

MTC4S

THERMOCOUPLE ASSEMBLIES WITH SAPPHIRE TUBE

Thermocouple assemblies of the MTC4S series are designed for applications with operating temperatures up to 1600°C in inert environments and up to 1350°C when immersed in glass melt. They have a protective sapphire tube which has excellent resistance to chemical aggressiveness of the environment, as well as excellent hot strength. The assemblies of this series cannot be subjected to thermal shocks.

The measuring element is a precious 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. Precious metal thermocouples are not included in the ordering code (ordered separately).

The assembly consists of head, holding pipe, guiding tube, protection sapphire tube and a capillary in which thermocouple can be installed. The head is equipped with a cable gland for connecting the compensation cable.

General Information (Table 4S.1)

	Insulation class acc. ČSN EN 60529	IP54 (head) IP5X (measuring part in length N)
①	Precious metal thermocouple (not included in the assembly)	
	Thermocouple length	(N + 80) mm
	Capillary	
②	Material	Mono-crystalline sapphire
	Diameter	2,1 mm
	Bore for thermocouple	1 x ø1,3 mm
	Protection tube	
③	Material	Mono-crystalline sapphire
	Outer / inner diameter	16 / 8 mm
	Guiding tube	
④	Material	Ceramic C799
	Outer / inner diameter	24 / 18 mm
	Holding pipe	
⑤	Material	Stainless steel
	Outer / inner diameter	32 / 28 mm
	Head	
⑥	Material	Aluminium alloy
	Cable bushing	M20 x 1,5

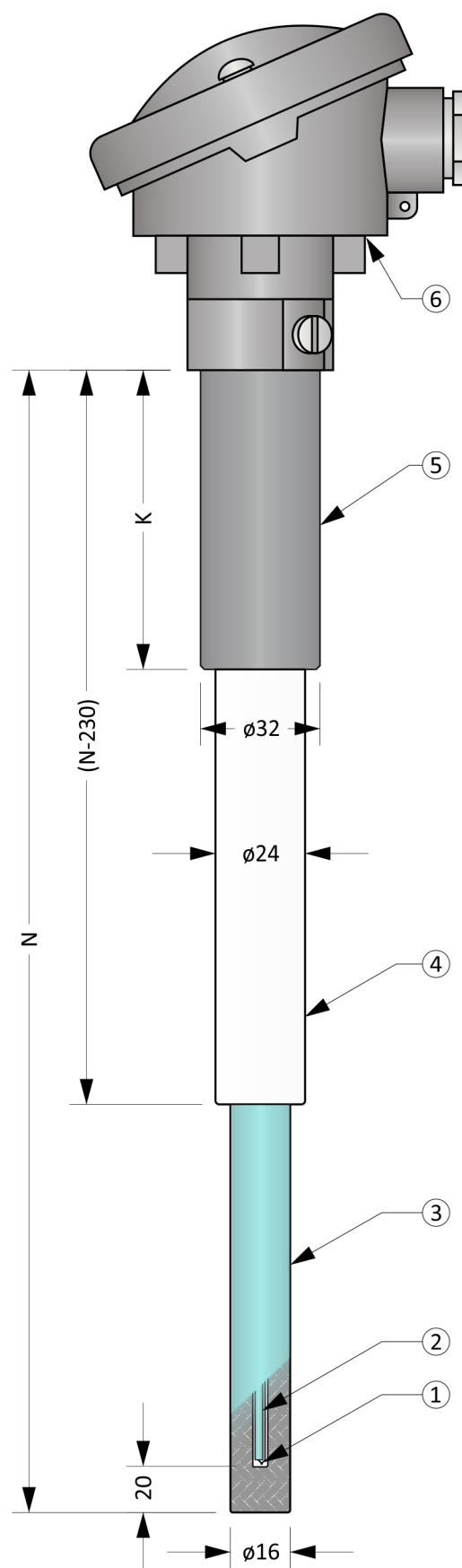


Figure 4S.1: MTC4S

Optional Parameters Including the Creation of an Order Code (Table 4S.2)

Pos.	Code	MTC4S - ① - ② - ③ ④
①	Nominal length N [mm]	
	xxx	Selectable range from 310 mm to 1000 mm (in 10 mm increments)
②	Holding pipe length K [mm]	
	0	Selectable range from 50 mm to (N-260) mm (in 5 mm increments)
③	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
④	Transmitter (transmitters are designed for assemblies with AUZH head)	
	0	Without transmitter
	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: MTC4S-500-150-00

... Nominal length N = 500 mm

... Holding pipe length K = 150 mm

... Head A

... Without transmitter

Approximate weight of the product: MTC4S-500-150-00 ... 1,4 kg

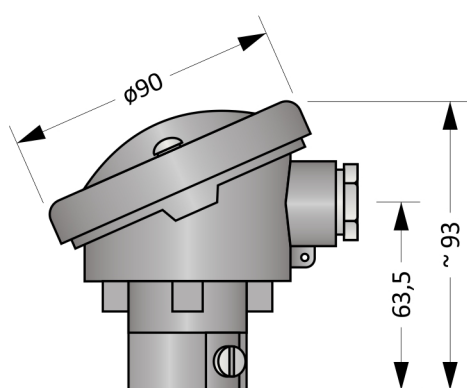
Length Tolerances (Table 4S.3)

Nominal length N	Length tolerance N	Length tolerance K
$N \leq 1000$ mm	± 3 mm	± 2 mm
$1000 < N$ mm	± 5 mm	± 2 mm

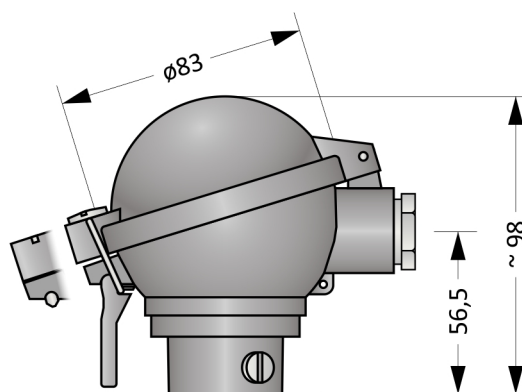
Recommended Maximum Temperatures of Sensor Parts (Table 4S.4)

Sensor part	Continuous operation	Short-term operation
Head / head with transmitter	< 100 °C / < 85 °C	-
Holding pipe	< 500 °C	-
Guiding tube	< 1600 °C	-
Sapphire tube (measuring part)	< 1900 °C	-
„S“, wire diameter 0,5 mm	< 1400 °C	< 1600 °C
„S“, wire diameter 0,35 mm	< 1300 °C	< 1400 °C
„B“, wire diameter 0,5 mm	< 1500 °C	< 1700 °C
„R“, wire diameter 0,5 mm	< 1400 °C	< 1600 °C

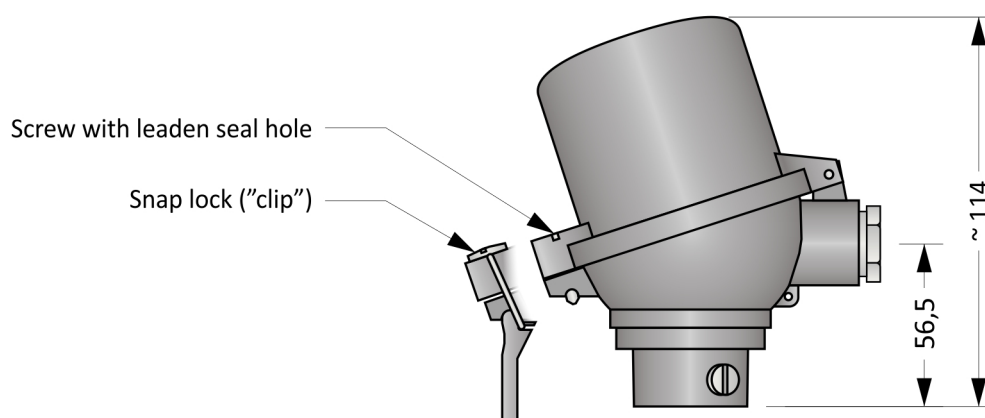
Notes: Operating temperatures are related to temperature measurement in a chemically inert environment. The values are determined empirically.

Head types


Head type A



Head type AUZ



Head type AUZH

Figure 4S.2: Head types

Head mounted transmitter (Table 4S.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

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 20 °C/min. Exceeding this value may damage the sensor.

The electrical connection of sensor with the transmitter is shown in Figure 4S.4. Electrical connection of the sensor without transmitter is shown in the Figures 4S.3. The output signal is thermoelectric voltage. The dependence of temperature on thermoelectric voltage is given by the standard ČSN EN 60584-1 ed. 2.

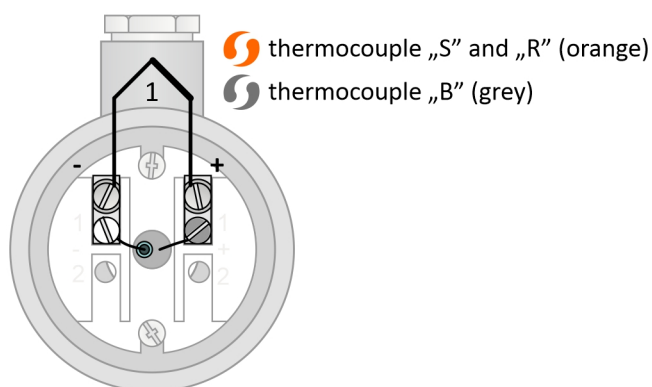


Figure 4S.3: Thermocouple wiring diagram

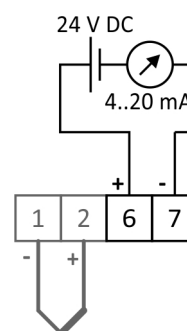


Figure 4S.4: Transmitter wiring diagram