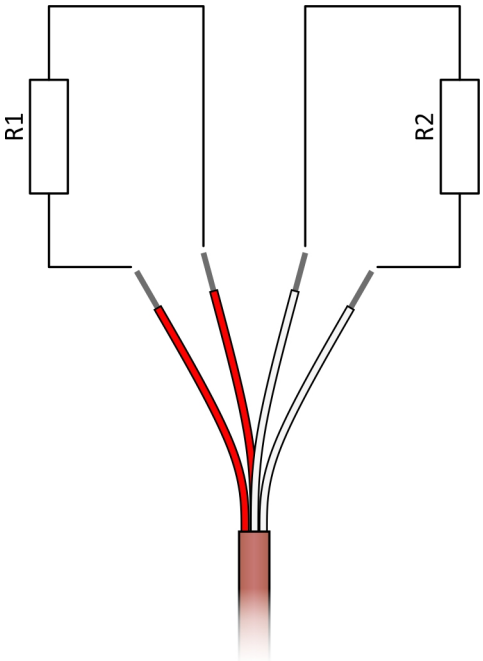


Figure 12.12: Two-wire 2 x RTD wiring diagram

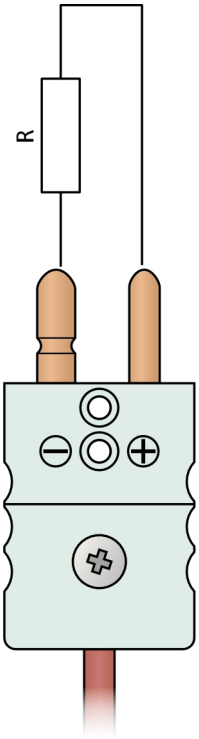


Figure 11.13: Two-wire RTD wiring diagram with connector

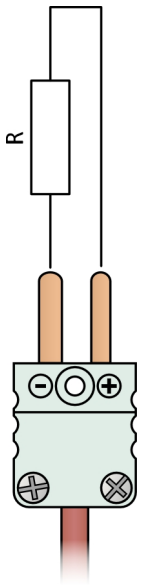


Figure 11.14: Two-wire RTD wiring diagram with miniature connector

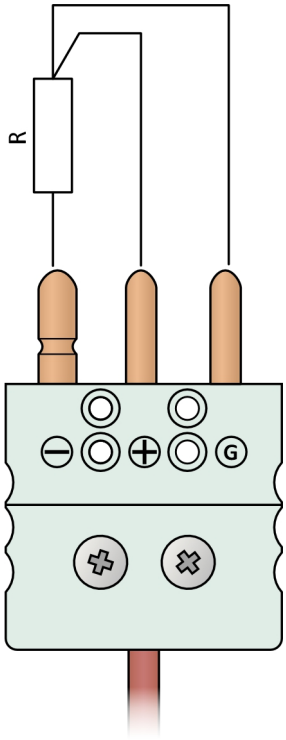


Figure 11.15: Three-wire RTD wiring diagram with connector

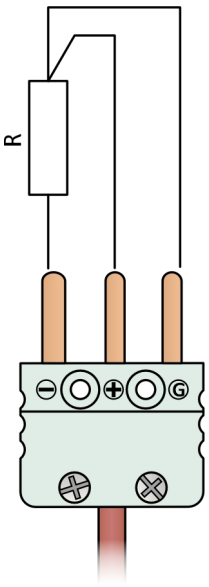
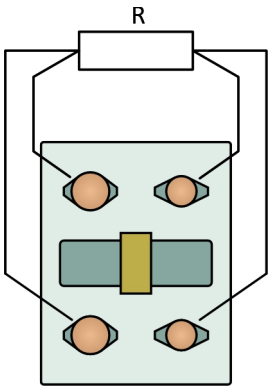


Figure 11.16: Three-wire RTD wiring diagram with miniature connector



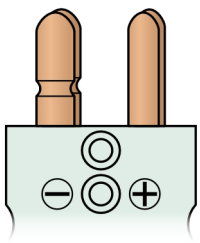
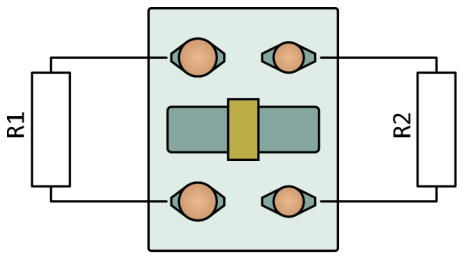


Figure 11.17: Four-wire RTD wiring diagram with connector



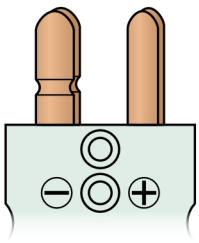


Figure 11.18: Two-wire 2 x RTD wiring diagram with connector

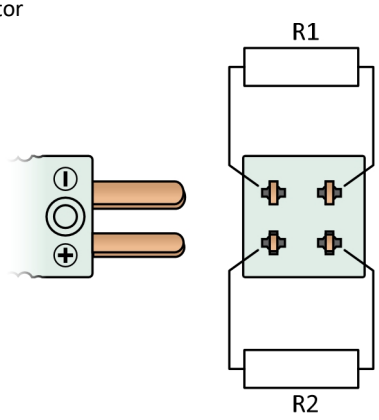
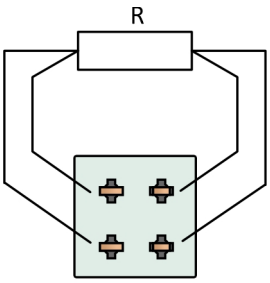


Figure 11.19: Two-wire 2 x RTD wiring diagram with miniature connector



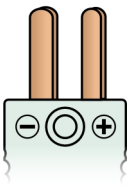


Figure 11.20: Four-wire RTD wiring diagram with miniature connector

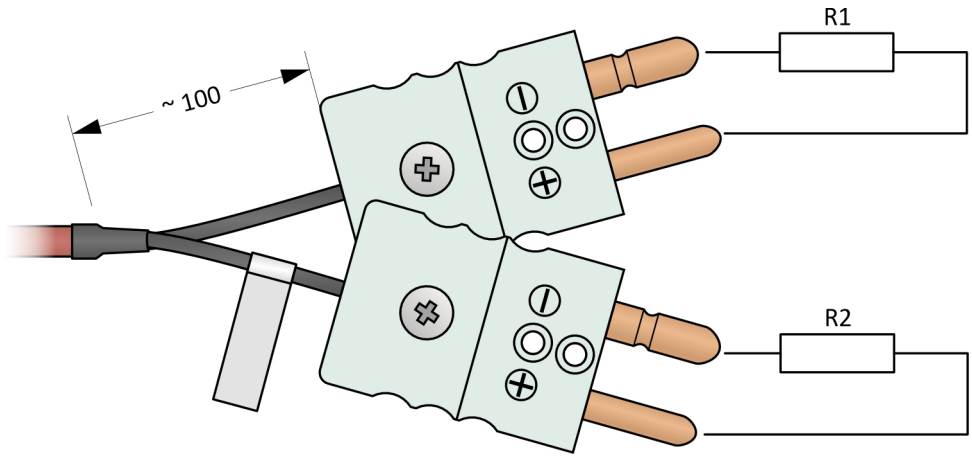


Figure 12.21: Two-wire 2 x RTD wiring diagram with connectors

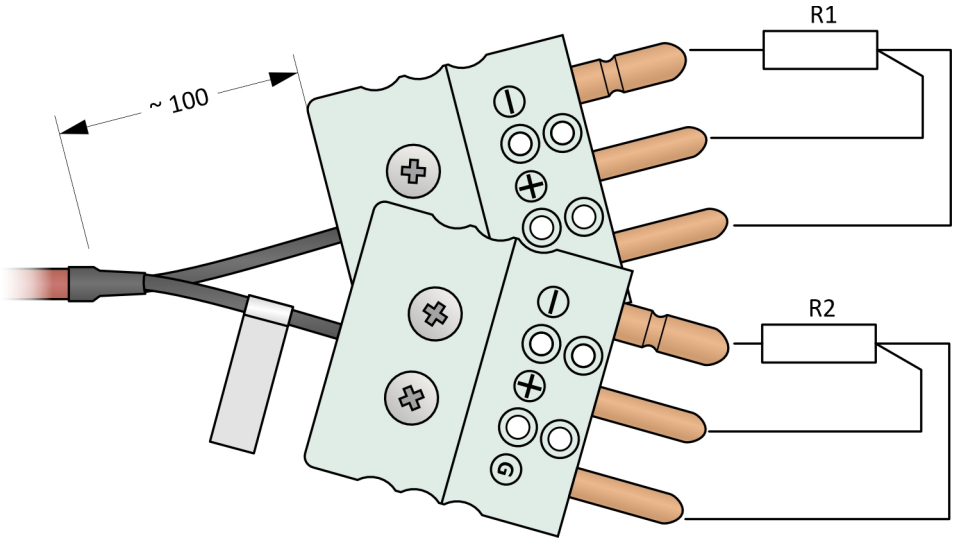


Figure 12.22: Three-wire 2 x RTD wiring diagram with connectors

MTR12M

CABLE RESISTANCE TEMPERATURE SENSORS

MTR12M series consists of the simplest version of cable resistance temperature sensors with a protective tube.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistance temperature element protected by a protective tube and a cable.

General Information (Table 12M.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (loose conductors) IP50 (cable) IP68 (measuring part in length N)
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	Accuracy class	B according to ČSN EN 60751
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Protection tube**	
	Material	Stainless steel
	Outer diameter	5 mm
③	**Cable**	
	Type	TSL 2 x 0,25 mm², vodiče Cu
	Min. bending radius	15 × extension cable diameter
	Properties	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
④	**Connector**	
⑤	**Loose conductors**	

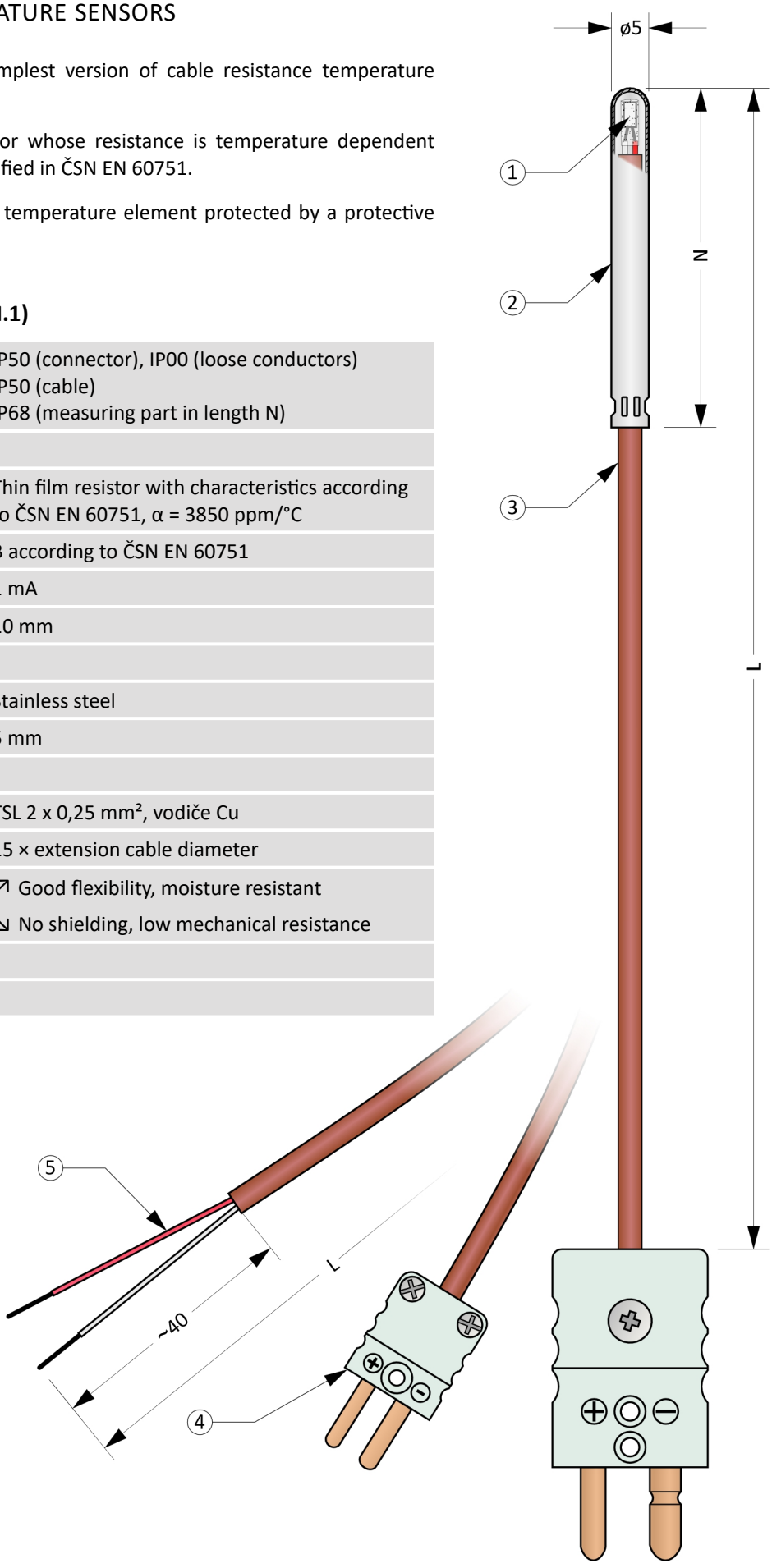


Figure 12M.1: MTR12M

Optional Parameters Including the Creation of an Order Code (Table 12M.2)

Pos.	Code	MTR012M - ❶❷ - ❸ - ❹
❶	**RTD type**	
	0	1 x Pt100, two-wire connection (2W)
	1	1 x Pt500, two-wire connection (2W)
	2	1 x Pt1000, two-wire connection (2W)
❷	**Protection tube length N [mm]**	
	0	Length N = 50 mm
❸	**Cable length L [cm]**	
	xxx	Selectable range from 20 to 450 cm (in 1 cm increments)
	xxx	Selectable range from 451 to 3000 cm (in 10 cm increments)
❹	**Provedení studeného konce snímače**	
	0	Loose conductors, length 40 mm
	1	Standard 2-pin connector, type MTCK-S, plug
	2	Standard 2-pin connector, type MTCK-S, plug + socket
	3	Miniature 2-pin connector, type MTCK-M, plug
	4	Miniature 2-pin connector, type MTCK-M, plug + socket

Order code example: MTR012M-00-500-1
... 1 x Pt100, dvouvodičové zapojení
... Tube length N = 50 mm
... Délka kabelu L = 500 cm
... Standard 2-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR012M-00-500-1 ... 0,1 kg

Length tolerance L (Table 12M.3)

Length L	Length tolerance L
20 ≤ L ≤ 250 cm	± 1 cm
250 cm < L ≤ 500 cm	± 1,5 cm
500 cm < L ≤ 3000 cm	± 0,5 % z L

Length tolerance N (Table 12M.4)

Length tolerance N
± 1 mm

Diameter tolerances (Table 12M.5)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts(Table 12M.6)

Sensor part	Continuous operation
Connector MTCK-M, MTCK-S	< 180 °C
Measuring end incl. cable	-60 ... 180 °C

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Connectors

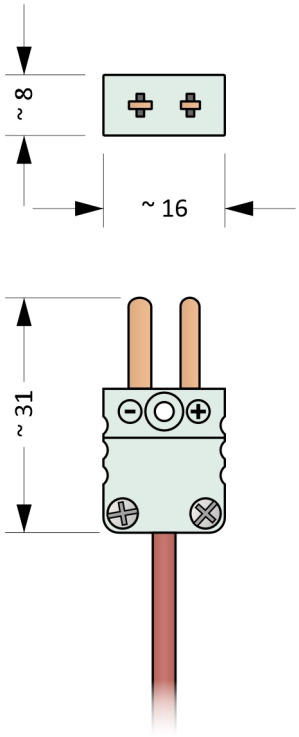


Figure 12M.2: MTCK-M

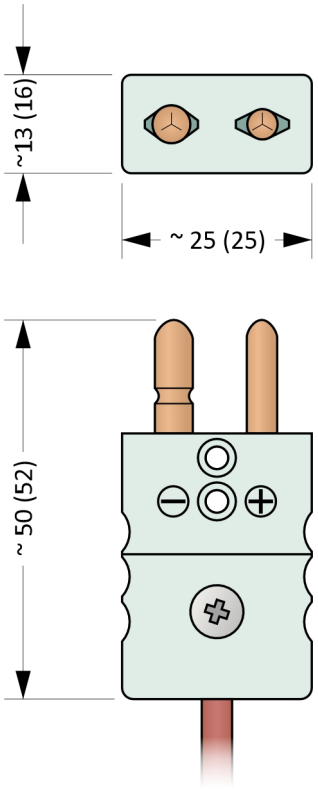


Figure 12M.3: MTCK-S

Installation And Operating Instructions

The sensor stem is used for mounting.

The electrical wiring of the sensor is shown in the Figures 12.4 to 12.6. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

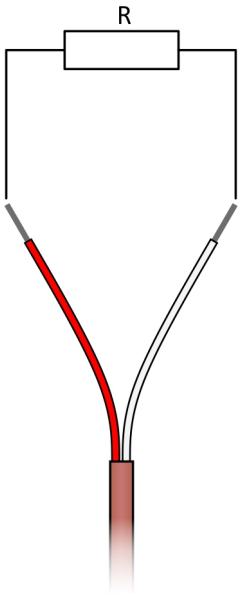


Figure 12M.4: Two-wire RTD wiring diagram

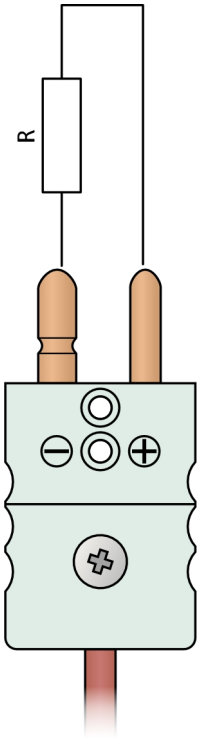


Figure 12M.5: Three-wire RTD wiring diagram with connector

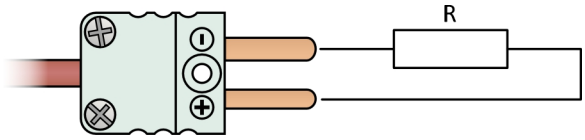


Figure 12M.6: Two-wire RTD wiring diagram with miniature connector

MTR12U

CABLE RESISTANCE TEMPERATURE SENSORS

MTR12U series consists of cable temperature sensors with a angled protective tube. They represent an economical solution for applications not requiring high temperature and mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistance temperature element protected by a protective tube and a cable.

General Information (Table 12U.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (loose conductors) IP50 (cable), IP68 (measuring part in length N)
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Protection tube**	
	Material	Stainless steel
③	**Cable**	
	Min. bending radius	15 × extension cable diameter
④	**Connector**	
⑤	**Loose conductors**	

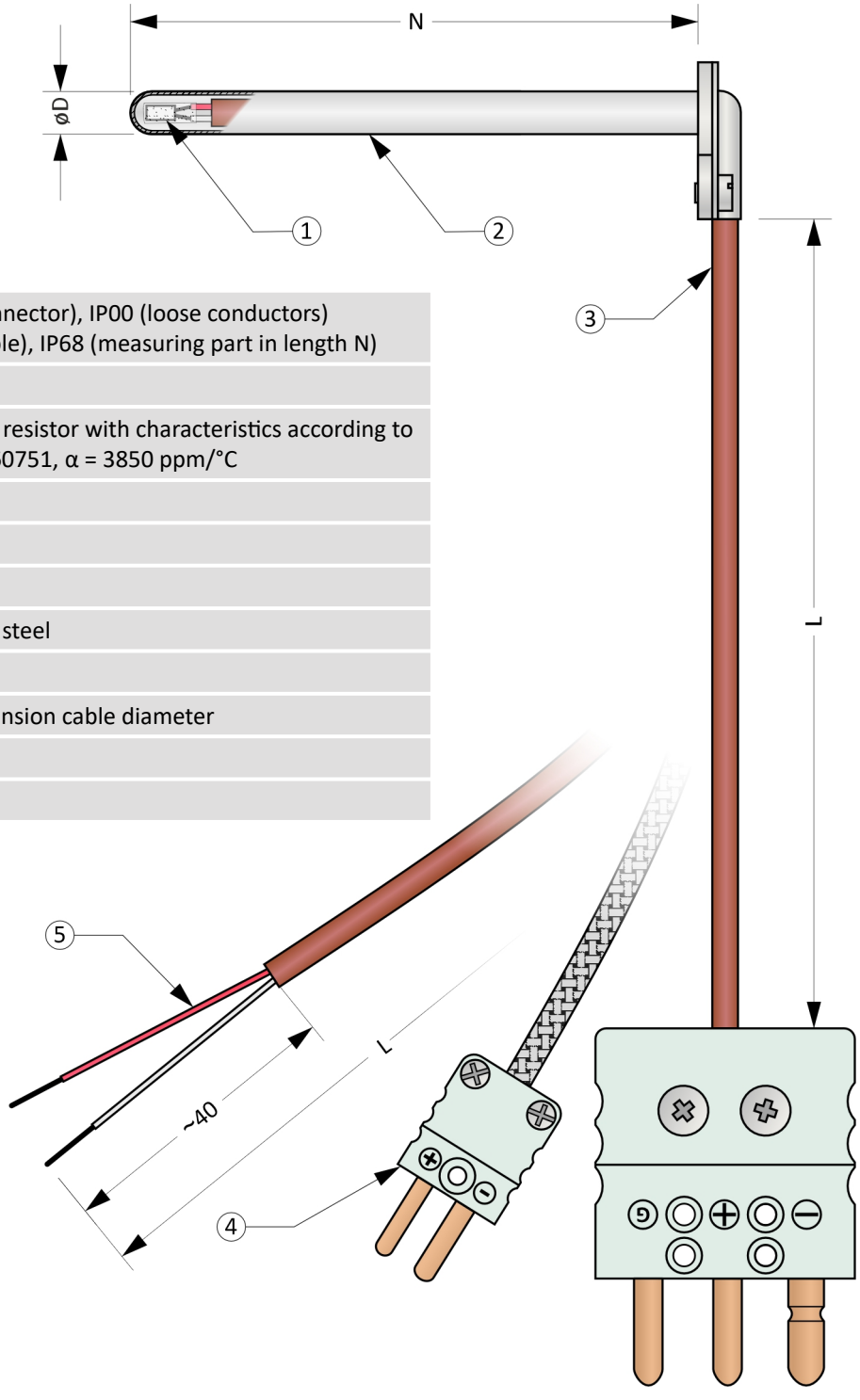


Figure 12U.1: MTR12U

Optional Parameters Including the Creation of an Order Code (Table 12U.2)

Pos.	Code	MTR012U - ❶❷❸ - ❹ - ❺ - ❻❼	
❶	**RTD type**		
	0	1 x Pt100, two-wire connection (2W)	
	1	1 x Pt500, two-wire connection (2W)	
	2	1 x Pt1000, two-wire connection (2W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, four-wire connection (4W)	
	7	1 x Pt500, four-wire connection (4W)	
	8	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, two-wire connection (2x2W)	
	B	2 x Pt500, two-wire connection (2x2W)	
	C	2 x Pt1000, two-wire connection (2x2W)	
	D	2 x Pt100, three-wire connection (2x3W)	
	E	2 x Pt500, three-wire connection (2x3W)	
	F	2 x Pt1000, three-wire connection (2x3W)	
❷	**Accuracy class according to ČSN EN 60751**		
	0	accuracy class B in range -50 ... +500 °C	
	1	accuracy class A in range -30 ... +300 °C	Not possible for 2x2W a 2W.
❸	**Cable**		
	0	Cable TGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	1	Cable GLGLV 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	2	Cable GLGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	3	Cable TSL 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	4	Cable TSL 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	5	Cable TWT 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	6	Cable TCuT 4 x 0,22 mm², Copper wires	Not possible for 2W and 2x3W.
	7	Cable TT 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
	8	Cable GLGLV 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
❹	**Cable length L [cm]**		
	xxx	Selectable range from 20 to 450 cm (in 1 cm increments)	
	xxx	Selectable range from 451 to 3000 cm (in 10 cm increments)	
❺	**Protection tube length N [mm]**		
	xxx	Selectable range from 30 to 500 mm (in 5 mm increments)	
❻	**Protection tube diameter D [mm]**		
	0	D = 6,0 mm	

Continuarion of table 12U.2 on the next page

Continuarion of table 12U.2 from the previous page

Pos.	Code	MTR012U - ❶❷❸ - ❹ - ❺ - ❻❼	
❼	**Cold end**		
	0	Loose conductors, length 40 mm	
	1	Standard 2-pin connector, type MTCK-S, plug	Not possible for 3W, 4W and 2x3W.
	2	Standard 2-pin connector, type MTCK-S, plug + socket	Not possible for 3W, 4W and 2x3W.
	3	Standard ceramic 2-pin connector, type MTCK-CS, plug	Not possible for 3W, 4W and 2x3W.
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket	Not possible for 3W, 4W and 2x3W.
	5	Miniature 2-pin connector, type MTCK-M, plug	Not possible for 3W, 4W and 2x3W.
	6	Miniature 2-pin connector, type MTCK-M, plug + socket	Not possible for 3W, 4W and 2x3W.
	A	Standard 3-pin connector, type MTCK-S, plug	Not possible for 2W, 4W, 2x2W.
	B	Standard 3-pin connector, type MTCK-S, plug + socket	Not possible for 2W, 4W, 2x2W.
	C	Miniature 3-pin connector, type MTCK-M, plug	Not possible for 2W, 4W, 2x2W.
	D	Miniature 3-pin connector, type MTCK-M, plug + socket	Not possible for 2W, 4W, 2x2W.
	E	Standard 4-pin connector, type MTCK-S, plug	Not possible for 2W, 3W a 2x3W.
	F	Standard 4-pin connector, type MTCK-S, plug + socket	Not possible for 2W, 3W a 2x3W.
	G	Miniature 4-pin connector, type MTCK-DM, plug	Not possible for 2W, 3W.
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket	Not possible for 2W, 3W.

Order code example: MTR012U-612-500-100-0E

... 1 x Pt100, four-wire connection
... accuracy class A in range -30 ... +300 °C
... Cable GLGLV 4 x 0,25 mm², Copper wires
... Cable length L = 500 mm
... Tube length N = 100 cm
... D = 6,0 mm
... Standard 4-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR012U-612-500-100-0E ... 0,1 kg

Length tolerance L (Table 12U.3)

Length L	Length tolerance L
20 ≤ L ≤ 250 cm	± 1 cm
250 cm < L ≤ 500 cm	± 1,5 cm
500 cm < L ≤ 3000 cm	± 0,5 % z L

Length tolerance N (Table 12U.4)

Length tolerance N
± 1 mm

Diameter tolerances (Table 12U.5)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts(Table 12U.6)

Sensor part	Cable insulation	Continuous operation
Connector MTCK-M, MTCK-S		See cable insulation, max. 220 °C
Ceramic connector MTCK-CS		See cable insulation
Measuring end incl. cable	SL nebo TSL	-60 ... 180 °C
	TWT	-60 ... 205 °C
	TT, TGLV nebo TCuT	-60 ... 205 °C
	GLGLV	< 400 °C

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Cables (Table 12U.7)

Insulation	Number x cross-section / dia. of wires	Outer cable diameter	Pros and cons
TSL	2 x 0,25 mm² 4 x 0,25 mm²	~ 3,8 mm ~ 4,3 mm	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
TWT	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TCuT	4 x 0,22 mm²	~ 3,7 mm	↗ Moisture resistant
TT	6 x 0,15 mm²	~ 3,5 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TGLV	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant, high mechanical resistance
GLGLV	2 x 0,25 mm² 4 x 0,25 mm² 6 x 0,15 mm²	~ 3,0 mm ~ 3,2 mm ~ 3,5 mm	↗ High mechanical resistance, suitable for higher temperatures ↘ Low moisture resistance

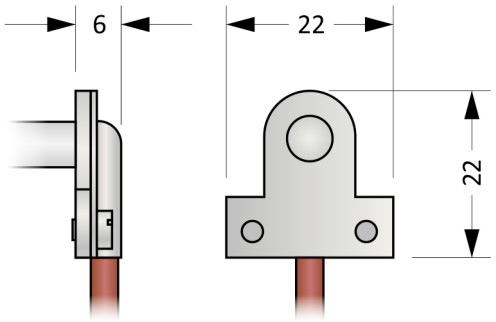


Figure 12U.2: Detail přechodky

Connectors

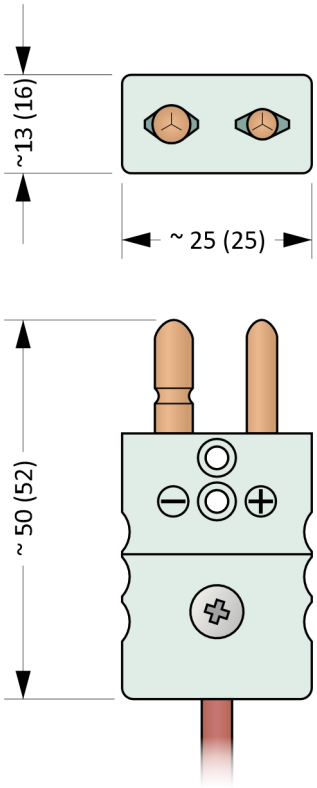


Figure 12U.3: MTCK-S a MTCK-CS

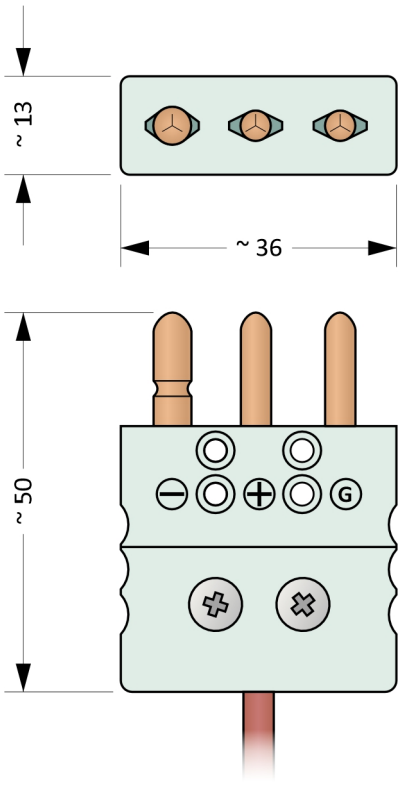


Figure 12U.4: MTCK-3S

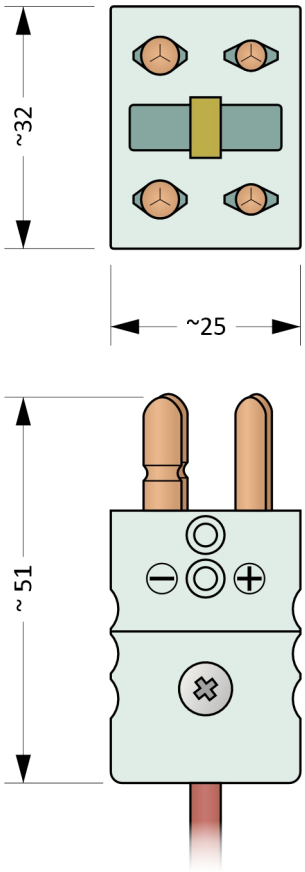


Figure 12U.5: MTCK-DS

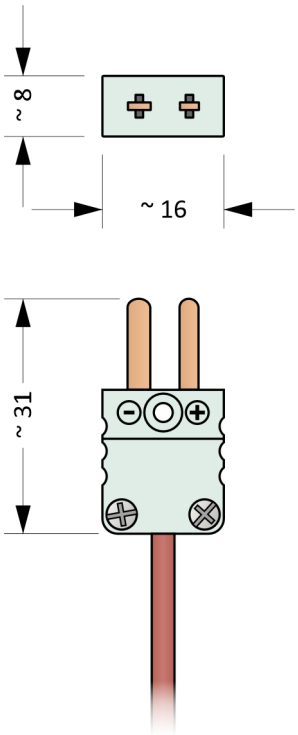


Figure 12U.6: MTCK-M

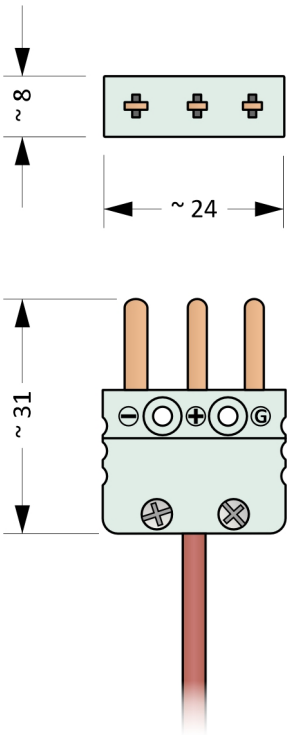


Figure 12U.7: MTCK-3M

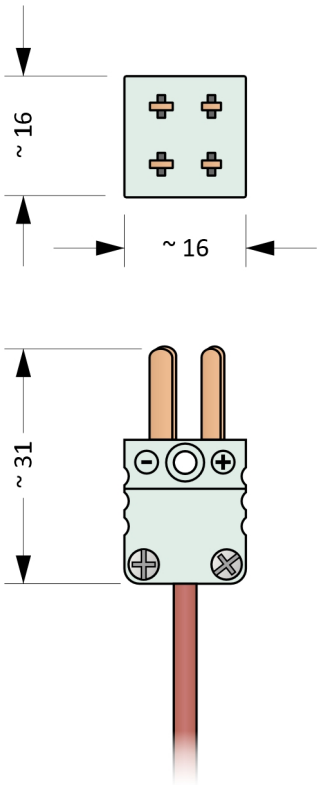


Figure 12U.8: MTCK-DM

Installation And Operating Instructions

The sensor protection tube including the transition part is used for mounting.

The electrical wiring of the sensor is shown in the Figures 12U.9 to 12U.22. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

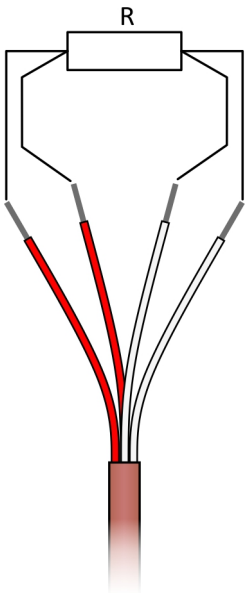


Figure 12U.9: Four-wire RTD wiring diagram

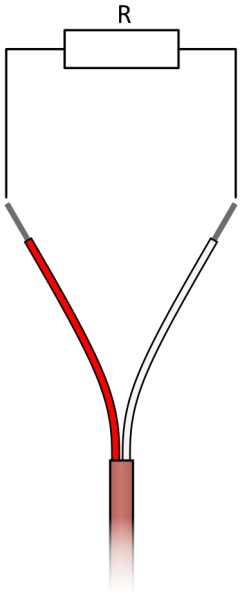


Figure 12U.10: Two-wire RTD wiring diagram

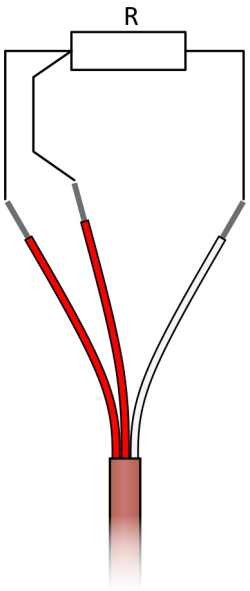


Figure 12U.11: Three-wire RTD wiring diagram

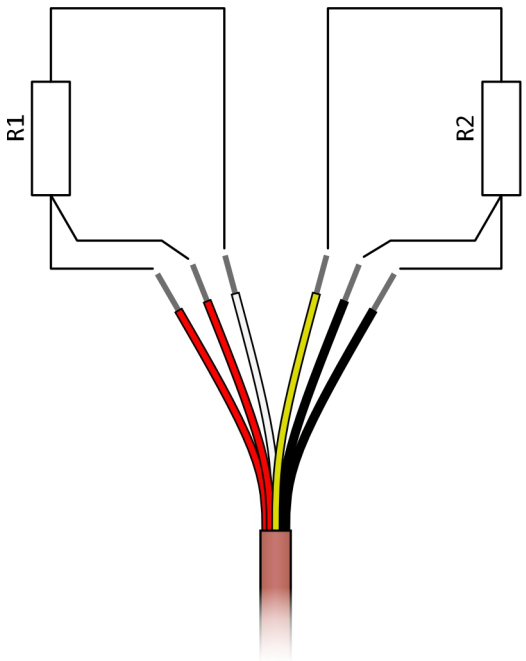


Figure 12U.12: Three-wire 2 x RTD wiring diagram

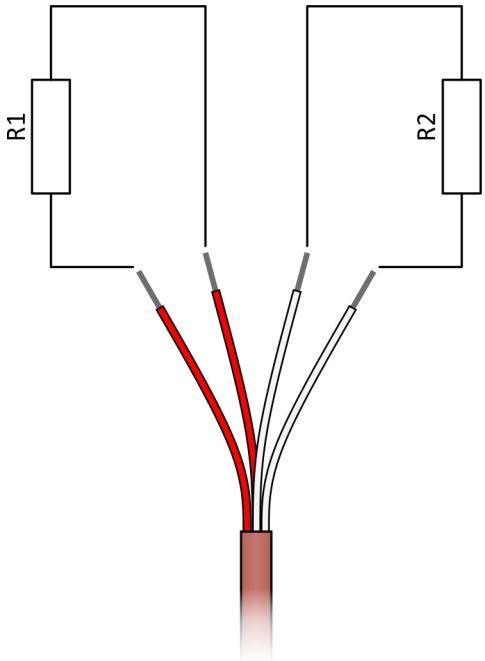


Figure 12U.13: Two-wire 2 x RTD wiring diagram

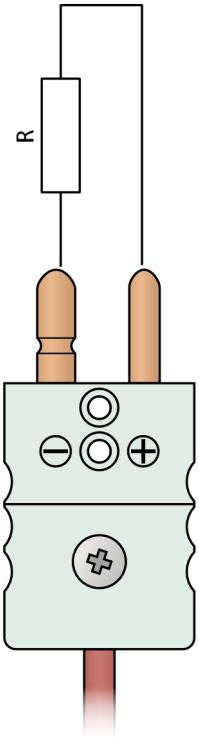


Figure 12U.14: Two-wire RTD wiring diagram with connector

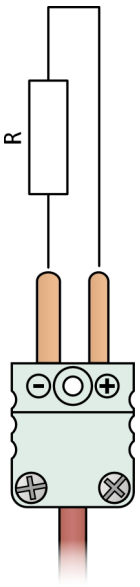


Figure 12U.15: Two-wire RTD wiring diagram with miniature connector

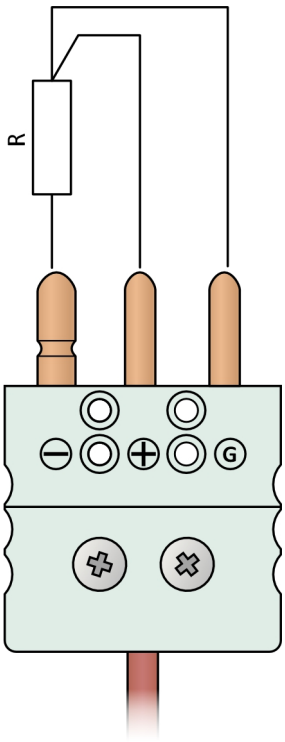


Figure 12U.16: Three-wire RTD wiring diagram with connector

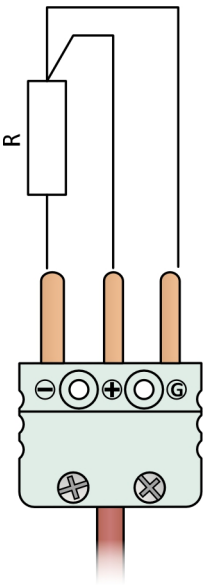
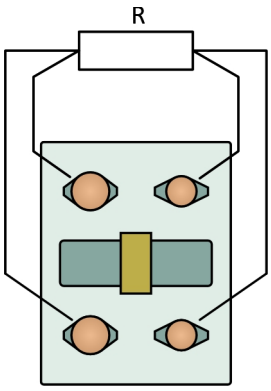


Figure 12U.17: Three-wire RTD wiring diagram with miniature connector



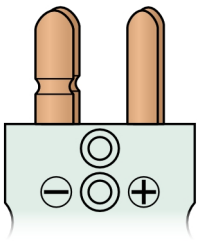
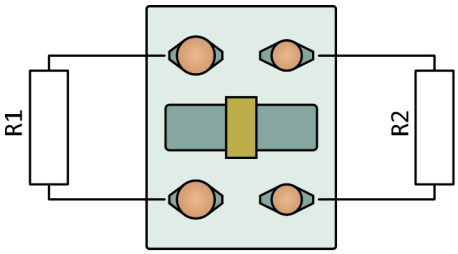


Figure 12U.18: Four-wire RTD wiring diagram with connector



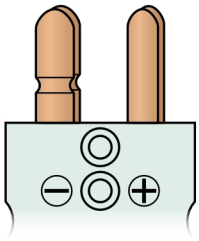


Figure 12U.19: Two-wire 2 x RTD wiring diagram with connector

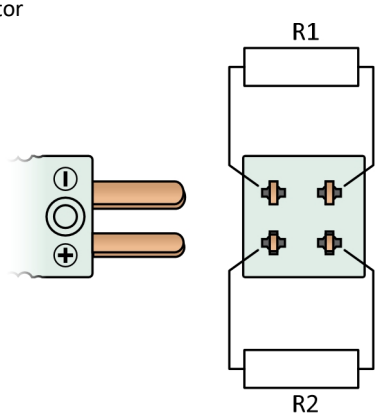


Figure 12U.20: Two-wire 2 x RTD wiring diagram with miniature connector

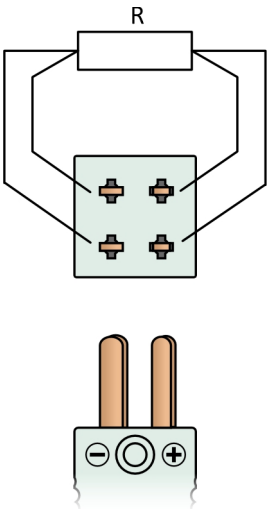


Figure 12U.21: Four-wire RTD wiring diagram with miniature connector

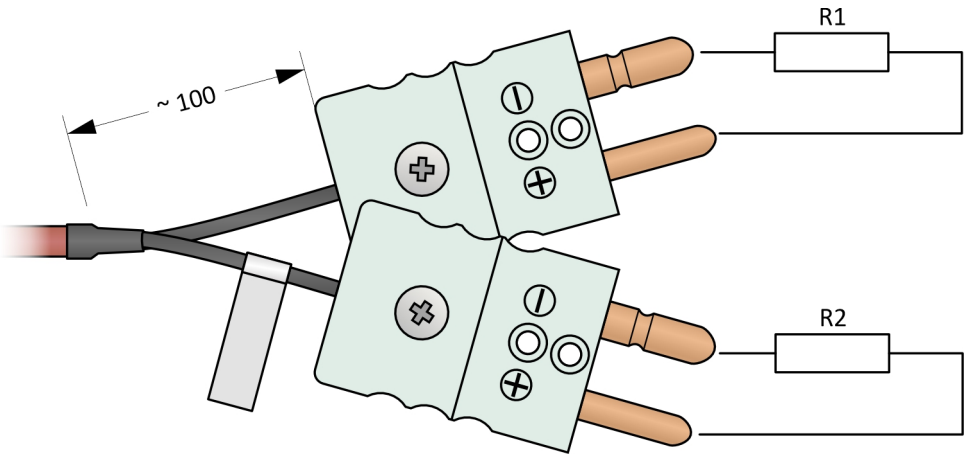


Figure 12U.22: Two-wire 2 x RTD wiring diagram with connectors

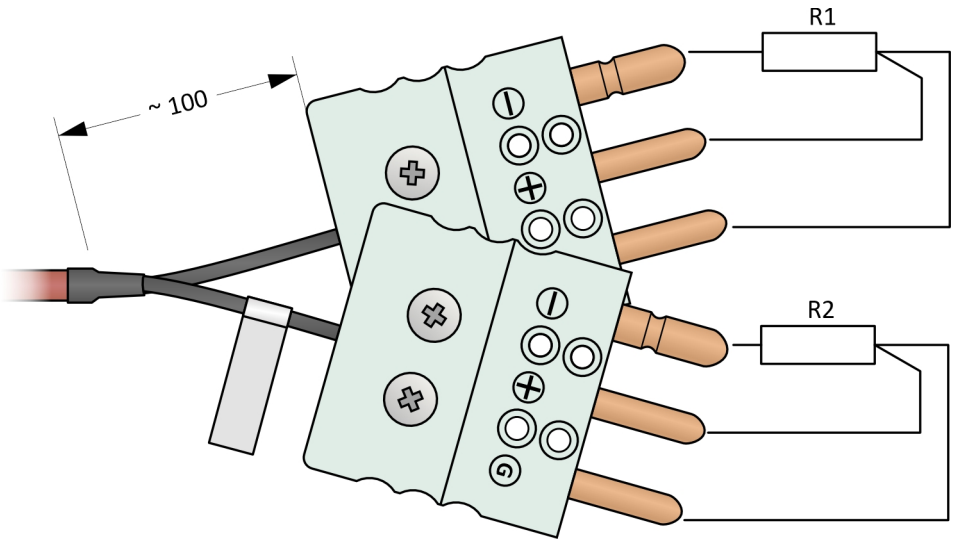


Figure 12U.23: Three-wire 2 x RTD wiring diagram with connectors

MTR12F

CABLE RESISTANCE TEMPERATURE SENSORS

MTR12F series consists of cable temperature sensors with a protective tube and head. The small size of the head allows for use in locations with limited installation space.

They represent an economical solution for applications not requiring high temperature and mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

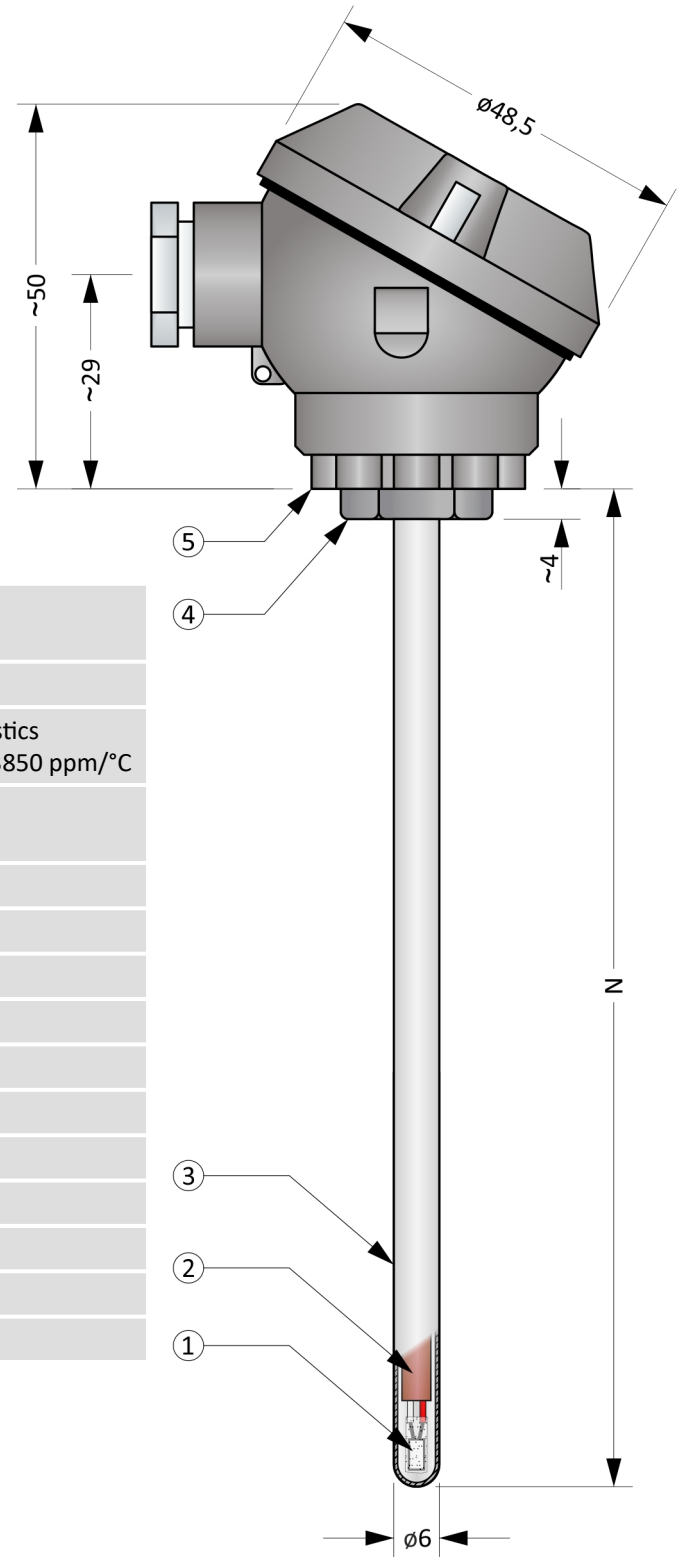


Figure 12F.1: MTR12F

General Information (Table 12F.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Cable**	
③	**Protection tube (stem)**	
	Material	Stainless steel
	Outer diameter	D = 6 mm
④	**Cable gland**	
	Material	Stainless steel
⑤	**Head**	
	Type	F
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 12F.2)

Pos.	Code	MTR012F - ❶❷ - ❸	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	2 x Pt100, two-wire connection (2x2W)	
	4	2 x Pt500, two-wire connection (2x2W)	
	5	2 x Pt1000, two-wire connection (2x2W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C	
	1	Working range -60 ... +200 °C, accuracy class A in range -30 ... +200 °C	Not possible for 2x2W.
❸	**Nominal length N [mm]**		
	xxx	Selectable range from 50 to 450 mm (in 5 mm increments)	

Order code example: MTR012F-00-200
... 1 x Pt100, four-wire connection
... Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C
... Nominal length N = 200 mm

Approximate weight of the product: MTR012F-00-200 ... 0,2 kg

Length tolerance N (Table 12F.3)

Length tolerance N
± 2 mm

Diameter tolerances (Table 12F.4)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts (Table 12F.5)

Sensor part	Continuous operation	Short-term operation
Head	< 100 °C	---
Measuring end	-60 ... 200 °C	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Installation And Operating Instructions

The sensor stem is used for mounting. The stem cannot be bent. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical wiring of the sensor is shown in the Figures 12F.2 a 12F.3. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

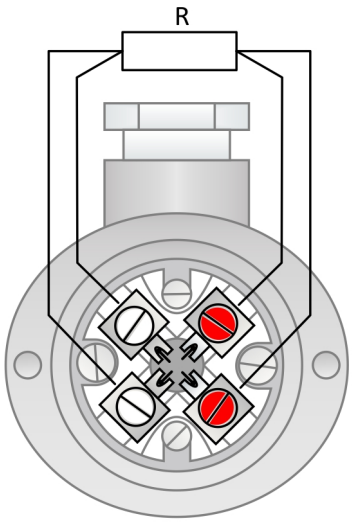


Figure 12F.2: Four-wire RTD wiring diagram

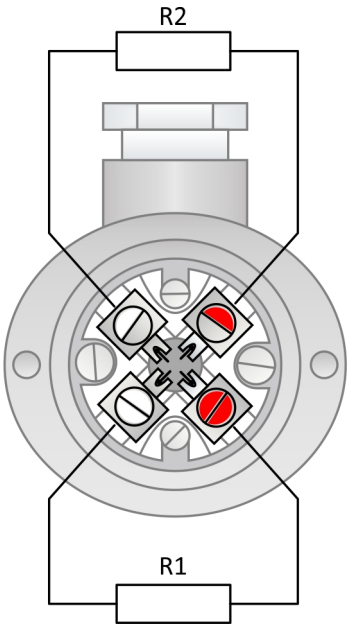


Figure 12F.3: Two-wire 2 x RTD wiring diagram

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MTR12FS

CABLE RESISTANCE TEMPERATURE SENSORS

MTR12FS series consists of cable temperature sensors with a protective tube and a head designed to be screwed into the screw. The small size of the head allows for use in locations with limited installation space.

They represent an economical solution for applications not requiring high temperature and mechanical robustness.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

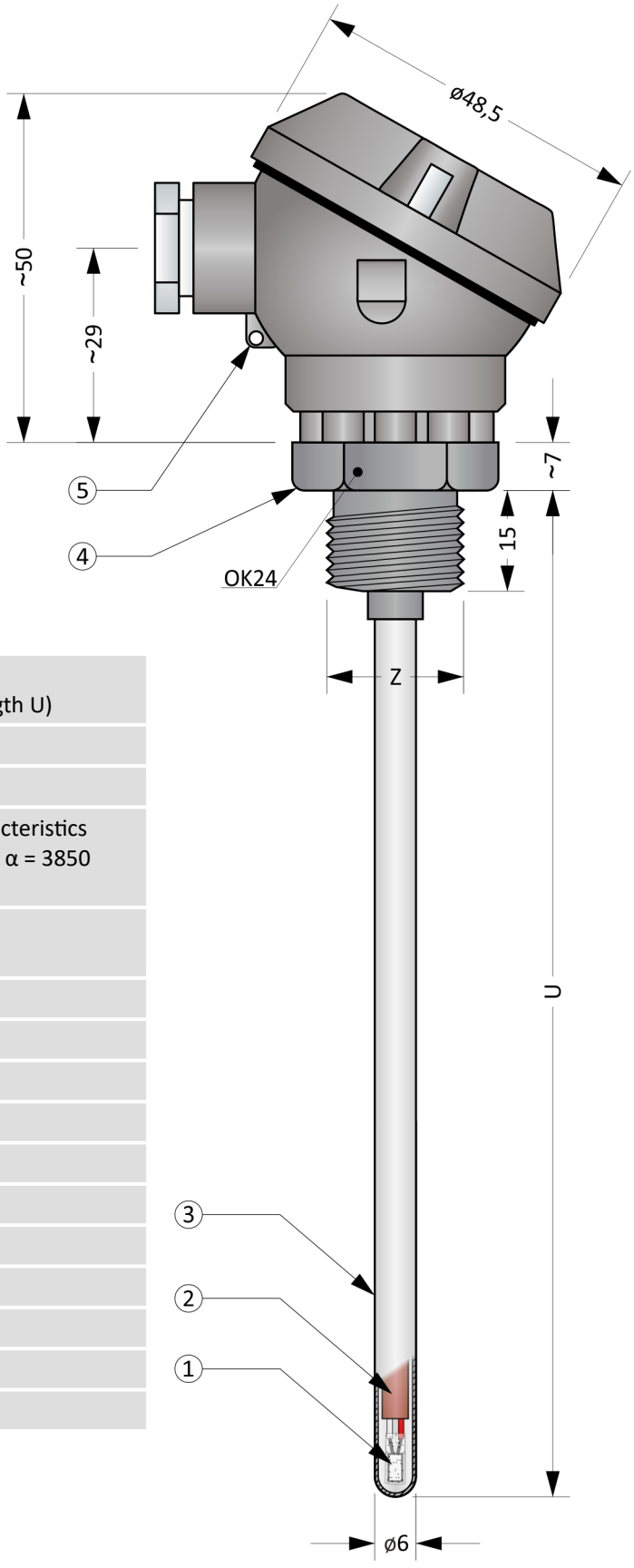

Figure 12FS.1: MTR12FS

General Information (Table 12FS.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length U)
	Max. overpressure	3 bar
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Cable**	
③	**Protection tube (stem)**	
	Material	Stainless steel
	Outer diameter	D = 6 mm
④	**Threaded fitting**	
	Material	Stainless steel
⑤	**Head**	
	Type	F
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 12FS.2)

Pos.	Code	MTR012FS - ❶❷ - ❸ - ❹	
❶	**RTD type**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	3	2 x Pt100, two-wire connection (2x2W)	
	4	2 x Pt500, two-wire connection (2x2W)	
	5	2 x Pt1000, two-wire connection (2x2W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C	
	1	Working range -60 ... +200 °C, accuracy class A in range -30 ... +200 °C	Not possible for 2x2W.
❸	**Immersion depth U [mm]**		
	xxx	Selectable range from 50 to 450 mm (in 5 mm increments)	
❹	**Type of thread Z**		
	0	Thread Z = G½“	
	1	Thread Z = M20 x 1,5	

Order code example: MTR012FS-00-200-0
... 1 x Pt100, four-wire connection
... Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C
... Immersion depth U = 500 mm
... Thread Z = G½“

Approximate weight of the product: MTR012FS-00-200-0 ... 0,2 kg

Length tolerance N (Table 12FS.3)

Length tolerance N
± 2 mm

Diameter tolerances (Table 12FS.4)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts (Table 11FS.5)

Sensor part	Continuous operation	Short-term operation
Head	< 100 °C	---
Measuring end, stem, threaded fitting	-60 ... 200 °C	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Installation And Operating Instructions

For mounting the sensor, a fitting is used, which is screwed into the weld-on piece. The stem cannot be bent. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical wiring of the sensor is shown in the Figures 12FS.2 a 12FS.3. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

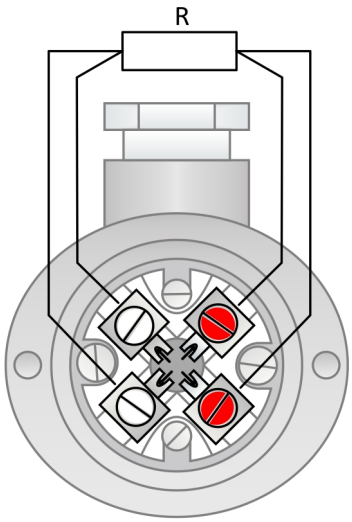

Figure 12FS.2: Four-wire RTD wiring diagram

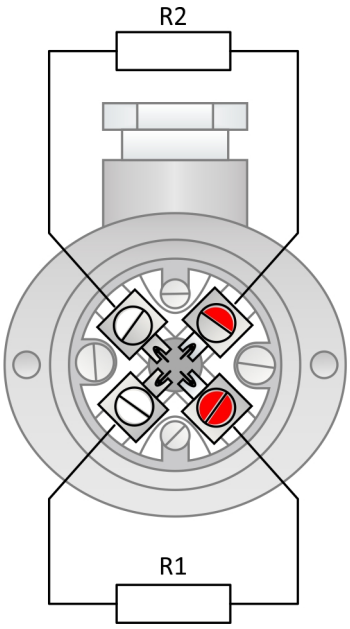

Figure 12FS.3: Two-wire 2 x RTD wiring diagram

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MTR12H

CABLE RESISTANCE TEMPERATURE SENSORS

The MTR12H series consists of cable temperature sensors with a protective tube and head.

They represent an economical solution for applications not requiring high temperature and mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

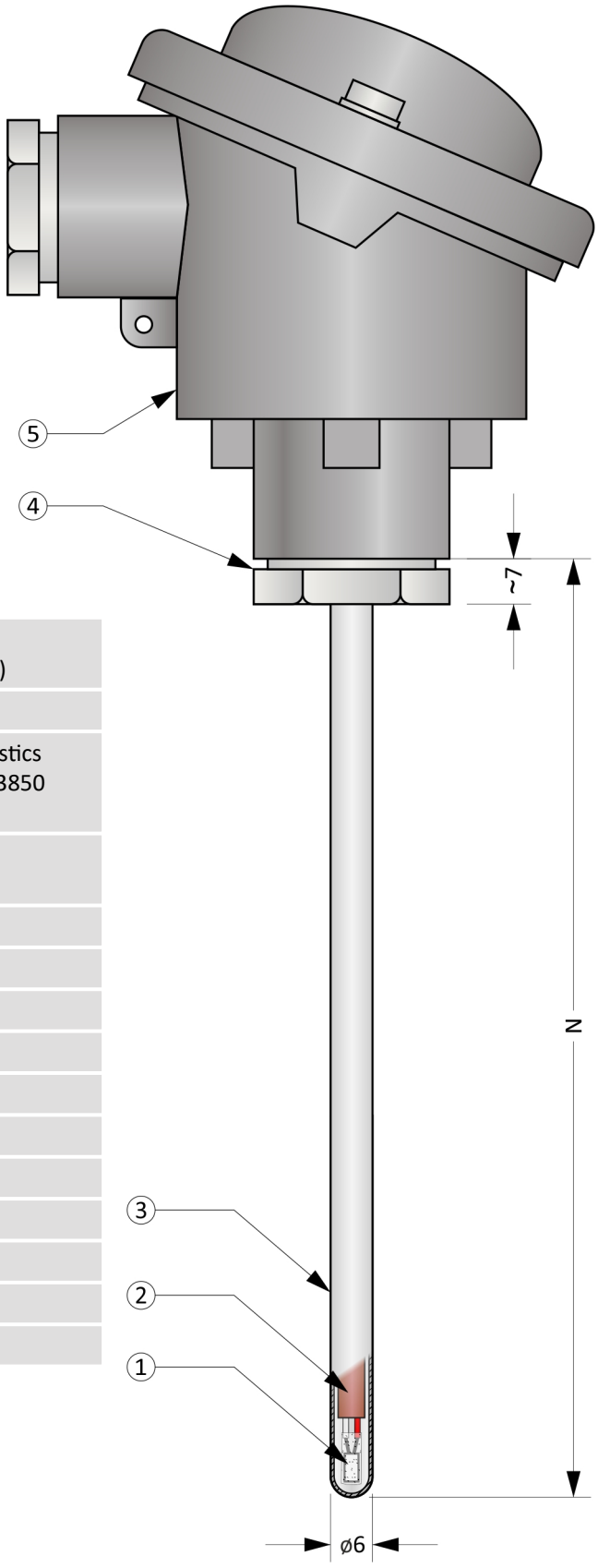


Figure 12H.1: MTR12H

General Information (Table 12H.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Cable**	
③	**Protection tube (stem)**	
	Material	Stainless steel
	Outer diameter	D = 6 mm
④	**Cable gland**	
	Material	Stainless steel
⑤	**Head**	
	Type	B
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 12H.2)

Pos.	Code	MTR012H - ❶❷ - ❸ - ❹❺
❶	**RTD type**	
	0	1 x Pt100, four-wire connection (4W)
	1	1 x Pt500, four-wire connection (4W)
	2	1 x Pt1000, four-wire connection (4W)
	3	2 x Pt100, three-wire connection (2x3W)
	4	2 x Pt500, three-wire connection (2x3W)
	5	2 x Pt1000, three-wire connection (2x3W)
❷	**Working range and accuracy class according to EN 60751**	
	0	Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C
	1	Working range -60 ... +200 °C, accuracy class A in range -30 ... +200 °C
❸	**Nominal length N [mm]**	
	xxx	Selectable range from 50 to 450 mm (in 5 mm increments)
❹	**Head**	
	0	B
	1	BH
	2	BUZ with screws with leaden seal holes
	3	BUZ with snap lock
	4	BUZH with screws with leaden seal holes
	5	BUZH with snap lock
❺	**Transmitter (only for sensor with 1xRTD)**	
	0	Without transmitter
	9	INOR APAQ C130 RTD
	3	INOR miniPAQ - HLP
	7	INOR IPAQ C330
	8	INOR IPAQ C530
	5	INOR IPAQ C520
	A	With another transmitter (e.g. supplied by the customer)

Order code example: MTR012H-00-200-00
... 1 x Pt100, four-wire connection
... Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C
... Nominal length N = 200 mm
... Head B
... Without transmitter

Approximate weight of the product: MTR012H-00-200-00 ... 0,2 kg

Length tolerance N (Table 12H.3)

Length tolerance N
± 2 mm

Diameter tolerances (Table 12H.4)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts (Table 12H.5)

Sensor part	Continuous operation	Short-term operation
Head	< 100 °C	---
Measuring end, stem	-60 ... 200 °C	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Heads

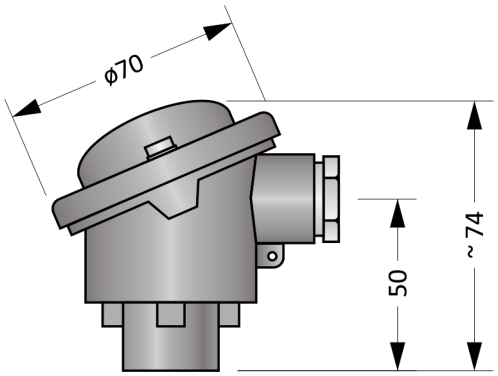


Figure 12H.2: Head B

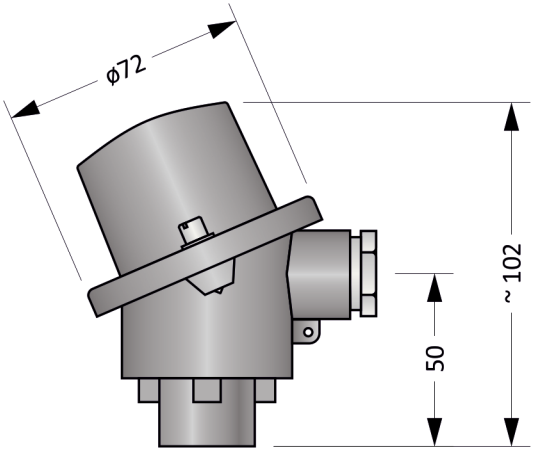


Figure 12H.3: Head BH

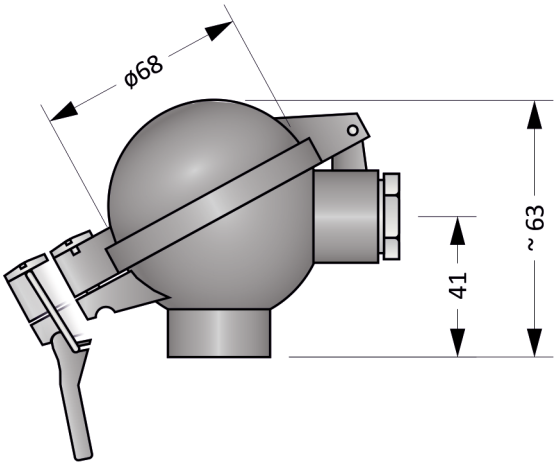


Figure 12H.4: Head BUZ

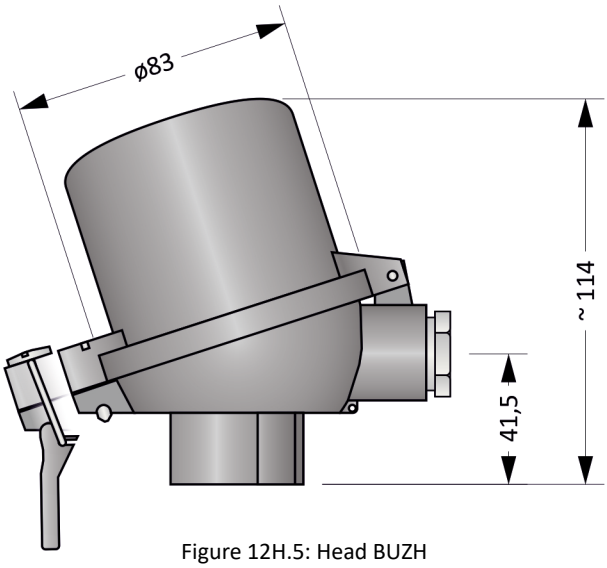


Figure 12H.5: Head BUZH

Head Mounted Transmitters (Table 12H.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Installation And Operating Instructions

The sensor stem is used for mounting. The stem cannot be bent. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical connection of sensor with the transmitter is shown in Figure 12H.9.

The electrical wiring of the sensor is shown in the Figures 12H.7 a 12H.8. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

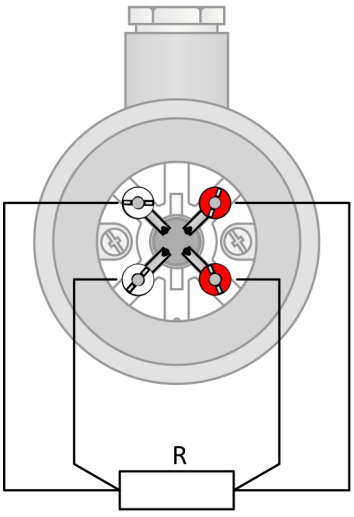


Figure 12H.7: Four-wire RTD wiring diagram

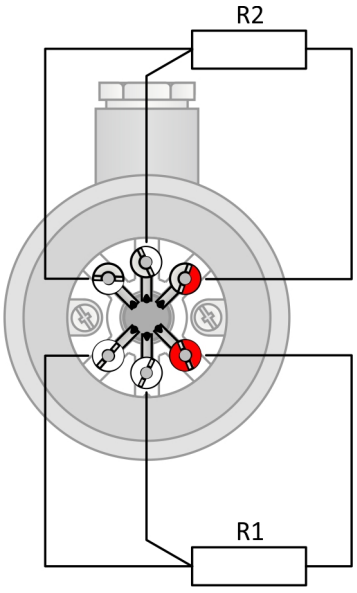


Figure 12H.8: Three-wire 2 x RTD wiring diagram

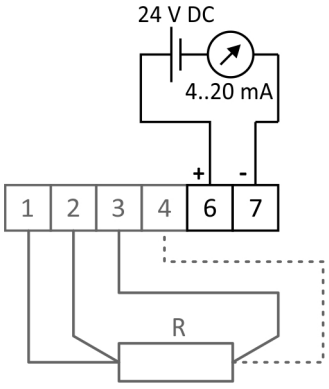


Figure 12H.9: Trasmitter wirring diagram

MTR12HS

CABLE RESISTANCE TEMPERATURE SENSORS

MTR12HS series consists of cable temperature sensors with a protective tube and a head designed to be screwed into the screw.

They represent an economical solution for applications not requiring high temperature and mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

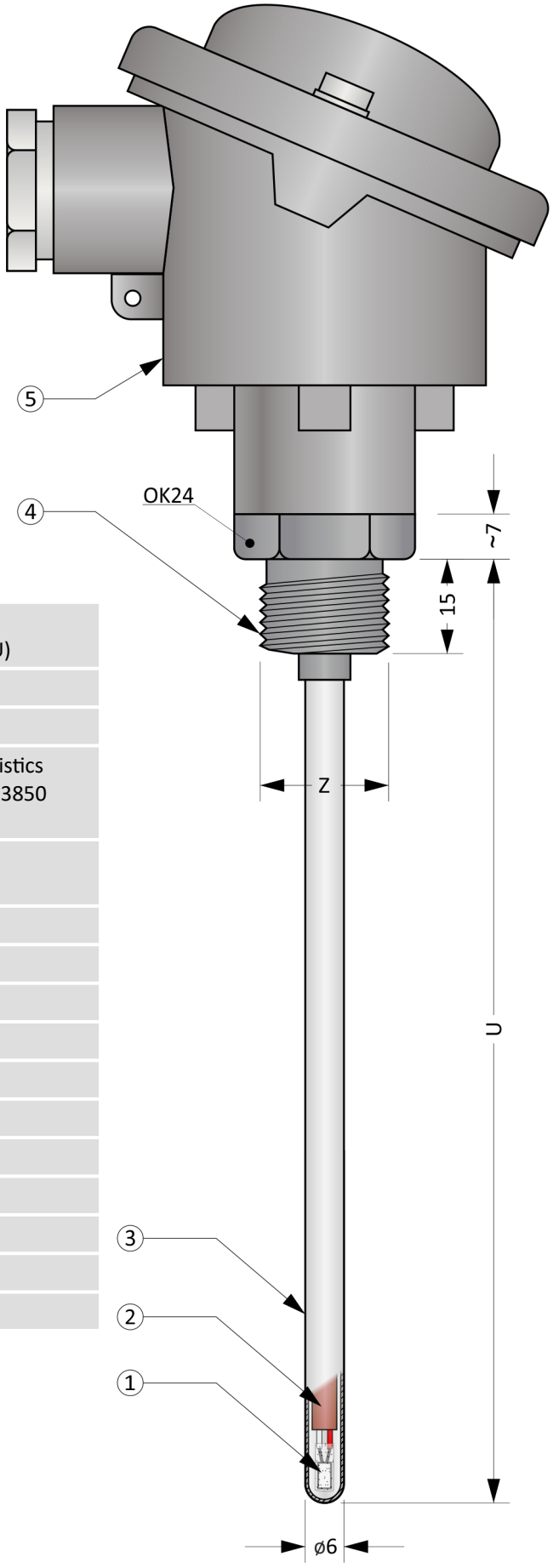


Figure 12HS.1: MTR12HS

General Information (Table 12HS.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length U)
	Max. overpressure	3 bar
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Cable**	
③	**Protection tube (stem)**	
	Material	Stainless steel
	Outer diameter	D = 6 mm
④	**Threaded fitting**	
	Material	Stainless steel
⑤	**Head**	
	Type	B
	Material	Aluminium alloy
	Cable gland	M16 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 12HS.2)

Pos.	Code	MTR012HS - ❶❷ - ❸ - ❹❺❻
❶	**RTD type**	
	0	1 x Pt100, four-wire connection (4W)
	1	1 x Pt500, four-wire connection (4W)
	2	1 x Pt1000, four-wire connection (4W)
	3	2 x Pt100, dvouvodičové zapojení (2x3W)
	4	2 x Pt500, dvouvodičové zapojení (2x3W)
	5	2 x Pt1000, dvouvodičové zapojení (2x3W)
❷	**Working range and accuracy class according to EN 60751**	
	0	Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C
	1	Working range -60 ... +200 °C, accuracy class A in range -30 ... +200 °C
❸	**Immersion depth U [mm]**	
	xxx	Selectable range from 50 to 450 mm (in 5 mm increments)
❹	**Type of thread Z**	
	0	Thread Z = G½“ , OK24
	1	Thread Z = M20 x 1,5, OK24
❺	**Head**	
	0	B
	1	BH
	2	BUZ with screws with leaden seal holes
	3	BUZ with snap lock
	4	BUZH with screws with leaden seal holes
	5	BUZH with snap lock
❻	**Transmitter (only for sensor with 1xRTD)**	
	0	bez převodníku
	9	INOR APAQ C130 RTD
	3	INOR miniPAQ - HLP
	7	INOR IPAQ C330
	8	INOR IPAQ C530
	5	INOR IPAQ C520
	A	With another transmitter (e.g. supplied by the customer)

Order code example: MTR012HS-00-200-000

... 1 x Pt100, four-wire connection
... Working range -60 ... +200 °C, accuracy class B in range -50 ... +200 °C
... Immersion depth U = 200 mm
... Thread Z = G½“
... Head B
... Without transmitter

Approximate weight of the product: MTR012HS-00-200-00 ... 0,2 kg

Length tolerance N (Table 12HS.3)

Length tolerance N
± 2 mm

Diameter tolerances (Table 12HS.4)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts (Table 12HS.5)

Sensor part	Continuous operation	Short-term operation
Head	< 100 °C	---
Measuring end, stem	-60 ... 200 °C	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Heads

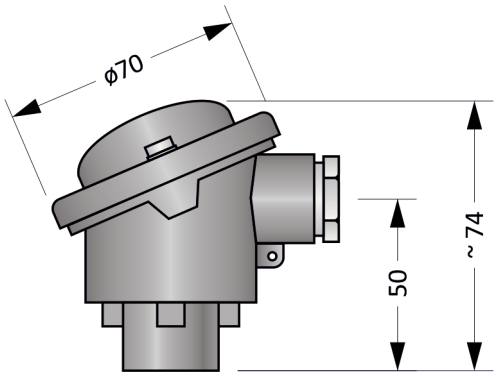


Figure 12HS.2: Head B

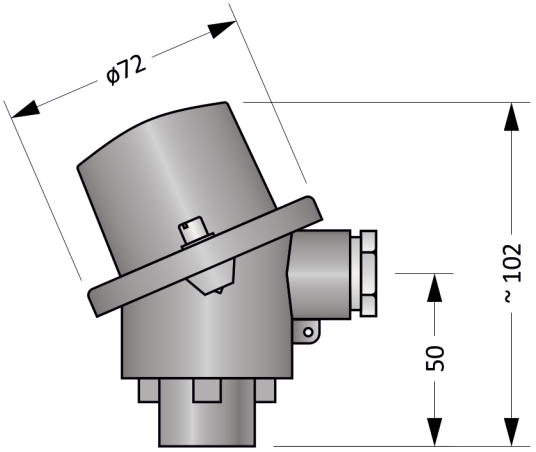


Figure 12HS.3: Head BH

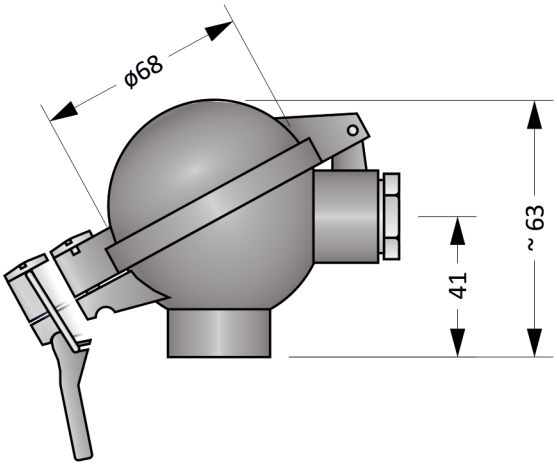


Figure 12HS.4: Head BUZ

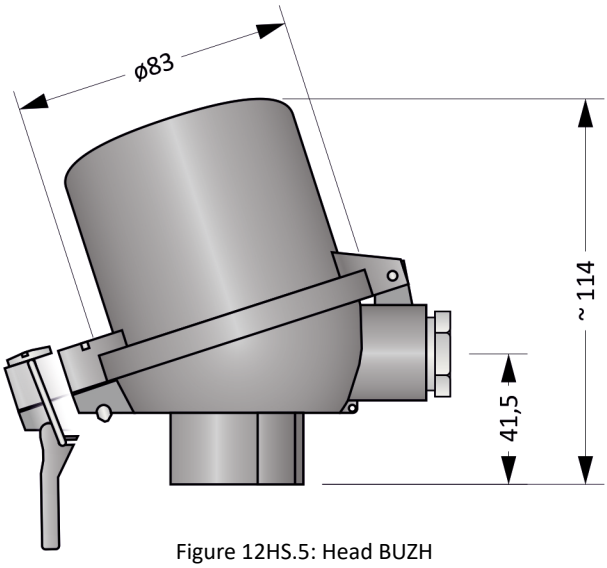


Figure 12HS.5: Head BUZH

Head Mounted Transmitters (Table 12HS.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Installation And Operating Instructions

For mounting the sensor, a fitting is used, which is screwed into the weld-on piece. The stem cannot be bent. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical connection of sensor with the transmitter is shown in Figure 12HS.9.

The electrical wiring of the sensor is shown in the Figures 12HS.7 a 12HS.8. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

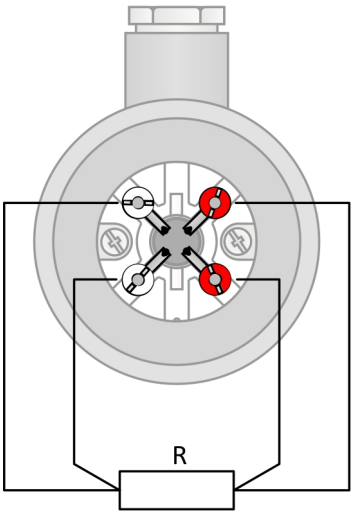


Figure 12HS.7: Four-wire RTD wiring diagram

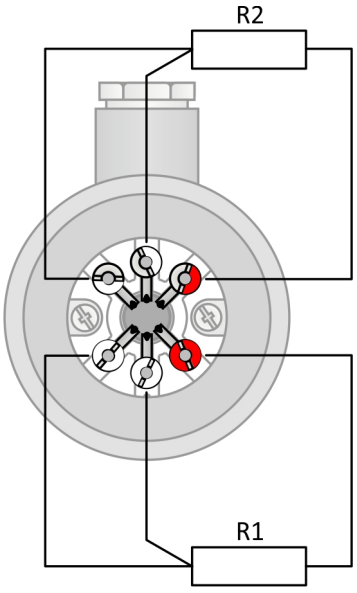


Figure 12HS.8: Three-wire 2 x RTD wiring diagram

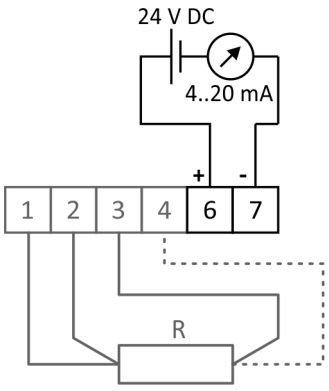


Figure 12HS.9: Trasmitter wirring diagram

MTR13

CABLE RESISTANCE TEMPERATURE SENSORS

MTR13 series consists of a basic series of pressure resistance temperature sensors.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistance temperature element protected by a protective tube and a cable.

General Information (Table 13.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (loose conductors) IP50 (measuring part in length L)
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Protection tube**	
	Material	Stainless steel
③	**Bayonet cap**	
④	**Spring**	
	Material	Stainless steel
⑤	**Cable**	
	Min. bending radius	15 × extension cable diameter
⑥	**Connector**	
⑦	**Loose conductors**	

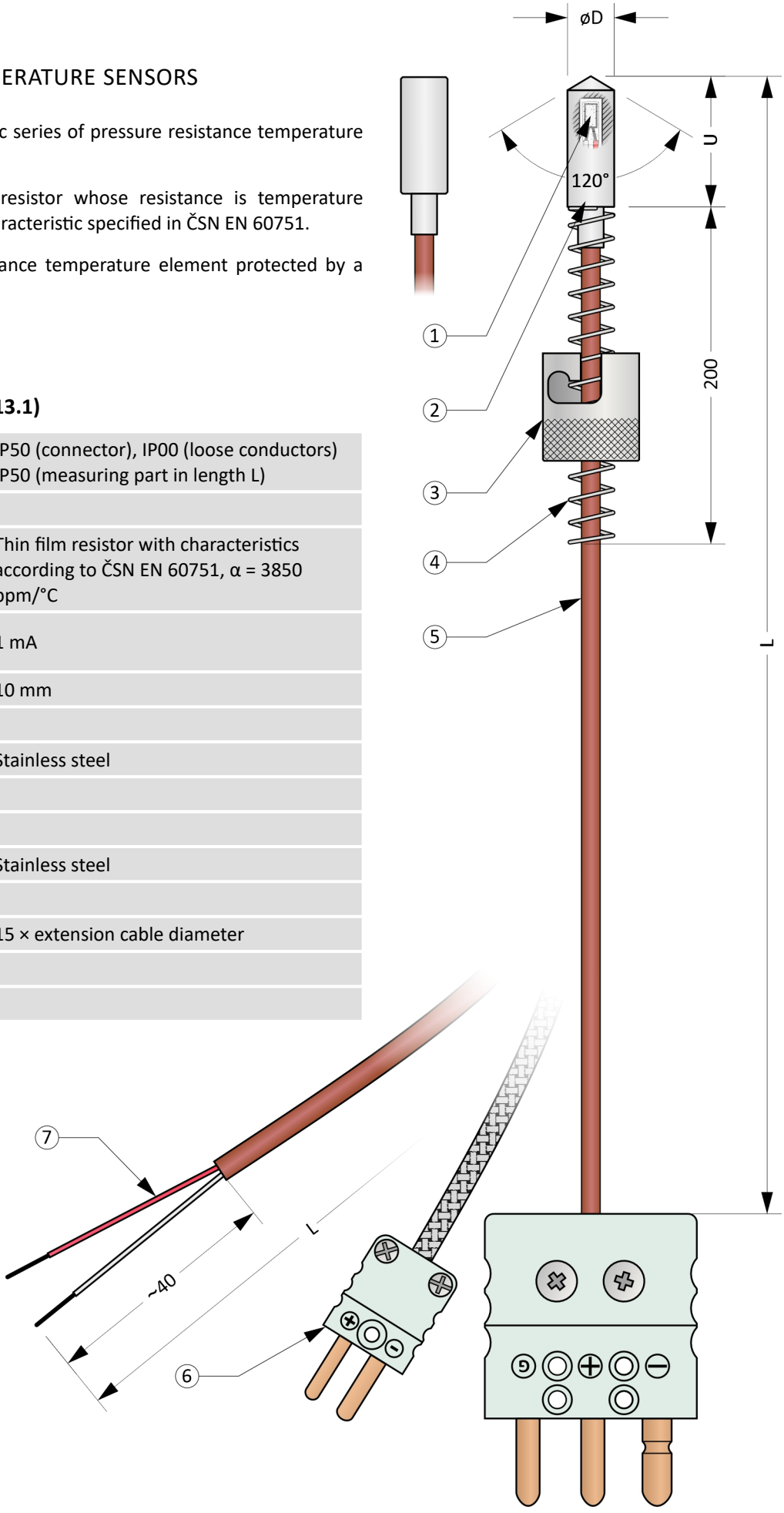


Figure 13.1: MTR13

Optional Parameters Including the Creation of an Order Code (Table 13.2)

Pos.	Code	MTR013 - ❶❷❸❹ - ❺ - ❻❼❽	
❶	**Design**		
	0	Without spring and bayonet	
	1	With spring and bayonet	
❷	**RTD type**		
	0	1 x Pt100, two-wire connection (2W)	
	1	1 x Pt500, two-wire connection (2W)	
	2	1 x Pt1000, two-wire connection (2W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, four-wire connection (4W)	
	7	1 x Pt500, four-wire connection (4W)	
	8	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, two-wire connection (2x2W)	
	B	2 x Pt500, two-wire connection (2x2W)	
	C	2 x Pt1000, two-wire connection (2x2W)	
	D	2 x Pt100, three-wire connection (2x3W)	
	E	2 x Pt500, three-wire connection (2x3W)	
	F	2 x Pt1000, three-wire connection (2x3W)	
❸	**Accuracy class according to ČSN EN 60751**		
	0	accuracy class B in range -50 ... +500 °C	
	1	accuracy class A in range -30 ... +300 °C	Not possible for 2x2W and 2W.
❹	**Protection tube**		
	0	Length U = 14 mm, diameter D = 6 mm, tip with 120° bevel	For spring with diameter B = 6 mm, only possible with cable with insulation GLGLV (2 x 0.25 mm², 4 x 0.25 mm²) and TGLV.
	1	Length U = 14 mm, diameter D = 6 mm, flat tip	For spring with diameter B = 6 mm, only possible with cable with insulation GLGLV (2 x 0.25 mm², 4 x 0.25 mm²) and TGLV.
	2	Length U = 14 mm, diameter D = 8 mm, tip with 120° bevel	For spring with diameter B = 8 mm
	3	Length U = 14 mm, diameter D = 8 mm, flat tip	For spring with diameter B = 8 mm
❺	**Cable length L [cm]**		
	xxx	Selectable range from 20 to 450 cm (in 1 cm increments)	
	xxx	Selectable range from 451 to 3000 cm (in 100 cm increments)	
❻	**Cable**		
	0	Cable TGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	1	Cable GLGLV 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W
	2	Cable GLGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	3	Cable TSL 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	4	Cable TSL 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	5	Cable TWT 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	6	Cable TCuT 4 x 0,22 mm², Copper wires	Not possible for 2W and 2x3W.
	7	Cable TT 6 x 0,15 mm², Copper wires	Nelze pro 2W, 2x2W, 3W a 4W.
	8	Cable GLGLV 6 x 0,15 mm², Copper wires	Nelze pro 2W, 2x2W, 3W a 4W.

Continuarion of table 13.2 on the next page

MTR13

Continuarion of table 13.2 from the previous page

Pos.	Code	MTR013 - ❶❷❸❹ - ❺ - ❻❼❽
❼	**Bayonet cap**	Only this combination is possible for this option: ❶ ... 0
	N	Not used
	0	Inner diameter C = 11,3 mm, 2 slots, with a spring of dia. 6 mm, material nickel-coated brass
	1	Inner diameter C = 12,2 mm, 2 slots, with a spring of dia. 6 mm, material Stainless steel
	2	Inner diameter C = 15,2 mm, 2 slots, with a spring of dia. 6 mm, material Stainless steel
	3	Inner diameter C = 12 mm, 2 slots, with a spring of dia. 8 mm, material Stainless steel
	4	Inner diameter C = 15 mm, 2 slots, with a spring of dia. 8 mm, material Stainless steel
❽	**Cold end**	
	0	Loose conductors, length 40 mm
	1	Standard 2-pin connector, type MTCK-S, plug — Not possible for 3W, 4W and 2x3W.
	2	Standard 2-pin connector, type MTCK-S, plug + socket — Not possible for 3W, 4W and 2x3W.
	3	Standard ceramic 2-pin connector, type MTCK-CS, plug — Not possible for 3W, 4W and 2x3W.
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket — Not possible for 3W, 4W and 2x3W.
	5	Miniature 2-pin connector, type MTCK-M, plug — Not possible for 3W, 4W and 2x3W.
	6	Miniature 2-pin connector, type MTCK-M, plug + socket — Not possible for 3W, 4W and 2x3W.
	A	Standard 3-pin connector, type MTCK-S, plug — Not possible for 2W, 4W, 2x2W.
	B	Standard 3-pin connector, type MTCK-S, plug + socket — Not possible for 2W, 4W, 2x2W.
	C	Miniature 3-pin connector, type MTCK-M, plug — Not possible for 2W, 4W, 2x2W.
	D	Miniature 3-pin connector, type MTCK-M, plug + socket — Not possible for 2W, 4W, 2x2W.
	E	Standard 4-pin connector, type MTCK-S, plug — Not possible for 2W, 3W a 2x3W.
	F	Standard 4-pin connector, type MTCK-S, plug + socket — Not possible for 2W, 3W a 2x3W.
	G	Miniature 4-pin connector, type MTCK-DM, plug — Not possible for 2W, 3W.
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket — Not possible for 2W, 3W.

Order code example: MTR013-0000-500-1NE

... Without spring and bayonet
... 1 x Pt100, four-wire connection
... accuracy class A in range -30 ... +300 °C
... protection tube length U = 14 mm, diameter D = 6 mm, tip with 120° bevel
... Cable length L = 500 mm
... Cable GLGLV 4 x 0,25 mm², Copper wires
... Bayonet cap - not used
... Standard 4-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR013-0000-500-1NE ... 0,1 kg

Length tolerance L (Table 13.3)

Length L	Length tolerance L
20 ≤ L ≤ 250 cm	± 1 cm
250 cm < L ≤ 500 cm	± 1,5 cm
500 cm < L ≤ 3000 cm	± 0,5 % z L

Length tolerance U (Table 13.4)

Length tolerance U
± 1 mm

Diameter tolerances (Table 13.5)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts(Table 13.6)

Sensor part	Cable insulation	Continuous operation
Connector MTCK-M, MTCK-S		See cable insulation, max. 220 °C
Ceramic connector MTCK-CS		See cable insulation
Measuring end incl. cable	SL nebo TSL	-60 ... 180 °C
	TWT	-60 ... 205 °C
	TT, TGLV nebo TCuT	-60 ... 205 °C
	GLGLV	< 400 °C

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Cables (Table 13.7)

Insulation	Number x cross-section / dia. of wires	Outer cable diameter	Pros and cons
TSL	2 x 0,25 mm² 4 x 0,25 mm²	~ 3,8 mm ~ 4,3 mm	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
TWT	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TCuT	4 x 0,22 mm²	~ 3,7 mm	↗ Moisture resistant
TT	6 x 0,15 mm²	~ 3,5 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TGLV	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant, high mechanical resistance
GLGLV	2 x 0,25 mm² 4 x 0,25 mm² 6 x 0,15 mm²	~ 3,0 mm ~ 3,2 mm ~ 3,5 mm	↗ High mechanical resistance, suitable for higher temperatures ↘ Low moisture resistance

Bayonet part design (Table 13.8)

The spring compressibility is 50 % (e.g. if we have a spring with a length of 100 mm, then its length after maximum compression will be 50 mm).

③	**Spring**	
	Material	Stainless steel
④	**Bayonet cap**	
	Material	Stainless steel

Dimensions of the bayonet cap (Table 13.9)

øC	H	øB
11,3 mm	16 mm	6 mm
12,2 mm	18 mm	6 mm
15,2 mm	18 mm	6 mm
12,0 mm	18 mm	8 mm
15,0 mm	18 mm	8 mm

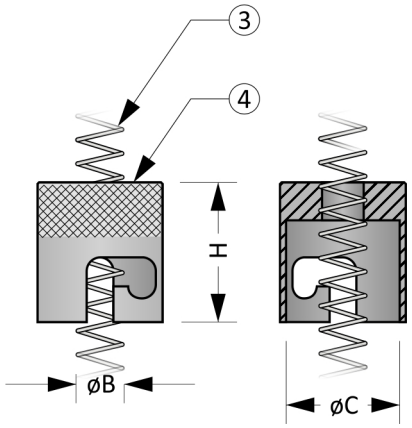


Figure 13.2: Bayonet cap

Connectors

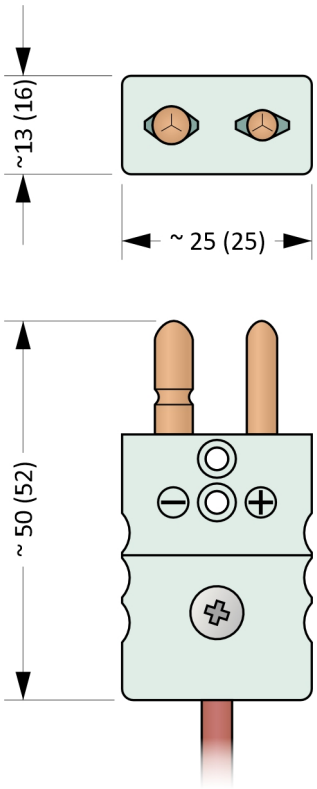


Figure 13.3: MTCK-S a MTCK-CS

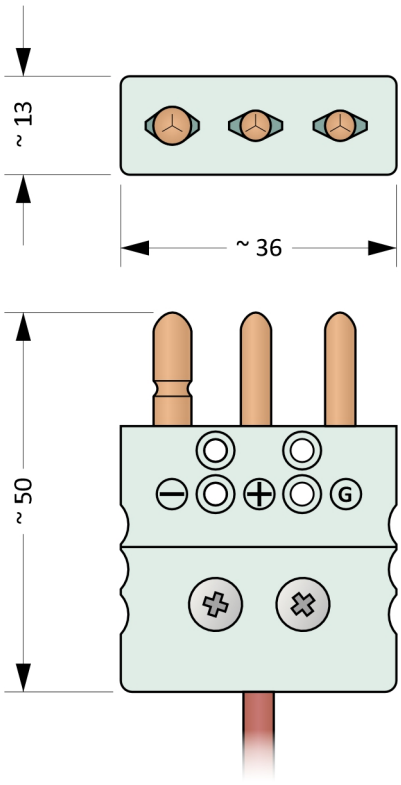


Figure 13.4: MTCK-3S

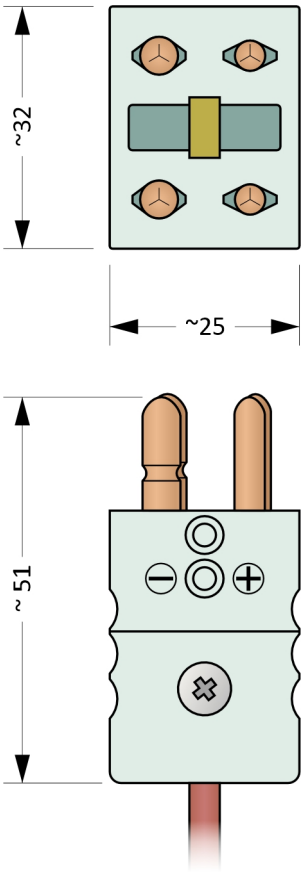


Figure 13.5: MTCK-DS

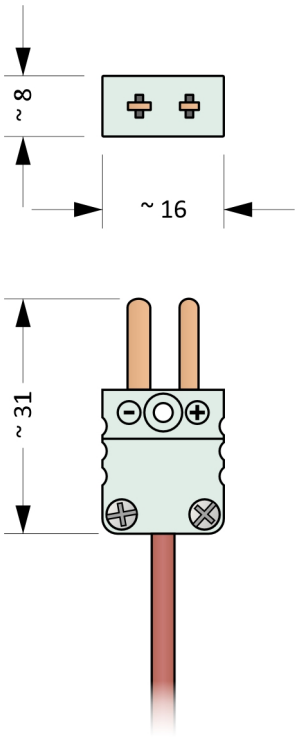


Figure 13.6: MTCK-M

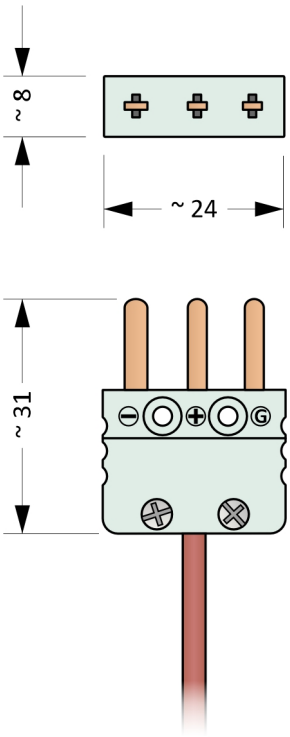


Figure 13.7: MTCK-3M

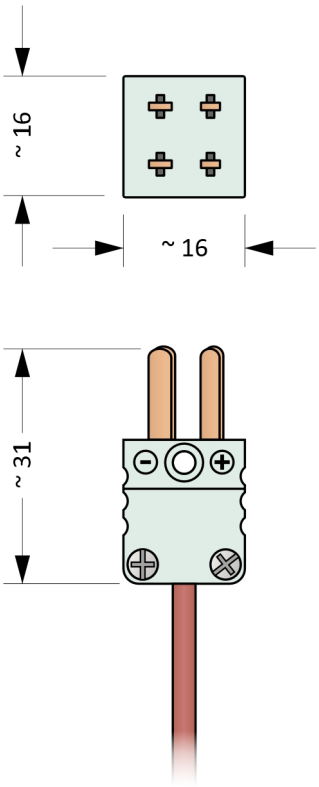


Figure 13.8: MTCK-DM

Installation And Operating Instructions

The sensor stem with bayonet cap is used for mounting.

The electrical wiring of the sensor is shown in the Figures 13.9 to 13.21. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

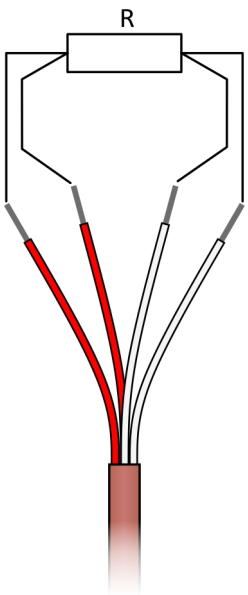


Figure 13.9: Four-wire RTD wiring diagram

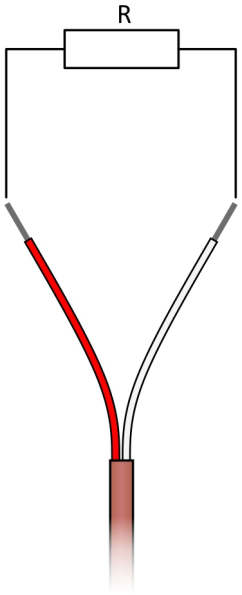


Figure 13.10: Two-wire RTD wiring diagram

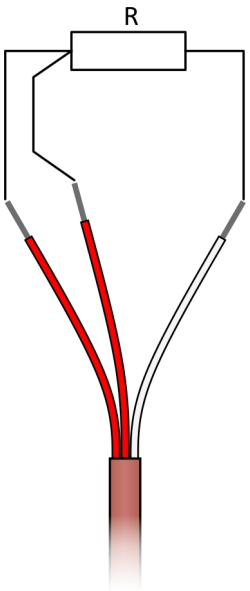


Figure 13.11: Three-wire RTD wiring diagram

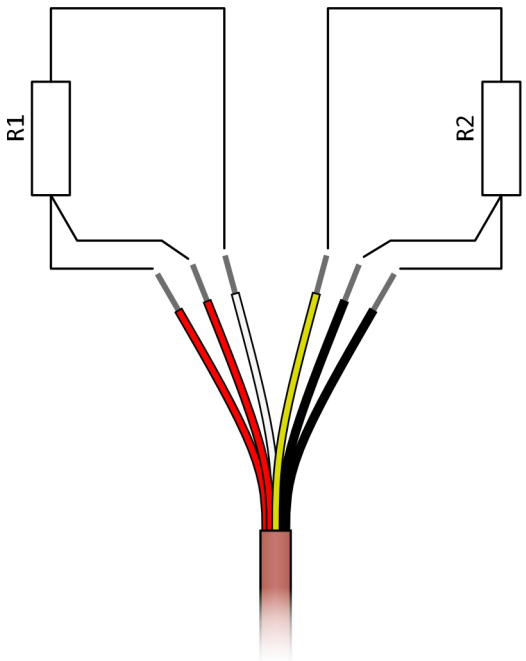


Figure 13.12: Three-wire 2 x RTD wiring diagram

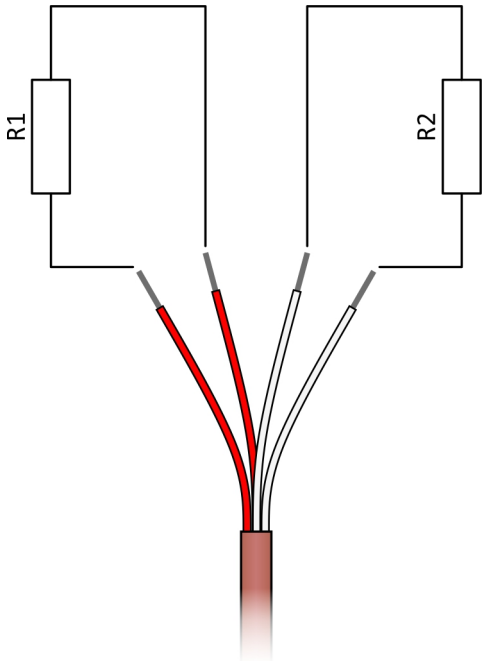


Figure 13.13: Two-wire 2 x RTD wiring diagram

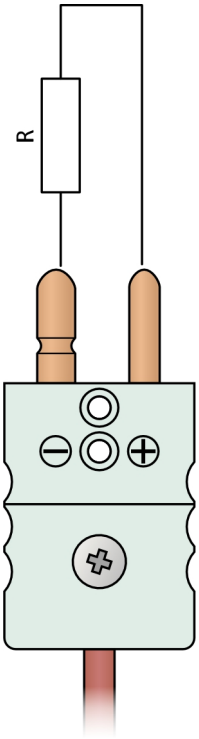


Figure 13.14: Two-wire RTD wiring diagram with connector

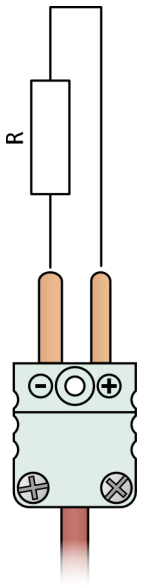


Figure 13.15: Two-wire RTD wiring diagram with miniature connector

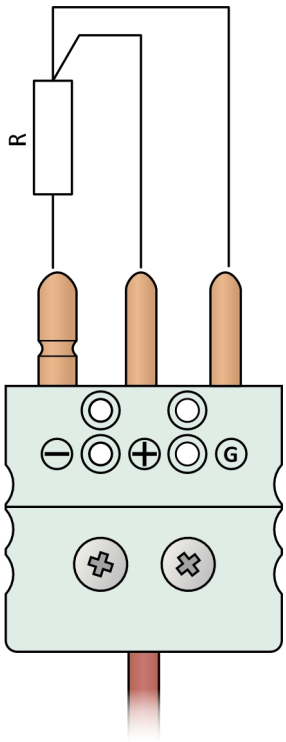


Figure 13.16: Three-wire RTD wiring diagram with connector

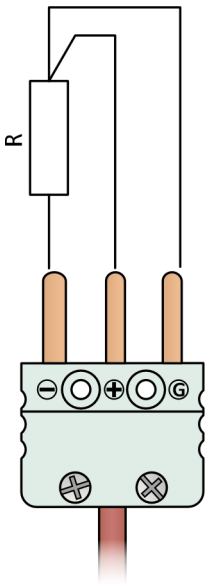
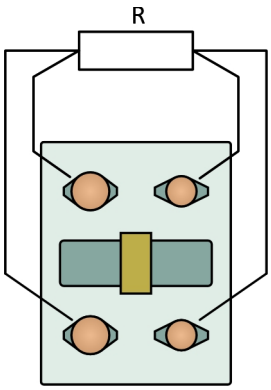


Figure 13.17: Three-wire RTD wiring diagram with miniature connector



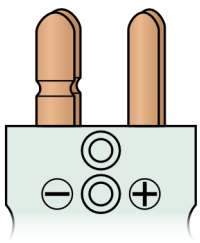
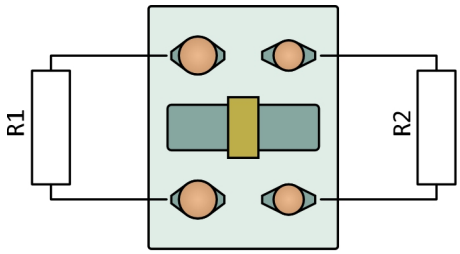


Figure 13.18: Four-wire RTD wiring diagram with connector



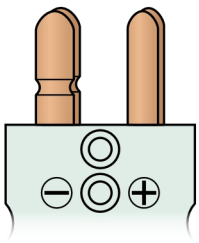


Figure 13.19: Two-wire 2 x RTD wiring diagram with connector

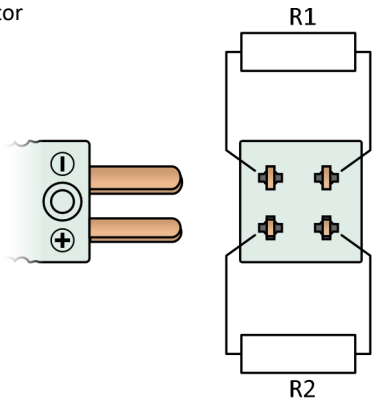
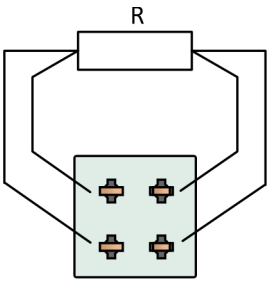


Figure 13.20: Two-wire 2 x RTD wiring diagram with miniature connector



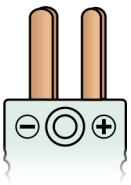


Figure 13.21: Four-wire RTD wiring diagram with miniature connector

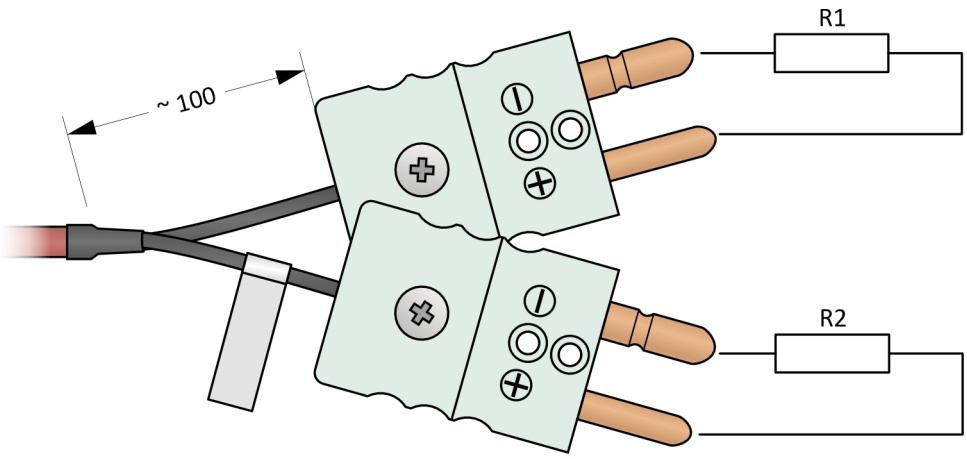


Figure 13.22: Two-wire 2 x RTD wiring diagram with connectors

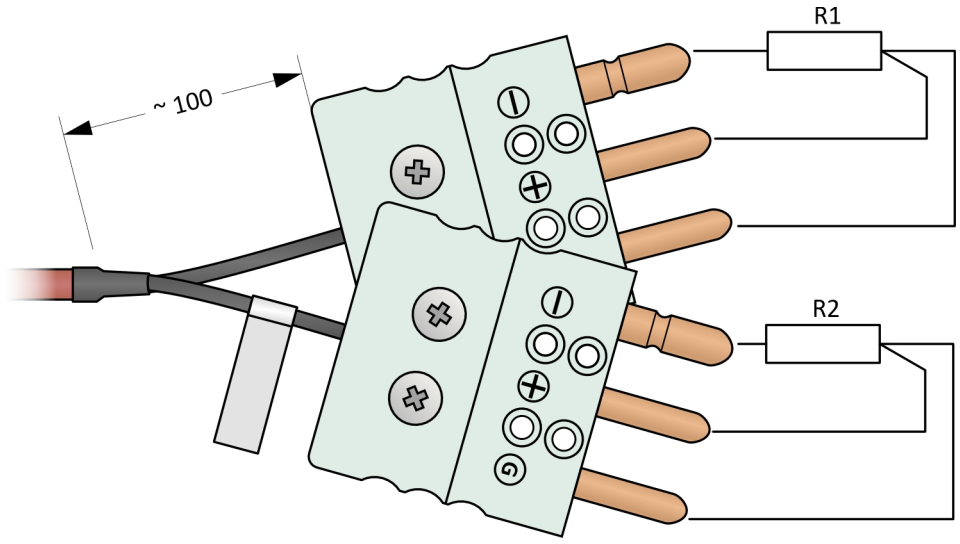


Figure 13.23: Three-wire 2 x RTD wiring diagram with connectors

MTR13T

CABLE RESISTANCE TEMPERATURE SENSORS

MTR13T series consists of cable resistance temperature sensors with a protective tube. They represent an economical solution for temperature measurement in environments with overpressure or underpressure of the medium to be measured.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of a resistance temperature element protected by a protective tube, threaded fitting and a cable.

General Information (Table 13T.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (loose conductors) IP50 (cable), IP68 (measu. part in length U)
	Max. overpressure	3 bar
①	**Sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
②	**Protection tube**	
	Material	Stainless steel
	Outer diameter	D = 6 mm
③	**Threaded fitting**	
	Material	Stainless steel
	Thread	M12 x 1,75
	Thread length	16 mm
	WAF	19 mm
④	**Cable**	
	Min. bending radius	15 × extension cable diameter
⑤	**Connector**	
⑥	**Loose conductors**	

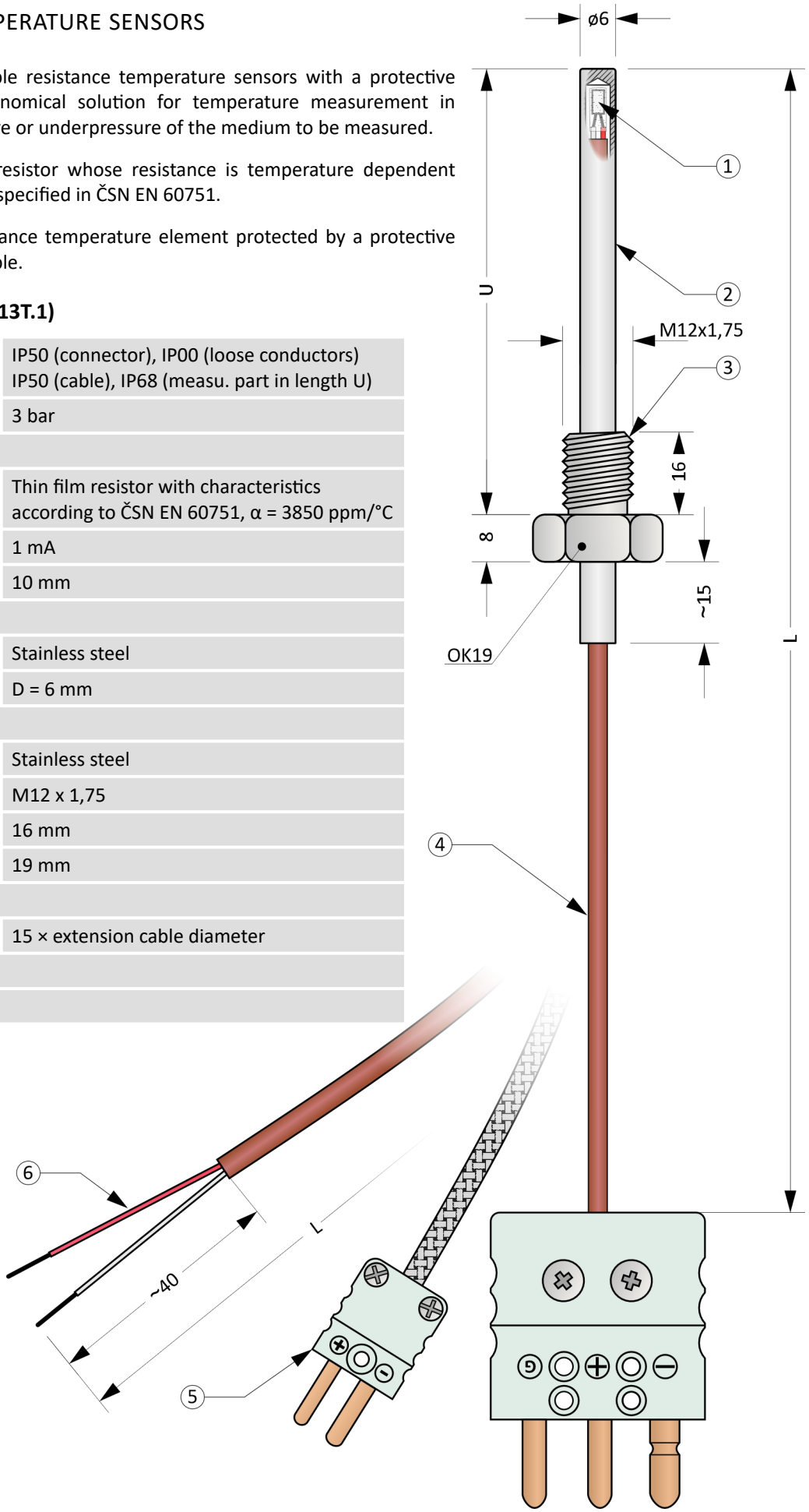


Figure 13T.1: MTR13T

Optional Parameters Including the Creation of an Order Code (Table 13T.2)

Pos.	Code	MTR013T - ❶❷❸ - ❹ - ❺ - ❻	
❶	**RTD type**		
	0	1 x Pt100, two-wire connection (2W)	
	1	1 x Pt500, two-wire connection (2W)	
	2	1 x Pt1000, two-wire connection (2W)	
	3	1 x Pt100, three-wire connection (3W)	
	4	1 x Pt500, three-wire connection (3W)	
	5	1 x Pt1000, three-wire connection (3W)	
	6	1 x Pt100, four-wire connection (4W)	
	7	1 x Pt500, four-wire connection (4W)	
	8	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, two-wire connection (2x2W)	
	B	2 x Pt500, two-wire connection (2x2W)	
	C	2 x Pt1000, two-wire connection (2x2W)	
	D	2 x Pt100, three-wire connection (2x3W)	
	E	2 x Pt500, three-wire connection (2x3W)	
	F	2 x Pt1000, three-wire connection (2x3W)	
❷	**Accuracy class according to ČSN EN 60751**		
	0	accuracy class B in range -50 ... +400 °C	
	1	accuracy class A in range -30 ... +300 °C	Not possible for 2x2W and 2W.
❸	**Cable**		
	0	Cable TGLV 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	1	Cable GLGLV 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	2	Cable GLGLV 4 x 0,25 mm², Copper wires	Not possible for 2x2W a 2x3W.
	3	Cable TSL 2 x 0,25 mm², Copper wires	Not possible for 3W, 4W, 2x3W and 2x2W.
	4	Cable TSL 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	5	Cable TWT 4 x 0,25 mm², Copper wires	Not possible for 2W and 2x3W.
	6	Cable TCuT 4 x 0,22 mm², Copper wires	Not possible for 2W and 2x3W.
	7	Cable TT 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
	8	Cable GLGLV 6 x 0,15 mm², Copper wires	Not possible for 2W, 3W, 4W and 2x2W.
❹	**Cable length L [cm]**		
	xxx	Selectable range from 20 to 450 cm (in 1 cm increments)	
	xxx	Selectable range from 451 to 3000 cm (in 100 cm increments)	
❺	**Immersion length U [mm]**		
	xxx	Selectable range from 30 to 450 mm (in 5 mm increments)	

Continuarion of table 13T.2 on the next page

Continuarion of table 13T.2 from the previous page

Pos.	Code	MTR013T - ❶❷❸ - ❹ - ❺ - ❻	
❻	**Cold end**		
	0	Loose conductors, length 40 mm	
	1	Standard 2-pin connector, type MTCK-S, plug	Not possible for 3W, 4W and 2x3W.
	2	Standard 2-pin connector, type MTCK-S, plug + socket	Not possible for 3W, 4W and 2x3W.
	3	Standard ceramic 2-pin connector, type MTCK-CS, plug	Not possible for 3W, 4W and 2x3W.
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket	Not possible for 3W, 4W and 2x3W.
	5	Miniature 2-pin connector, type MTCK-M, plug	Not possible for 3W, 4W and 2x3W.
	6	Miniature 2-pin connector, type MTCK-M, plug + socket	Not possible for 3W, 4W and 2x3W.
	A	Standard 3-pin connector, type MTCK-S, plug	Not possible for 2W, 4W, 2x2W.
	B	Standard 3-pin connector, type MTCK-S, plug + socket	Not possible for 2W, 4W, 2x2W.
	C	Miniature 3-pin connector, type MTCK-M, plug	Not possible for 2W, 4W, 2x2W.
	D	Miniature 3-pin connector, type MTCK-M, plug + socket	Not possible for 2W, 4W, 2x2W.
	E	Standard 4-pin connector, type MTCK-S, plug	Not possible for 2W, 3W a 2x3W.
	F	Standard 4-pin connector, type MTCK-S, plug + socket	Not possible for 2W, 3W a 2x3W.
	G	Miniature 4-pin connector, type MTCK-DM, plug	Not possible for 2W, 3W.
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket	Not possible for 2W, 3W.

Order code example: MTR013T-012-500-100-E

... 1 x Pt100, four-wire connection
... accuracy class A in range -30 ... +300 °C
... Cable GLGLV 4 x 0,25 mm², Copper wires
... Cable length L = 500 mm
... Immersion length U = 100 cm
... Standard 4-pin connector, type MTCK-S, plug

Approximate weight of the product: MTR013T-012-500-100-E ... 0,1 kg

Length tolerance L (Table 13T.3)

Length L	Length tolerance L
20 ≤ L ≤ 250 cm	± 1 cm
250 cm < L ≤ 500 cm	± 1,5 cm
500 cm < L ≤ 3000 cm	± 0,5 % z L

Length tolerance U (Table 13T.4)

Length tolerance U
± 1 mm

Diameter tolerances (Table 13T.5)

Diameter tolerance D
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts(Table 13T.6)

Sensor part	Cable insulation	Continuous operation
Connector MTCK-M, MTCK-S		See cable insulation, max. 220 °C
Ceramic connector MTCK-CS		See cable insulation
Measuring end incl. cable	SL nebo TSL	-60 ... 180 °C
	TWT	-60 ... 205 °C
	TT, TGLV nebo TCuT	-60 ... 205 °C
	GLGLV	< 400 °C

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Cables (Table 13T.7)

Insulation	Number x cross-section / dia. of wires	Outer cable diameter	Pros and cons
TSL	2 x 0,25 mm² 4 x 0,25 mm²	~ 3,8 mm ~ 4,3 mm	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
TWT	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TCuT	4 x 0,22 mm²	~ 3,7 mm	↗ Moisture resistant
TT	6 x 0,15 mm²	~ 3,5 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TGLV	4 x 0,25 mm²	~ 3,6 mm	↗ Moisture resistant, high mechanical resistance
GLGLV	2 x 0,25 mm² 4 x 0,25 mm² 6 x 0,15 mm²	~ 3,0 mm ~ 3,2 mm ~ 3,5 mm	↗ High mechanical resistance, suitable for higher temperatures ↘ Low moisture resistance

Connectors

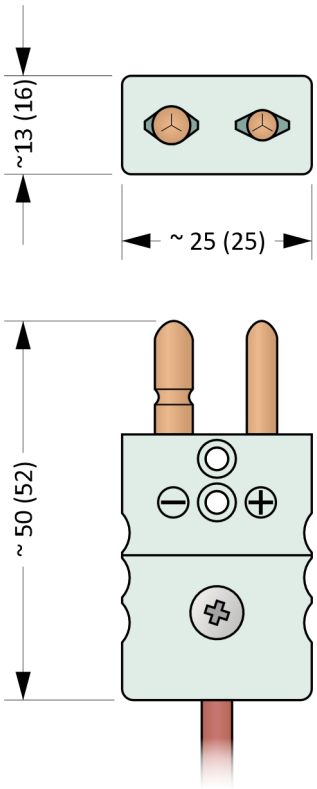


Figure 13T.2: MTCK-S a MTCK-CS

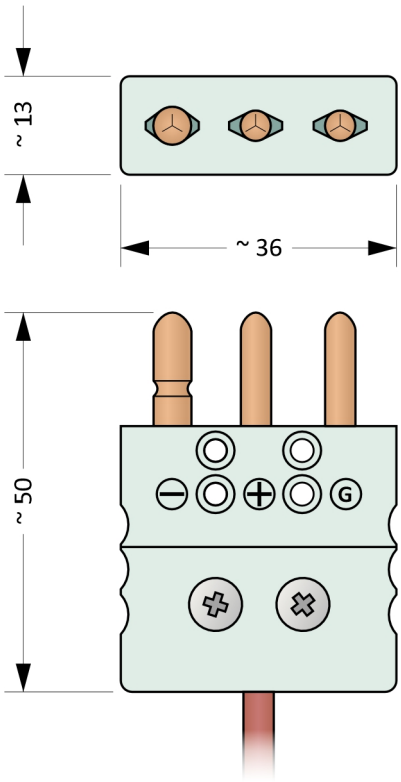


Figure 13T.3: MTCK-3S

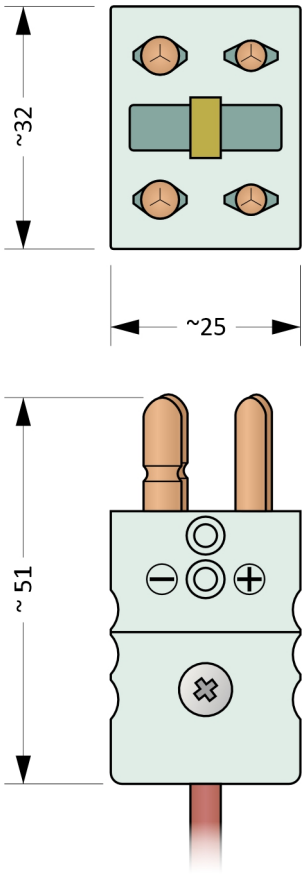


Figure 13T.4: MTCK-DS

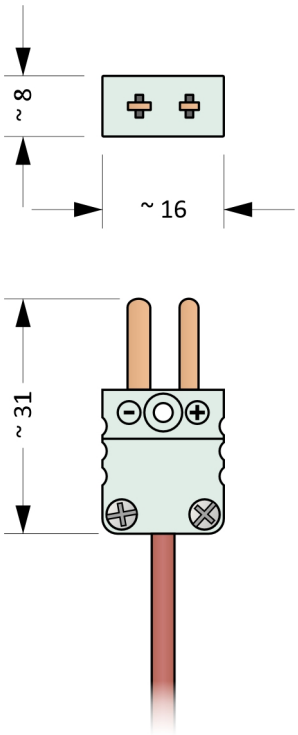


Figure 13T.5: MTCK-M

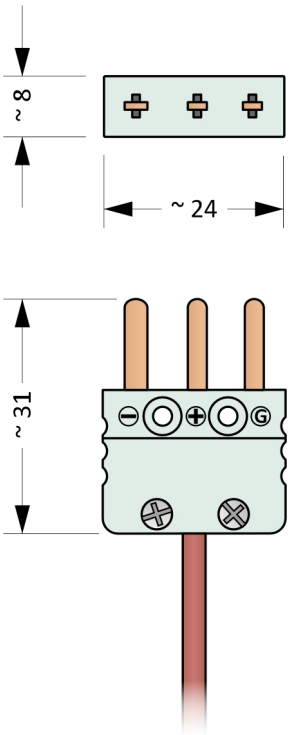


Figure 13T.6: MTCK-3M

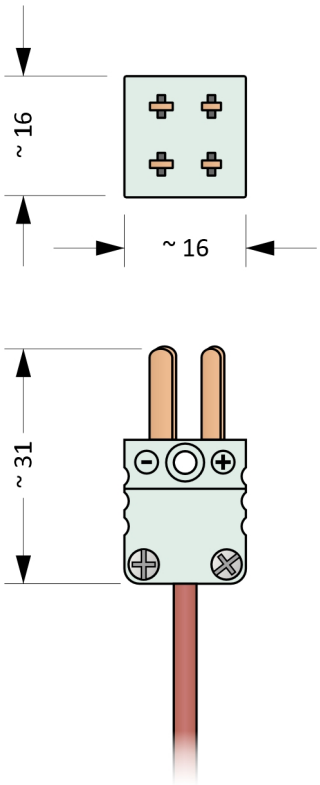


Figure 13T.7: MTCK-DM

Installation And Operating Instructions

For mounting the sensor, a fitting is used, which is screwed into the weld-on piece.

The electrical wiring of the sensor is shown in the Figures 13T.8 to 13T.22. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

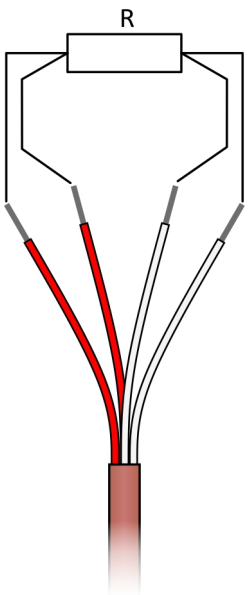


Figure 13T.8: Four-wire RTD wiring diagram

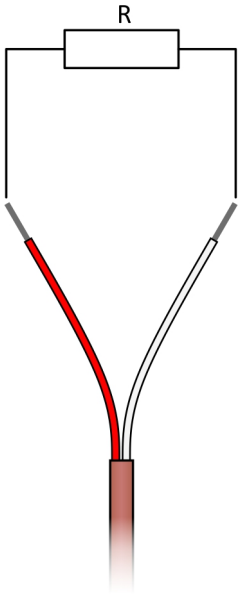


Figure 13T.9: Two-wire RTD wiring diagram

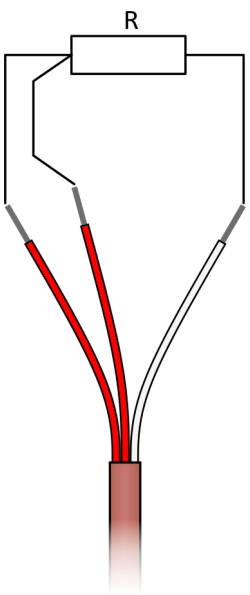


Figure 13T.10: Three-wire RTD wiring diagram

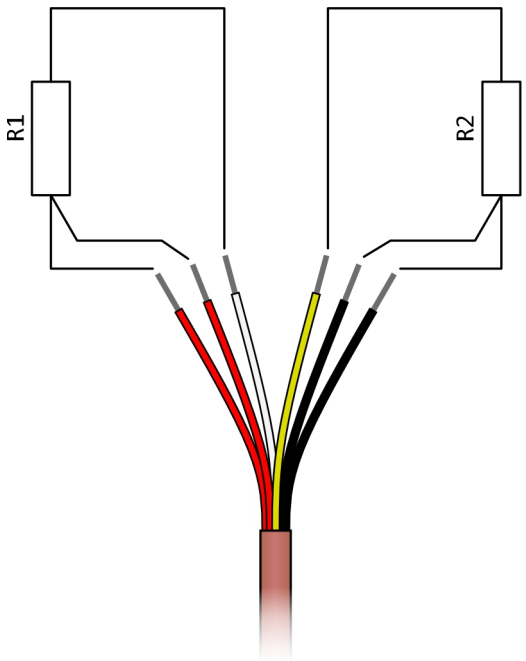


Figure 13T.11: Three-wire 2 x RTD wiring diagram

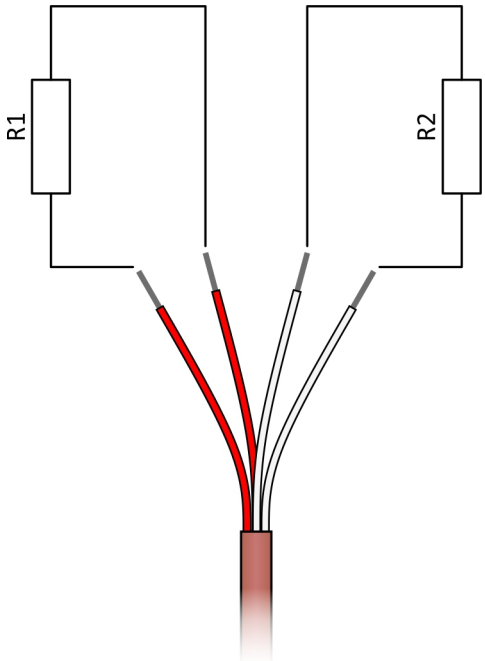


Figure 13T.12: Two-wire 2 x RTD wiring diagram

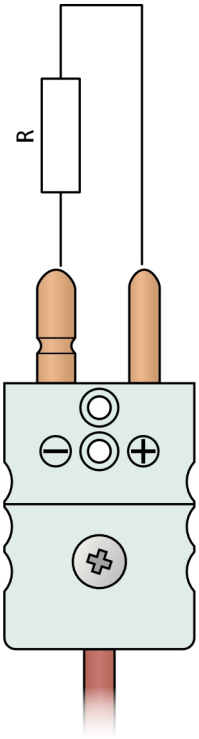


Figure 13T.13: Two-wire RTD wiring diagram with connector

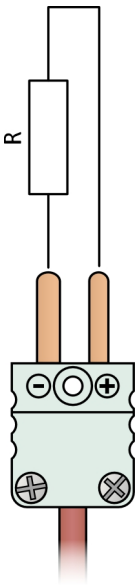


Figure 13T.14: Two-wire RTD wiring diagram with miniature connector

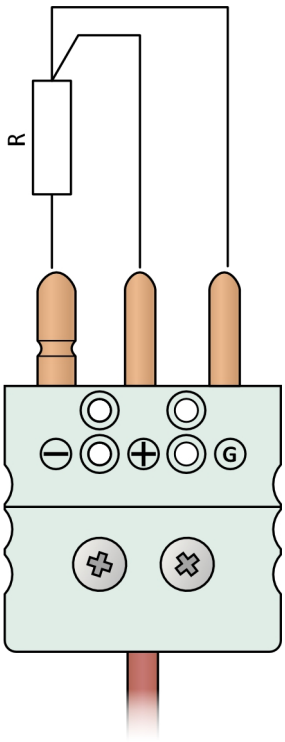


Figure 13T.15: Three-wire RTD wiring diagram with connector

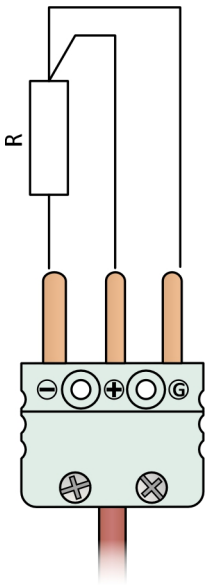
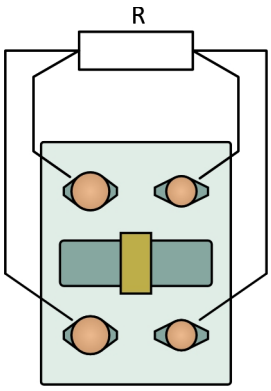


Figure 13T.16: Three-wire RTD wiring diagram with miniature connector



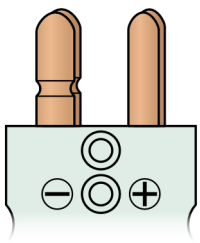
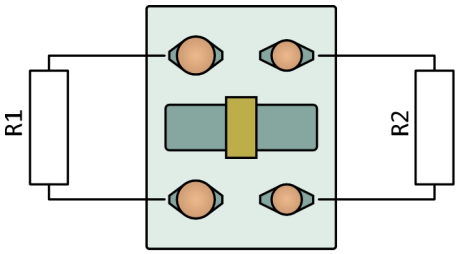


Figure 13T.17: Four-wire RTD wiring diagram with connector



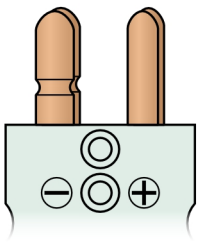


Figure 13T.18: Two-wire 2 x RTD wiring diagram with connector

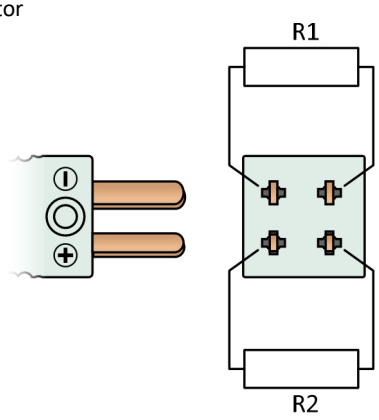


Figure 13T.19: Two-wire 2 x RTD wiring diagram with miniature connector

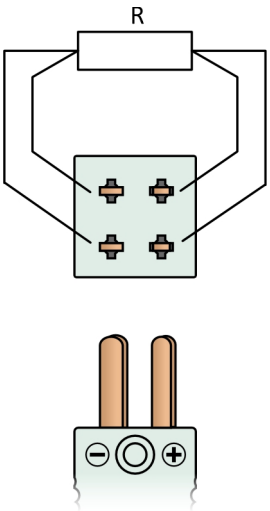


Figure 13T.20: Four-wire RTD wiring diagram with miniature connector

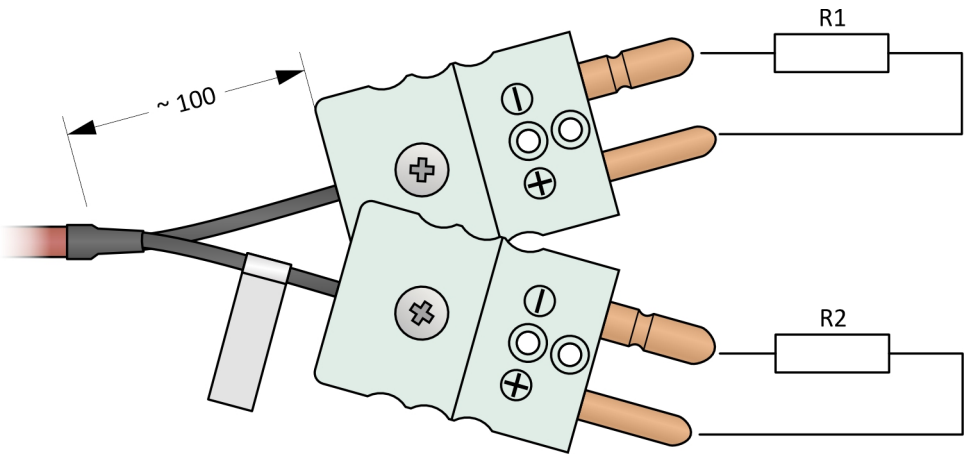


Figure 13T.21: Two-wire 2 x RTD wiring diagram with connectors

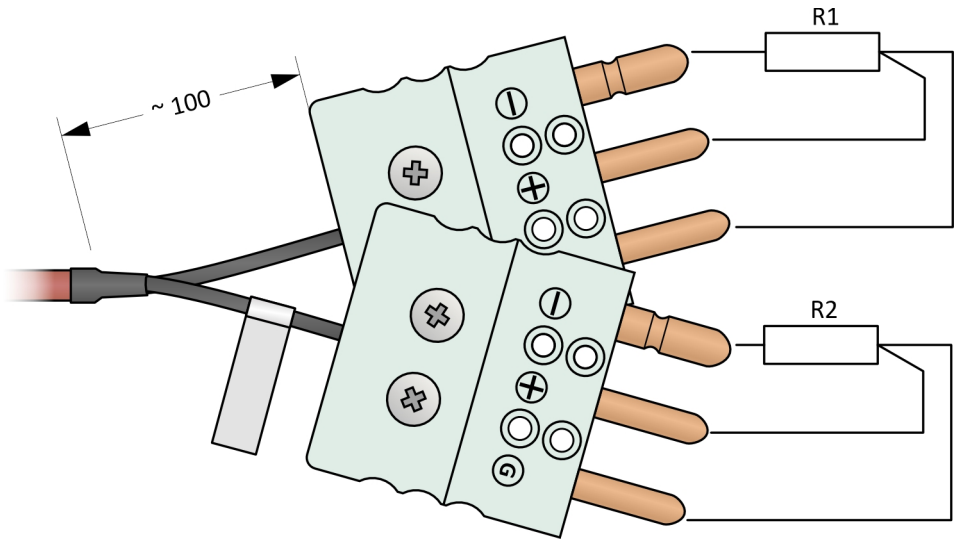


Figure 13T.22: Three-wire 2 x RTD wiring diagram with connectors

MTR14

RESISTANCE TEMPERATURE SENSORS WITH PROTECTION TUBE

MTR14 series temperature sensors are designed for applications with operating temperatures up to 600 °C and a requirement for a good mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of an assembly and a replaceable measuring insert. The assembly consists of a head and a protection tube. The head is equipped with a cable gland for connecting the cable.

General Information (Table 14.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
	Max. overpressure	16 bar
①	**Measuring insert**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath diameter	4,5 mm
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
②	**Threaded fitting**	
	Material	Stainless steel
③	**Protection tube (stem)**	
	Outer / inner diameter	11 / 7 mm
	Material	Stainless steel 1.4404
④	**Head**	
	Material	Aluminium alloy
	Cable gland	M20 x 1,5

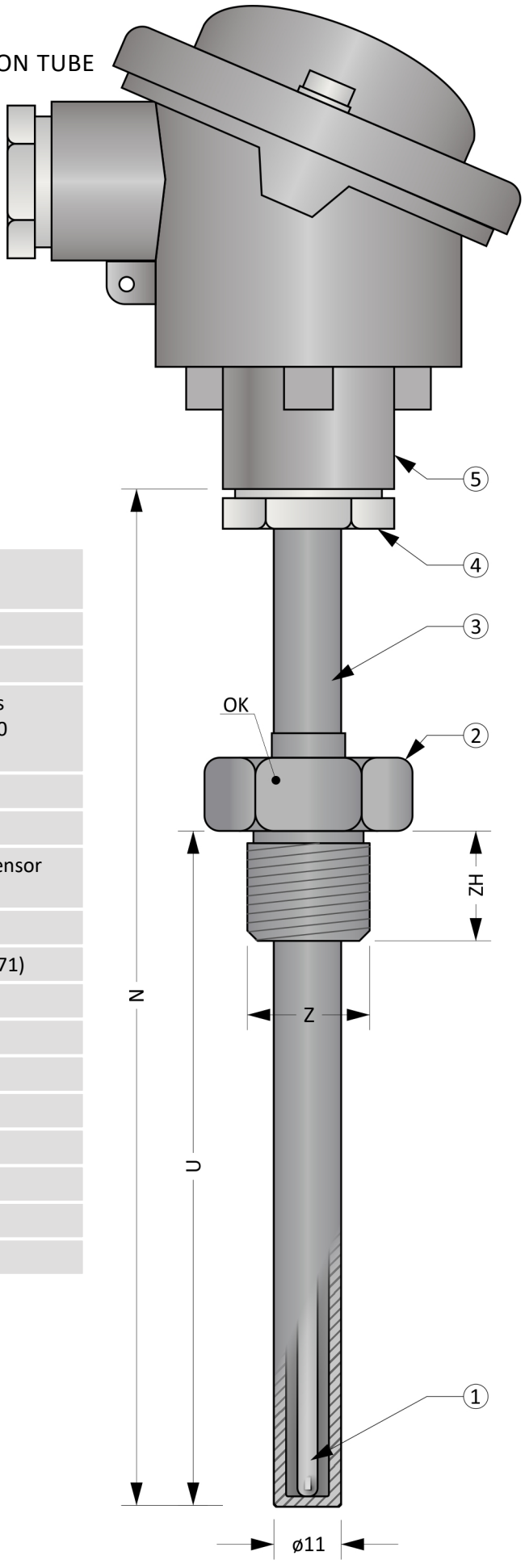


Figure 14.1: MTR14

Optional Parameters Including the Creation of an Order Code (Table 14.2)

Pos.	Code	MTR014 - ❶❷ - ❸ - ❹ - ❺❻❼	
❶	**Type of measuring insert**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, three-wire connection (2x3W)	
	B	2 x Pt500, three-wire connection (2x3W)	
	C	2 x Pt1000, three-wire connection (2x3W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
❸	**Nominal length N [mm]**		
	xxx	Selectable range from 150 to 2500 mm (in 10 mm increments)	
❹	**Immersion length U [mm]**		
	0	Without fitting	
	xxx	Selectable range from 50 to (N-100) mm (in 5 mm increments)	
❺	**Threaded fitting**		
	0	Without fitting	
	1	Welded threaded fitting Z = M27 x 2, ZH = 26 mm, WAF 36 (OK), incl. sealing ring	
	2	Welded threaded fitting Z = M20 x 1,5, ZH = 17 mm, WAF 30 (OK), incl. sealing ring	
	3	Welded threaded fitting Z = G½“, ZH = 17 mm, WAF 30 (OK)	
❻	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❼	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter - equipped with terminal	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR014-01-500-100-300

... 1 x Pt100, four-wire connection
... Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C
... Nominal length N = 500 mm
... Immersion depth U = 100 mm
... Welded threaded fitting G½
... Head B
... Without transmitter

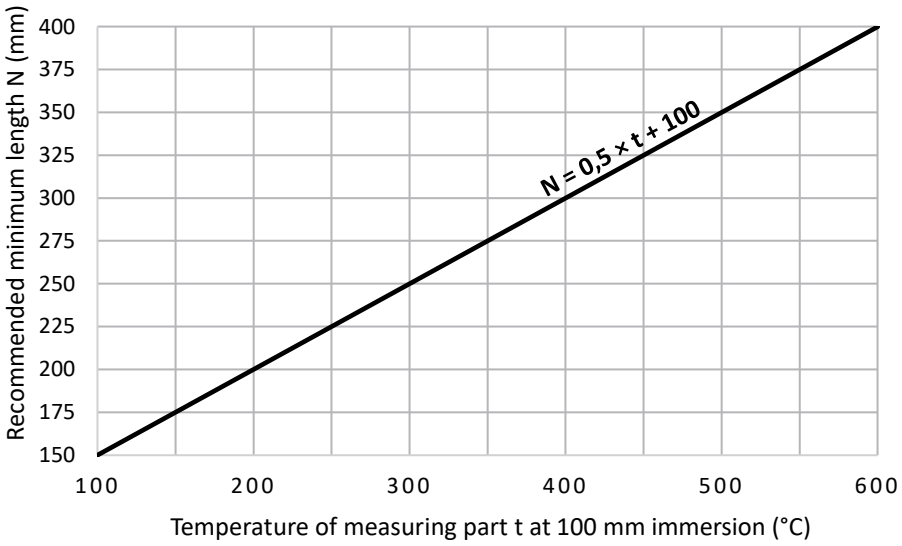
Approximate weight of the product: MTR014-01-500-100-300 ... 0,8 kg

Length Tolerances (Table 14.3)

Length	Length tolerance N	Length tolerance U
≤ 1500 mm	± 2 mm	± 2 mm
> 1500 mm	± 3 mm	± 3 mm

Recommended Min. Sensor Length N (Chart 14.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 14.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Measuring end, protection tube and thread fitting	See working range from table 14.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Head Mounted Transmitters (Table 14.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Heads

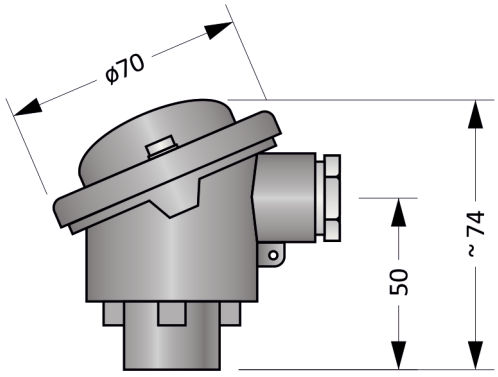


Figure 14.2: Head B

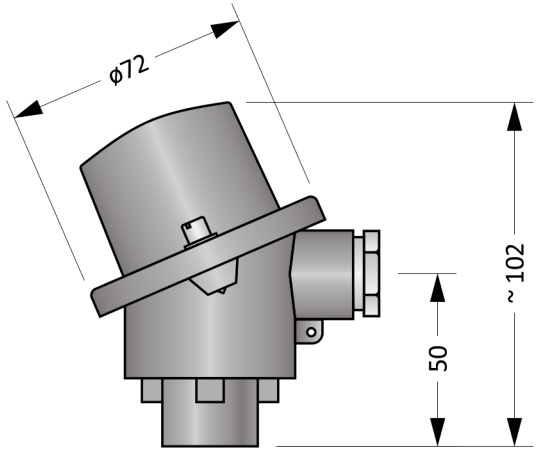


Figure 14.3: Head BH

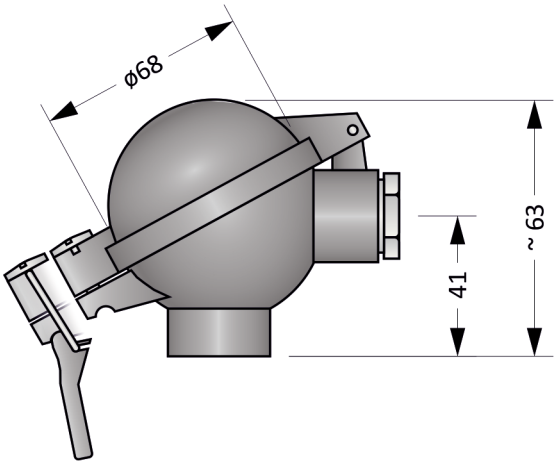


Figure 14.4: Head BUZ

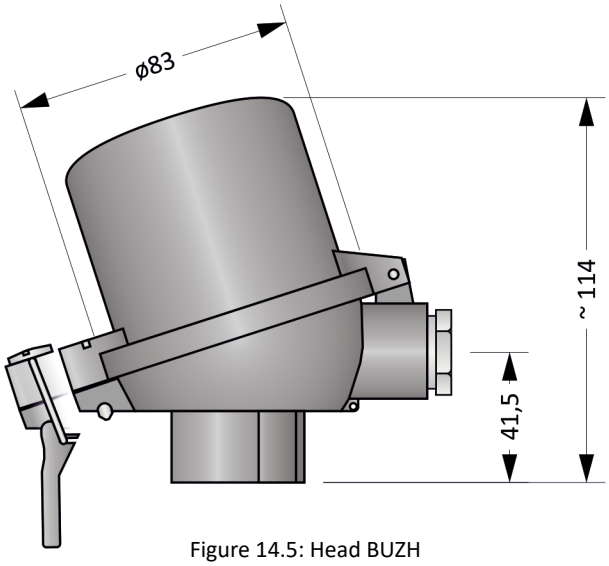


Figure 14.5: Head BUZH

Installation And Operating Instructions

For mounting of the sensor, a tube or welded fitting is used. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical connection of sensor with the transmitter is shown in Figure 14.8.

Electrical connection of the sensor without transmitter is shown in the Figures 14.6 a 14.7. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

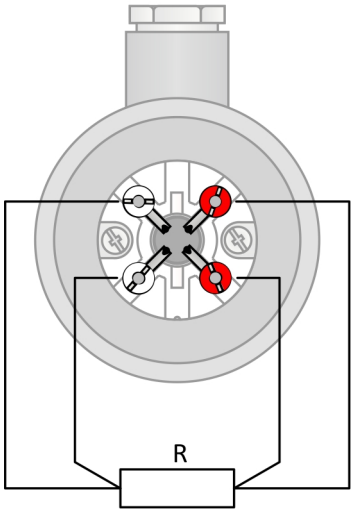


Figure 14.6: Four-wire RTD wiring diagram

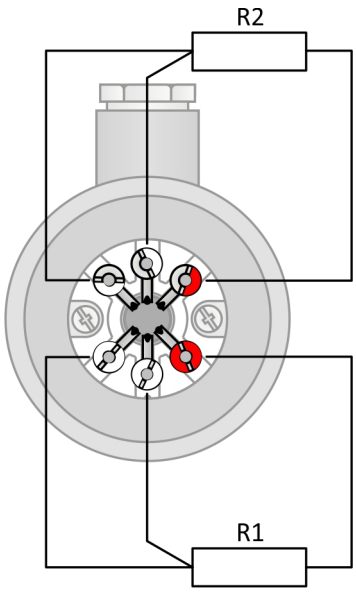


Figure 14.7: Three-wire 2 x RTD wiring diagram

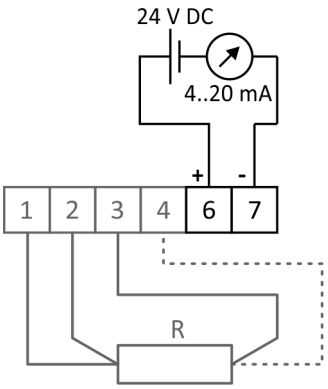


Figure 14.8: Trasmitter wirring diagram

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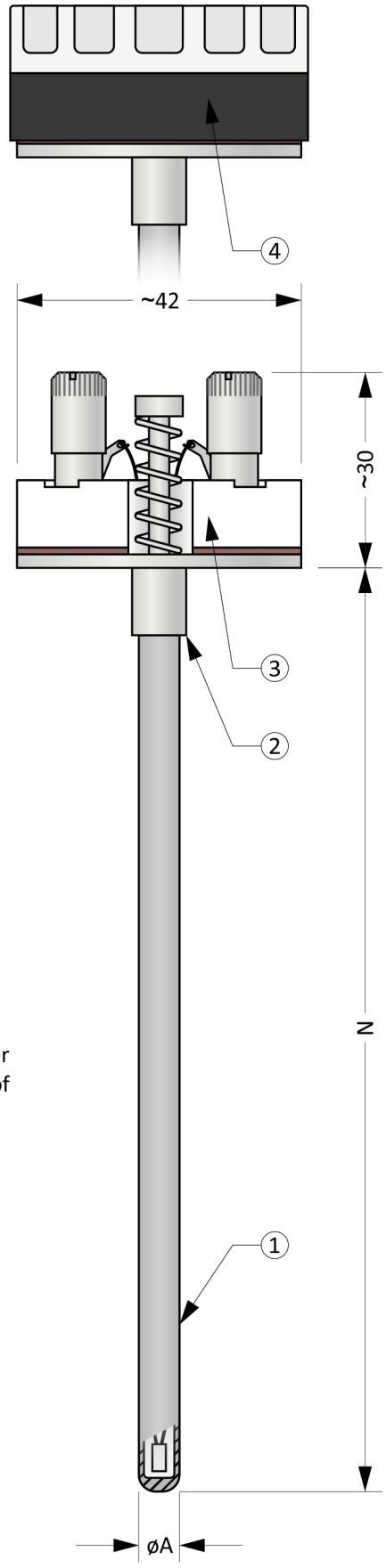
MTR15

MINERAL INSULATED METAL SHEATHED RESISTANCE TEMPERATURE SENSORS

MTR15 series sensors can be used as measuring inserts in MTR assemblies or as stand-alone sensors.

The sensor consists of a resistive RTD enclosed in a mineral insulated metal sheathed cable and terminal. The sensor is flexible and can be easily positioned to the measurement location.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.



General Information (Table 15.1)

	Insulation class acc. ČSN EN 60529	IP00 (terminal, transmitter) IP68 (measuring part)
①	**Sheathed sensor**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
	Min. bending radius	10 × øA
②	**Disk**	
③	**Terminal block**	
④	**Transmitter**	

Recommended Min. Sensor Length N (Chart 15.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.

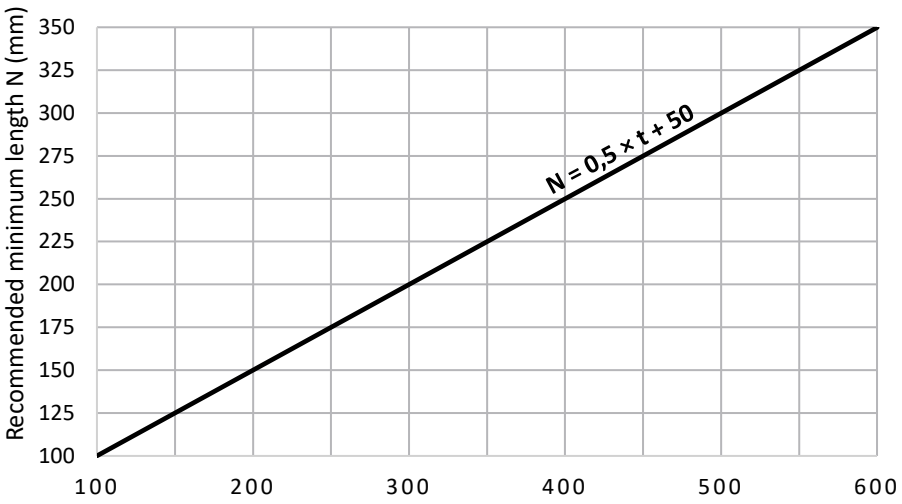


Figure 15.1: MTR15

Optional Parameters Including the Creation of an Order Code (Table 15.2)

Pos.	Code	MTR015 - ❶❷❸ - ❹ - ❺	
❶	**Type of measuring insert**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, three-wire connection (2x3W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	B	2 x Pt500, three-wire connection (2x3W)	Not possible for ø A = 3 mm, ø A = 5 mm.
	C	2 x Pt1000, three-wire connection (2x3W)	Not possible for ø A = 3 mm, ø A = 5 mm.
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	Not possible for ø A = 5 mm.
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	Not possible for ø A = 5 mm.
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 and Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for ø A = 5 mm, Pt500 a Pt1000.
❸	**Outer sheath diameter**		
	0	A = 6,0 mm	
	1	A = 5,0 mm	
	2	A = 4,5 mm	
	3	A = 3,0 mm	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 50 to 4500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 to 10000 mm (in 10 mm increments)	
❺	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter - equipped with terminal	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR015-010-500-0

... 1 x Pt100, four-wire connection

... Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C

... A = 6,0 mm

... Nominal length N = 500 mm

... Without transmitter

Approximate weight of the product: MTR015-010-500-0 ... 0,2 kg

Length Tolerances (Table 15.3)

Length	Length tolerance N
≤ 1500 mm	± 2 mm
1500 mm < Length ≤ 2500 mm	± 3 mm
2500 mm < Length ≤ 5000 mm	± 10 mm
> 5000 mm	± 20 mm

Diameter Tolerances (Table 15.4)

Diameter Tolerance A
± 0,1 mm

Recommended Maximum Temperatures of Sensor Parts (Table 15.5)

Sensor part	Continuous operation	Short-term operation
Terminal block / transmitter	< 100 °C / < 85 °C	---
Measuring end	See working range from table 15.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Transmitters (Table 15.6)

The transmitter is installed on the disk and replaces the terminal block.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Installation And Operating Instructions

The sensor stem or terminal screws are used for mounting the sensor.

The sensor stem can be bent to adapt it to the measuring place. The bend must be made outside the protected part of the stem, i.e. at a distance of at least 30 mm from the measuring end, see Figure 15.2.

The electrical connection of sensor with the transmitter is shown in Figure 15.5.

Electrical connection of the sensor without transmitter is shown in the Figures 15.3 a 15.4. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

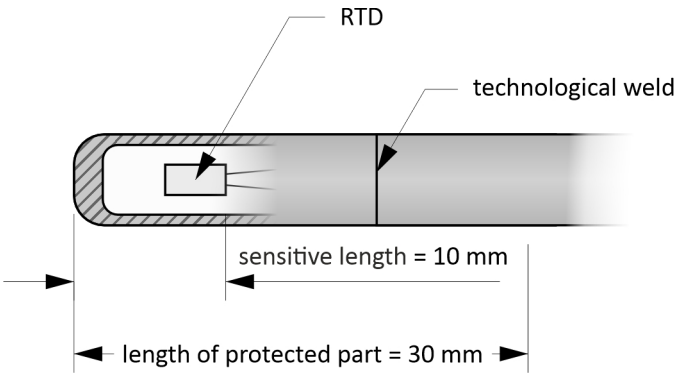


Figure 15.2: Measuring end detail

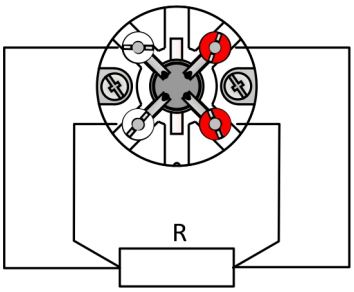


Figure 15.3: Four-wire RTD wiring diagram

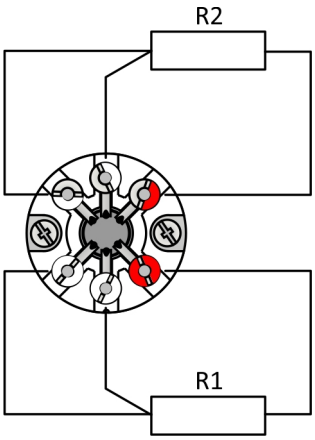


Figure 15.4: Three-wire 2 x RTD wiring diagram

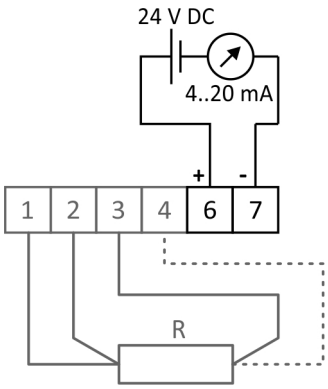


Figure 15.5: Trasmitter wirring diagram

MTR16

RESISTANCE TEMPERATURE SENSORS WITH PROTECTION TUBE

MTR16 series temperature sensors are designed for applications with operating temperatures up to 600 °C and a requirement for a good mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of an assembly and a replaceable measuring insert. The assembly consists of a head and a protection tube. The head is equipped with a cable gland for connecting the cable.

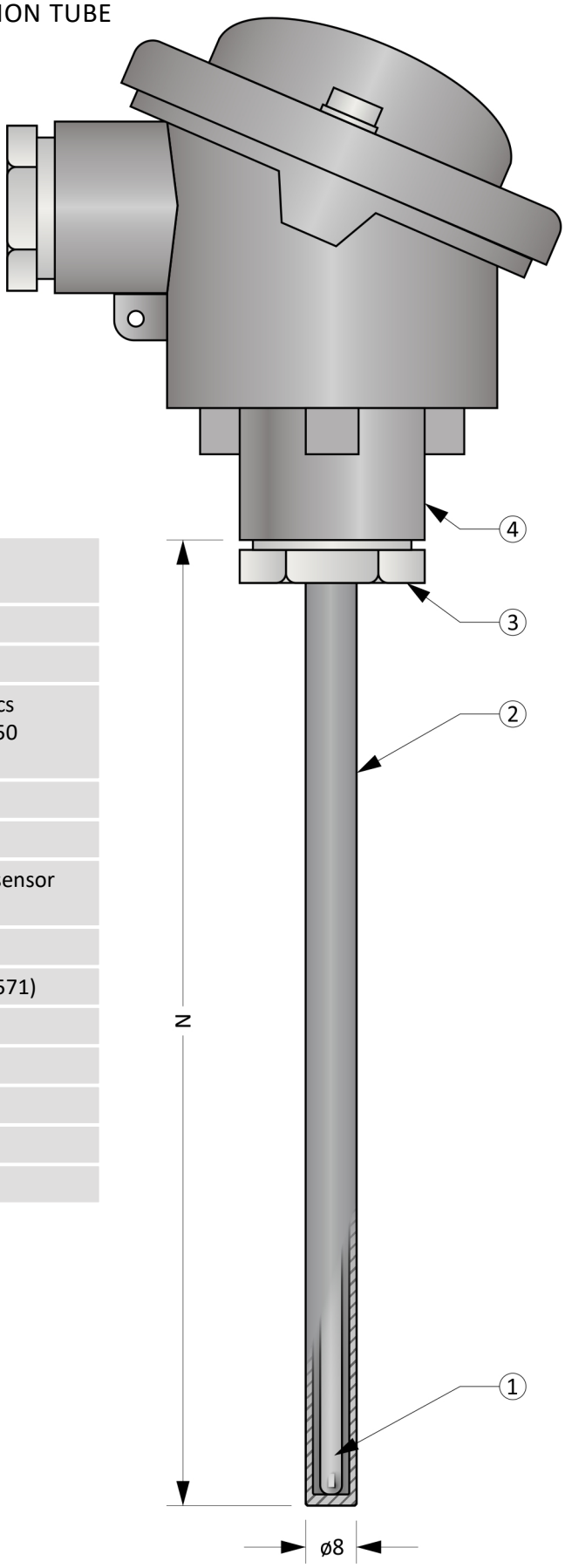


Figure 16.1: MTR16

General Information (Table 16.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
	Max. overpressure	16 bar
①	**Measuring insert**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath diameter	4,5 mm
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
②	**Protection tube (stem)**	
	Outer / inner diameter	8 / 6 mm
③	**Head**	
	Material	Aluminium alloy
	Cable gland	M20 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 16.2)

Pos.	Code	MTR016 - ❶❷ - ❸ - ❹ - ❺❻	
❶	**Type of measuring insert**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, three-wire connection (2x3W)	
	B	2 x Pt500, three-wire connection (2x3W)	
	C	2 x Pt1000, three-wire connection (2x3W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
❸	**Material of protection tube**		
	A	Stainless steel 1.4541	
	B	Stainless steel 1.4841	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 50 to 2500 mm (in 1 mm increments)	
❺	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❻	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter - equipped with terminal	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR016-01-A500-00

... 1 x Pt100, four-wire connection

... Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C

... Tube material 1.4541

... Nominal length N = 500 mm

... Head B

... Without transmitter

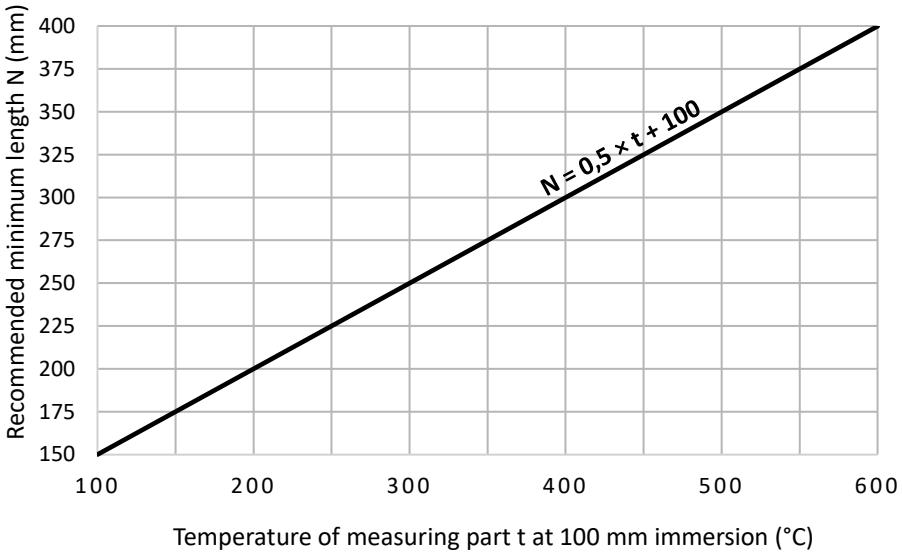
Approximate weight of the product: MTR016-01-A500-00 ... 0,7 kg

Length Tolerances (Table 16.3)

Length	Length tolerance N
≤ 1500 mm	± 2 mm
> 1500 mm	± 3 mm

Recommended Min. Sensor Length N (Chart 16.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 16.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Measuring end, protection tube and thread fitting	See working range from table 16.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Head Mounted Transmitters (Table 16.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Heads

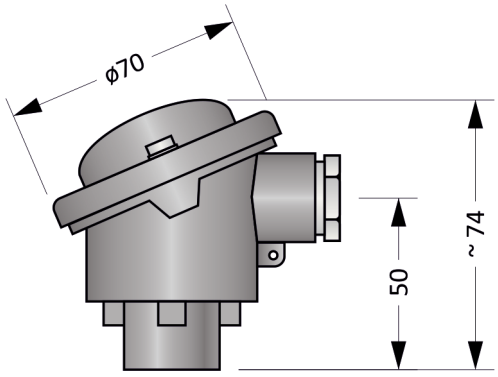


Figure 16.2: Head B

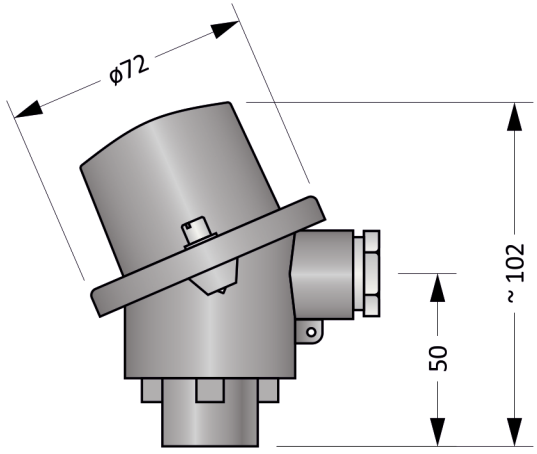


Figure 16.3: Head BH

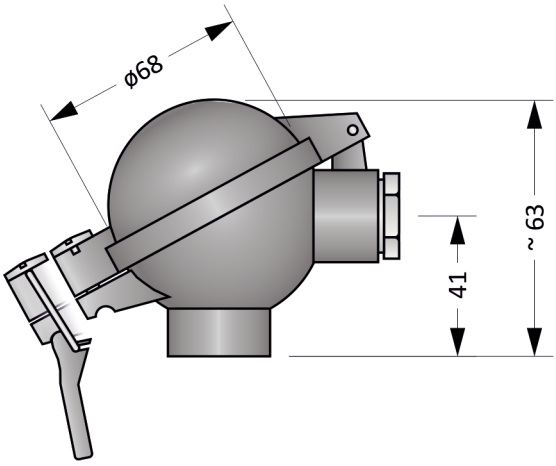


Figure 16.4: Head BUZ

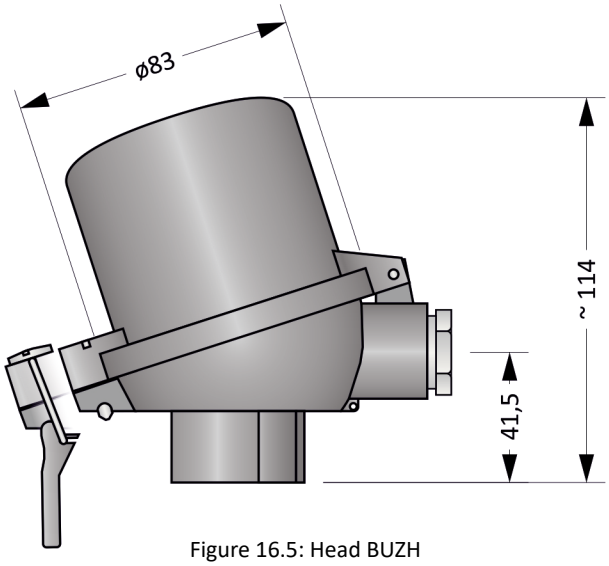


Figure 16.5: Head BUZH

Installation And Operating Instructions

A protection tubeor or welded fitting is used for mounting. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical connection of sensor with the transmitter is shown in Figure 16.8.

Electrical connection of the sensor without transmitter is shown in the Figures 16.6 a 16.7. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

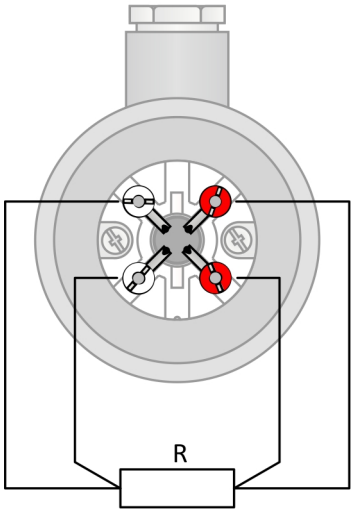


Figure 16.6: Four-wire RTD wiring diagram

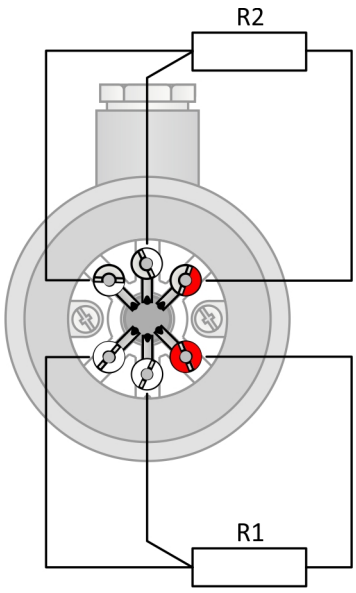


Figure 16.7: Three-wire 2 x RTD wiring diagram

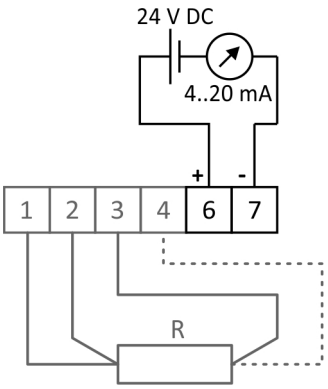


Figure 16.8: Trasmitter wirring diagram

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MTR16S

RESISTANCE TEMPERATURE SENSORS WITH PROTECTION TUBE

MTR16S series temperature sensors are designed for applications with operating temperatures up to 600 °C and a requirement for a good mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of an assembly and a replaceable measuring insert. The assembly consists of a head and a protection tube with welded thread fitting. The head is equipped with a cable gland for connecting the cable.

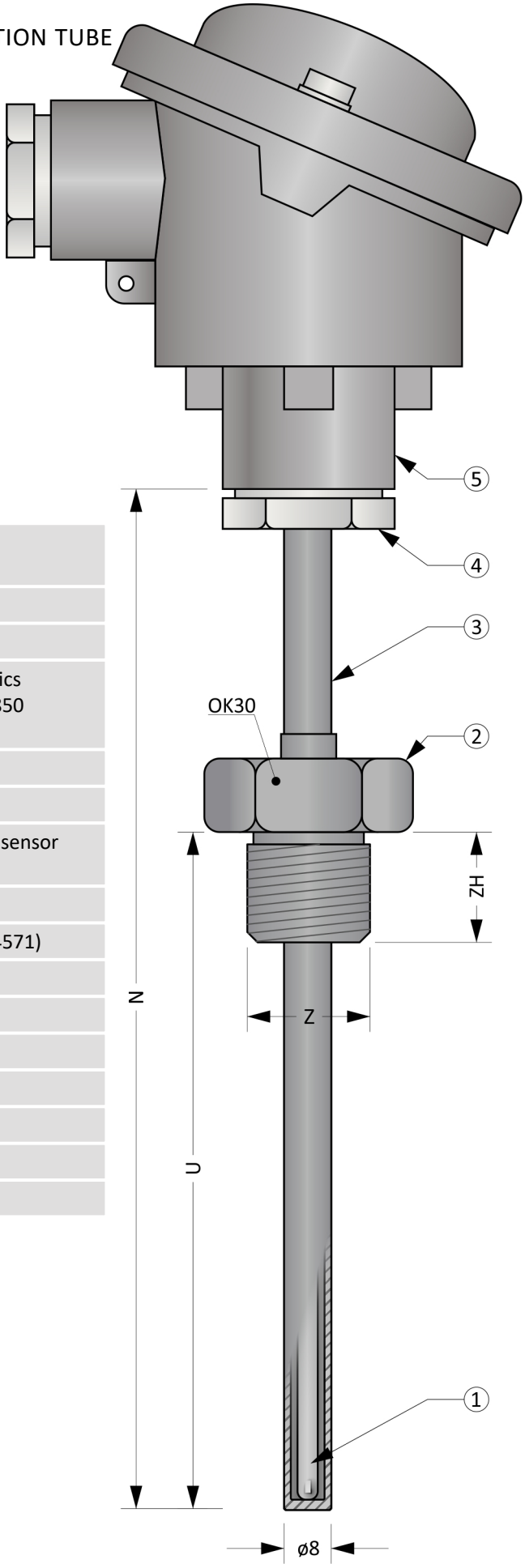


Figure 16S.1: MTR16S

General Information (Table 16S.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
	Max. overpressure	16 bar
①	**Measuring insert**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath diameter	4,5 mm
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
②	**Threaded fitting**	
	Material	Stainless steel
③	**Protection tube**	
	Outer / inner diameter	8 / 6 mm
④	**Head**	
	Material	Aluminium alloy
	Cable gland	M20 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 16S.2)

Pos.	Code	MTR016S - ❶❷ ❸ - ❹ - ❺ - ❻❼❽	
❶	**Type of measuring insert**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, three-wire connection (2x3W)	
	B	2 x Pt500, three-wire connection (2x3W)	
	C	2 x Pt1000, three-wire connection (2x3W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
❸	**Material of protection tube**		
	A	Stainless steel 1.4541	
	B	Stainless steel 1.4841	
❹	**Nominal length N [mm]**		
	xxx	Selectable range from 90 to 2500 mm (in 10 mm increments)	
❺	**Immersion length U [mm]**		
	xxx	Selectable range from 10 to (N-80) mm (in 5 mm increments)	
❻	**Threaded fitting**		
	0	Welded threaded fitting Z = M20 x 1,5, ZH = 17 mm, WAF 30 (OK), incl. sealing ring	
	1	Welded threaded fitting Z = G½“, ZH = 17 mm, WAF 30 (OK)	
❼	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❽	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR016S-01-A500-100-300

... 1 x Pt100, four-wire connection
... Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C
... Tube material 1.4541
... Nominal length N = 500 mm
... Immersion depth U = 100 mm
... Welded threaded fitting G½
... Head B
... Without transmitter

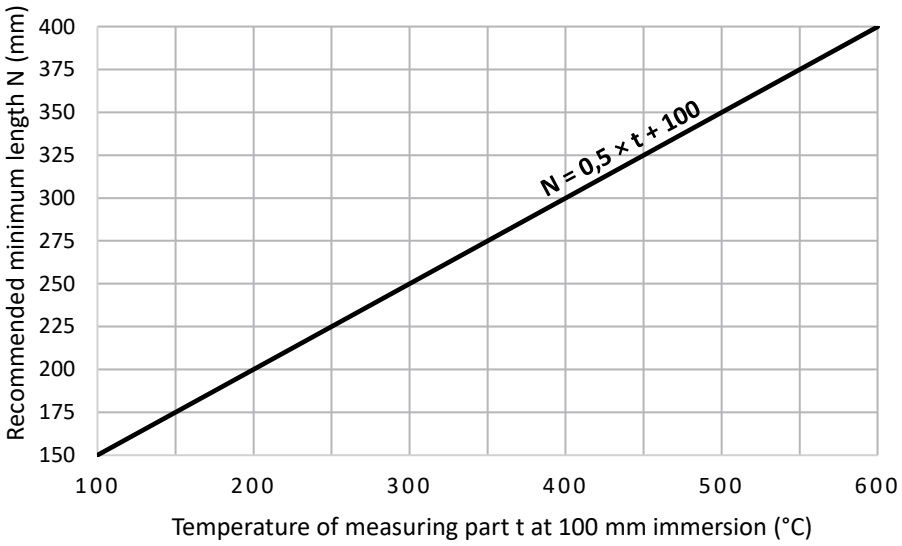
Approximate weight of the product: MTR016S-01-A500-100-300 ... 0,8 kg

Length Tolerances (Table 16S.3)

Length	Length tolerance N	Length tolerance U
≤ 1500 mm	± 2 mm	± 2 mm
> 1500 mm	± 3 mm	± 3 mm

Recommended Min. Sensor Length N (Chart 16S.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 16S.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Measuring end, protection tube and thread fitting	See working range from table 14.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Head Mounted Transmitters (Table 16S.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Heads

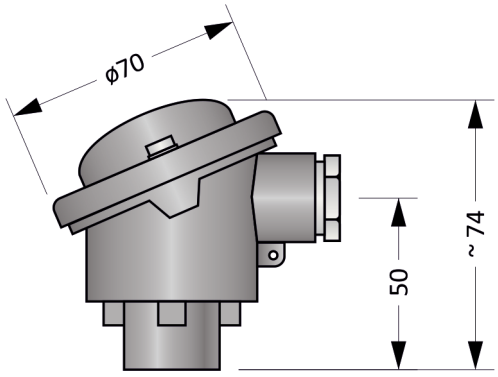


Figure 16S.2: Head B

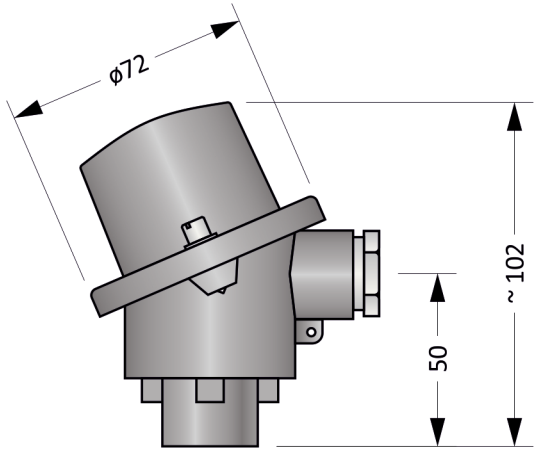


Figure 16S.3: Head BH

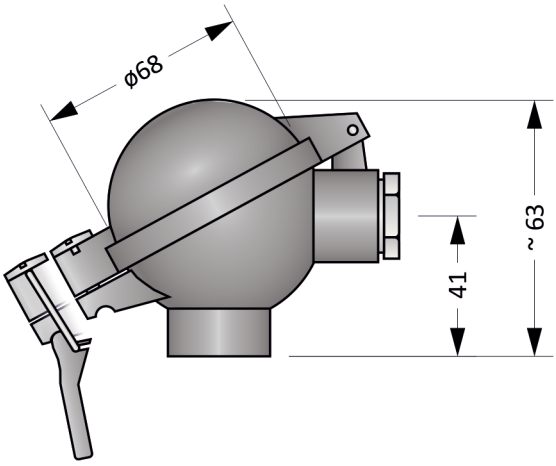


Figure 16S.4: Head BUZ

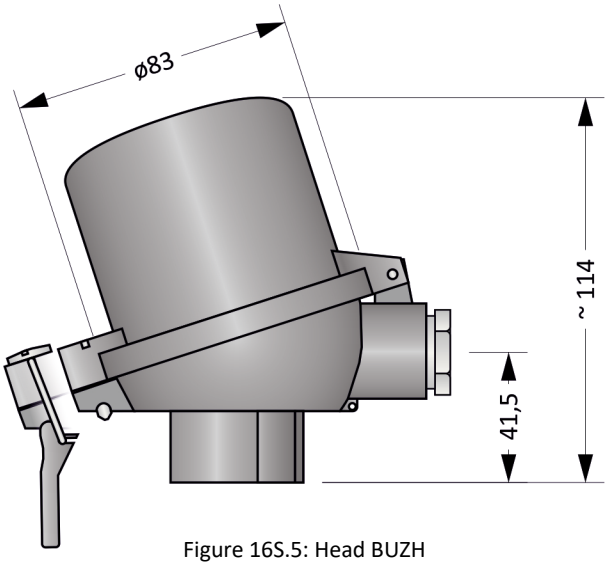


Figure 16S.5: Head BUZH

Installation And Operating Instructions

For mounting of the sensor, a tube or welded fitting is used. To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical connection of sensor with the transmitter is shown in Figure 16S.8.

Electrical connection of the sensor without transmitter is shown in the Figures 16S.6 a 16S.7. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

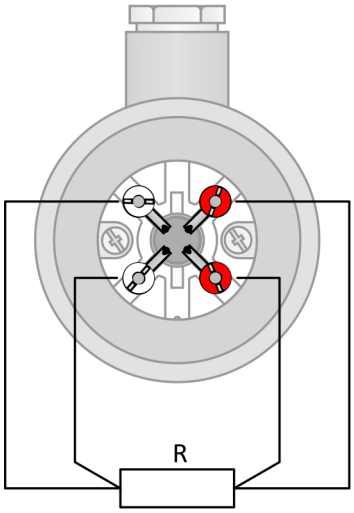


Figure 16S.6: Four-wire RTD wiring diagram

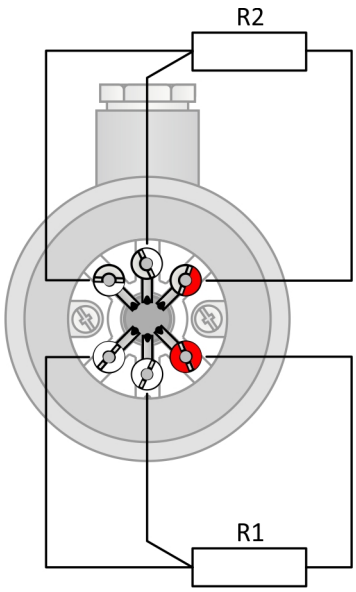


Figure 16S.7: Three-wire 2 x RTD wiring diagram

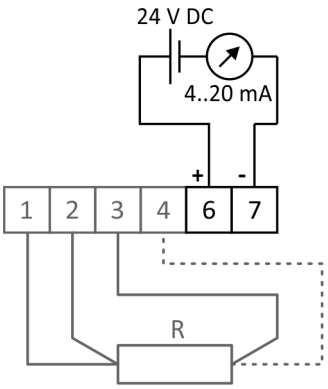


Figure 16S.8: Trasmitter wirring diagram

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MTR16N

RESISTANCE TEMPERATURE SENSORS WITH PROTECTION TUBE

MTR16N series temperature sensors are designed for applications with operating temperatures up to 600 °C and a requirement for a good mechanical durability.

The measuring element is a resistor whose resistance is temperature dependent according to the characteristic specified in ČSN EN 60751.

The sensor consists of an assembly and a replaceable measuring insert. The assembly consists of a head and a protection tube. The head is equipped with a cable gland for connecting the cable.

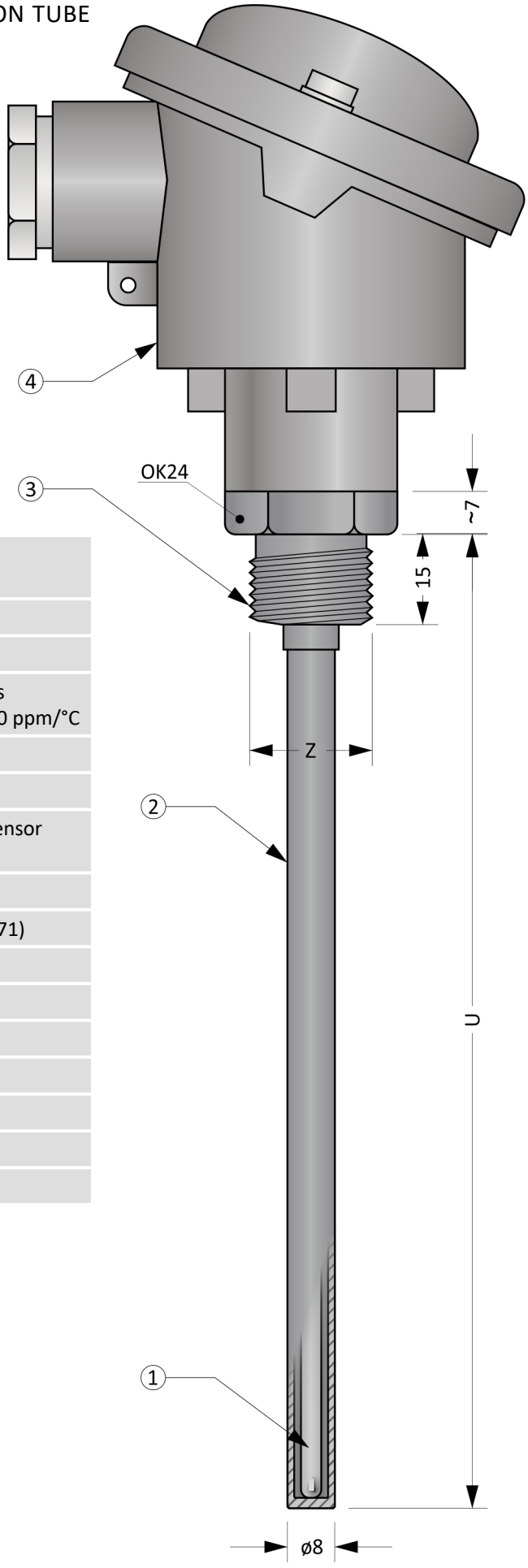


Figure 16N.1: MTR16N

General Information (Table 16N.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
	Max. overpressure	16 bar
①	**Measuring insert**	
	RTD type	Thin film resistor with characteristics according to ČSN EN 60751, α = 3850 ppm/°C
	RTD measuring current	1 mA
	Sensitive length	10 mm
	Design	Mineral insulated metal-sheathed sensor (MIMS)
	Sheath diameter	4,5 mm
	Sheath material	Stainless steel (1.4541, 1.4404, 1.4571)
②	**Threaded fitting**	
	Material	Stainless steel
③	**Protection tube (stem)**	
	Outer / inner diameter	8 / 6 mm
④	**Head**	
	Material	Aluminium alloy
	Cable gland	M20 x 1,5

Optional Parameters Including the Creation of an Order Code (Table 16N.2)

Pos.	Code	MTR016N - ❶❷❸ - ❹ - ❺ - ❻❼❽	
❶	**Type of measuring insert**		
	0	1 x Pt100, four-wire connection (4W)	
	1	1 x Pt500, four-wire connection (4W)	
	2	1 x Pt1000, four-wire connection (4W)	
	A	2 x Pt100, three-wire connection (2x3W)	
	B	2 x Pt500, three-wire connection (2x3W)	
	C	2 x Pt1000, three-wire connection (2x3W)	
❷	**Working range and accuracy class according to EN 60751**		
	0	Working range -200 ... +400 °C, accuracy class B in range -50 ... +400 °C	
	1	Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C	
	2	Working range -200 ... +600 °C, accuracy class B in range -50 ... +500 °C	
	3	Working range -200 ... +600 °C, accuracy class A in range -30 ... +300 °C	
	4	Working range -200 ... +600 °C, accuracy class B in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
	5	Working range -200 ... +600 °C, accuracy class A in range -200 ... +600 °C	Not possible for Pt500 and Pt1000.
❸	**Material of protection tube**		
	A	Stainless steel 1.4541	
	B	Stainless steel 1.4841	
❹	**Immersion length U [mm]**		
	xxx	Selectable range from 100 to 2500 mm (in 10 mm increments)	
❺	**Threaded fitting**		
	0	Welded threaded fitting Z = M20 x 1,5, ZH = 17 mm, OK24, incl. sealing ring	
	1	Welded threaded fitting Z = G½“, ZH = 17 mm, OK24	
❻	**Head**		
	0	B	
	1	BH	
	2	BUZ with screws with leaden seal holes	
	3	BUZ with snap lock	
	4	BUZH with screws with leaden seal holes	
	5	BUZH with snap lock	
❼	**Transmitter (only for sensor with 1xRTD)**		
	0	Without transmitter	
	9	INOR APAQ C130 RTD	
	3	INOR miniPAQ - HLP	
	7	INOR IPAQ C330	
	8	INOR IPAQ C530	
	5	INOR IPAQ C520	
	A	With another transmitter (e.g. supplied by the customer)	

Order code example: MTR016N-01-A500-000

... 1 x Pt100, four-wire connection
... Working range -200 ... +400 °C, accuracy class A in range -30 ... +300 °C
... Tube material 1.4541
... Immersion length U = 500 mm
... Welded threaded fitting G½
... Head B
... Without transmitter

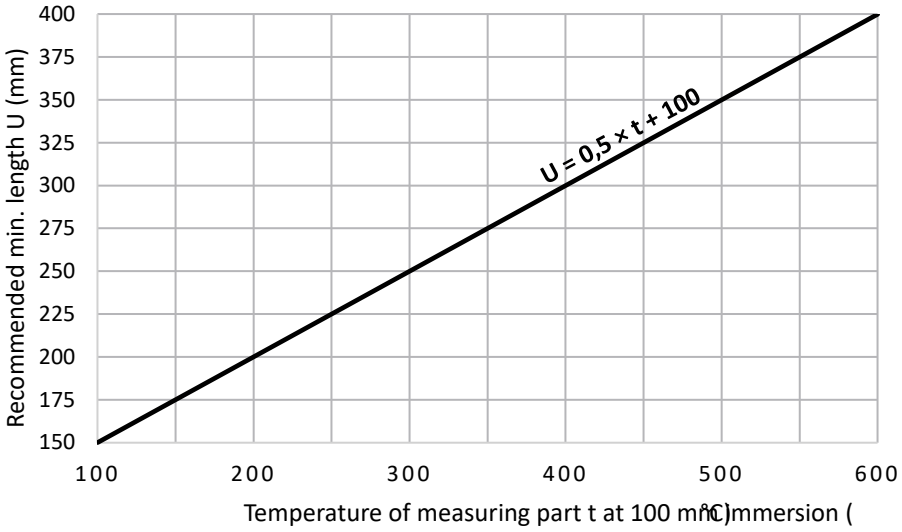
Approximate weight of the product: MTR016N-01-A500-000 ... 0,8 kg

Length Tolerances (Table 16N.3)

Length	Length tolerance U
≤ 1500 mm	± 2 mm
> 1500 mm	± 3 mm

Recommended Min. Sensor Length N (Chart 16N.1)

The minimum recommended length is determined with respect to the heat transfer from the measuring end to the terminal. If the length is not observed, there is a risk of overheating.



Recommended Maximum Temperatures of Sensor Parts (Table 16N.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	---
Measuring end, protection tube and thread fitting	See working range from table 14.2	---

Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Head Mounted Transmitters (Table 16N.5)

The transmitter is installed in the head and replaces the terminal block. When using a head with a raised lid (version BH, BUZH), the terminal block is preserved and the transmitter is placed in the lid.

Type	Input	Output	Settings	Notes
INOR APAQ C130 RTD	RTD	4 ... 20 mA	INOR CONNECT (NFC)	
INOR miniPAQ - HLP	Thermocouple - B, C, E, J, K, L, N, R, S, T, U RTD	4 ... 20 mA	PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanically isolated	PC WIN ConSoft (ICON USB adaptor) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adaptor)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanically isolated	PC WIN ConSoft (ICON USB adaptor)	2 Inputs (redundance) SIL 2 certificate, ATEX

Notes: Detailed information about the transmitters can be found in the respective data sheets.

Heads

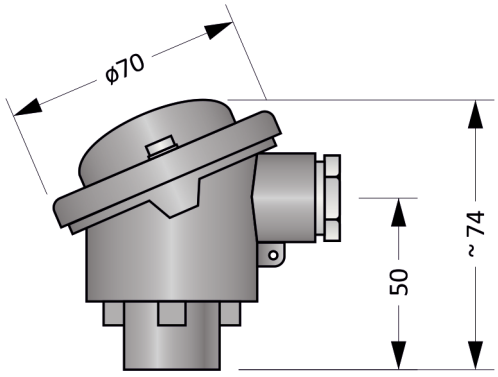


Figure 16N.2: Head B

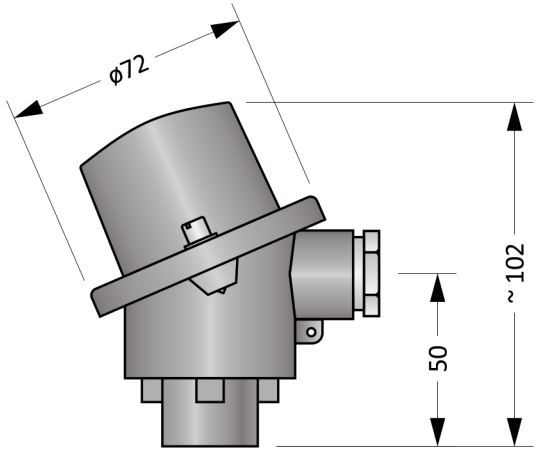


Figure 16N.3: Head BH

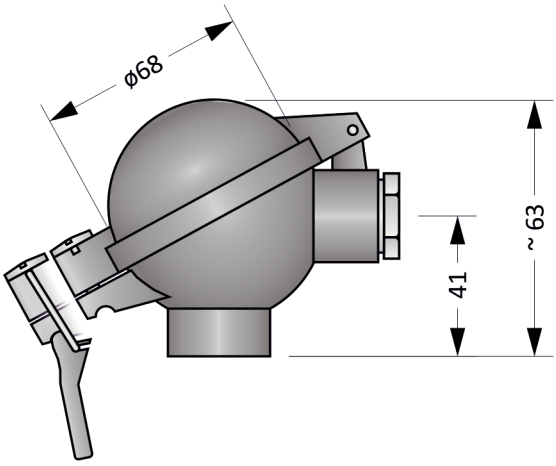


Figure 16N.4: Head BUZ

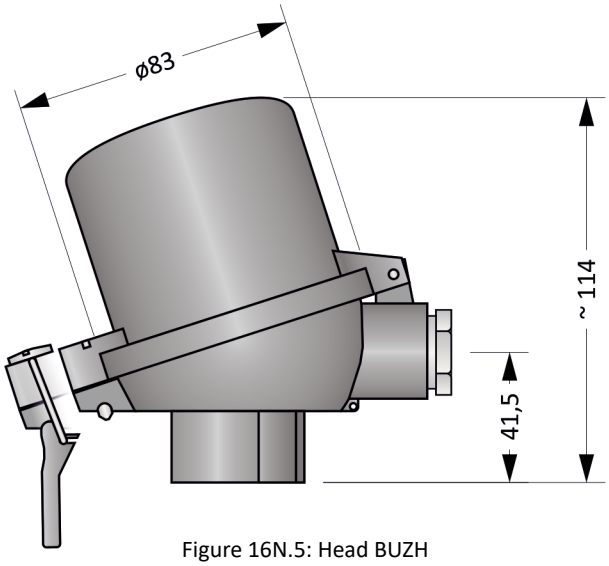


Figure 16N.5: Head BUZH

Installation And Operating Instructions

For mounting the sensor, a fitting is used, which is screwed into the weld-on piece.To ensure IP54 protection of the head, it is necessary to install the sensor in a vertical position with the head in the upper position.

The electrical connection of sensor with the transmitter is shown in Figure 16N.8.

Electrical connection of the sensor without transmitter is shown in the Figures 16N.6 a 16N.7. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

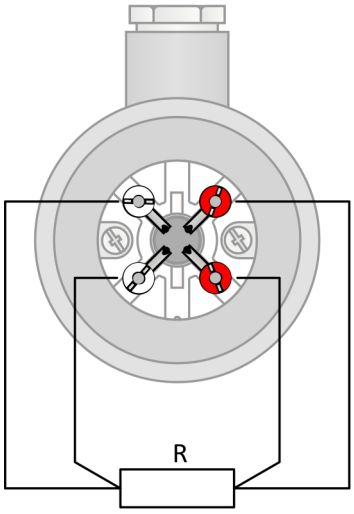


Figure 16N.6: Four-wire RTD wiring diagram

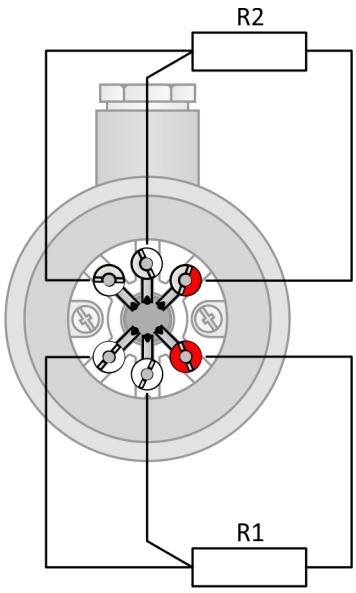


Figure 16N.7: Three-wire 2 x RTD wiring diagram

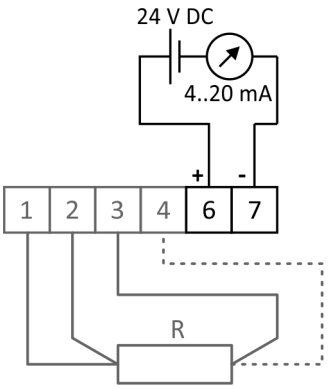


Figure 16N.8: Trasmitter wirring diagram

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