# MTC6M

## THERMOCOUPLE ASSEMBLIES WITH CERAMIC TUBE AND MEASURING INSERT

Thermocouple assemblies of the MTC6M series are designed for applications with operating temperatures up to 1100 °C and a requirement for a small outer diameter. They have a ceramic tube made of C799 material, which is gas-tight. However, their resistance to thermal shock is low.

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, holding pipe, protection ceramic tube and measuring insert. The head is equipped with a cable gland for connecting the compensation cable.

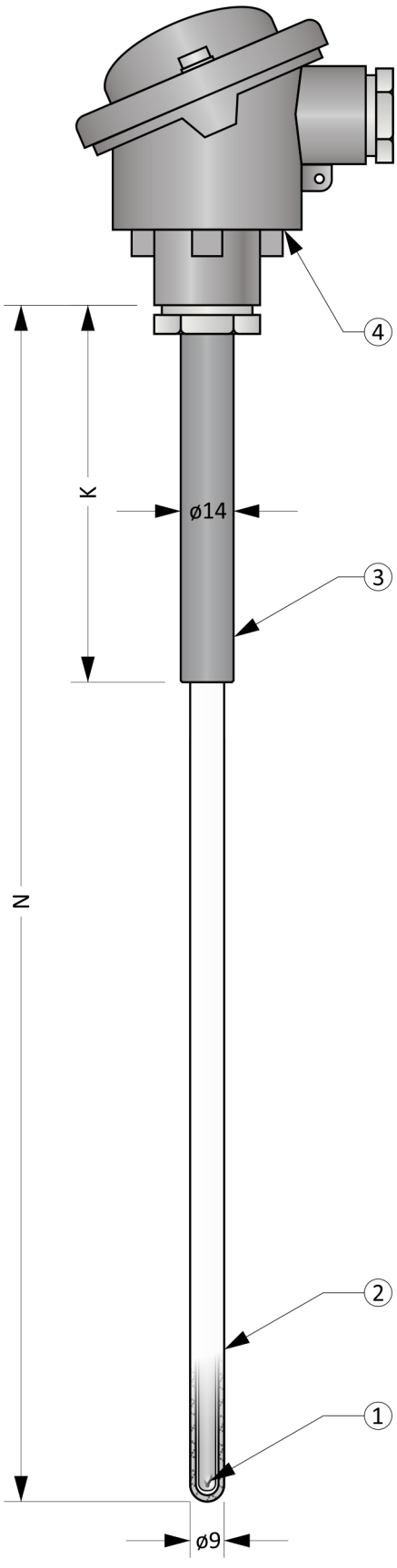


Figure 6M.1: MTC6M

### General Information (Table 6M.1)

| | | |
|---|---|---|
| | Insulation class acc. ČSN EN 60529 | IP54 (head)<br>IP5X (measuring part in length N) |
| | **Base metal thermocouple measuring insert** | |
| ① | Design | Mineral insulated metal-sheathed thermocouple according to the ČSN EN 61515 ed.2 |
| | Diameter | 4,5 mm |
| | **Protection tube** | |
| ② | Material | Ceramic C799 |
| | Outer / inner diameter | 9 / 6 mm |
| | **Holding pipe** | |
| ③ | Material | Stainless steel |
| | Outer / inner diameter | 14 / 10 mm |
| | **Head** | |
| ④ | Material | Aluminium alloy |
| | Cable bushing | M20 x 1,5 |

## Optional Parameters Including the Creation of an Order Code (Table 6M.2)

| Pos. | Code | MTC6M - ❶❷ - ❸ - ❹ - ❺❻ |
|---|---|---|
| ❶ | **Type of measuring insert (thermocouples acc. ČSN EN 60584-1 ed. 2)** | |
| | 0 | 1 x „K“, thermocouple isolated from the sheath, sheath material 2.4816 |
| | 2 | 1 x „J“, thermocouple isolated from the sheath, sheath material 1.4541 |
| | 1 | 2 x „K“, thermocouple isolated from the sheath, sheath material 2.4816 |
| | 3 | 2 x „J“, thermocouple isolated from the sheath, sheath material 1.4541 |
| | 4 | 1 x „N“, thermocouple isolated from the sheath, sheath material 2.4816 |
| | 5 | 2 x „N“, thermocouple isolated from the sheath, sheath material 2.4816 |
| ❷ | **Accuracy class acc. ČSN EN 60584-1 ed. 2** | |
| | 0 | accuracy class 2 |
| | 1 | accuracy class 1 |
| ❸ | **Nominal length N [mm]** | |
| | xxx | Selectable range from 100 mm to 1200 mm (in 10 mm increments) |
| ❹ | **Immersion depth K [mm]** | |
| | xxx | Selectable range from 40 mm to (N-40) mm (in 5 mm increments) |
| ❺ | **Head type** | |
| | 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 single 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: MTC6M-01-500-150-00

... 1 x „K“ , thermocouple isolated from the sheath, sheath material 2.4816

... Accuracy class 1 acc. ČSN EN 60584-1 ed. 2

... Nominal length N = 500 mm

... Immersion depth K = 150 mm

... Head B

... Without transmitter

Approximate weight of the product: MTC6M-01-500-150-00 ... 1,0 kg

### Length Tolerances (Table 6M.3)

| Nominal length N | Length tolerance N | Length tolerance K |
|---|---|---|
| N ≤ 1000 mm | ± 3 mm | ± 2 mm |
| 1000 < N mm | ± 5 mm | ± 2 mm |

### Recommended Maximum Temperatures of Sensor Parts (Table 6M.4)

| Sensor part | Continuous operation | Short-term operation |
|---|---|---|
| Head / head with transmitter | < 100 °C / < 85 °C | - |
| Protection tube (measuring part) | < 1700 °C | - |
| „J“, sheath dia. 4,5 mm | < 550 °C | < 620 °C |
| „K“, sheath dia. 4,5 mm | < 1080 °C | < 1140 °C |
| „N“, sheath dia. 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.

### Head types

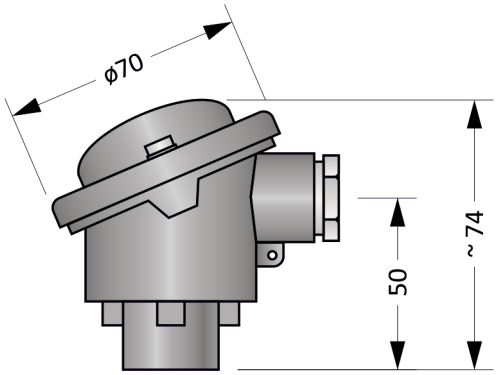


Figure 6M.3: Head B

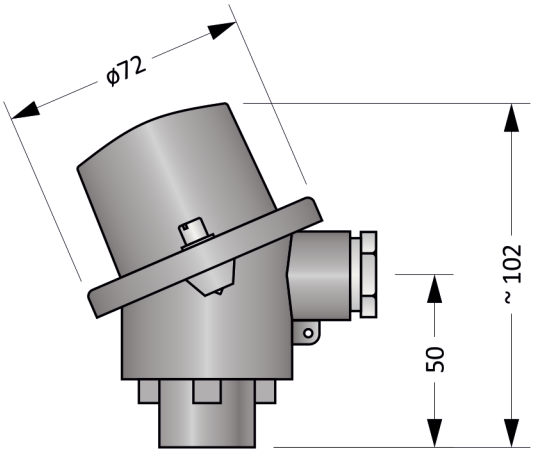


Figure 6M.4: Head BH

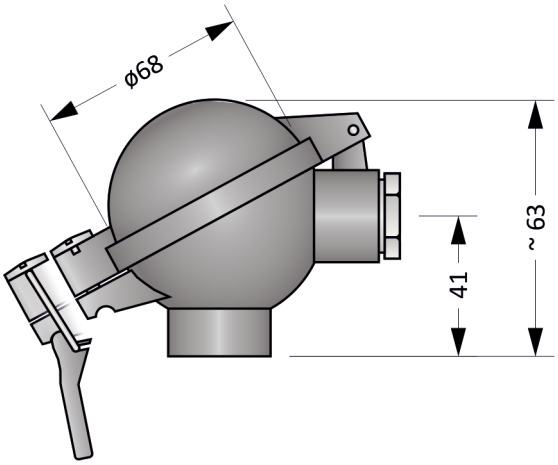


Figure 6M.5: Head BUZ

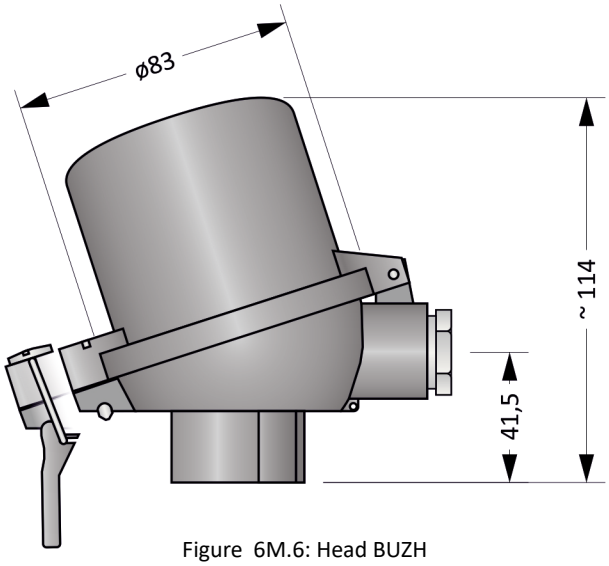


Figure 6M.6: Head BUZH

### Head mounted transmitter (Table 6M.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.

| 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<br>RTD | 4 ... 20 mA | PC WIN ConSoft (ICON USB adapter) | |
| INOR IPAQ C330 | Thermocouple - B, C, D, E, J, K, N, R, S, T<br>RTD, mV | 4 ... 20 mA, galvanic isolated | PC WIN ConSoft (ICON USB adapter)<br>INOR CONNECT ( NFC, Bluetooth®) | |
| INOR IPAQ C530 | Thermocouple - B, C, D, E, J, K, N, R, S, T<br>RTD, mV | 4 ... 20 mA, HART, galvanic isolated | INOR CONNECT ( NFC, Bluetooth®)<br>PC WIN ConSoft (ICON USB adapter) | |
| INOR IPAQ C520 | Thermocouple - B, C, D, E, J, K, N, R, S, T<br>RTD, mV | 4 ... 20 mA, HART, galvanic isolated | PC WIN ConSoft (ICON USB adapter) | 2 inputs (redundancy)<br>SIL 2, ATEX certificate |

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

### Installation And Operating Instructions

For mechanical installation, a holding pipe is used. 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 measuring part of the sensor is allowed to be exposed to a temperature gradient up to 60 °C/min. Exceeding this value may damage the sensor.

The electrical connection of sensor with the transmitter is shown in Figure 6M.9.

Electrical connection of the sensor without transmitter is shown in the Figures 6M.7 a 6M.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.

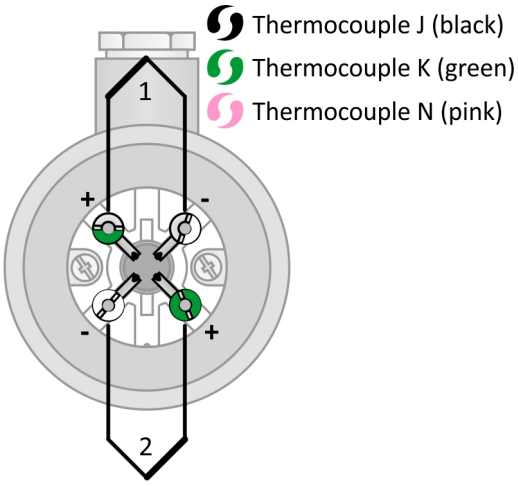


Figure 6M.7: Double thermocouple wiring diagram

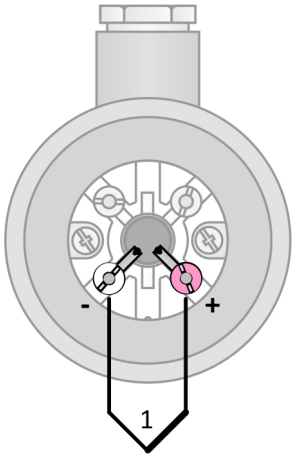


Figure 6M.8: Single thermocouple wiring diagram

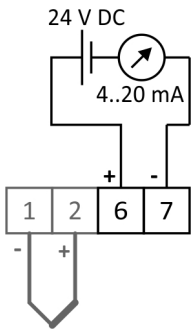


Figure 6M.9: Transmitter wiring diagram