MTC9

THERMOCOUPLE ASSEMBLIES WITH METAL TUBE

Thermocouple assemblies of the MTC9 series are designed for applications with operating temperatures up to 800 °C and where high mechanical robustness is required. Optional parameters include welded threaded fitting and tapered masuring tip for fast temperature response.

The measuring element is a base metal thermocouple, 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.

The assembly consists of head, protection metal tube and capillary/ beads in which one or two thermocouples can be installed. The head is equipped with a cable gland for connecting the compensation cable.

General Information (Table 9.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP68 (measuring part in length N)
	Max. medium overpressure	16 bar
①	**Base metal thermocouple**	
②	**Insulating beads / capillary**	
	Material	Ceramic C610
③	**Protection tube**	
	Material	Stainless steel 1.4541
	Outer / inner diameter	14 / 10 mm
④	**Threaded fitting**	
	Material	Stainless steel 1.4541
⑤	**Head**	
	Material	Aluminium alloy
	Cable bushing	M20 x 1,5
⑥	**Tapered tip**	
	Material	Stainless steel 1.4541
	Diameter	9 mm

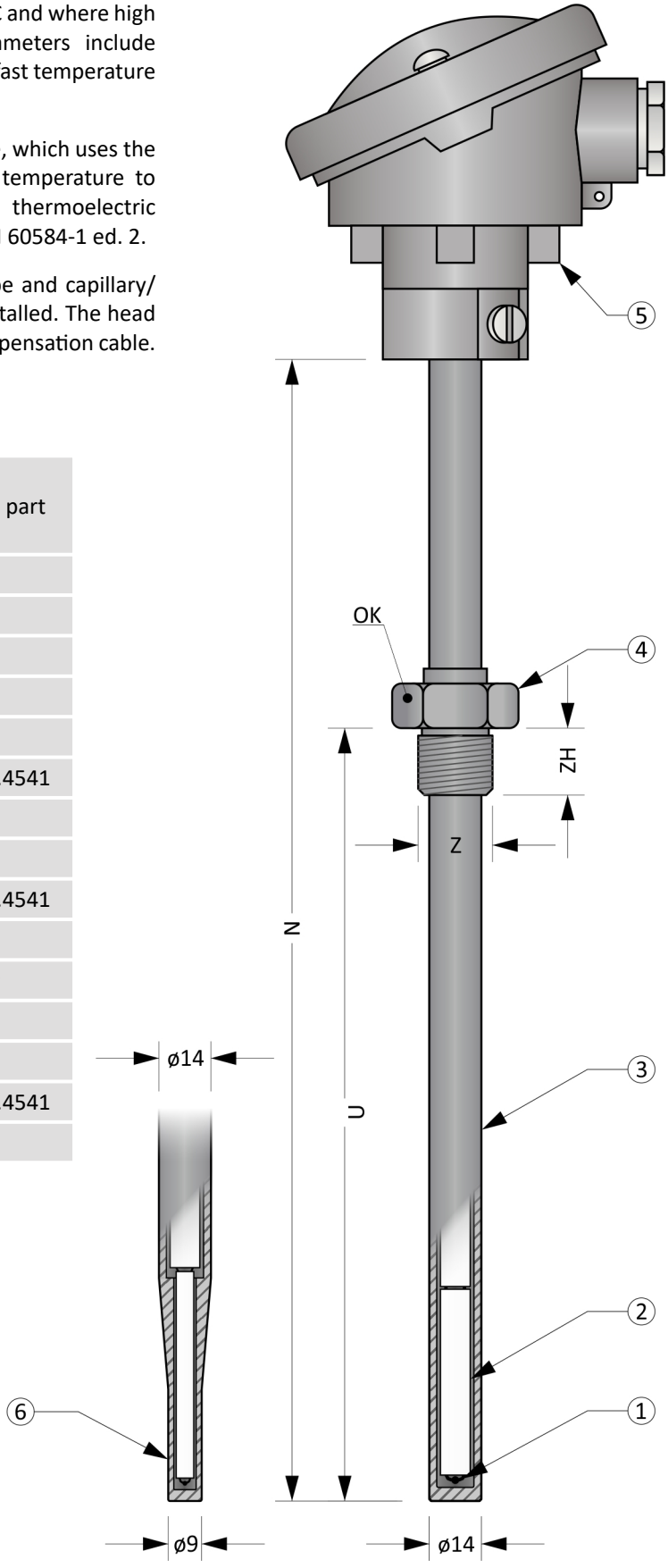

Figure 9.1: MTC9

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

Pos.	Code	MTC9 - ❶ - ❷ - ❸ - ❹❺❻❼
❶	**Thermocouple type (thermocouples acc. ČSN EN 60584-1 ed. 2)**	
	0	1 x „J“, accuracy class 2, isolated, wire diameter 1,0 mm
	1	1 x „K“, accuracy class 2, isolated, wire diameter 1,38 mm (1,0 mm if tapered tip is used)
	2	2 x „J“, accuracy class 2, isolated, wire diameter 1,0 mm
	3	2 x „K“, accuracy class 2, isolated, wire diameter 1,38 mm (1,0 mm if tapered tip is used)
	4	1 x „N“, accuracy class 2, isolated, wire diameter 1,30 mm (not applicable if tapered tip is used)
	5	2 x „N“, accuracy class 2, isolated, wire diameter 1,30 mm (not applicable if tapered tip is used)
❷	**Nominal length N [mm]**	
	xxx	Selectable range from 200 mm to 1500 mm (in 10 mm increments)
❸	**Immersion depth U [mm]**	
	0	Without threaded fitting
	xxx	Selectable range from 50 mm to (N-100) mm (in 10 mm increments)
❹	**Threaded fitting**	
	0	Without threaded fitting
	1	Welded threaded fitting Z = M27 x 2, ZH = 26 mm, WAF36
	2	Welded threaded fitting Z = M20 x 1,5, ZH = 17 mm, WAF30
	3	Welded threaded fitting Z = G½“, ZH = 17 mm, WAF30
❺	**Tube design**	
	0	Standard
	1	Tapered tip - reduced diameter form 14 to 9 mm
❻	**Head type**	
	0	A
	1	AUZH with screws with leaden seal holes
	2	AUZH with snap lock
	3	AUZ with screws with leaden seal holes
	4	AUZ with snap lock
❼	**Transmitter (transmitters are designed for assemblies with AUZH head and one thermocouple)**	
	0	Without transmitter
	8	INOR APAQ C130 TC
	3	INOR miniPAQ - HLP
	5	INOR IPAQ C520
	6	INOR IPAQ C330
	7	INOR IPAQ C530
	A	With another transmitter (e.g. supplied by the customer)

Order code example: MTC9-1-800-500-0000

... 1 x „K“, accuracy class 2, wire diameter 1,38 mm

... Nominal length N = 800 mm

... Immersion depth U = 800 mm

... Without threaded fitting

... Standard

... Head A

... Without transmitter

Approximate weight of the product: MTC9-1-800-500-0000 ... 1,5 kg

Length Tolerances (Table 9.3)

Nominal length N	Length tolerance N	Length tolerance U
250 ≤ N ≤ 1000 mm	± 2 mm	± 2 mm
1000 < N mm	± 3 mm	± 2 mm

Recommended Maximum Temperatures of Sensor Parts (Table 9.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	-
Threaded fitting	< 800 °C	-
Protection tube	< 800 °C	-
„J“, wire diameter 1,0 mm	< 400 °C	< 520 °C
„K“, wire diameter 1,0 mm	< 870 °C	< 980 °C
„K“, wire diameter 1,38 mm	< 900 °C	< 1020 °C
„N“, wire diameter 1,3 mm	< 950 °C	< 1090 °C

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

Head types

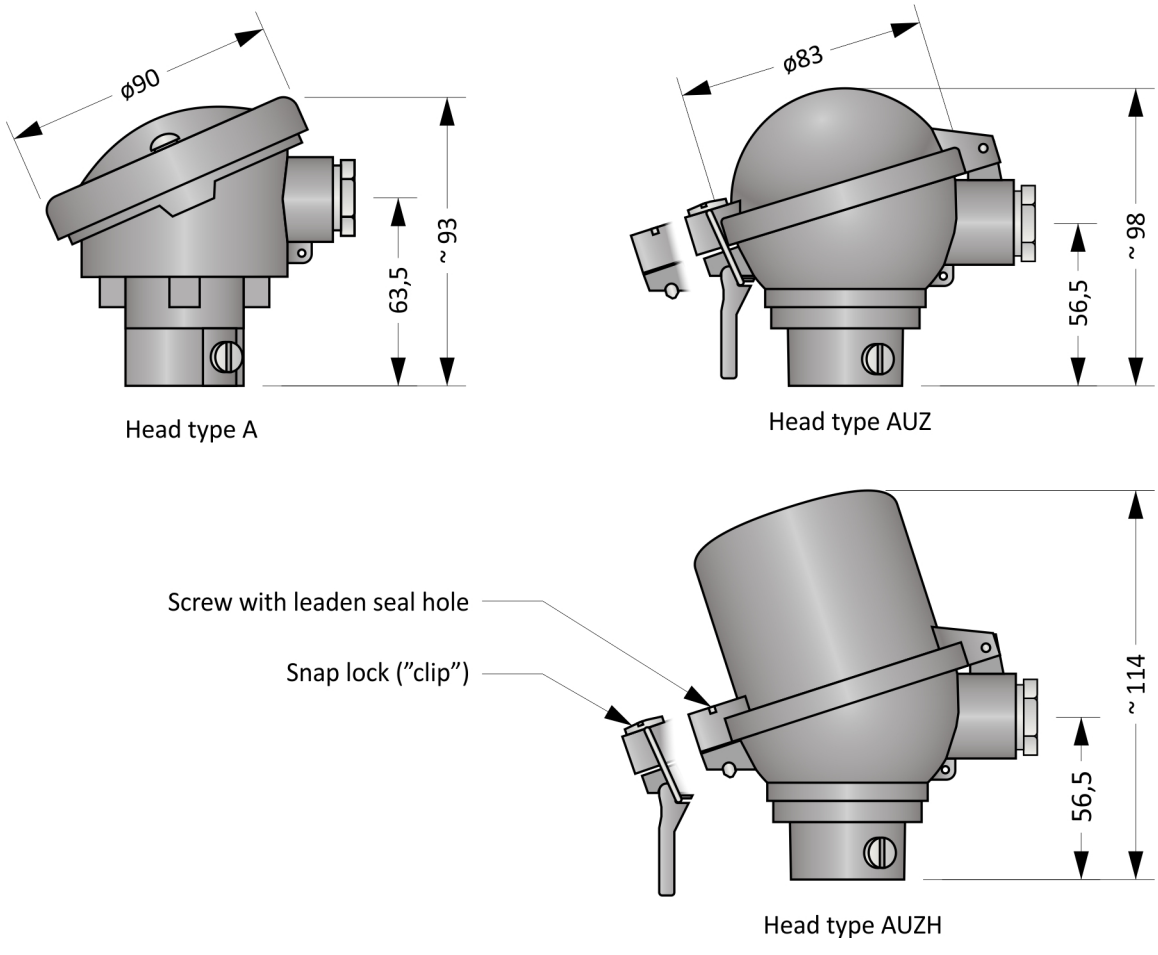

Figure 9.2: Head types

Head mounted transmitter (Table 9.5)

Typ	Input	Output	Setting	Notes
INOR APAQ C130 TC	Thermocouple - B, E, J, K, N, R, S, T	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 adapter)	
INOR IPAQ C330	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, galvanic isolated	PC WIN ConSoft (ICON USB adapter) INOR CONNECT (NFC, Bluetooth®)	
INOR IPAQ C530	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanic isolated	INOR CONNECT (NFC, Bluetooth®) PC WIN ConSoft (ICON USB adapter)	
INOR IPAQ C520	Thermocouple - B, C, D, E, J, K, N, R, S, T RTD, mV	4 ... 20 mA, HART, galvanic isolated	PC WIN ConSoft (ICON USB adapter)	2 inputs (redundancy) SIL 2, ATEX certificate

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

Installation And Operating Instructions

Use metal tube or welded fitting (if applicable) for mounting. Other parts cannot be used. The longest lifetime of the sensor can be achieved by mounting it vertically.

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 9.5.

Electrical connection of the sensor without transmitter is shown in the Figures 9.3 and 9.4. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

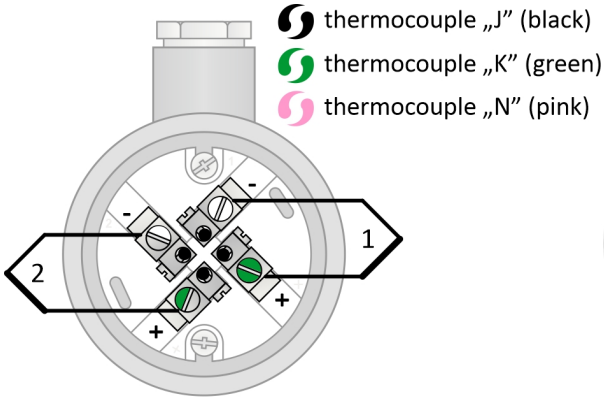

Figure 9.3: Double thermocouple wiring diagram

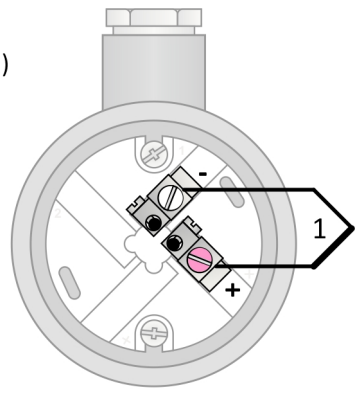

Figure 9.4: Single thermocouple wiring diagram

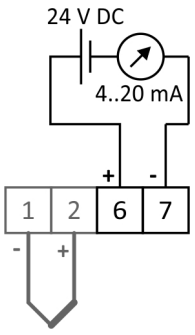

Figure 9.5: Transmitter wiring diagram