

MTC11P

MINERAL INSULATED METAL-SHEATHED THERMOCOUPLES

Temperature sensors of the MTC11P series are flexible and robust sensors with a fast temperature response suitable for industrial environments. Thanks to the pressure mechanism, constant contact with the measured place is guaranteed.

The measuring element is a thermocouple of the J, K or N type, which uses the dependence of the thermoelectric voltage on the temperature to measure the temperature. The output signal is a thermoelectric voltage, the value of which is according to the ČSN EN 60584-1 ed. 2.

Thermocouple is mineral insulated metal-sheathed according to the ČSN EN 61515 with bayonet mechanism and compensation cable. The sheath is flexible and the sensor can be easily adapted to the measurement place.

General Information (Table 11P.1)

	Insulation class acc. ČSN EN 60529	IP50 (connector), IP00 (stripped ends) IP6X (transition part), IP68 (measuring part in length N)
	Common metal thermocouple (stem)	
①	Design	Mineral insulated metal-sheathed thermocouple according to the ČSN EN 61515 ed.2
	Min. bending radius	$10 \times \phi A$
②	Spring stop	
③	Bayonet spring	
④	Bayonet cap	
⑤	Transition part	
⑥	Spring	
⑦	Compensation cable	
	Min. bending radius	$15 \times$ outer diameter of the cable
⑧	Additional armor protection	
⑨	Stripped ends	
⑩	Connector	

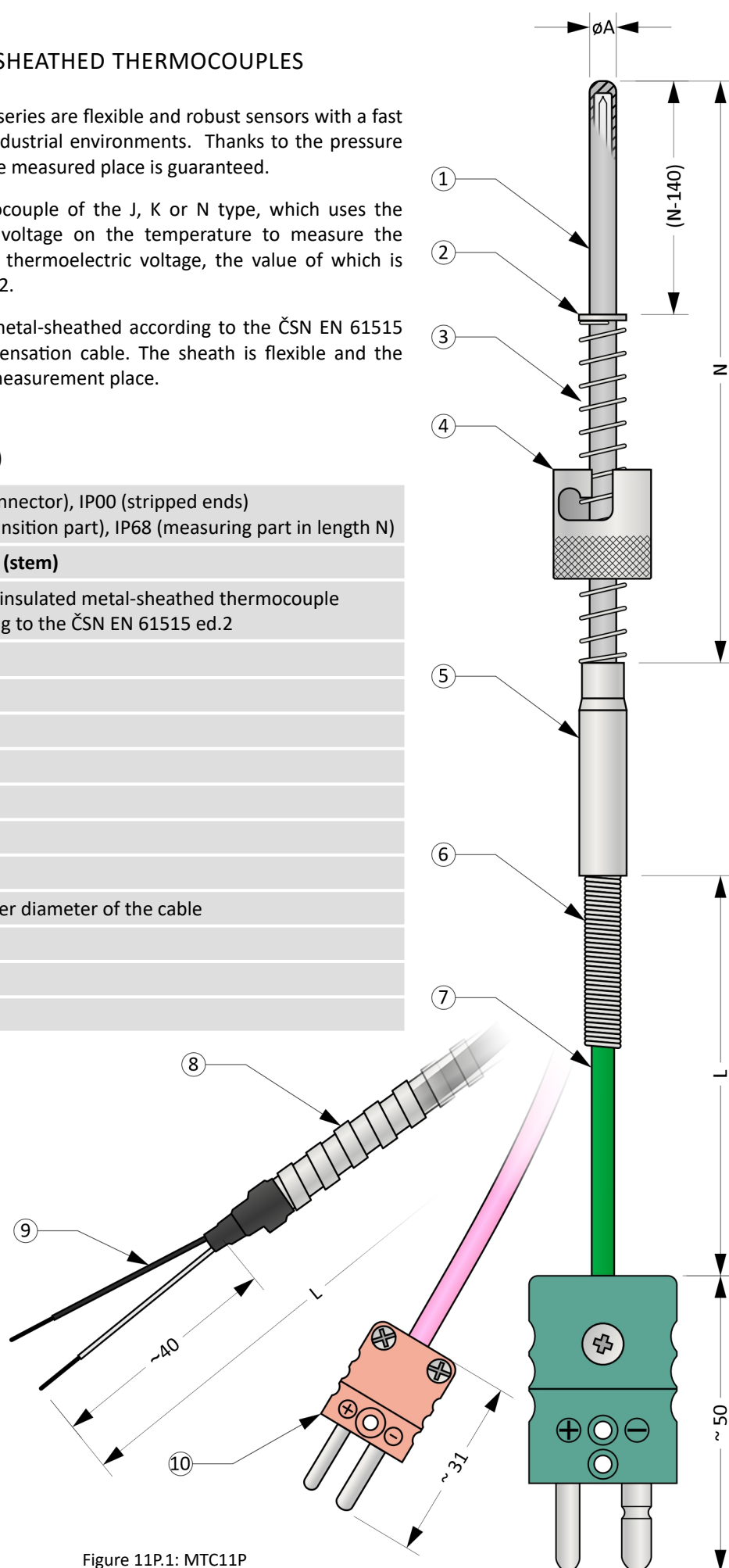


Figure 11P.1: MTC11P

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

Pos.	Code	MTC11P - 1 2 - 3 - 4 - 5 6	
1	Thermocouple type of dia. A = 3,0 mm (thermocouples acc. ČSN EN 60584-1 ed. 2)		
	1	1 x „J“, sheath material 1.4541	
	0	1 x „K“, sheath material 2.4816	
	4	1 x „N“, sheath material 2.4816	
	Thermocouple type of dia. A = 4,5 mm (thermocouples acc. ČSN EN 60584-1 ed. 2)		
	3	1 x „J“, sheath material 1.4541	
	2	1 x „K“, sheath material 2.4816	
	5	1 x „N“, sheath material 2.4816	
2	Measuring junction design and thermocouple accuracy class acc. ČSN EN 60584-1 ed. 2		
	1	Accuracy class 1, thermocouple isolated from the sheath, blunt tip	
	3	Accuracy class 1, thermocouple connected to the sheath, blunt tip	
	0	Accuracy class 2, thermocouple isolated from the sheath, blunt tip	
	2	Accuracy class 2, thermocouple connected to the sheath, blunt tip	
3	Nominal length N [mm]		
	xxx	Selectable range from 50 mm to 4 500 mm (in 1 mm increments)	
	xxx	Selectable range from 4501 mm to 50 000 mm (in 100 mm increments)	
4	Cable length L [cm]		
	xxx	Compensation cable, selectable range from 10 cm to 450 cm (in 1 cm increments)	
	xxx	Compensation cable, selectable range from 460 cm to 5 000 cm (in 10 cm increments)	
	Axxx	Compensation cable with additional armor protection, selectable range from 10 cm to 450 cm (in 1 cm increments)	
	Axxx	Compensation cable with additional armor protection, selectable range from 460 cm to 600 cm (in 10 cm increments)	
5	Design of the cold junction		
	0	Stripped ends, length 40 mm	
	1	Standard connector, MTCK-S type, plug	
	2	Standard connector, MTCK-S type, plug + socket	
	3	Miniature connector, MTCK-M type, plug	
	4	Miniature connector, MTCK-M type, plug + socket	
	5	Ceramic standard connector, MTCK-CS type, plug	
	6	Ceramic standard connector, MTCK-CS type, plug + socket	
	7	Ceramic miniature connector, MTCK-CM type, plug	
	8	Ceramic miniature connector, MTCK-CM type, plug + socket	
6	Bayonet cap		
	0	Inner diameter C = 11,3 mm, 2 slot, with a spring of dia. 6 mm	Only for A = 3,0 mm.
	1	Inner diameter C = 12 mm, 2 slot, with a spring of dia. 6 mm	Only for A = 3,0 mm.
	2	Inner diameter C = 15 mm, 2 slot, with a spring of dia. 6 mm	Only for A = 3,0 mm.
	3	Inner diameter C = 12 mm, 2 slot, with a spring of dia. 8 mm	Only for A = 4,5 mm.
	4	Inner diameter C = 15 mm, 2 slot, with a spring of dia. 8 mm	Only for A = 4,5 mm.

Order code example: MTC11P-00-500-500-00

... 1 x „K“, sheath dia. A = 3,0 mm, sheath material 2.4816 (INCONEL 600)

... Accuracy class 2, thermocouple isolated from the sheath, blunt tip

... Nominal length N = 500 mm

... Compensation cable length L = 500 cm

... Stripped ends

... Bayonet cap C = 11,3 mm

Approximate weight of the product: MTC11P-00-500-500-00 ... 0,4 kg

Length Tolerances (Table 11P.3)

Length N, L	Tolerance N	Tolerance L
$50 \leq (N, L) \leq 1500 \text{ mm}$	$\pm 2 \text{ mm}$	$\pm 10 \text{ mm}$
$1500 < (N, L) \leq 2500 \text{ mm}$	$\pm 3 \text{ mm}$	$\pm 10 \text{ mm}$
$2500 < (N, L) \leq 5000 \text{ mm}$	$\pm 5 \text{ mm}$	$\pm 15 \text{ mm}$
$5000 < (N, L) \leq 50000 \text{ mm}$	$\pm 0,5 \% \text{ of } N$	$\pm 0,5 \% \text{ of } N$

Diameter tolerance (Table 11P.4)

Stem diameter A	Tolerance A
$1 \leq A \leq 4,5 \text{ mm}$	$\pm 0,05 \text{ mm}$
$4,5 < A \text{ mm}$	$\pm 0,06 \text{ mm}$

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

Sensor part	Sheat dia. / insulation type	Continuous operation	Short-term operation
Compensation cable	GLGLP	-200 ... 400 °C	-
Spring stop, spring, bayonet cap		< 500 °C	-
Transition part		< 165 °C	-
Connectors MTCK-S, MTCK-M		< 220 °C	-
Connectors MTCK-CS, MTCK-CM		< 400 °C	-
Thermocouple type „J“ measuring junction	3 mm	< 470 °C	< 520 °C
	4,5 mm	< 550 °C	< 620 °C
Thermocouple type „K“ and „N“ measuring junction	3 mm	< 980 °C	< 1050 °C
	4,5 mm	< 1080 °C	< 1140 °C

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

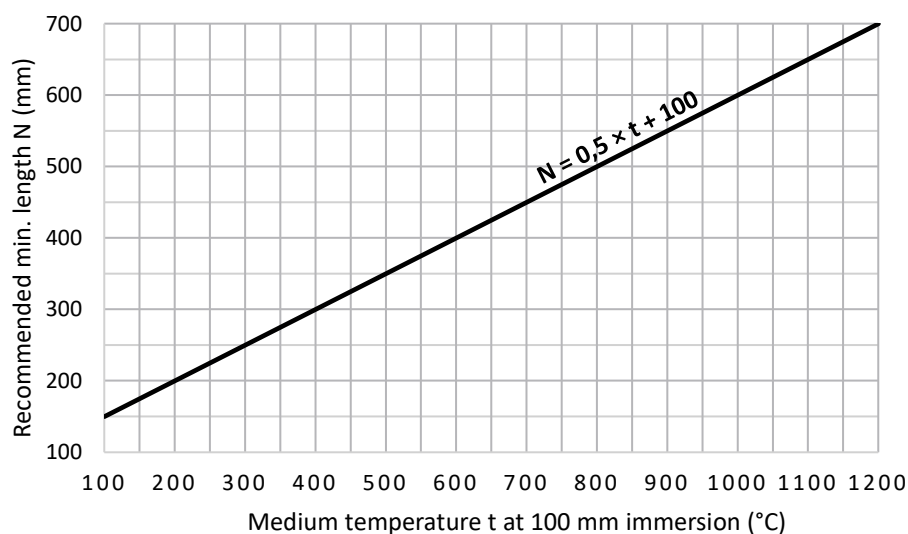
Compensation Cable Overview (Table 11P.6)

Compensation cables are in accuracy class 2 and meet the requirements of the ČSN EN 60584-3 standard.

Type	Insulation	Number x cross-section of wires	Cable outer diameter	Pros and cons
JX KCA NC	GLGLP	2 x 0,22 mm ²	~ 3,5 mm	↗ High mechanical resistance, suitable for higher temperatures ↘ Low moisture resistance

Recommended Min. Sensor Length (Chart 11P.1)

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



Measuring Junction Design



Figure 11P.2: Thermocouple isolated from the sheath



Figure 11P.3: Thermocouple connected to the sheath

Bayonet part design (Table 11P.7)

①	Bayonet cap	
	Material	Stainless steel
②	Bayonet spring	
	Material	Stainless steel

Dimensions of the bayonet cap (Table 11P.8)

ϕC	H	ϕB	ϕA
11,3 mm	16 mm	6 mm	3,0 mm
12,0 mm	18 mm	6 mm	3,0 mm
		8 mm	4,5 mm
15,0 mm	18 mm	6 mm	3,0 mm
		8 mm	4,5 mm

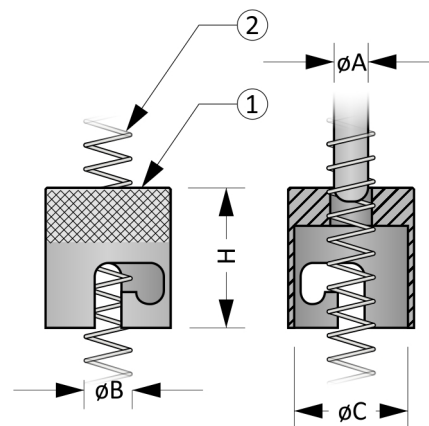


Figure 11P.4: Bayonet cap

Design of the transition part (Table 11P.9)

Transition part		
①	Note	It enables the connection of the thermocouple and the compensation cables.
	Material	Stainless steel
Spring		
②	Note	It is only used for thermocouples with a diameter of 2 mm and above. It reduces the wear of the cable at the point of exit from the transition part.
	Material	Stainless steel
Additional armor protection		
③	Note	It increases the mechanical resistance of the cable.
	Material	Stainless steel
	Properties	Flexible, does not prevent the ingress of moisture

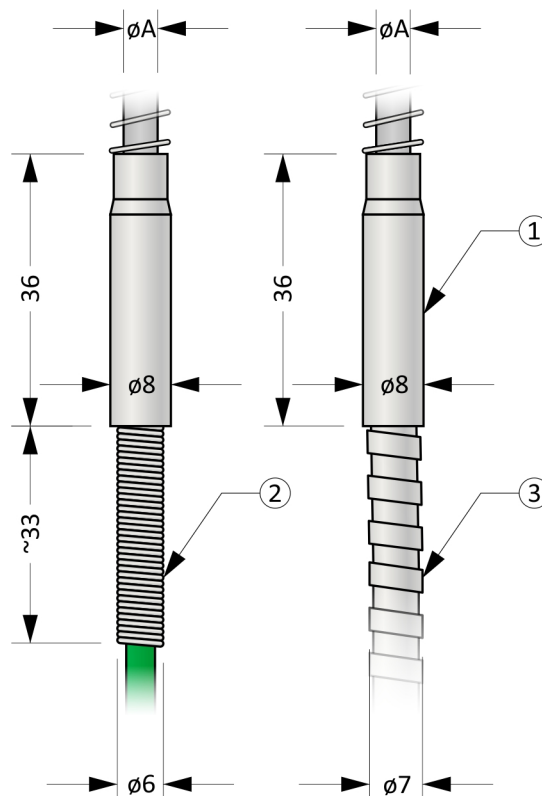


Figure 11P.5: Transition part design options.

Installation And Operating Instructions

The sensor is fixed using a bayonet mechanism. Other parts cannot be used.

The electrical connection of the sensor is shown in Figures 11P.6 and 11P.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.

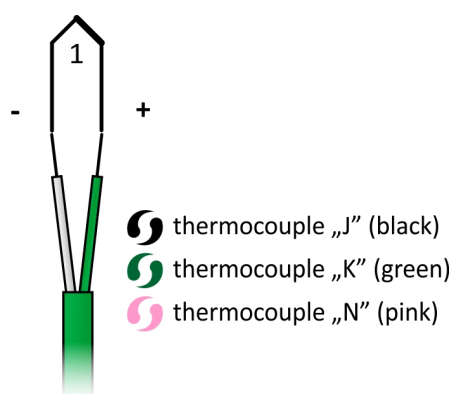


Figure 11P.6: Single thermocouple wiring diagram

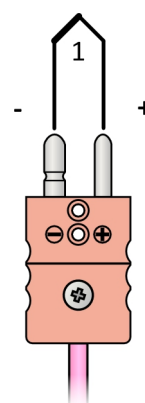


Figure 11P.7: Connector wiring diagram

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