

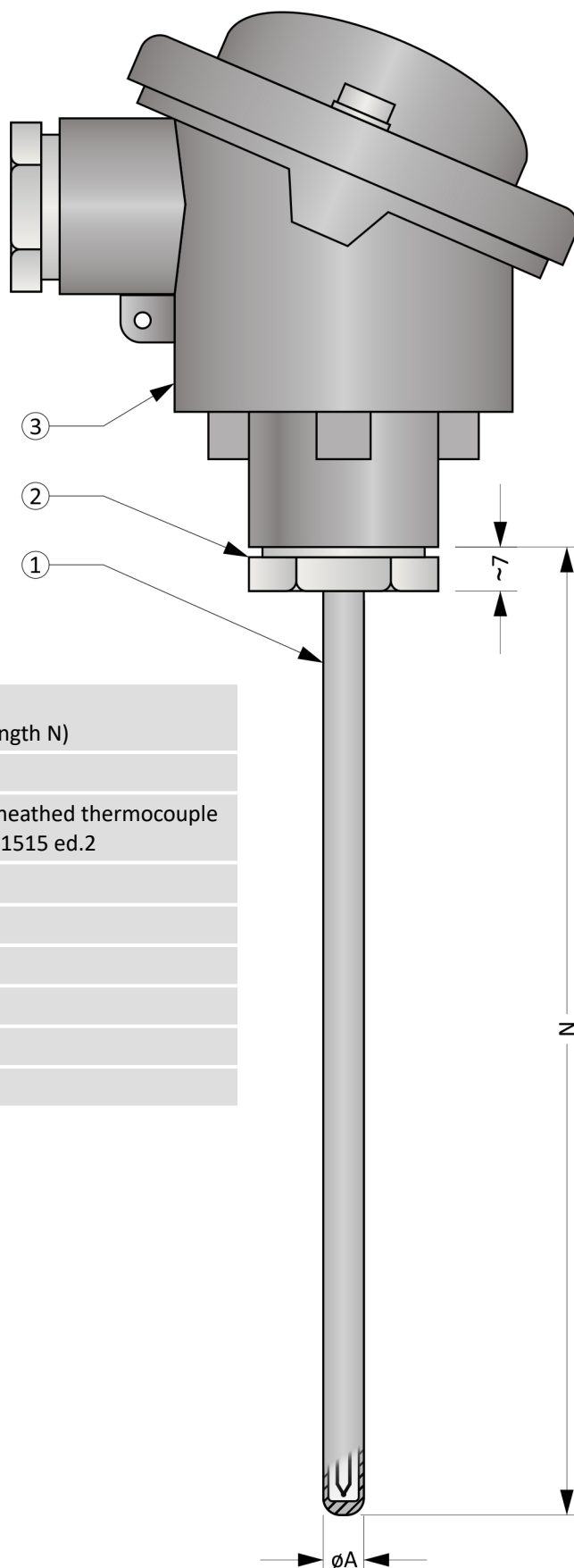
# MTC11H

## MINERAL INSULATED METAL-SHEATHED THERMOCOUPLES

Temperature sensors of the MTC11H series are flexible and robust sensors with a fast temperature response suitable for industrial environments. The size of the head allows the transmitter to be installed inside.

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 11H.1)

|   |                                         |                                                                                  |
|---|-----------------------------------------|----------------------------------------------------------------------------------|
|   | Insulation class acc. ČSN EN 60529      | IP54 (head)<br>IP68 (measuring part in length N)                                 |
|   | <b>Common metal thermocouple (stem)</b> |                                                                                  |
| ① | Design                                  | Mineral insulated metal-sheathed thermocouple according to the ČSN EN 61515 ed.2 |
|   | Min. bending radius                     | 10 × øA                                                                          |
| ② | <b>Cable bushing</b>                    |                                                                                  |
|   | Material                                | Aluminium alloy                                                                  |
|   | <b>Head</b>                             |                                                                                  |
| ③ | Material                                | Aluminium alloy                                                                  |
|   | Cable bushing                           | M20 x 1,5                                                                        |

Figure 11H.1: MTC11H

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

| Pos. | Code                                                                                       | MTC11H - ① ② - ③ - ④ ⑤                                             |
|------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| ①    | <b>Thermocouple type of dia. A = 3,0 mm (thermocouples acc. ČSN EN 60584-1 ed. 2)</b>      |                                                                    |
|      | 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                                    |
|      | <b>Thermocouple type of dia. A = 4,5 mm (thermocouples acc. ČSN EN 60584-1 ed. 2)</b>      |                                                                    |
|      | 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                                    |
|      | <b>Thermocouple type of dia. A = 6,0 mm (thermocouples acc. ČSN EN 60584-1 ed. 2)</b>      |                                                                    |
|      | 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    | <b>Measuring junction design and thermocouple accuracy class acc. ČSN EN 60584-1 ed. 2</b> |                                                                    |
|      | 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    | <b>Nominal length N [mm]</b>                                                               |                                                                    |
|      | 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    | <b>Head type</b>                                                                           |                                                                    |
|      | 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                                                |

Continuation of table 11H.2 on the next page

Continuation of table 11H.2 from the previous page

| Pos. | Code                                              | MTC11H - ① ② - ③ - ④ ⑤                                   |
|------|---------------------------------------------------|----------------------------------------------------------|
| ⑤    | <b>Transmitter (only for single thermocouple)</b> |                                                          |
|      | 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: MTC11H-00-500-00

... 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

... Head A

... Without transmitter

Approximate weight of the product: MTC11H-00-500-00 ... 0,5 kg

### Length Tolerances (Table 11H.3)

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

### Diameter tolerance (Table 11H.4)

| Stem diameter A        | Tolerance A   |
|------------------------|---------------|
| $1 \leq A \leq 4,5$ mm | $\pm 0,05$ mm |
| $4,5 < A$ mm           | $\pm 0,06$ mm |

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

| Sensor part                                      | sheath dia. | Continuous operation   | Short-term operation |
|--------------------------------------------------|-------------|------------------------|----------------------|
| Head / head with transmitter                     |             | $< 100$ °C / $< 85$ °C | -                    |
| Thermocouple type „J“ measuring junction         | 3 mm        | $< 470$ °C             | $< 520$ °C           |
|                                                  | 4,5 mm      | $< 550$ °C             | $< 620$ °C           |
|                                                  | 6 mm        | $< 650$ °C             | $< 720$ °C           |
| Thermocouple type „K“ and „N“ measuring junction | 3 mm        | $< 980$ °C             | $< 1050$ °C          |
|                                                  | 4,5 mm      | $< 1080$ °C            | $< 1140$ °C          |
|                                                  | 6 mm        | $< 1140$ °C            | $< 1200$ °C          |

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

## Measuring Junction Design



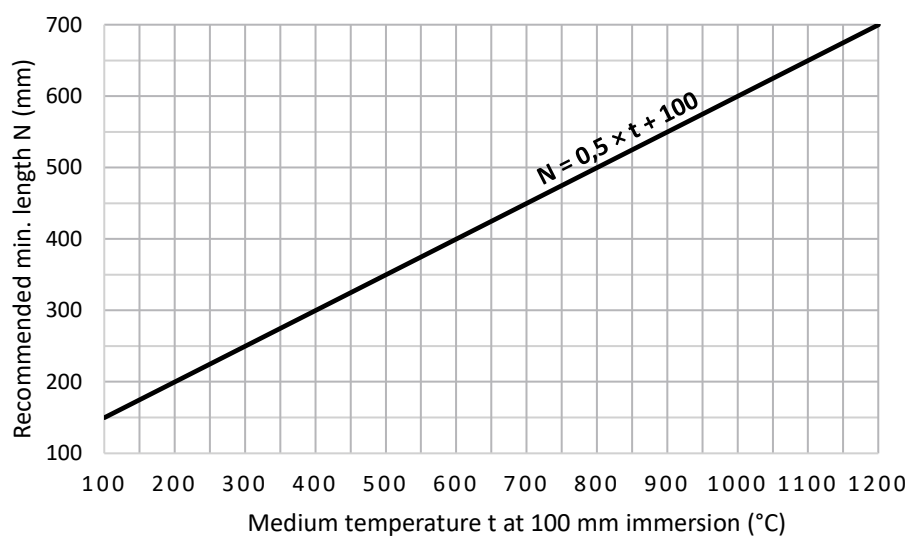
Figure 11H.2: Thermocouple isolated from the sheath



Figure 11H.3: Thermocouple connected to the sheath

## Recommended Min. Sensor Length (Chart 11H.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.



## Head types

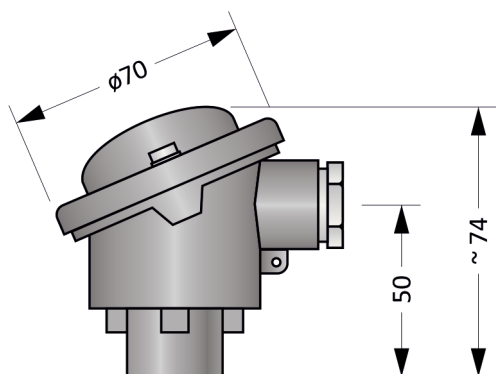


Figure 11H.4: Head B

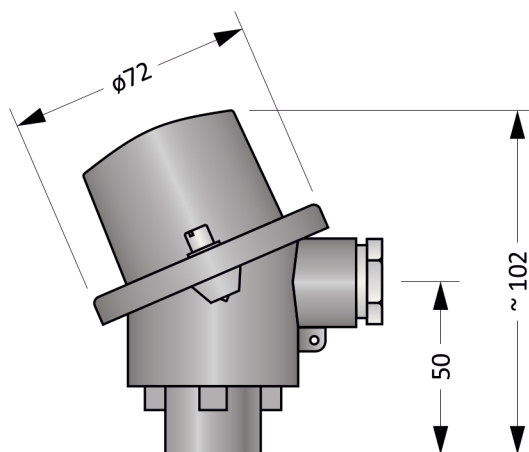


Figure 11H.5: Head BH

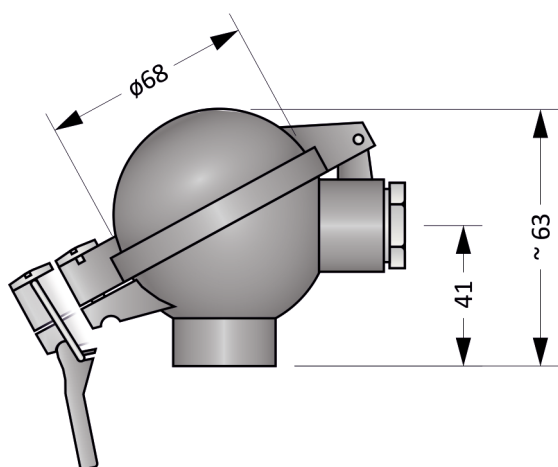


Figure 11H.6: Head BUZ

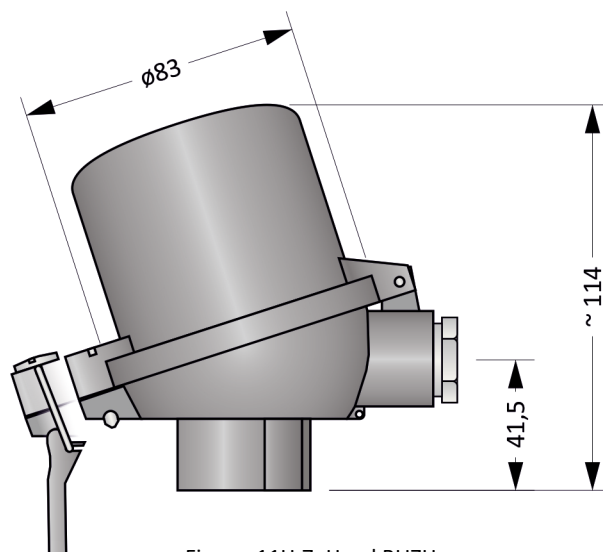


Figure 11H.7: Head BUZH

### Head mounted transmitter (Table 11H.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.

| Type               | 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

The sensor's stem is used for mechanical fastening. Other parts cannot be used.

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 11H.10.

The electrical connection of the sensor is shown in Figures 11H.8 and 11H.9. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

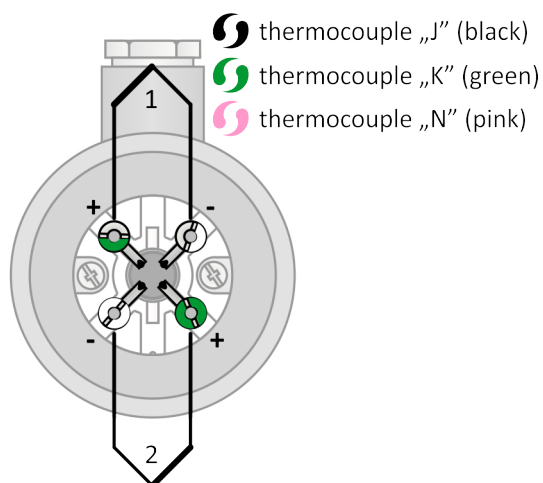


Figure 11HS.8: Double thermocouple wiring diagram

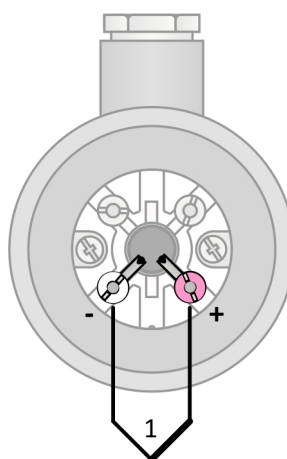


Figure 11HS.9: Single thermocouple wiring diagram

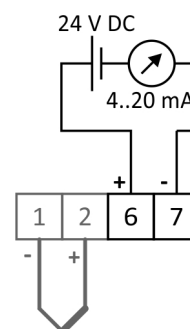


Figure 11HS.10: Transmitter wiring diagram