

→ Series MH

→ Series UM



HAND-HELD INSTRUMENTS →

Hand-held instruments

Series MH - for humidity, temperature and pressure Series UM - for temperature

The handy and reliable instruments are used for measuring and recording humidity, temperature or pressure. The range is very flexible and is equally suitable for simple measurements and special applications in high-precision area.

Sensors and probes

The high accuracy of the signal detection and processing is achieved by means of powerful sensors with electronic linearisation of the characteristic curve. The correct probes are available for a wide range of measuring tasks.

Operating comfort

The innovative design of the attractive housing and the advanced technology make the sensors comfortable to operate. In mobile use, all functions can be selected and carried out easily by pressing the buttons. The membrane keypad guarantees protection against dust and moisture.

Multi-function display

As well as MIN / MAX values, hold function and the selected unit of measurement, various calculation values, such as temperature differential, pressure differential, dew point or heat capacity can also be shown on the multi-function display.

Explosion protection

Hand-held pressure measuring devices and pressure sensors are available in EXI versions (EEx ib IIC T4-03ATEX0136X).

Inputs

Automatic sensor recognition through standard DIN socket provides a plug-&-play solution that is easy to install.



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.



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

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

Type MH 3750



Temperature hand-held sensors for MH 3710 and MH 3750

Pt100	Fig. on page 146	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)

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

- 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)



User-defined characteristic curve

customer-specific curve

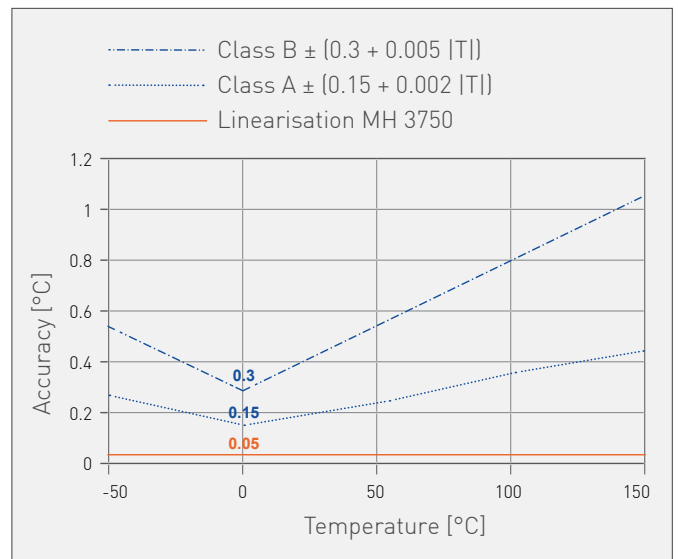
With this function, customer-specific curves can be used, alongside the standard calculation of the resistance / temperature characteristic curve in compliance with EN 60751.

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.



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.

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.

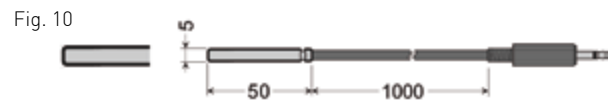
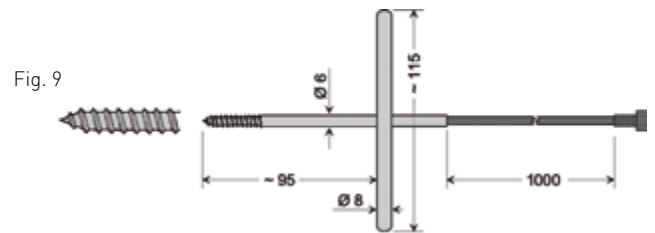
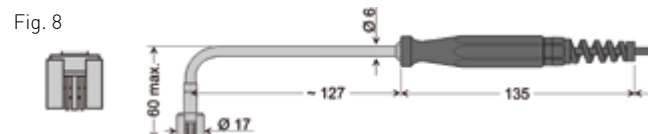
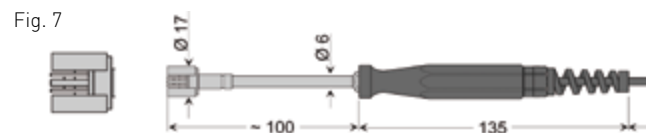
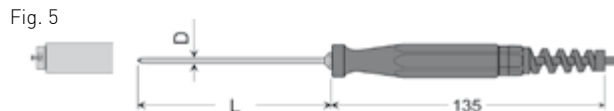
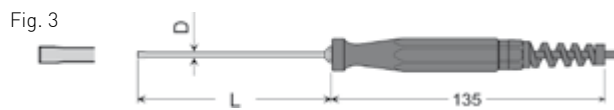
Calibration reference sensor - Type TF

Pt100 reference sensor for UM RTD.2

Technical data	
Measuring range	
TF 255-3-300	-55...255 °C / sensitive area 2 mm
TF 650-3-300	-35...650 °C / sensitive area 5 mm
TF 650-6-300	-35...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	\varnothing 3 mm, L = 300 mm \varnothing 6 mm, L = 300 mm
Electrical connection	Silicon cable with cable plug connection M8, 4-pin

Temperature sensors

For temperature hand-held instruments MH-Series



MH 1150 and MH 1170

MH 1150

Digital temperature hand-held instrument
For use with NiCr-Ni-exchangeable sensors

- Inputs
1 x mini-TC-socket for thermocouple Type K
- Measuring ranges / Resolution
NiCr-Ni -50...1150 °C / 1 °C
- Accuracy
±1 % of rdg. ±1 digit
- Units
°C

Type MH 1150



MH 1170

Same as MH 1150
Extended resolution and accuracy

- Measuring ranges / resolution
Selectable resolution 0.1 °C or 1 °C
NiCr-Ni -65...199.9 °C or -65...1150 °C
- Accuracy
±0.05 % of rdg. ±0.2 % full scale ±1 digit
- Units
°C and °F

Type MH 1170



Temperature hand-held sensors for MH 1150, MH 1170, MH 3210, MH 3230 and MH 3250

Typ K	Fig. Page 146	Name	Temperature range	L	D
Standard sensor	Fig.1	GTF900	-65...1000 °C	130 mm	3 mm
Fast response sensor	Fig.1	GTF400	-65...550 °C	130 mm	1.5 mm
Spike sensor	Fig.2	GES900	-65...1000 °C	100 mm	3 mm
Inconel sensor	Fig.2	GTF1200 / 300	-200...1150 °C	300 mm	3 mm
Surface sensor	Fig.4	GOF130CU	-65...500 °C	130 mm	3 mm (head = 4 mm)
Surface sensor	Fig.5	GOF130	-65...900 °C	130 mm	8 mm
Surface sensor	Fig.7	GOF400VE	-65...400 °C	100 mm	6 mm (head = 17 mm)
Surface sensor	Fig.8	GOF400HO	-65...400 °C	130 / 60 mm	6 mm (head = 17 mm)
Air / gas sensor	Fig.6	GLF900	-65...600 °C	130 mm	3 mm (head = 6 mm)

MH 3210, MH 3230 and MH 3250

MH 3210

Digital universal temperature hand-held instrument
For use with thermocouple exchangeable sensors

- Inputs
1 x mini-TC-socket for thermocouples K / J / S / T / N
- Measuring ranges / resolution
Selectable resolution 0.1 °C or 1 °C
Type K NiCr-Ni -220...1370 °C
Type T Cu-CuNi -200...1100 °C
Type J FeCu-Ni -200...1100 °C
Type N NiCrSi-NiSi -200...1300 °C
Type S Pt10Rh-Pt -50...1750 °C
- Accuracy
±0.2 % full scale ±1 digit
- Units
°C and °F
- Outputs
Analogue output 0...1 V
Scalable for easy data readout
- PC Interface
Data link with serial PC-Interface
DC-isolated and short-circuit proof

MH 3230

Same as MH 3210
Additional measuring input
Differential measurement and TARE
Without analogue output

- Inputs
2 x mini-TC-socket for thermocouples K / J / S / T / N

Type MH 3250



MH 3250

Same as MH 3230
Additional logger-, alarm- and clock functions

- Alarm and time display
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, temp2, T2-T1, time and date)
Manual data set reading via keystroke
CYCLE
9999 data sets (temp1, temp2, T2-T1)
Automatic data set reading in the set interval
Adjustable measurement interval 1 s...60 minutes

MH 175

MH 175

Digital temperature hand-held instrument
For use with Pt1000 exchangeable sensors

- Inputs
1 x jack-socket for Pt1000 / 2-wire
- Measuring ranges / resolution
-70.0...199.9 °C / 0.1 °C
- Accuracy
±0.1 % of rdg. ±1 digit
- Units
°C



Temperature hand-held sensors for MH 175

Pt1000	Fig. Page 146	Name	Temperature range	L	D
Standard sensor	Fig.1	GTF175	-70...200 °C	100 mm	3 mm
Fast response sensor	Fig.1	GTF175-1.6	-70...200 °C	100 mm	1.6 mm
Spike sensor	Fig.2	GES175	-70...200 °C	100 mm	3 mm
Surface sensor	Fig.3	GOF175	-70...200 °C	100 mm	3 mm (head = 4 mm)
Air / gas sensor	Fig.6	GLF175	-70...200 °C	100 mm	3 mm (head = 6 mm)
Cable sensor	Fig.10	GTF2000	-70...200 °C	50 mm	5 mm
Frozen cargo sensor	Fig.9	GGF175	-70...200 °C	100 mm	6 mm

Hand-held instruments for humidity and temperature

MH 3330 and MH 3350

MH 3330

Digital universal humidity / temperature hand-held instrument
For use with automatically recognizable exchangeable sensor
TFS 0100 E

- Inputs
2 x mini-DIN-sockets for capacitive polymer humidity sensor with Pt1000 temperature sensor 1 x mini-DIN-socket for type K surface temperature
- Measuring ranges / resolution
Humidity 0.0...100.0 % r.H. / 0.1 %
Temperature -40.0...120.0 °C / 0.1 °C
Surface temperature -80.0...250.0 °C / 0.1 °C
- Accuracy
Humidity ±0.1 % full scale
Temperature ±0.2 % full scale ±1 digit
Surface temperature ±0.5 % of rdg. ±0.5 °C ±1 digit
- Units
°C, °F, r.H.
- PC Interface
Data link with serial PC-Interface
DC-isolated and short-circuit proof

MH 3350

Same as MH 3330
Additional logger-, alarm- and clock functions

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

Types MH 3330 / 3350 , TFS 0100 E



- Data storage (Log function)
STORE
99 data sets (humidity, temp1, temp2, dew point, dew point distance, heat content, time, date)
Manual data set reading via keystroke
CYCLE
5400 data sets (humidity, temp1, temp2, dew point, dew point distance, heat content)
Automatic data set reading in the set interval
Adjustable measurement interval 1 s...60 minutes

Sensor TFS 0100 E	
Measuring ranges / resolution	Humidity 0.0...100 % rH / 0.1 % rH Temperature -40.0...120.0 °C / 0.1 °C
Measuring elements	Humidity capacitive polymer sensor Temperature Pt 1000 / 2-wire
Accuracy	Humidity ±2 % of rdg. Temperature 1/3 DIN Pt1000 (±0.1 °C ±0.005 [T])
Electrical connection	PVC cable (1m) with mini-DIN-plug
Tube	Anodized aluminium with plastic sensor head
Dimensions / weight	14 x 120 mm (D x L1) / approx. 110 g

Hand-held instruments for pressure

MH 3161 and MH 3181

MH 3161

Digital universal pressure hand-held instrument with internal piezoresistive pressure sensor for air and non-corrosive / ionizing gases and fluids

- Pressure types
Overpressure, negative pressure, differential and absolute pressure, air pressure/ barometer, vacuum
- Inputs
2 x metal connection plugs for pressure hose 6 x 1 mm
- Measuring ranges / resolution
-19999...19999 digit

Type	Measuring range	Over load	Resolution
MH 3161-01	-1...25 mbar (rel.)	100 mbar	(0.01 mbar)
MH 3161-07	-10...350 mbar (rel.)	1 bar	(0.1 mbar)
MH 3161-12	0...1300 mbar (abs.)	4 bar	(1 mbar)
MH 3161-13	-100...2000 mbar (rel.)	4 bar	(1 mbar)

- Accuracy
±0.2 % full scale (hysteresis and linearity)
- Units
mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH₂O
- PC Interface
Data link with serial PC-Interface
DC-isolated and short-circuit proof
- Measuring rate
4 measurements / s

MH3181

Same as MH 3161

Additional analogue output

Logger-, alarm- and clock functions

Selectable measuring rate and average calculation

Type	Measuring range	Over load	Resolution
MH 3181-01	-1...25 mbar (rel.)	100 mbar	(0.01 mbar)
MH 3181-07	-10...350 mbar (rel.)	1 bar	(0.1 mbar)
MH 3181-12	0...1300 mbar (abs.)	4 bar	(1 mbar)
MH 3181-13	-100...2000 mbar (rel.)	4 bar	(1 mbar)

Types MH 3161 and MH 3181



- Outputs
Analogue output 0...1 V
Scalable for easy data readout
- Alarm and time display
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 (measured value, min / max value, time, date)
Manual data set reading via keystroke
CYCLE
9999 data sets (measured or average value, min / max value)
Automatic data set reading in the set interval
Adjustable measurement interval 1 s...60 minutes
- Measuring rates
SLOW = 4 measurements / s
FAST = 100 measurements / s
PEAK = 1000 measurements / s
- Average calculation
Via integration of measurement values at the adjustable interval
- Options
higher accuracy sensor (available from 350 mbar)
EXI-Version (Ex ib IIC T4 - 03ATEX0136X)

MH 3111, MH 3151 and MH 3156

MH 3111

Digital universal pressure hand-held instrument
 For use with automatically recognizable exchangeable sensors MSD

- Pressure types
 Overpressure, negative pressure, differential and absolute pressure, air pressure / barometer, vacuum (depending on plugged sensor)
- Inputs
 1 x mini-DIN-socket
- Measuring range
 -19999...19999 digit
- Accuracy
 $\pm 0.2\%$ full scale (hysteresis and linearity)
- Units
 mbar, bar, Pa, kPa, MPa, mmHg, PSI, mH₂O
- PC Interface
 Data link with serial PC-Interface
 DC-isolated and short-circuit proof
- Measuring rate
 4 measurements / s

MH 3151

Same as MH 3111
 Analogue output
 Logger function, alarm and real time clock
 Switchable measuring rate

- Outputs
 Analogue output 0...1 V
 Scalable for easy data readout
- Alarm and time display
 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 (measured value, min / max value, time, date)
 Manual data set reading via keystroke
CYCLE
 9999 data sets (measured value or average value, min / max value)
 Automatic data set reading in the set interval
 Adjustable measurement interval 1 s...60 minute



Types MH 3111, 3151 and 3156

- Measuring rates
SLOW = 4 measurements / s
FAST = 100 measurements / s
PEAK = 1000 measurements / s
- Average calculation
 Via integration of measurement values at the adjustable interval

MH3156

Same as MH 3151
 Additional measuring input
 Expand logger function at CYCLE modus

- Inputs
 2 x mini-DIN-socket
- Data storage (Log function)
CYCLE
 4000 data sets (measurement1 or average1, min1 value, max1 value) (measurement2 or average2, min2 value, max2 value) (diff M1-M2 or diff AV1-AV2, diff min1-min2, diff max1-max2)
 Automatic data set reading in the set interval
 Adjustable measurement interval 1 s...60 minutes
- Options
 Higher accuracy sensor (available from 350 mbar)
 EXI-Version (Ex ib IIC T4 - 03ATEX0136X)

Pressure sensors MSD

For pressure hand-held instruments MH-Series

Nylon type

Piezoresistive pressure sensor for air as well as non-corrosive / ionizing gases and fluids with integrated sensor memory

- Inputs
2 x nylon connection plugs for pressure hose 6 x 1 mm
- Accuracy
±0.2 % full scale (hysteresis and linearity)
- Measuring ranges / resolution

Type (Nylon)	Measuring range	Over load	Resolution
MSD 2.5 MR	-2...2.5 mbar (rel.)	200 mbar	0.001 mbar
MSD 25 MR	-20...25 mbar (rel.)	300 mbar	0.01 mbar
MSD 350 MR	-200...350 mbar (rel.)	1 bar	0.1 mbar
MSD 1.3 BA	0...1.3 bar (abs.)	4 bar	1 mbar
MSD 2 BA	0...2 bar (abs.)	4 bar	1 mbar
MSD 2 BR	-1...2 bar (rel.)	4 bar	1 mbar
MSD 7 BA	0...7 bar (abs.)	10 bar	10 mbar
MSD 10 BR	-1...10 bar (rel.)	10.5 bar	10 mbar

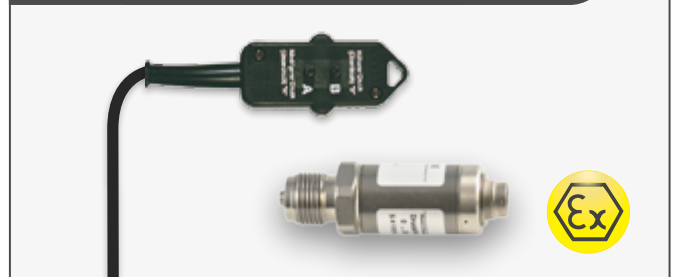
- Electrical Connection
PVC cable (1m) with mini-DIN-plug
- Housing
Robust ABS plastic, Degree of protection IP65
- Dimensions
70 x 30 x 15 mm (H x D x W)
- Weight
Approx. 75 g

Stainless steel type

Piezoresistive pressure sensor for aggressive media, water, gases, and fluids, with internal sensor memory

- Inputs
Stainless steel connection G $\frac{1}{2}$
- Accuracy
±0.2 % full scale (hysteresis and linearity)
- Electrical connection (not part of delivery)
PVC cable (1 m) with mini-DIN-plug
- Housing
Stainless steel, Degree of protection IP65

Types MSD 250 MRE and MSD 160 BRE



- Dimensions
Approx. 23 x 85 mm (Ø x L)
- Weight
Approx. 175 g
- Measuring range / Resolution

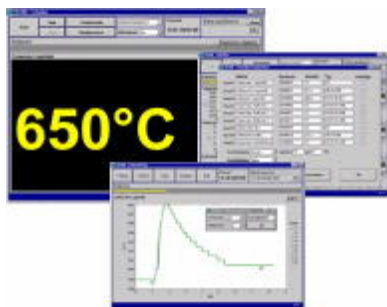
Type (st. steel)	Measuring ranges	Over load	Resolution
MSD 100 MRE	0...100 mbar (rel.)	1 bar	0.1 mbar
MSD 250 MRE	0...250 mbar (rel.)	2 bar	0.1 mbar
MSD 400 MRE	0...400 mbar (rel.)	2 bar	0.1 mbar
MSD 1 BAE	0...1 bar (abs.)	5 bar	1 mbar
MSD 1 BRE	0...1 bar (rel.)	5 bar	1 mbar
MSD -1 / 1.5 BRE	-1...1.5 bar (rel.)	10 bar	1 mbar
MSD -1 / 3 BRE	-1...3 bar (rel.)	17 bar	1 mbar
MSD 2.5 BAE	0...2.5 bar (abs.)	10 bar	1 mbar
MSD 2.5 BRE	0...2.5 bar (rel.)	10 bar	1 mbar
MSD 4 BAE	0...4 bar (abs.)	17 bar	1 mbar
MSD 4 BRE	0...4 bar (rel.)	17 bar	1 mbar
MSD 6 BAE	0...6 bar (abs.)	35 bar	1 mbar
MSD 6 BRE	0...6 bar (rel.)	35 bar	1 mbar
MSD 10 BAE	0...10 bar (abs.)	35 bar	10 mbar
MSD 10 BRE	0...10 bar (rel.)	35 bar	10 mbar
MSD 16 BAE	0...16 bar (abs.)	80 bar	10 mbar
MSD 25 BAE	0...25 bar (abs.)	50 bar	10 mbar
MSD 25 BRE	0...25 bar (rel.)	50 bar	10 mbar
MSD 40 BRE	0...40 bar (rel.)	80 bar	10 mbar
MSD 60 BRE	0...60 bar (rel.)	120 bar	10 mbar
MSD 100 BRE	0...100 bar (rel.)	200 bar	0.1 bar
MSD 160 BRE	0...160 bar (rel.)	320 bar	0.1 bar
MSD 250 BRE	0...250 bar (rel.)	500 bar	0.1 bar
MSD 400 BRE	0...400 bar (rel.)	800 bar	0.1 bar
MSD 600 BRE	0...600 bar (rel.)	1200 bar	0.1 bar
MSD 1000 BRE	0...1000 bar (rel.)	1500 bar	1 bar

- Options for nylon and stainless steel
Higher accuracy sensor (available from 350 mbar)
EXI-Version (EEx ib IIC T4 - 03ATEX0136X)

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



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



Certificates

To confirm the outstanding accuracy for applications in the service sector, measurement and control workshops and in quality assurance, works or DAkkS certificates are available to you from our DAkkS laboratory.

Humidity/temperature certificates

- Works test certificate 9 measurement points with 20 %, 40 %, 60 %, 80 % (rising / falling) and room temperature
- DAkkS certificate on request

Prüfprotokoll / Test Certificate

Kalibriergegenstand Calibration object	Temperatur-Mikrobadkalibrator Temperature Liquid bath calibrator	<p>Die für die Kalibrierung verwendeten Messorenkungen werden regelmäßig kalibriert und sind rückführbar auf die nationalen Normale der Physikalisch-Technischen Bundesanstalt (PTB) Deutschland oder auf andere nationale Normale. Die für diesen Vorgang erzielte Dokumentation kann eingesehen werden. Alle erforderlichen Messdaten sind auf dem(n) nachfolgenden Gehäus(e) dieses Kalibrierscheins aufgeführt. Dieses Prüfprotokoll darf nur vollständig und unverändert weiterverbreitet werden. Auszüge und/oder Änderungen bedürfen der Genehmigung der erteilenden Stelle. Prüfprotokolle ohne Unterschrift und Stempel haben keine Gültigkeit.</p> <p>The measuring devices used for calibration are regularly calibrated and traceable to the national standards of the Physikalisch-Technische Bundesanstalt (PTB) or other national standards. The documents created for this procedure are available for viewing. All the necessary measured data can be found on the following page(s) of this calibration certificate. This test certificate may not be reproduced other than in full except with the permission of the issuing office. Test certificates without signature and seal are not valid.</p>
Hersteller Manufacturer	SIKA Dr. Siebert & Kühn GmbH & Co. KG 34260 Kaufungen	
Typ Type	TPM16SS -35 °C / 165 °C	
Fabrikat/Serien-Nr. Serial number		
Auftraggeber Customer		
Anzahl der Seiten des Kalibrierscheins Number of pages of the certificate	2	
Datum der Kalibrierung Date of calibration	Dez 2014	
Umgebungsbedingungen Ambient conditions	Raumtemperatur/ Amb. temperature Rel. Luftfeuchte/ Rel. air humidity Luftdruck/ Amb. pressure	(23 ± 2) °C (50 ± 20) % (990 ± 30) mbar
Verwendete Normale Used standards	Pl100, SN ASL-02, 3730 D-K-17734-01-00 / 2012-09 DMM Keithley, SN 596023, 0249 DKD-K-13901/ 2013-10	
Abgleich durchgeführt mit Adjustment carried out with	Siikonbi 10 cSt Bechereinsatz Siliconoil 10 cSt tub insert	

SIKA Dr. Siebert & Kühn GmbH & Co. KG • Struthweg 7-9 • 34260 Kaufungen • Germany
Phone +49 5605-803-0 • Fax +49 5605-803-54 • info@SIKA.net • www.SIKA.net

Dr. Siebert & Kühn GmbH & Co. KG
Struthweg 7-9
34260 Kaufungen
Germany

akkreditiert durch die / accredited by the
Deutsche Akkreditierungsstelle GmbH
als Kalibrierlaboratorium im / as calibration laboratory in the
Deutschen Kalibrierdienst

000271
D-K
19638-01-00
2014-11

Kalibrierschein Calibration certificate		Kalibrierschein Calibration mark
Gegenstand Object	Mikrokalibrierbad Micro calibration bath	<p>Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten im Übereinstimmung mit dem DAkkS im internationalen Einheitensystem (SI). Übereinkommen der Europäischen Akkreditations (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur Befähigung der Eintragung eines angemesenen First zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich. This calibration certificate documents the traceability to national standards, which realize the International System of Units (SI). The DAkkS is signatory to the multilateral agreements of the European co-operation for Laboratory Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates. The user is obliged to have the object re-calibrated at appropriate intervals.</p>
Hersteller Manufacturer	Dr. Siebert & Kühn GmbH & Co. KG 34260 Kaufungen	
Typ Type	TPM16SE	
Fabrikat/Serien-Nr. Serial number	141261	
Auftraggeber Customer	Musterma AG Musterplatz 1 22465 Musterstadt	
Auftragsnummer Order No.	100 741 854	
Anzahl der Seiten des Kalibrierscheins Number of pages of the certificate	4	
Datum der Kalibrierung Date of calibration	2014-11-30	
Datum Date	2014-11-30	Stellv. Leiter des Kalibrierlaboratoriums Assistant Head of the calibration laboratory
		Bearbeiter Person in charge

Dr. Siebert & Kühn GmbH & Co. KG • Struthweg 7-9 • D-34260 Kaufungen • Telefon: 0 56 05 / 8 03 - 0 • Fax: 0 56 05 / 803 - 54 / 60

Temperature certificates

- Works test certificate 4 measurement points up to 650 °C
- DAkkS certificate 4 measurement points up to 500 °C

Pressure certificates

- Works test certificate 10 measurement points
- DAkkS certificate 10 measurement points

Our products at a glance

Series MH and UM

	Temperature							
	MH 3710	MH 3750	UM RTD.2	MH 1150	MH 1170	MH 3210	MH 3230	MH 3250
Measuring input	Pt100		Pt50, Pt100, Pt200, Pt500, Pt1000, Cu10, Cu50, Ni100, Ni120, Ni1000	TC-K	TC-K	TC-K / J / S / T / N		
Measuring ranges	-199.99...199.99 °C 200.0...850.0 °C		-200,000...850,000 °C 0...3600 Ω	-50...1150 °C	-65...199.9 °C 200...1150 °C	-199.9...199.9 °C 200...1750 °C		
Resolution	0.01°C / 0.1 °C autorange		0,001 °C	1 °C	0.1°C / 1 °C	0.1°C / 1 °C		
Units	°C / °F		°C / °F / customized	°C	°C / °F	°C / °F		
Display	2 x 4½ digit		Multifunction- display	3½ digit	3½ digit	2 x 4½ digit		
Linearisation	Offset / slope	Offset / slope	Offset	Offset / slope	Offset / slope	Offset		
Inputs	1	1	switchable	1	1	1	2	2
Analogue output	✓	✓				✓		
Logger function		✓	✓					✓
PC-Interface	✓	✓	✓			✓	✓	✓
Alarm function (buzzer)		✓						✓
Clock / date (real time)		✓	✓					✓
Sensor specific linearisation		✓	✓					
EXI-Version								
Auto-off function	✓	✓	✓		✓	✓	✓	✓
Min-max-value	✓	✓	✓		✓	✓	✓	✓
Hold-function	✓	✓	✓		✓	✓	✓	✓
Correction value for surface measurement						✓	✓	✓
Differential pressure								
Tare-function								
Sea-level- correction (abs.)								
Extended measurement functions								<ul style="list-style-type: none"> • Differential measurement • Difference function

	Temperature	Humidity/Temperature		Pressure				
	MH 175	MH 3330	MH 3350	MH 3161	MH 3181	MH 3111	MH 3151	MH 3156
	Pt1000	Capacitive polymer sensor / Pt1000 / TC-K		Internal sensor		External sensor		
	-70.0...199.9 °C	0...100.0 % rH -40.0...120.0 °C / -80.0...250 °C		-1...2000 mbar		Depending on the chosen sensor MSD		
	0.1 °C	0.1 % rH / 0.1 °C		0.01 mbar		0.001 mbar...10 mbar, depending on the chosen sensor MSD		
	°C	% rH / °C / °F		Mbar / bar / kPa / MPa / mmHg / PSI / mH ₂ O				
	3½ digit	2 x 4½ digit		2 x 4½ digit				
	Offset / slope	Offset		Offset / slope		Offset / slope		
	1	2	2	2	2	1	1	2
					✓		✓	✓
			✓		✓		✓	✓
		✓	✓	✓	✓	✓	✓	✓
			✓		✓		✓	✓
					✓		✓	✓
				✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓
		✓	✓					
				✓	✓	✓	✓	✓
				✓	✓			
				✓	✓	✓	✓	✓
		<ul style="list-style-type: none"> Dew point Dew point distance Heat content 			<ul style="list-style-type: none"> Average value Fast / PEAK / SLOW 		<ul style="list-style-type: none"> Average value Fast / PEAK / SLOW 	