

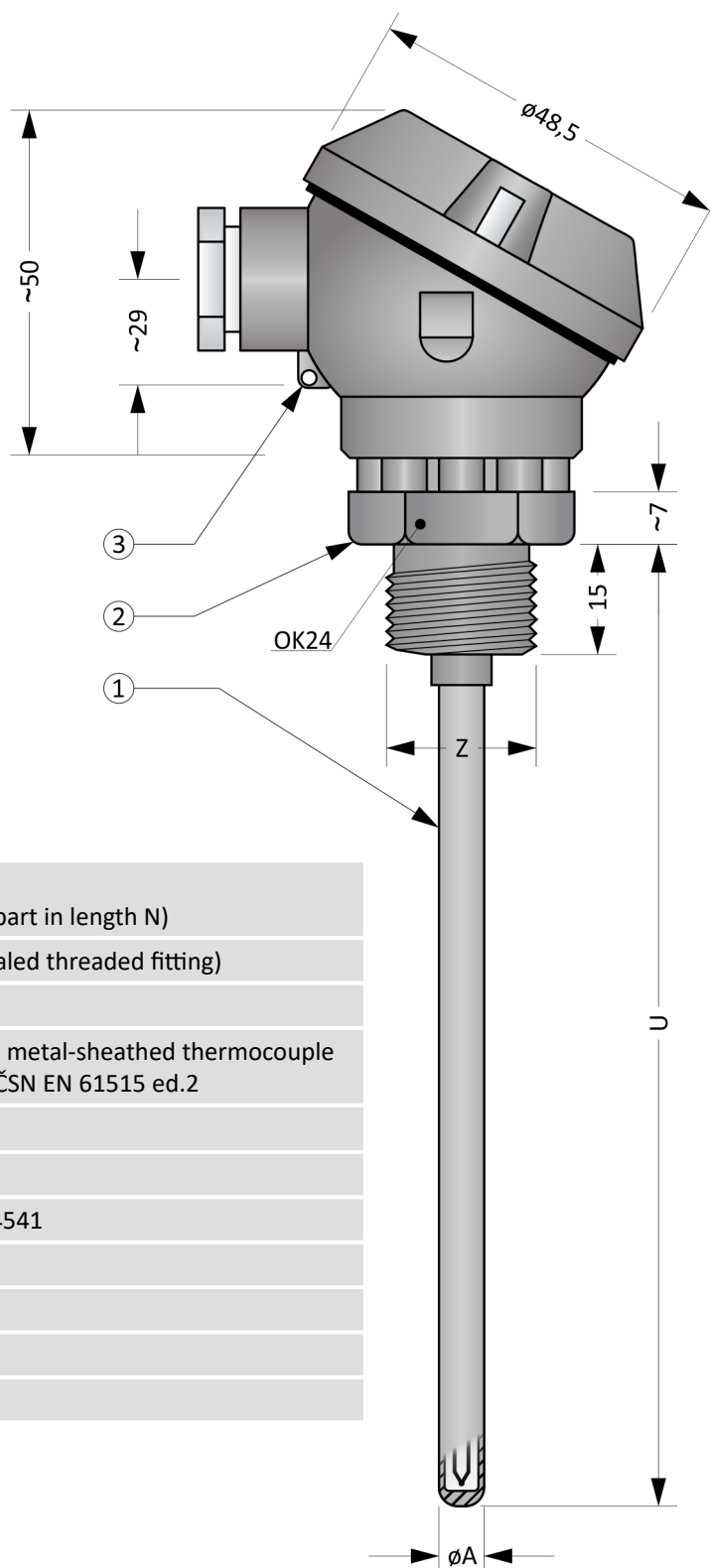
MTC11FS

MINERAL INSULATED METAL-SHEATHED THERMOCOUPLES

Temperature sensors of the MTC11FS series are flexible and robust sensors with a fast temperature response suitable for industrial environments. The small size of the head enables use in places with limited installation space. Sensors are designed for screwing into welding socket.

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 connection head. The sheath is flexible and the sensor can be easily adapted to the measurement place.



General Information (Table 11FS.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
	Medium max. overpressure	3 bar (only for sealed threaded fitting)
	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	Threaded fitting	
	Material	Stainless steel 1.4541
	Head	
③	Type	F
	Material	Aluminium alloy
	Cable bushing	M16 x 1,5

Figure 11FS.1: MTC11FS

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

Pos.	Code	MTC11FS - ① ② - ③ - ④
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
	C	1 x „N“, sheath material 2.4816
	7	2 x „J“, sheath material 1.4541
	6	2 x „K“, sheath material 2.4816
	F	2 x „N“, sheath material 2.4816
	Thermocouple type of dia. A = 4,5 mm (thermocouples acc. ČSN EN 60584-1 ed. 2)	
	5	1 x „J“, sheath material 1.4541
	4	1 x „K“, sheath material 2.4816
	D	1 x „N“, sheath material 2.4816
	B	2 x „J“, sheath material 1.4541
	A	2 x „K“, sheath material 2.4816
	G	2 x „N“, sheath material 2.4816
	Thermocouple type of dia. A = 6,0 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
	E	1 x „N“, sheath material 2.4816
	9	2 x „J“, sheath material 1.4541
	8	2 x „K“, sheath material 2.4816
	H	2 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	Process thread Z	
	0	Process thread Z = G½“, unsealed, OK24
	1	Process thread Z = G½“, sealed, OK24
	2	Process thread Z = M20 x 1,5, unsealed, OK24
	3	Process thread Z = M20 x 1,5, unsealed, OK24

Order code example: MTC11FS-00-500-2

... 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
 ... Process thread M20 x 1,5, unsealed

Approximate weight of the product: MTC11FS-00-500-2 ... 0,4 kg

Length Tolerances (Table 11FS.3)

Nominal length N	Tolerance N
$50 \leq N \leq 1500 \text{ mm}$	$\pm 2 \text{ mm}$
$1500 < N \leq 2500 \text{ mm}$	$\pm 3 \text{ mm}$
$2500 < N \leq 5000 \text{ mm}$	$\pm 5 \text{ mm}$
$5000 < N \leq 50000 \text{ mm}$	$\pm 0,5 \% \text{ of } N$

Diameter tolerance (Table 11FS.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 11FS.5)

Sensor part	Sheat dia.	Continuous operation	Short-term operation
Head		$< 100 \text{ }^{\circ}\text{C}$	-
Threaded fitting		$< 500 \text{ }^{\circ}\text{C}$	-
Thermocouple type „J“ measuring junction	3 mm	$< 470 \text{ }^{\circ}\text{C}$	$< 520 \text{ }^{\circ}\text{C}$
	4,5 mm	$< 550 \text{ }^{\circ}\text{C}$	$< 620 \text{ }^{\circ}\text{C}$
	6 mm	$< 650 \text{ }^{\circ}\text{C}$	$< 720 \text{ }^{\circ}\text{C}$
Thermocouple type „K“ and „N“ measuring junction	3 mm	$< 980 \text{ }^{\circ}\text{C}$	$< 1050 \text{ }^{\circ}\text{C}$
	4,5 mm	$< 1080 \text{ }^{\circ}\text{C}$	$< 1140 \text{ }^{\circ}\text{C}$
	6 mm	$< 1140 \text{ }^{\circ}\text{C}$	$< 1200 \text{ }^{\circ}\text{C}$

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

Measuring Junction Design



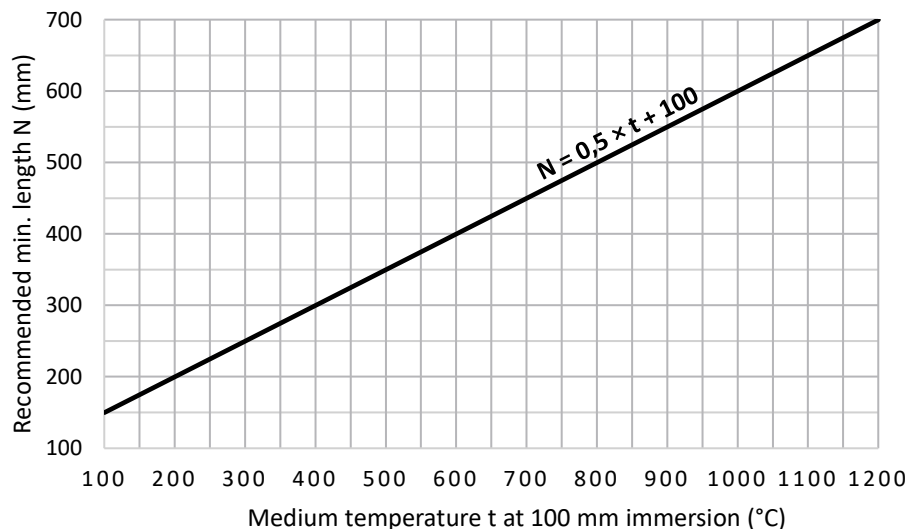
Figure 11FS.2: Thermocouple isolated from the sheath



Figure 11FS.3: Thermocouple connected to the sheath

Recommended Min. Sensor Length (Chart 11FS.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.



Installation And Operating Instructions

The sensor's threaded fitting is used for mechanical fastening.

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 the sensor is shown in Figures 11FS.4 and 11FS.5. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

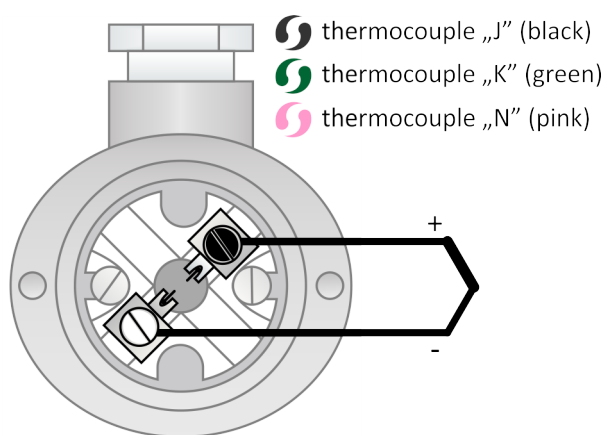


Figure 11FS.4: Single thermocouple wiring diagram

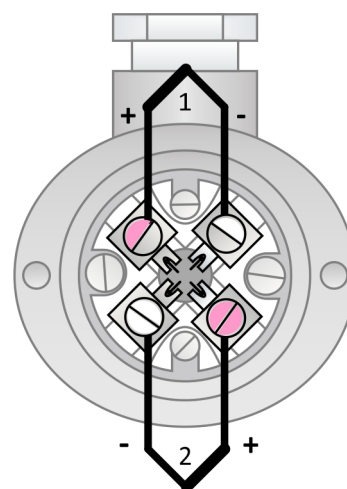


Figure 11FS.5: Double thermocouple wiring diagram