Hand-held instruments for temperature

MH 3710 and MH 3750

	MH 3710/3750
Connection	1 x Mini-DIN-socket
Inputs	Pt100
Outputs	Analogue output 0...1 V
Measuring ranges / resolution	-199,99...199,99 °C / 0,01 °C
	200,0...850,0 °C / 0,1 °C
Accuracy	±0,015 % full scale ±1 digit
Editable units	°C / °F
Multi-conductor connection	4-wire

Type MH 3750

MH 3710

- Operator guidance
  Sequential menu

- Scalable outputs for easy data readout

- Battery supply, 9 V block battery

- Mains adapter (optional)

- PC Interface
  Data link with serial PC-Interface
  DC-isolated and short-circuit proof

- Software (optional)

MH 3750

Same as MH 3710 but additional

- User-defined measuring input characteristic

- Alarm and time display / date
  Min-max alarm signal via display, interface and buzzer
  Real time clock with date and year indication

- Data storage (Log function)
  STORE
  99 data sets (temp1, time and date)
  Manual data set reading via keystroke
  CYCLE
  16 200 data sets (temp1)
  Automatic data set reading in the set interval
 Adjustable measurement interval 1 s...60 minutes

Temperature hand-held sensors for MH 3710 and MH 3750

Pt100	Fig. on page 128	Name	Temperature range	L	D
Standard sensor	Fig.1	GTF401	-50...400 °C	150 mm	3 mm
Spike sensor	Fig.2	GES401	-50...400 °C	150 mm	3 mm
Surface sensor	Fig.3	GOF401	-50...400 °C	300 mm	3 mm (head = 4 mm)
Air / gas sensor	Fig.6	GLF401	-50...400 °C	100 mm	3 mm (head = 6 mm)

Temperature sensors

## For temperature hand-held instruments MH-Series

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10
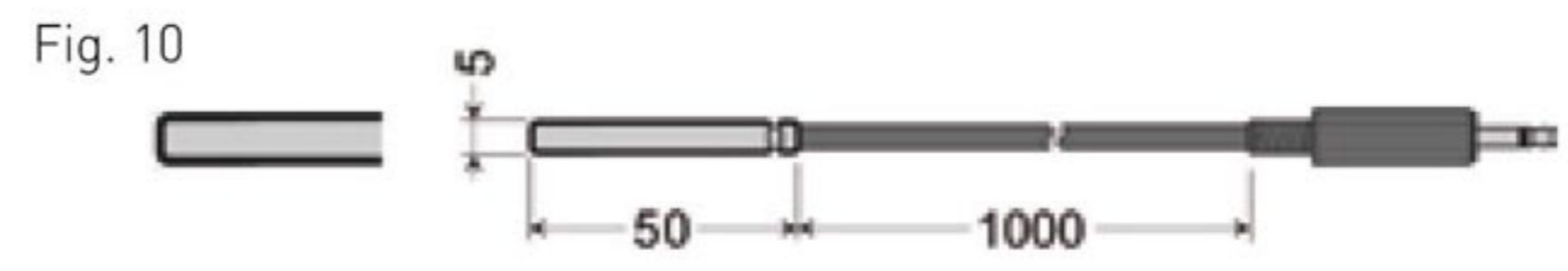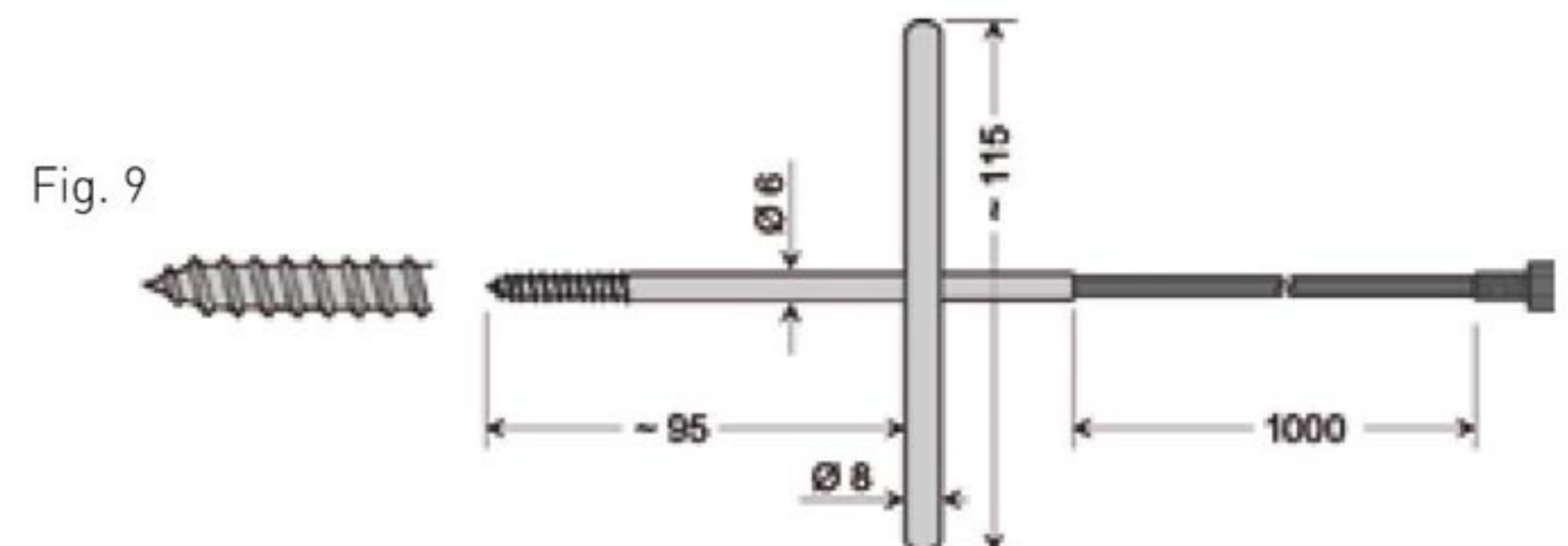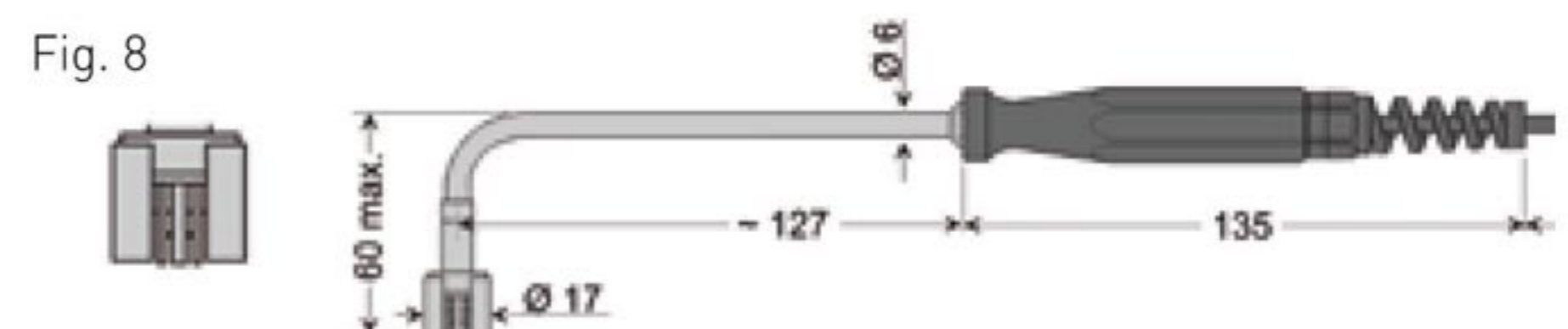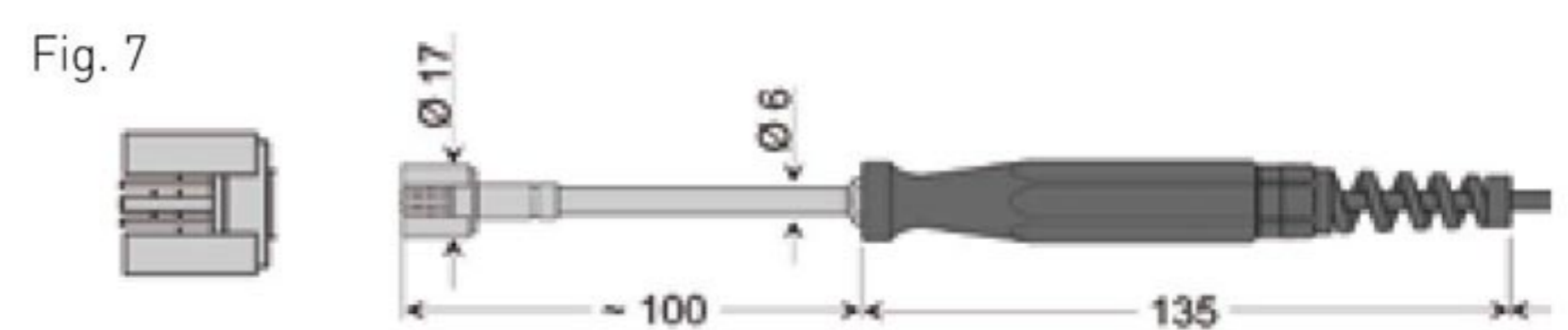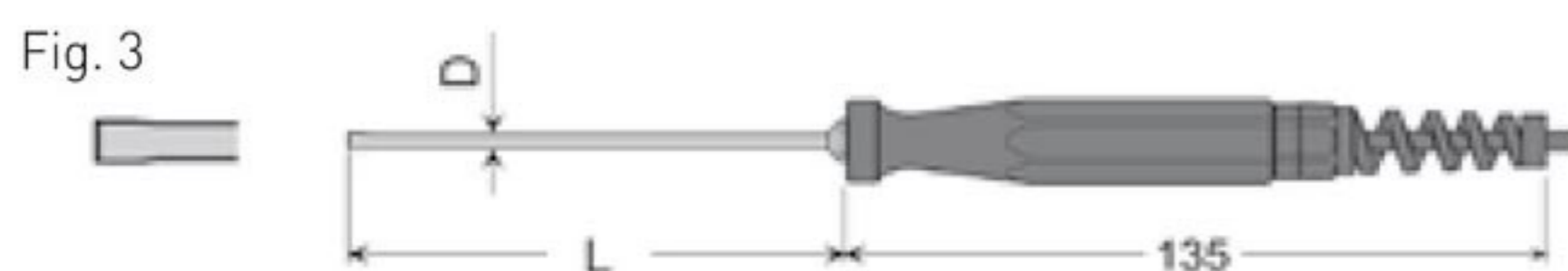
UM RTD.2

	UM RTD.2
Connections	1x 4 mm-socket 1x 4-pin M8 plug
Inputs	Pt50, Pt100, Pt200, Pt500, Pt1000, Cu10, Cu50, Ni100, Ni120, Ni1000, 0...3600 Ω
Measuring ranges / resolution	-200.000...850.000 / 0.001 °C
Accuracy	±0.012 % ±1 digit + k
Editable units	°C / °F / customized
Multi-conductor connection	2 / 3 / 4-wire

Type UM RTD.2

- User-defined measuring input characteristic
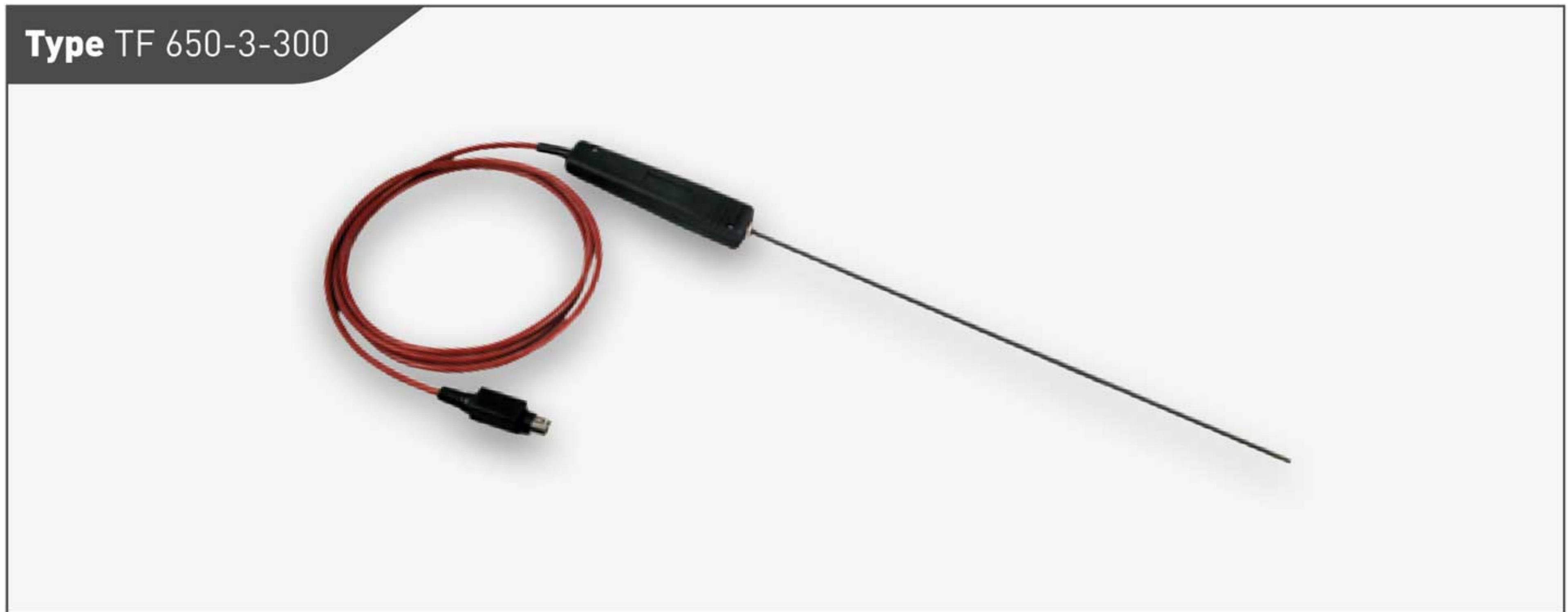- Operator guidance
  Menu with pull-down windows
- Data storage (Log function) for 10 000 values
  with value tables and graphics function
- Calibration data files and linearisation points, 5 x 4 values
- Battery supply, 4x 1,5 V AA
- Accu set with mains adapter (optional)
- PC Interface
  Data link with mini-USB interface
  DC-isolated and short-circuit proof
- Software (optional)

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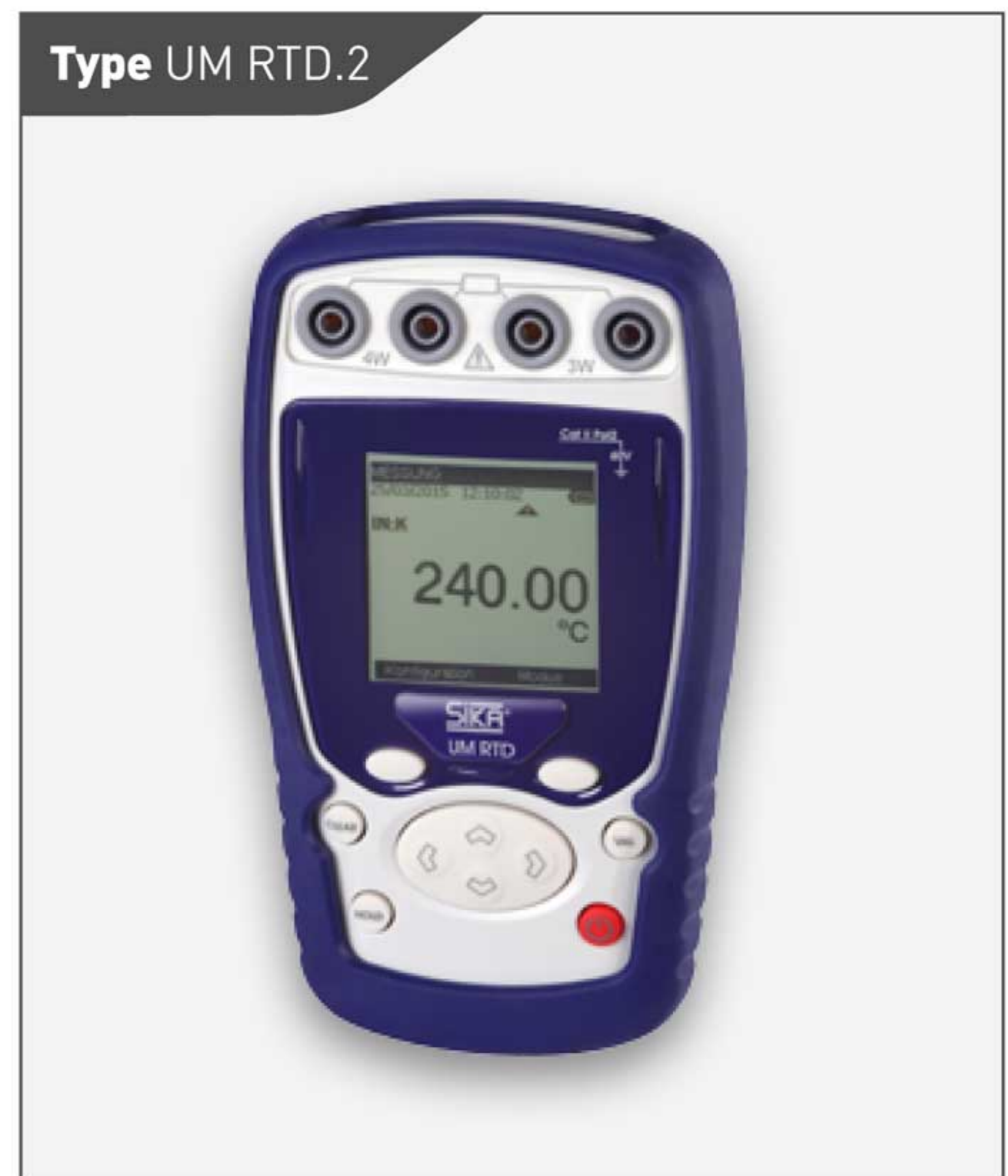
Calibration reference sensors

For precision hand-held instruments UM-Series

Type TF 650-3-300

An ace of calibration

Particular attention is given to the physical construction to ensure that shocks have minimal effect on the reference sensor.

The use of robust measuring elements in thinfilm technology ensure standardised and reliable performance.

Intensive ageing tests are carried out at the maximum operating temperature to examine longterm temperature stability. In order to detect longterm effects through thermal stress, a defined tempering process is carried out with a special selection of reference sensors over 300 hours. In the case of stress caused by thermocycling, no significant hysteresis effects were found.

The physical structure of the reference sensors requires that different materials be joined together. The special design of the joint areas prevents the occurrence of parasitic thermoelectric voltages. Thus the measurement reading is not affected by the temperature gradients from the measurement point to the handle.

In examining the self-heating characteristics it was seen that measurement currents ⩽ 1 mA are ideally suited, since no distortion of the measurement result occurs. Here the self-heating effect can be neglected.

Calibration reference sensor - Type TF

Pt100 reference sensor for UM RTD.2

Technical data	
Measuring range	
TF 255-3-300	-50...255 °C / sensitive area 2 mm
TF 650-3-300	-50...650 °C / sensitive area 5 mm
TF 650-6-300	-50...650 °C / sensitive area 5 mm
Tolerance	
±0.05 °C in the entire range with a user-defined characteristic curve	
Version	
Material	Rust and acid-proof Stainless steel 1.4571
	Robust plastic handle
Immersion tube	Ø 3 mm, L = 300 mm Ø 6 mm, L = 300 mm
Electrical connection	Silicon cable with cable plug connection M8, 4-pin

User-defined characteristic curve

customer-specific curve

With this function, customer-specific curves can be used, alongside the standard calculation of the resistance / temperature characteristic curve in compliance with EN 60751.

The MH 3750 and the UM RTD.2 both have a very high accuracy of measurement. In order to be able to exploit this high degree of accuracy, appropriate high-quality temperature sensors must be used. Various standard classes of accuracy are available for this purpose.

For applications that require a very high degree of accuracy which is higher than the accuracy of the sensor itself, it is recommended that the sensor be calibrated by means of a user-defined characteristic curve.

To perform the calculation the calibrated actual values of the sensor are determined and compared with the actual temperatures in a calculation table.
On the basis of these reference points the sensor curve is calculated with a mathematical function and stored in the gauge. The MH 3750 stores up to 50 value pairs. The UM RTD.2 can store 10 value pairs.
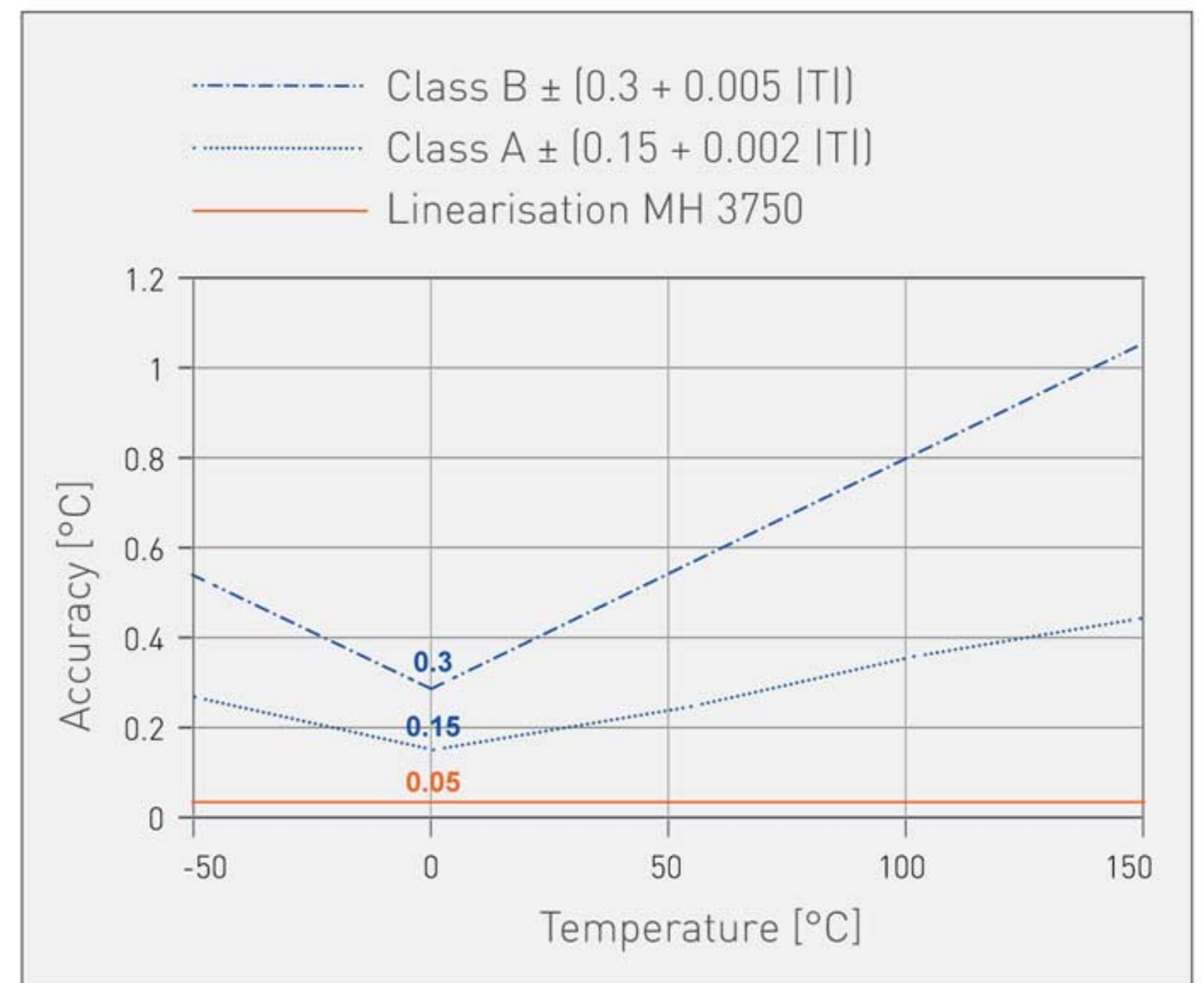
Class B ± (0.3 + 0.005 |T|)
Class A ± (0.15 + 0.002 |T|)
Linearisation MH 3750

For applications that require a very high degree of accuracy which is higher than the accuracy of the sensor itself, it is recommended that the sensor be calibrated to the MH 3750 or UM RTD.2 by means of a user-defined characteristic curve. In this way, you can meet the highest accuracy requirements in the range ≤ 0.05 °C.

Outputs

Extensive alarm functions via the display and buzzer, freely scalable standard signal output and PC interface are available.

Data storage (Log functions)

Some instruments can store data. The integrated memory records up to 16 200 measurement values. The date and time is automatically added to the values. A real time clock is integrated for this purpose.

Two **log functions** are available:

- In the STORE mode, data is transferred by means of pressing a button and 99 records can be stored. The values stored are shown directly on the display.

- In CYCLE operation, values are recorded automatically at a pre-programmed interval. Up to 16 200 records can be stored. The stored values are shown on a PC.

PC Interface

To transfer the measurement values and stored values to a PC, the majority of the instruments are fitted with a serial interface.

The software packages are available with extensive recorder and display functions, also for evaluation of the logged and alarm values. Process sequences can then be monitored and analysed clearly using the measurement procedures recorded and visualised as well as all data can be exported into standard programs e.g. Excel.

Alarm- & time displays

A visual and acoustic warning signal indicates when measurements exceed or fall below a programmed alarm point. Transmission via PC is also possible.

All data can be displayed with the year and date, thanks to the real time clock.

Accessories

Software

Nearly all instruments in the MH range are fitted with a PC interface, so that the values measured and stored can be transferred and recorded onto a PC. Using the software and an interface converter, a cost-effective measurement data recording system can be easily constructed. The EBS 20 M software packages with extensive recording and display functions are available, as is SOFT 3050 for evaluation of the logged and alarm values. Process sequences can then be monitored and analysed clearly using the measurement procedures recorded and visualised.
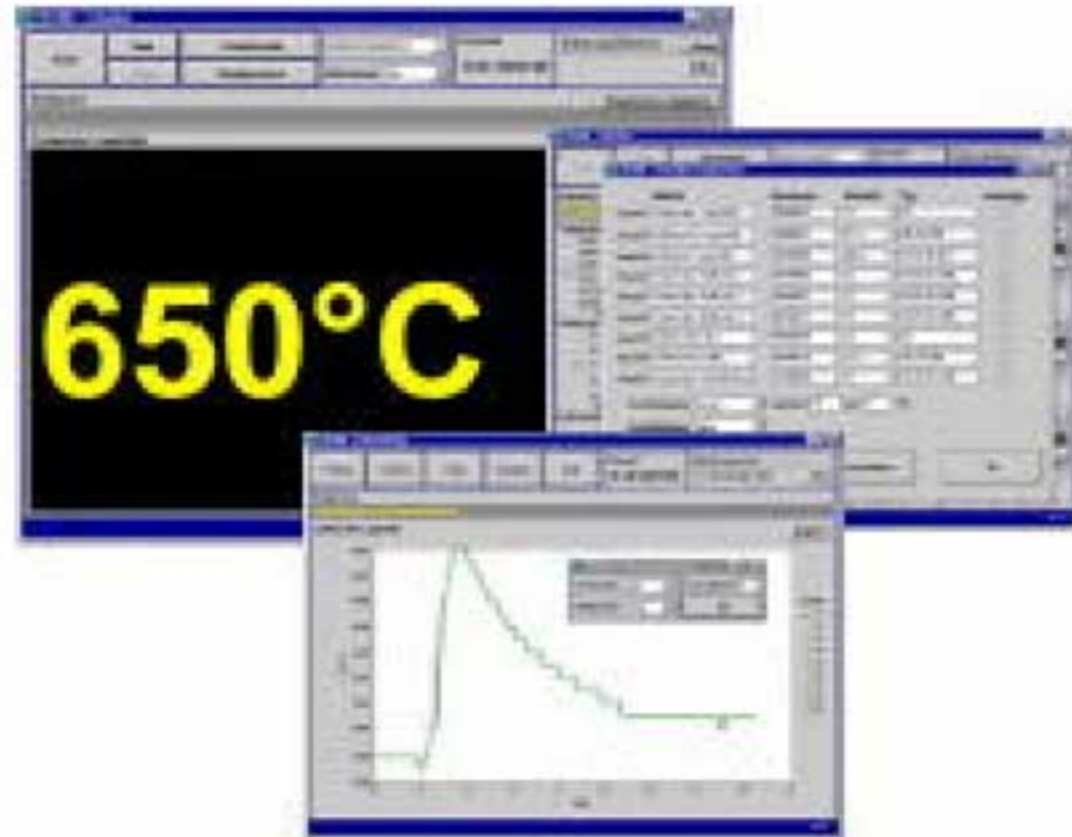
WINDOWS PC-software

With a convenient measurement data recording system, recorder, large display, data display for a maximum of 20 measuring channels and graphic presentation of measurement values:

- Adjustable time and measurement value axis
- Adjustable starting and stopping conditions
- Individual labelling of axis
- Adjustable line thickness and colour
- Adjustable labelling of the measurement points
- Digital display of measurement values across the whole screen
- Transfer, recording and archiving of the measurement values
- Adjustable sampling rate
- Large comment field
- Data storage as ASCII code
- Language: German or English can be selected

Interface converter

- Data connection with serial PC interface
- Electrically isolated and protected against short-circuits
- Connection to PC via 9-pin sub-D socket or USB plug
- Power supply directly via PC

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Battery / mains and charger

- Regulated plug adapter
- NiCd battery, rechargeable
- Charger for NiCd battery

Service and carrying case / service bag

Hard shell case in various sizes with packing foam and click lock:

- Standard (275 x 229 x 83 mm)
- Large (394 x 294 x 106 mm)
- Service bag with nylon sensor cover