



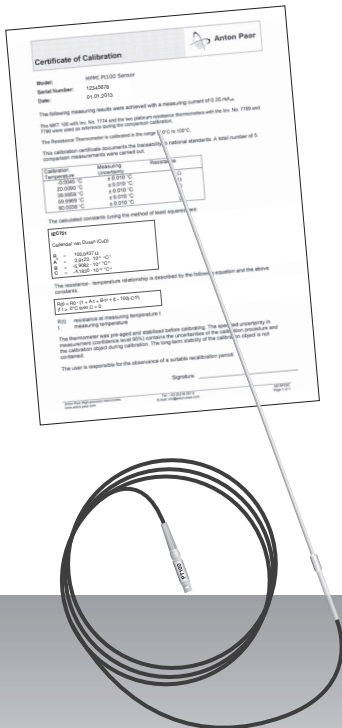
Anton Paar

MKT 50

Standard Operating Procedure

- ● ● ● Required Equipment
- ● ● ● Entering Calibration Coefficients
- ● ● ● Selecting Sensor
- ● ● ● Measurement

Required Equipment



Entering Calibration Coefficients



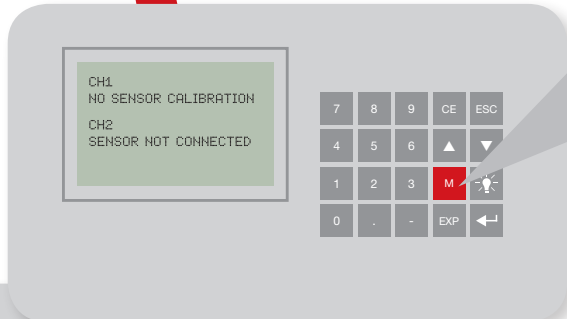
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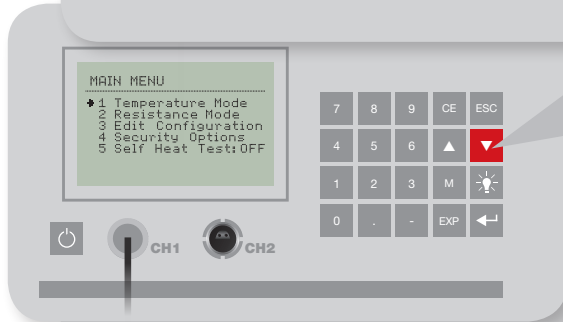
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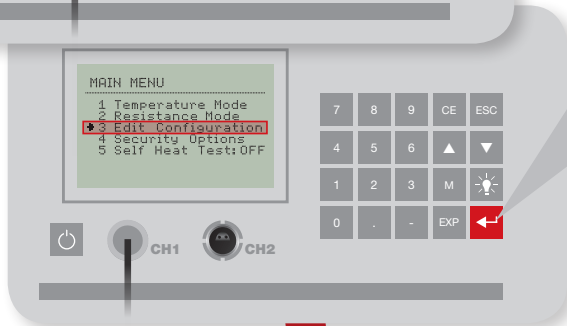
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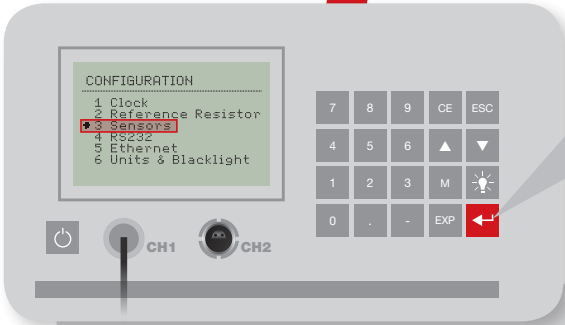
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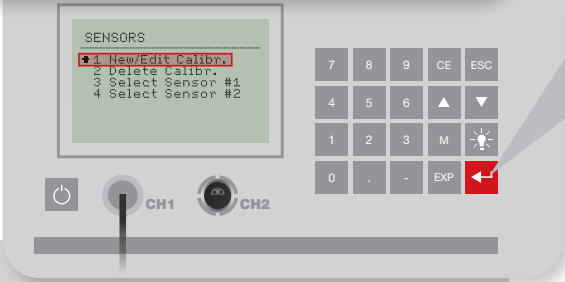
5



6



7



8



Certificate of Calibration

Model: MPMS P100 Sensor
 Serial Number: 12345678
 Date: 01.01.2013

The following measuring results were achieved with a measuring current of 0.35 mA_{DC}.
 The MPT 100 with Inv. No. 7774 and the two platinum resistance thermometers with the Inv. No. 7789 and 7790 were used as reference during the comparison calibration.

The Resistance Thermometer is calibrated in the range of 0°C to 100°C.

This calibration certificate documents the traceability to national standards. A total number of 5 comparison points were used.

Resistance	Temperature
100,0437 Ω	0 °C
100,0437 Ω	100 °C

IEC751

Callendar van Dusen (CvD)

$R_0 = 100,0437 \Omega$
 $A = 3,9123 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$
 $B = -5,9082 \cdot 10^{-7} \text{ } ^\circ\text{C}^{-2}$
 $C = -4,1830 \cdot 10^{-12} \text{ } ^\circ\text{C}^{-4}$

$R(t) = R_0 \cdot (1 + A \cdot t + B \cdot t^2 + (t - 100) \cdot C)$
 If $t \geq 0^\circ\text{C}$ then $C = 0$

The user is responsible for the observation of a suitable recalibration period.

Signature _____

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SELECT SENSOR TYPE

▶ IEC751	13-273K
ITS-90	24-273K
ITS-90	54-273K
ITS-90	83-273K
ITS-90	-38-29 °C

CH1

CH2

7	8	9	CE	ESC
4	5	6	▲	▼
1	2	3	M	💡
0	.	-	EXP	←



Certificate of Calibration

Model: MPMI Pt100 Sensor
Serial Number: 12345678 **SN**
Date: 01.01.2013

The following measuring results were achieved with a measuring current of 0.35 mA_{exc}.

The MKT 100 with Inv. No. 7774 and the two platinum resistance thermometers with the Inv. No. 7789 and 7790 were used as reference during the comparison calibration.

The Resistance Thermometer is calibrated in the range of 0°C to 100°C.

This calibration certificate documents the traceability to national standards. A total number of 5 comparison measurements were carried out.

Calibration Temperature	Measuring Uncertainty	Resistance
-0.0045 °C	± 0.010 °C	Ω
20.0090 °C	± 0.010 °C	Ω
39.9958 °C	± 0.010 °C	Ω
59.9969 °C	± 0.010 °C	Ω
80.0038 °C	± 0.010 °C	Ω

The calculated constants (using the method of least squares) are:

IEC751

Callendar van Dusen (CvD)

$R_0 = 100,0437 \Omega$
 $A = 3,9123 \cdot 10^{-4} \text{ } ^\circ\text{C}^{-1}$
 $B = -5,9082 \cdot 10^{-7} \text{ } ^\circ\text{C}^2$
 $C = -4,1830 \cdot 10^{-12} \text{ } ^\circ\text{C}^3$

The resistance - temperature relationship is described by the following equation and the above constants.

$$R(t) = R_0 \cdot (1 + A \cdot t + B \cdot t^2 + (t - 100) \cdot C \cdot t^3)$$

If $t \geq 0^\circ\text{C}$ then $C = 0$

$R(t)$ resistance at measuring temperature t
 t measuring temperature

The thermometer was pre-aged and stabilised before calibrating. The specified uncertainty in measurement (confidence level 95%) contains the uncertainties of the calibration procedure and the calibration object during calibration. The long-term stability of the calibration object is not contained.

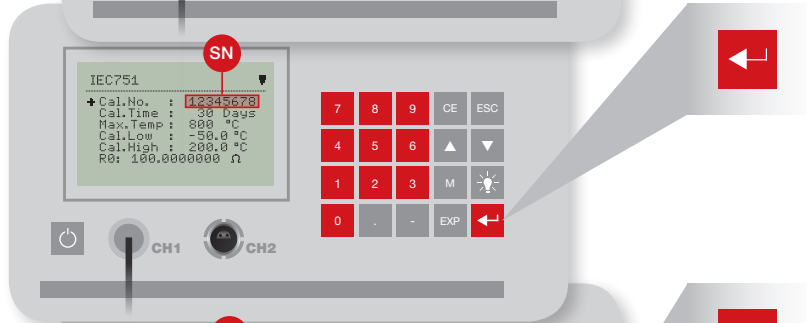
The user is responsible for the observance of a suitable recalibration period.

Signature _____

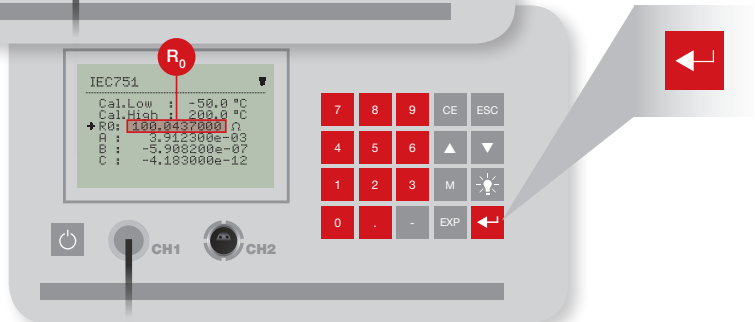
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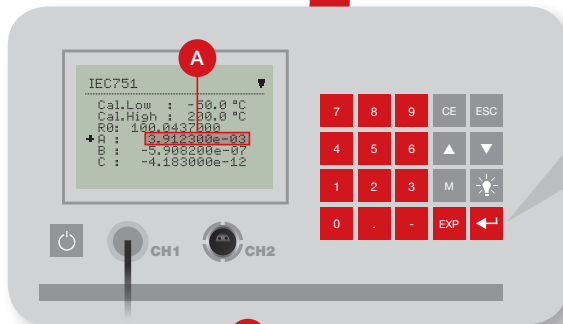
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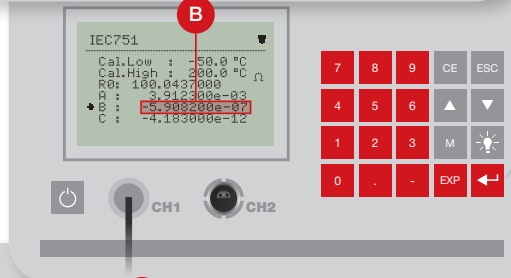
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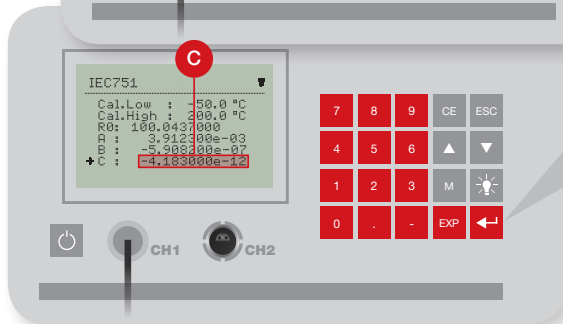
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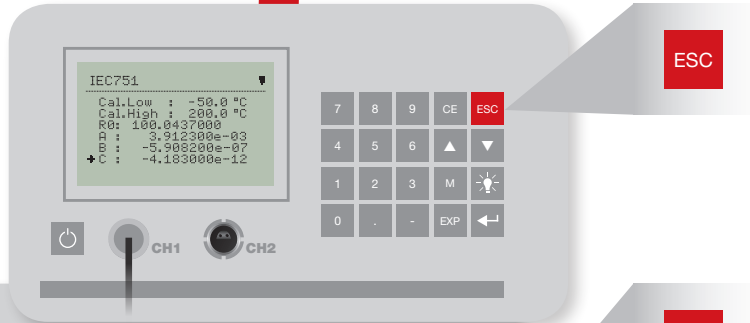
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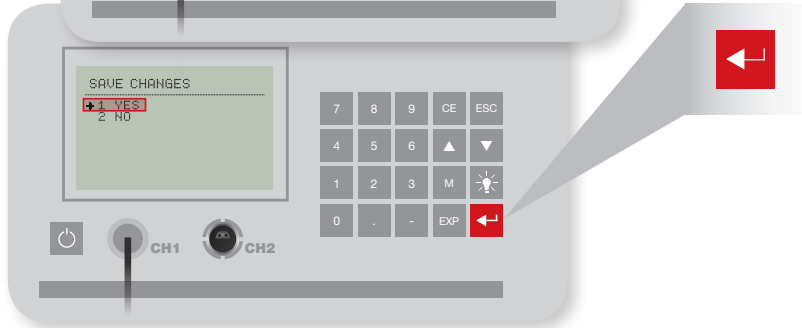
Example

$$3.9083 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$$
$$=$$
$$3.908300 + \text{EXP}$$
$$+ \text{ } + 03$$

16



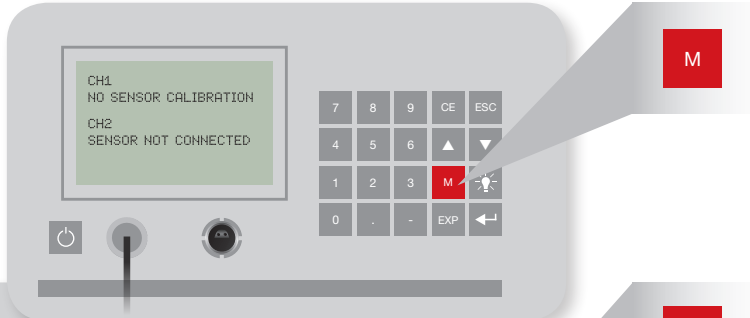
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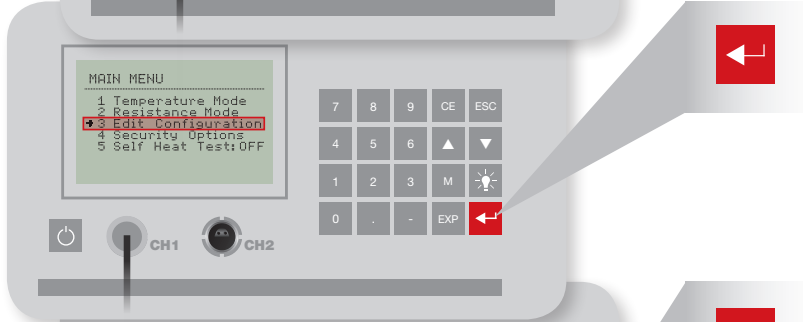
Selecting Sensor



1



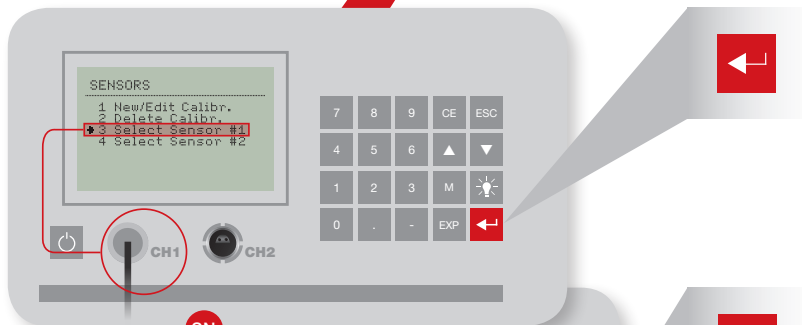
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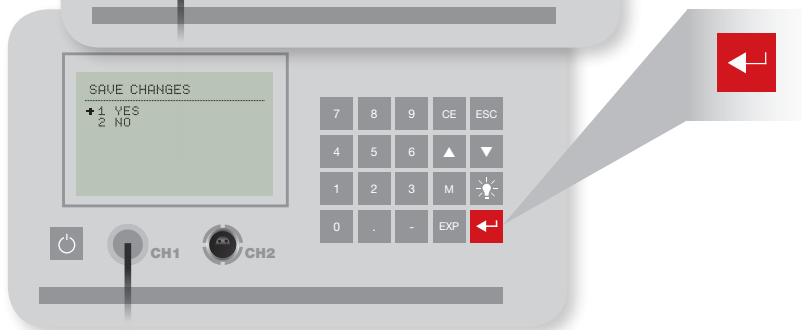
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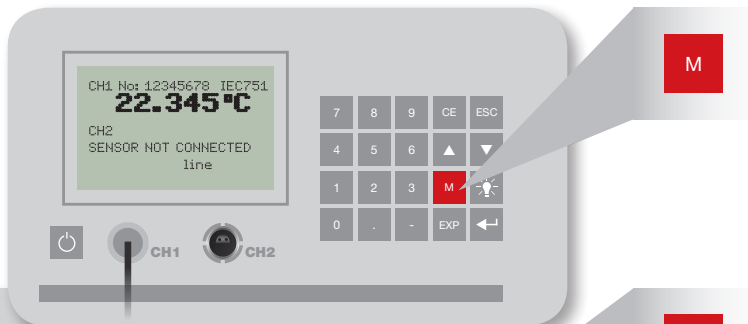
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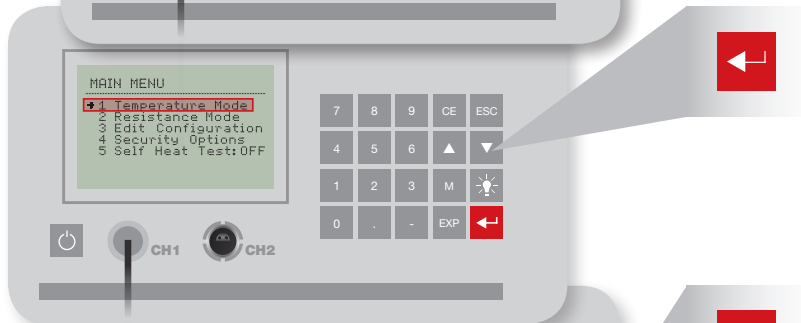
Measurement



1



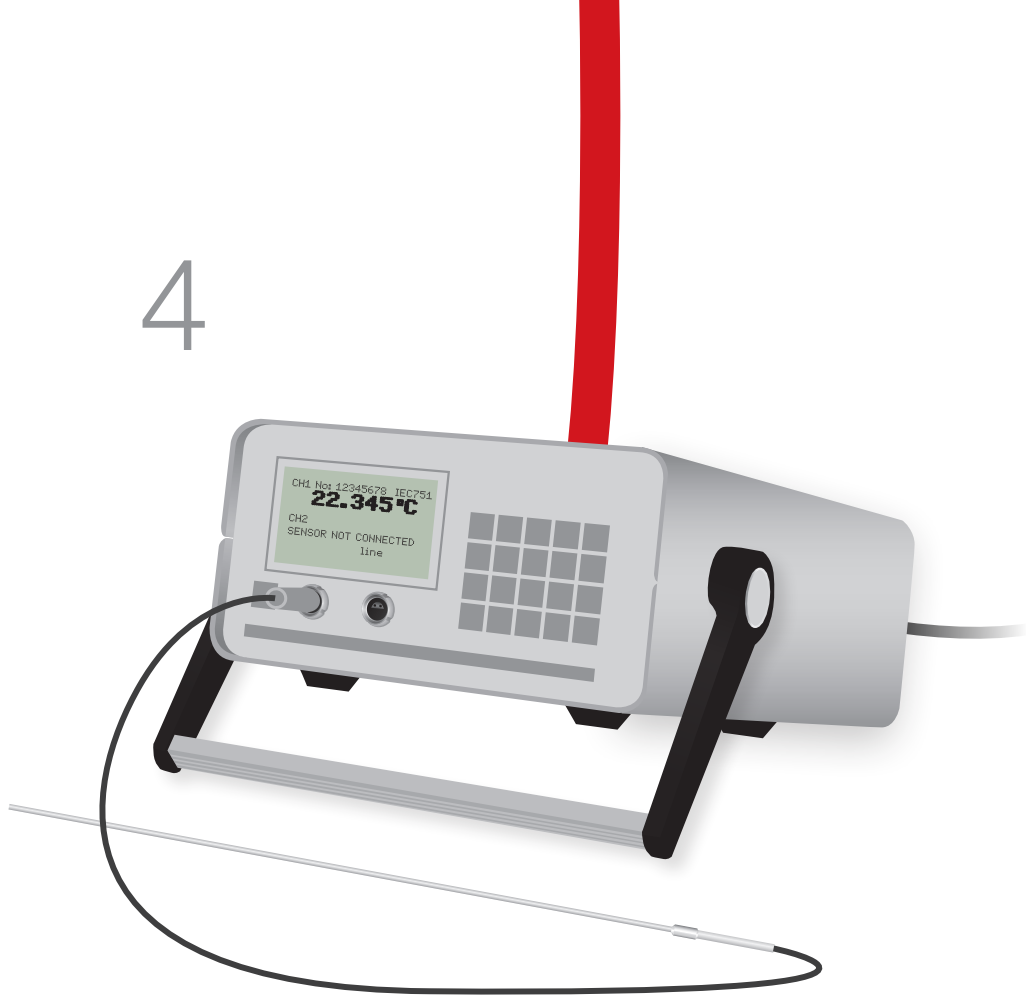
2



3



4





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