

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, $\alpha = 3850$ 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	

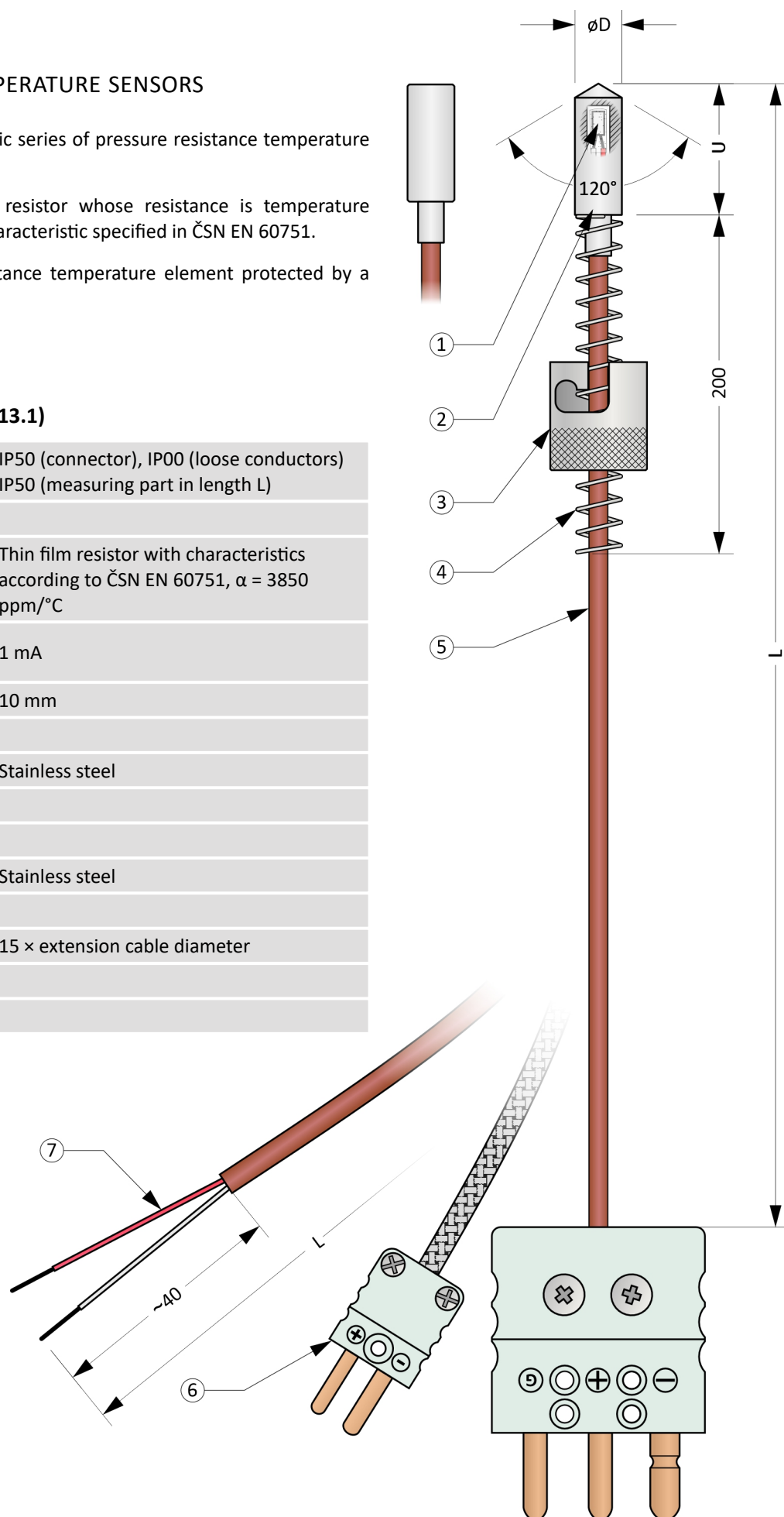


Figure 13.1: MTR13

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

Pos.	Code	MTR013 - ① ② ③ ④ - ⑤ - ⑥ ⑦ ⑧										
①	Design											
	0	Without spring and bayonet										
	1	With spring and bayonet										
②	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)										
③	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										
④	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
⑤	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)										
⑥	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.	
Continuation of table 13.2 on the next page												

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Continuarion of table 13.2 from the previous page

Pos.	Code	MTR013 - 1 2 3 4 - 5 - 6 7 8
7	Bayonet cap	
	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
8	Cold end	
	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	Standard ceramic 2-pin connector, type MTCK-CS, plug
	4	Standard ceramic 2-pin connector, type MTCK-CS, plug + socket
	5	Miniature 2-pin connector, type MTCK-M, plug
	6	Miniature 2-pin connector, type MTCK-M, plug + socket
	A	Standard 3-pin connector, type MTCK-S, plug
	B	Standard 3-pin connector, type MTCK-S, plug + socket
	C	Miniature 3-pin connector, type MTCK-M, plug
	D	Miniature 3-pin connector, type MTCK-M, plug + socket
	E	Standard 4-pin connector, type MTCK-S, plug
	F	Standard 4-pin connector, type MTCK-S, plug + socket
	G	Miniature 4-pin connector, type MTCK-DM, plug
	H	Miniature 4-pin connector, type MTCK-DM, plug + socket

Only this combination is possible for this option:
1 ... 0

Not possible for 3W, 4W and 2x3W.

Not possible for 3W, 4W and 2x3W.

Not possible for 3W, 4W and 2x3W.

Not possible for 3W, 4W and 2x3W.

Not possible for 3W, 4W and 2x3W.

Not possible for 3W, 4W and 2x3W.

Not possible for 2W, 4W, 2x2W.

Not possible for 2W, 4W, 2x2W.

Not possible for 2W, 4W, 2x2W.

Not possible for 2W, 4W, 2x2W.

Not possible for 2W, 3W a 2x3W.

Not possible for 2W, 3W a 2x3W.

Not possible for 2W, 3W.

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
$20 \leq L \leq 250$ cm	± 1 cm
$250 \text{ cm} < L \leq 500$ cm	$\pm 1,5$ cm
$500 \text{ cm} < L \leq 3000$ cm	$\pm 0,5 \% \geq L$

Length tolerance U (Table 13.4)

Length tolerance U
± 1 mm

Diameter tolerances (Table 13.5)

Diameter tolerance D
$\pm 0,1 \text{ mm}$

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 mm ² 4 x 0,25 mm ²	~ 3,8 mm ~ 4,3 mm	↗ Good flexibility, moisture resistant ↘ No shielding, low mechanical resistance
TWT	4 x 0,25 mm ²	~ 3,6 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TCuT	4 x 0,22 mm ²	~ 3,7 mm	↗ Moisture resistant
TT	6 x 0,15 mm ²	~ 3,5 mm	↗ Moisture resistant ↘ No shielding, low mechanical resistance
TGLV	4 x 0,25 mm ²	~ 3,6 mm	↗ Moisture resistant, high mechanical resistance
GLGLV	2 x 0,25 mm ² 4 x 0,25 mm ² 6 x 0,15 mm ²	~ 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

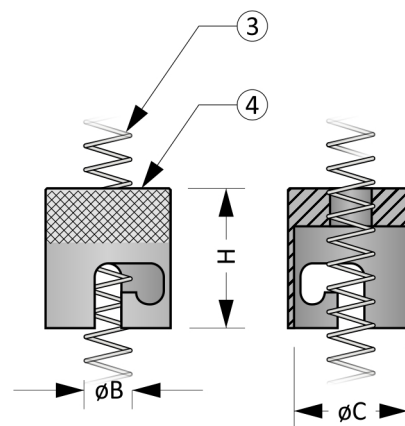


Figure 13.2: Bayonet cap

Connectors

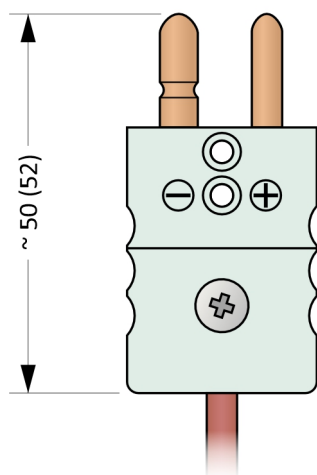
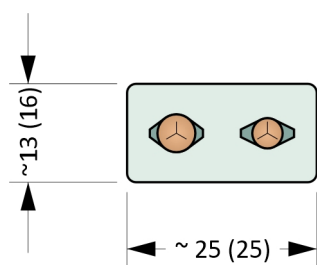


Figure 13.3: MTCK-S a MTCK-CS

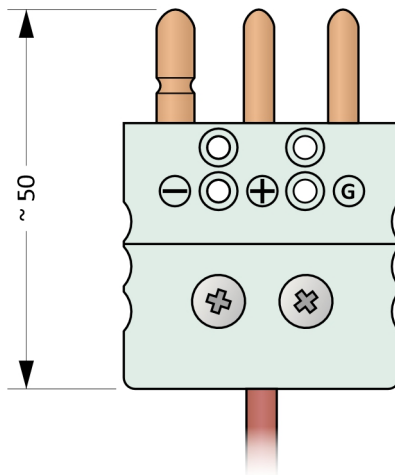
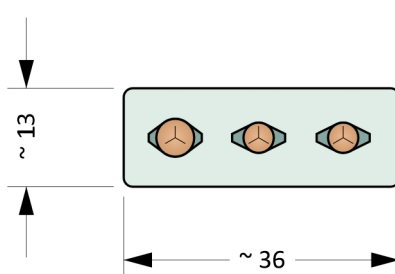


Figure 13.4: MTCK-3S

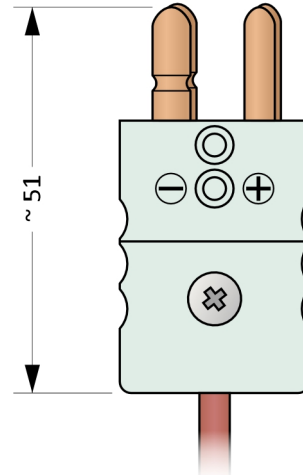
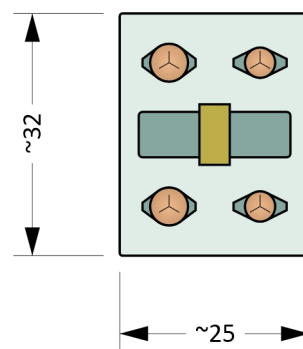


Figure 13.5: MTCK-DS

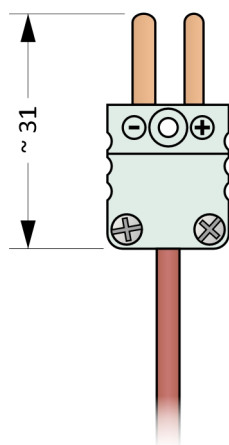
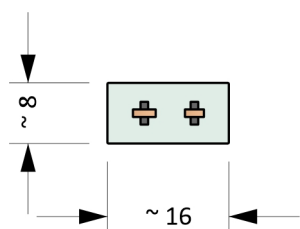


Figure 13.6: MTCK-M

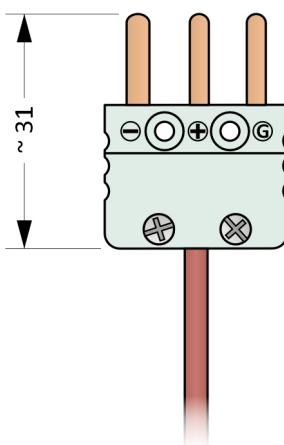
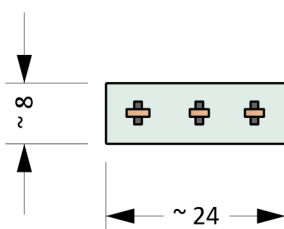


Figure 13.7: MTCK-3M

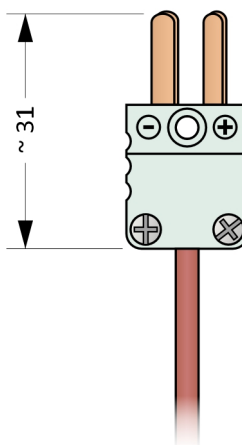
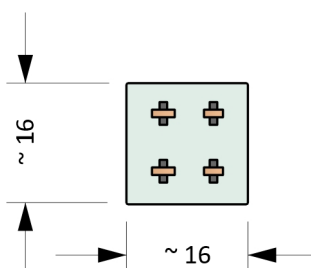


Figure 13.8: MTCK-DM

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.

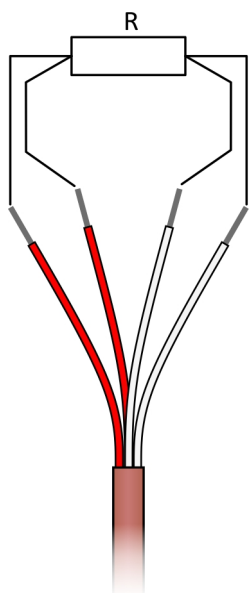


Figure 13.9: Four-wire RTD wiring diagram

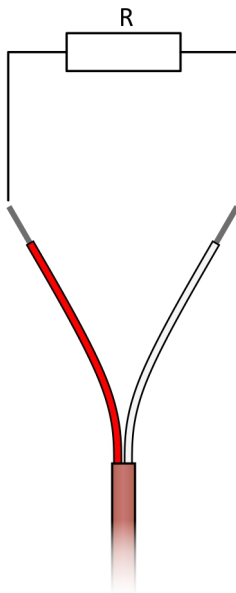


Figure 13.10: Two-wire RTD wiring diagram

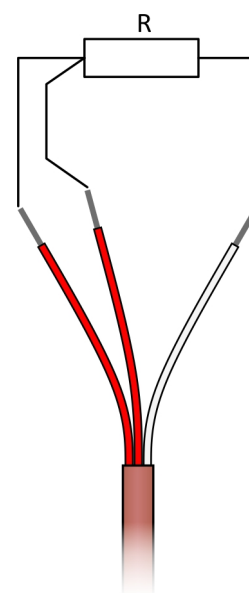


Figure 13.11: Three-wire RTD wiring diagram

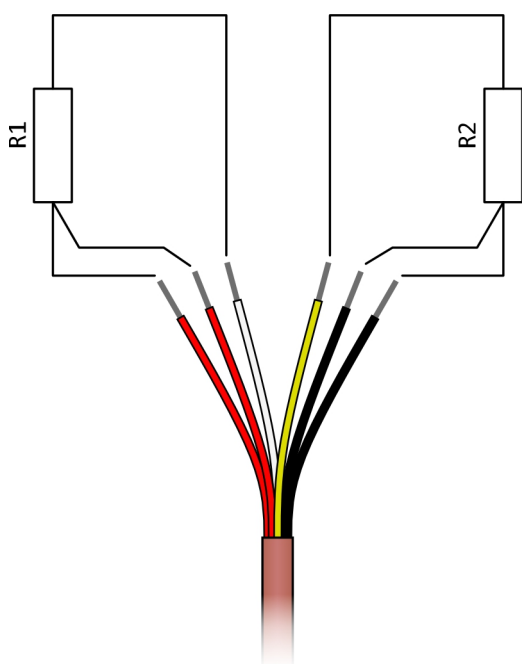


Figure 13.12: Three-wire 2 x RTD wiring diagram

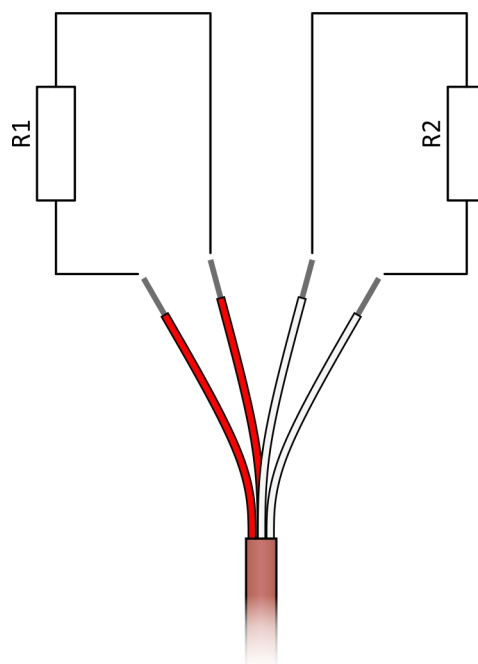


Figure 13.13: Two-wire 2 x RTD wiring diagram

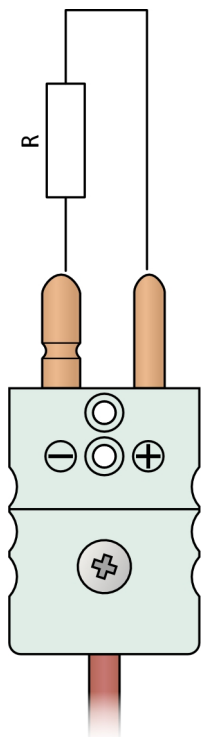


Figure 13.15: Two-wire RTD wiring diagram with miniature connector

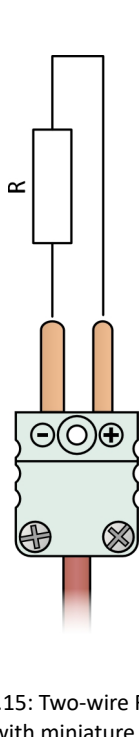


Figure 13.16: Three-wire RTD wiring diagram with connector

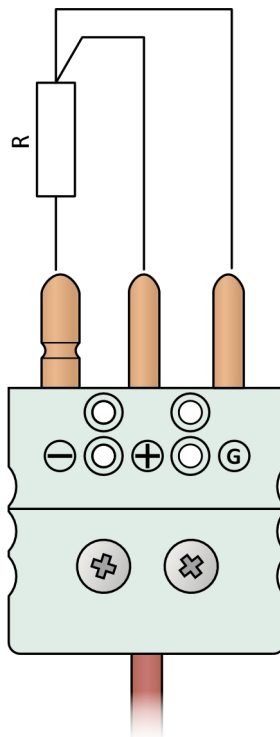


Figure 13.17: Three-wire RTD wiring diagram with miniature connector

Figure 13.14: Two-wire RTD wiring diagram with connector

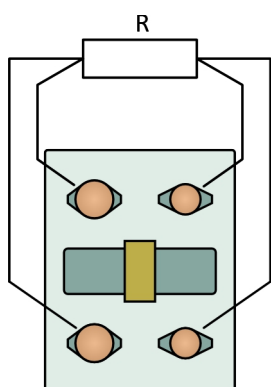


Figure 13.18: Four-wire RTD wiring diagram with connector

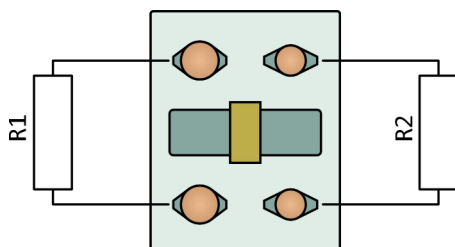


Figure 13.19: Two-wire 2 x RTD wiring diagram with connector

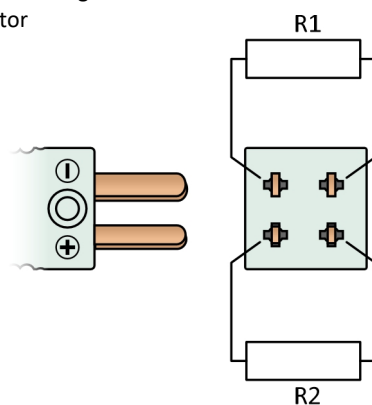


Figure 13.20: Two-wire 2 x RTD wiring diagram with miniature connector

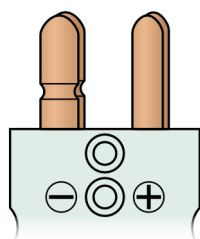
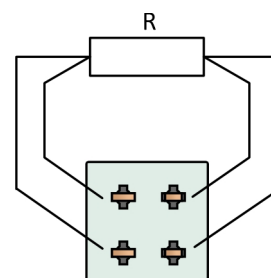


Figure 13.21: Four-wire RTD wiring diagram with miniature connector



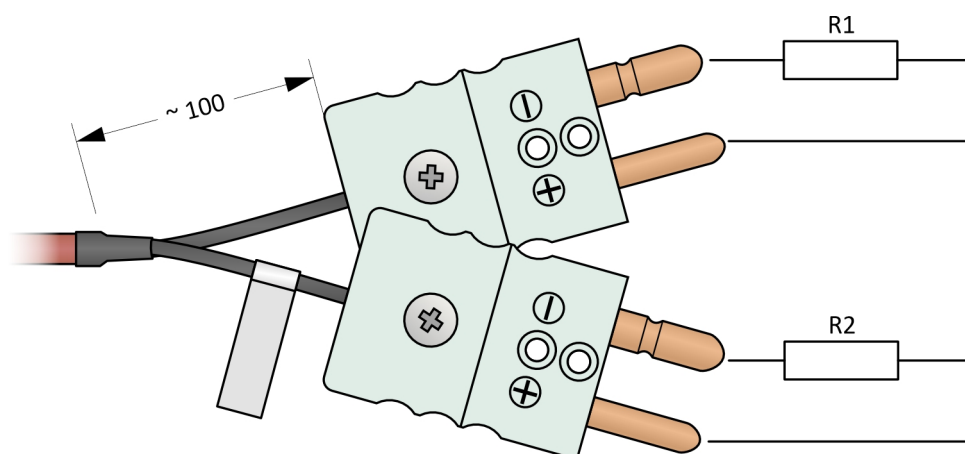


Figure 13.22: Two-wire 2 x RTD wiring diagram with connectors

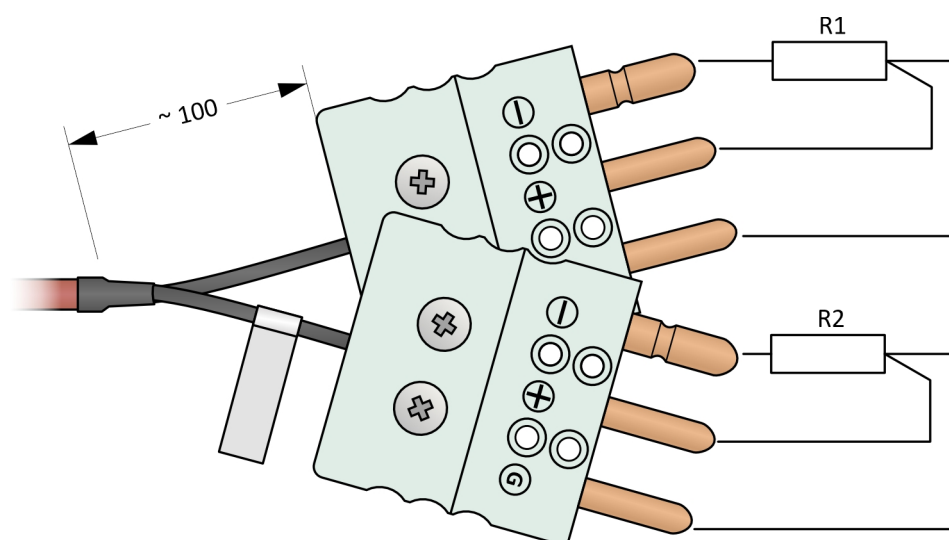


Figure 13.23: Three-wire 2 x RTD wiring diagram with connectors