→ Monofunction simulators

→ Multifunction simulators

SIMULATORS →

Simulators

Measurement and simulation of process signals

Simulators measure and generate diverse process variables. These portable and extremely handy instruments are ideal for on-site use. In addition to electrical signals such as current, voltage and resistance, further variables such as temperature, pressure and frequency can be measured and additionally generated.

The implemented sensor functions simulate specific supply variables and display an exact given value. This distinguishes a signal calibrator from the conventional measuring functions of a multimeter.

Simulators simplify service routines with the combination of measuring input and signal output and features that include special functions for repair, maintenance and troubleshooting in industrial installations.

These process calibrators allow comprehensive testing of control equipment, measuring instrument accuracy and reproducibility. The documentation of calibration results is also actively supported with internal memory and display functions or convenient external control via PC software.

SIKA simulators have been developed for simple and flexible calibration and maintenance. Various tests can be performed in a single operation without having to change instruments. This saves time.

A wide range of highly reliable cutting-edge instruments is available to suit every application. Our highly accurate multifunction calibrators have been designed for a broad spectrum of applications and offer best value for money.

What this means in precise terms: being mobile and more versatile with a modern, convenient, compact and lightweight instrument.

Main applications

- Service, maintenance and repair
- Quality assurance
- Testing laboratories and research
- Instrumentation and control
- Process industry
- Energy supply
- Machine and apparatus engineering

Numerous other applications are also possible.

Mono + Mono = Multi

Brief description

The combination of different types of signals determines the simulator type and its specific features. Whereas monofunction simulators can only process one type of signal, multifunction simulators can process different types of signals.

Available are resistance thermometers (RTD) and thermocouples (TC) with varying linearisation and corresponding resistance (Ω) and voltage signals (mV). Analogue current (mA) and voltage signals (V) as well as frequency (Hz) and pulse signals (0 / C) and pressure signals (bar) round off the spectrum.

Monofunction simulators

SIKA monofunction simulators offer exceptional performance, durability and reliability. Our temperature or current loop calibrators are compact, lightweight and easy to transport. These instruments feature rubber keys for ease of use and are insensitive to dust and splashing water. The tough plastic housing is resistant to shocks and impacts and offers additional protection against vibrations in harsh environments. Screened 4 mm sockets allow quick and easy connection of equipment to be tested.

Multifunction simulators

SIKA multifunction simulators combine the functions of several devices in one instrument. These simulators are designed for easy generation and measurement of temperature, pressure, frequency and electrical signals. These documenting instruments have been developed for testing and calibration of numerous process signals as well as their generation and measurement with high accuracy. Operation is intuitive via keypad or pull-down menus.

Features

Multifunction display

The back-lit multifunction display ensures clear indication of input and output values as well as all adjustments.

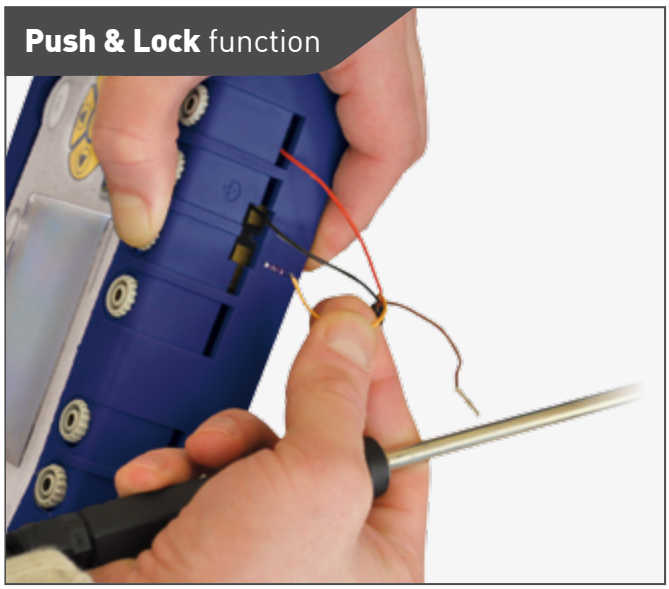
Operating concepts

Features include a rubber keypad, convenient interactive menu control via function keys, navigator and numeric keypad. These features allow easy selection and display of numerous functions.

Connection options

A large, switchable double display shows the connection options in graphic form. The 4 mm safety sockets ensure quick and easy connection of equipment to be tested. Connection takes place via laboratory connectors. Alternatively, bare cable ends can be connected without further adaptation via a Push & Lock function. Separate channels allow parallel system processing. This obviates the need for reconnecting the leads, which saves time and increases efficiency.

Push & Lock function



Wide range of functions

Manual call

Signals can be adjusted manually for different output levels for testing and calibration as required. The required value is output after configuration.

High-speed call

Signal values needed time and again are permanently or flexibly stored in the simulator and can be recalled quickly at the push of a button.

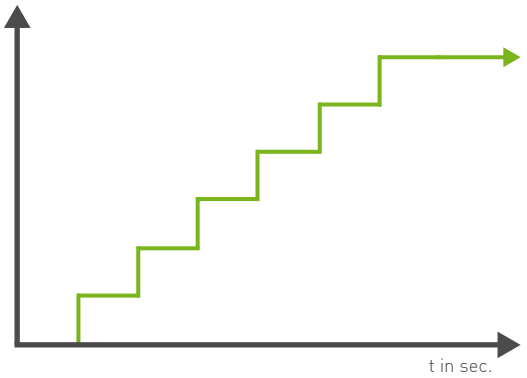
Steps and ramps

An automatic program is generated for periodic calls. The type of signal, duration and value are defined. Start delay, number of repetitions and a continuous linear increasing or decreasing characteristic can be individually programmed.

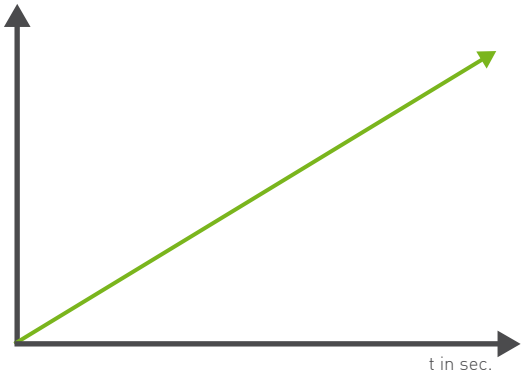
Synthesizer

The synthesiser function can be used for the generation of a discontinuous characteristic with changing signal values. Previously programmed changing signal levels are displayed on the simulator.

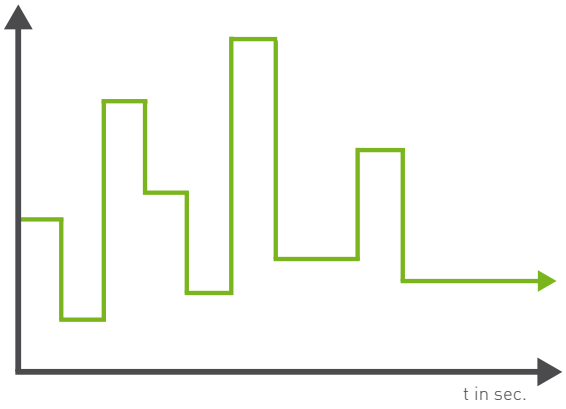
This function allows the simple definition and successive call of different steps, ramps or synthesiser values for easier testing.



Steps function



Ramp function

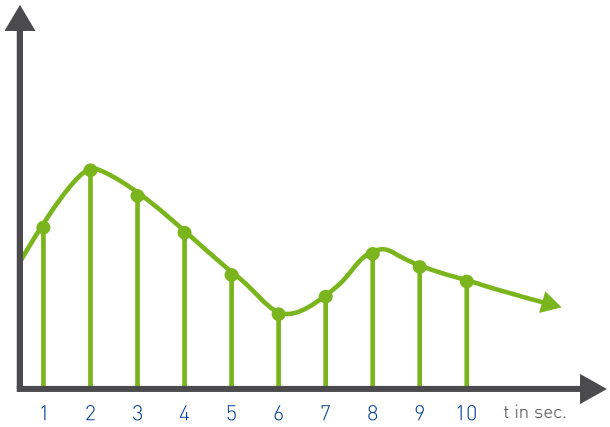


Synthesiser function

User-defined characteristics

Measurement is often based on ideal linear characteristics. In normal practice, sensors, transmitters, transducers, etc., are often subject to non-linear characteristics due to various offset, gradient, linearity or hysteresis errors.

For the faultless measurement or generation of such non-linear characteristics, the measuring input or signal output can be configured with up to ten points by the user. The unit relating to the value is freely editable.



User defined characteristics with 10 points

Calibration and linearisation points

If the measuring characteristics and deviations of a sensor are known and these are available in the form of a calibration certificate, they should be taken into account in measurement to obtain accurate measuring results.

The simulator input can be shifted linearly by offset programming to approach the measuring characteristics of the sensor. This single-point calibration is the simplest and most popular method for improving measuring results.

Multipoint calibration can be used for greater measuring accuracy. The input is configured by means of four linearisation points to the real sensor characteristics to compensate for linearity errors. Up to five different calibration data files can be directly stored and easily recalled as required.

PC connection and memory

A remote control can be connected and all programming carried out via a USB port and PC software. The internal configuration memory of the simulator stores diverse testing and calibration data. These configuration files can easily be retrieved locally and preset functions selected at the push of a button.

Measured values can be stored as required. The data memory allows direct display of tables or graphs on the multifunction display. This enables complete test reports to be stored in the simulator and uploaded to a PC as required.

Software package

Function	DataCal
Memory management	
→ PC download / delete / export	✓
→ Real time data recording	✓
→ Value tables / graphics function	✓
Configuration management	
→ Adjust signals / function	✓
→ PC-Upload	✓
Calibration management	
→ Set up calibration routines	✓
→ Set up calibration certificates	✓
Display management	
→ Remote indication	✓
→ Start / Stop of simulation	✓
Types	
	UC RTD / UC TC / MC 75

Monofunction simulators

EC RTD and UC RTD.2

Type EC RTD

Type UC RTD.2

Signals	EC RTD	UC RTD.2
Resistance thermometer (RTD)		
Generation and measurement of RTD signals	Pt100, Cu50	Pt50, Pt100, Pt200, Pt500, Pt1000, Cu10, Cu50, Ni100, Ni120, Ni1000
Ω-generator function	0...400 Ω	0...3500 Ω
Ω-measurement function	0...450 Ω	0...3600 Ω
Accuracy (of rdg. + const.)	±0.05 %	±0.0012 %
Selectable temperature unit	°C / °F	°C / °F
Measurement of multi-wire connections	2	2 / 3 / 4

Functions	EC RTD	UC RTD.2
Generation		
High-speed call values		10 points (flexible)
Linear steps and ramps		✓
User-defined synthesiser values		10
User-defined signal output characteristic		10 points
Editable units		✓
Output zero	✓	
Measurement		
Data memory		10 000 values
Value tables and graphics function		✓
Offset programming for sensor characteristic		✓
Calibration data files and linearisation points		5 x 4 values
User-defined measuring input characteristic		10 points
Editable units		✓
Measured value min. / max.		✓
Measured value hold function		✓
Averaging function		✓

EC RTD

- Operator guidance
  Keypad
- Battery supply / Operating time
  Approx. 25 h with Auto-Power off

UC RTD.2

- Operator guidance
  Menu with pull-down windows
  Programming and control via PC
- Battery supply / Operating time
  Approx. 40 h
- Accu set with mains adapter (optional)
- Software (optional)

EC TC and UC TC.2

Type EC TC

Type UC TC.2

Signals	EC TC	UC TC.2
Thermocouples (TC)		
TC signal generation and measurement	J, K, T, R, S, B, N, E	J, K, T, R, S, B, N, E, U, L, C
mV generator function	-10...1100 mV	-9.5...80 mV
mV measurement function	-10...110 mV	-10...100 mV
Accuracy (of rdg. + const.)	±0.05 %	±0.02 %
Selectable temperature unit	°C / °F	°C / °F
Internal comparison point	±0.5 °C	±0.3 °C

Functions	EC TC	UC TC.2
Generation		
High-speed call values		10 points (flexible)
Linear steps and ramps		✓
User-defined synthesiser values		10
User-defined signal output characteristic		10 points
Editable units		✓
Measurement		
Data memory		10 000 values
Value tables and graphics function		✓
Sensor characteristic offset programming		✓
Calibration data files and linearisation points		5 x 4 values
User-defined measuring input characteristic		10 points
Editable units		✓
Measured value min. / max.		✓
Measured value hold function		✓
Averaging function		✓

EC TC

- Operator guidance
  Keypad
- Battery supply / Operating time
  Approx. 25 h with Auto-Power off

UC TC.2

- Operator guidance
  Menu with pull-down windows
  Programming and control via PC
- Battery supply / Operating time
  Approx. 40 h
- Accu set with mains adapter (optional)
- Software (optional)

EC mAV.2 and UC mAV.2

Type EC mAV.2

Type UC mAV.2

Type	EC mAV.2	UC mAV.2
Current (mA)		
Loop current signal generation	0...22 mA	0(4)...25 mA
Loop current signal measurement	-1...22 mA	-6...25 mA
Accuracy (of rdg. + const.)	±0.05 %	±0.015 %
Current loop supply	24 V ±10 %, 22 mA	24 V ±10 %, 25 mA
HART communication protective resistor		250 Ω
Voltage (V)		
Voltage signal generation		0...10(15) V
Voltage signal measurement	-0.2...28 V	-5...50 V
Accuracy (of rdg. + const.)	±0.02 %	±0.015 %
Continuity (O / C)		
Continuity measurement		O / C
Switching threshold "open"		1 kΩ

Functions	EC mAV.2	UC mAV.2
Generation		
High-speed call values	7 points (permanent) in 25 % steps	10 points (flexible)
Linear steps and ramps	✓	✓
User-defined signal output characteristic		10 points
Editable units		✓
Measurement		
User-defined measuring input characteristic		10 points
Editable units		✓
Measured value min. / max.		✓
Measured value hold function		✓
Averaging function		✓

EC mAV.2

- Operator guidance
  Keypad
- Battery supply / Operating time
  Approx. 20 h

UC mAV.2

- Operator guidance
  Menu with pull-down windows
- Battery supply / Operating time
  Approx.25 h
- Accu set with mains adapter (optional)

Multifunction simulators

EC 10 and EC 25

Type EC 10

Type EC 25

Type	EC 10	EC 25
Resistance thermometer (RTD)		
RTD signal generation and measurement	Pt100, Pt200, Pt500, Pt1000, Cu10, Cu50	
Ω-generator function	0...4000 Ω	0...40 000 Ω
Ω-measurement function	0...5500 Ω	0...5500 Ω
Accuracy (rdg. + const.)	±0.05 %	
Selectable temperature unit	°C / °F	
Measurement of multi-wire connections	2 / 3 / 4	2 / 3
Thermocouples (TC)		
TC signal generation and measurement	J, K, T, R, S, B, N, E, U, L	J, K, T, R, S, B, N, E
mV generator function	-100...1100 mV	-100...110 mV
mV measurement function	-50...550 mV	
Accuracy (rdg. + const.)	±0.02 %	
Selectable temperature unit	°C / °F	
Internal comparison point	±0.5 °C	
Current (mA)		
Loop current signal generation		0...22 mA
Loop current signal measurement		-5...55 mA
Accuracy (of rdg. + const.)		±0.02 %
Current loop supply		24 V ±10 %, 22 mA
Voltage (V)		
Voltage signal generation		-1...11 V
Voltage signal measurement		-5...55 V
Accuracy (of rdg. + const.)		±0.02 %
Continuity (O / C)		
Continuity measurement	O / C	
Switching threshold "open"	0.5 kΩ	
Frequency and pulse (Hz)		
Frequency and pulse signal generation		3 Hz...110 kHz
Frequency and pulse signal measurement		3 Hz...50 kHz
Accuracy (of rdg. + const.)		±0.005 %

Functions	EC 10	EC 25
Generation		
High-speed call values		7 points (fix) in 25 % steps
Linear steps and ramps		✓
Output zero	✓	✓
Transmitter function simulation		✓
Measurement		
Measured value hold function	✓	✓
Averaging function	✓	✓
Room temperature display	✓	✓

EC 10

- Operator guidance
  Keypad
- Battery supply / Operating time
  Approx. 25 h with Auto-Power off

EC 25

- Operator guidance
  Keypad
  Separate channels for parallel signal processing
- Battery supply / Operating time
  Approx. 20 h with Auto-Power off

MC 50.2 and MC 75.2

Type MC 50.2

Type MC 75.2

Type	MC 50.2	MC 75.2
Resistance thermometer (RTD)		
RTD signal generation and measurement	Pt50, Pt100, Pt200, Pt500, Pt1000, Cu10, Cu50, Ni100, Ni120, Ni1000	
Ω generator function	0...4000 Ω	
Ω measurement function	0...4000 Ω	
Accuracy (of rdg. + const.)	±0.012 %	
Selectable temperature unit	°C / °F	
Measurement of multi-wire	2 / 3 / 4	
Thermocouples (TC)		
TC signal generation and measurement	J, K, T, R, S, B, N, E, U, L	
mV generator function	0...100 mV	
mV measurement function	0...100 mV	
Accuracy (of rdg. + const.)	±0.013 %	
Selectable temperature unit	°C / °F	
Internal comparison point	±0.3 °C	
Current (mA)		
Loop current signal generation	0(4)...24 mA	
Loop current signal measurement	0(4)...50 mA	
Accuracy (of rdg. + const.)	±0.0175 %	
Current loop supply	24 V ±10 %, 22 mA	
HART compatible internal loop resistor	250 Ω	
Voltage (V)		
Voltage signal generation	0...20 V	
Voltage signal measurement	0...50 V	
Accuracy (of rdg. + const.)	±0.015 %	
Continuity (O / C)		
Continuity measurement	O / C	
Switching threshold "open"	1 kΩ	
Frequency and pulse (Hz)		
Frequency and pulse signal generation	0.01 Hz...10 kHz	
Frequency and pulse signal measurement	0.01 Hz...20 kHz	
Accuracy (of rdg. + const.)	±0.005 %	
Pressure signals (bar)		
Pressure measurement with external pressure module		✓
Editable pressure units		✓
Connection via DIN socket		5-pin

Functions	MC 50.2	MC 75.2
Generation		
High-speed call values	10 points (flexible)	10 points (flexible)
Linear steps and ramps	✓	✓
User-defined synthesiser values	100	100
User-defined signal output characteristic	10 points	10 points
Editable units	✓	✓
Transmitter function simulation		✓
Measurement		
Data memory		10.000 values
Value tables and graphics function		✓
Offset programming for sensor characteristic	✓	✓
Calibration data files and linearisation points		5 x 4 values
User-defined measuring input characteristic	10 points	10 points
Editable units	✓	✓
Measured value min. / max.	✓	✓
Averaging function	✓	✓

MC 50.2

- Operator guidance
  Separate channels for parallel signal processing
  Menu with pull-down windows
  Programming and control via PC
  Graphic display of connection options
  Configuration files for test adjustments (10)

- Battery supply / Operating time
  Approx. 25 h with Auto-Power off

MC 75.2

- Operator guidance
  Separate channels for parallel signal processing
  Menu with pull-down windows
  Programming and control via PC
  Graphic display of connection options
  Configuration files for test adjustments (10)
  Test report generation / Calibration routines (10)
- Battery supply / Operating time
  Approx. 20 h with Auto-Power off
- Software (optional)

Further information on pressure measurement with the MC 75 2 simulator is provided on the next page.

Pressure measurement

MC 75.2 with external pressure modules

For universal on-site use, the MC 75 2 simulator is capable of measuring different pressures from -1 bar to 1000 bar.

The EPM plug-in modules are based on intelligent sensor technology with storage for measuring range and accuracy. Connection takes place via a DIN socket with Plug & Play function.

For the best measuring results with high accuracy, various absolute or relative pressure ranges in three precision classes are available.

Type EPM - external pressure modul

Technical data	Type EPM
Measuring rate	400 measurements/sec.
Digital signals	RS 485
Electrical connection	5-pin 1 m shielded connecting cable
Medium temperature	10...40 °C
Pressure connection	G¼ stainless steel 1.4404
Degree of protection	IP65
Dimensions	Approx. D = 30 mm, L = 110 mm
Weight	Approx. 140 g

Type EPM versions

Type EPM	Model A	Model B	Model C	
Precision	±0.05 % full scale	±0.025 % full scale	±0.01 % full scale	Max. pressure range
1	-1...1 bar rel. (PR)			2 bar
	0...1 bar abs. (PAA)			
3	-1...3 bar rel. (PR)			5 bar
	0...3 bar abs. (PAA)			
4	-1...4 bar rel. (PR)	-1...4 bar rel. (PA)		20 bar
	0...4 bar abs. (PAA)	0...4 bar abs. (PAA)		
7	-1...7 bar rel. (PR)	-1...7 bar rel. (PA)		20 bar
	0...7 bar abs. (PAA)	0...7 bar abs. (PAA)		
10	-1...10 bar rel. (PR)	-1...10 bar rel. (PA)	-1...10 bar rel. (PA)	20 bar
	0...10 bar abs. (PAA)	0...10 bar abs. (PAA)	0...10 bar abs. (PAA)	
12	-1...12 bar rel. (PR)	-1...12 bar rel. (PA)		60 bar
	0...12 bar abs. (PAA)	0...12 bar abs. (PAA)		
20	-1...20 bar rel. (PR)	-1...20 bar rel. (PA)		60 bar
	0...20 bar abs. (PAA)	0...20 bar abs. (PAA)		
30	-1...30 bar rel. (PR)	-1...30 bar rel. (PA)	-1...30 bar rel. (PA)	60 bar
	0...30 bar abs. (PAA)	0...30 bar abs. (PAA)	0...30 bar abs. (PAA)	
40	-1...40 bar rel. (PA)	-1...40 bar rel. (PA)		200 bar
	0...40 bar abs. (PAA)	0...40 bar abs. (PAA)		
70	0...70 bar rel. (PA)	0...70 bar rel. (PA)		200 bar
	0...70 bar abs. (PAA)	0...70 bar abs. (PAA)		
100	0...100 bar rel. (PA)	0...100 bar rel. (PA)	0...100 bar rel. (PA)	200 bar
	0...100 bar abs. (PAA)	0...100 bar abs. (PAA)	0...100 bar abs. (PAA)	
120	0...120 bar rel. (PA)	0...120 bar rel. (PA)		400 bar
	0...120 bar abs. (PAA)	0...120 bar abs. (PAA)		
135	0...135 bar rel. (PA)	0...135 bar rel. (PA)		400 bar
	0...135 bar abs. (PAA)	0...135 bar abs. (PAA)		
160	0...160 bar rel. (PA)	0...160 bar rel. (PA)		400 bar
	0...160 bar abs. (PAA)	0...160 bar abs. (PAA)		
200	0...200 bar rel. (PA)	0...200 bar rel. (PA)		400 bar
	0...200 bar abs. (PAA)	0...200 bar abs. (PAA)		
300	0...300 bar rel. (PA)	0...300 bar rel. (PA)	0...300 bar rel. (PA)	400 bar
	0...300 bar abs. (PAA)	0...300 bar abs. (PAA)	0...300 bar abs. (PAA)	
400	0...400 bar rel. (PA)	0...400 bar rel. (PA)		1000 bar
	0...400 bar abs. (PAA)	0...400 bar abs. (PAA)		
700	0...700 bar rel. (PA)	0...700 bar rel. (PA)	0...700 bar rel. (PA)	1000 bar
	0...700 bar abs. (PAA)	0...700 bar abs. (PAA)	0...700 bar abs. (PAA)	
1000	0...1000 bar rel. (PA)	0...1000 bar rel. (PA)	0...1000 bar rel. (PA)	1000 bar
	0...1000 bar abs. (PAA)	0...1000 bar abs. (PAA)	0...1000 bar abs. (PAA)	

PR: Relative pressure measuring cell, ambient pressure as zero point
PAA: Absolute pressure measuring cell, vacuum as zero point
PA: Absolute pressure measuring cell, ambient pressure as zero point

Contents

Types EC Mono

❶ Multifunction display
LCD, 5½ digit

❷ Test connection via 4 safety sockets (1 channel)

❸ Keypad
Key operation

❹ ABS plastic with protective cover

Contents

- 1 x 9 V monobloc battery
- 2 sets with safety instrument leads (4 mm) and alligator clips
- Nylon pouch
- Plastic case (optional)
- Works certificate / DAkkS calibration certificate (optional)

Types UC Mono

❶ Multifunction display
LCD, 6 digit

❷ Test connection via 4 safety sockets (1 channel)**

❸ Keypad
Function keys, navigator

❹ ABS plastic with protective cover

❺ PC connection USB type Mini B

Contents

- 4 x 1.5 V AA batteries
- Rechargeable battery including power adapter 230 VAC / 12 VD (optional)
- 2 sets with safety instrument leads (4 mm) and alligator clips (optional)*
- Nylon pouch (optional)
- Plastic case (optional)
- Software / data cable (optional)
- Works certificate / DAkkS calibration certificate (optional)

* For type UC mAV.2 included as standard

** Type UC TC with 2 safety sockets (1 channel).

Types EC Multi

❶ Multifunction display
Double LCD*, 5½-digit, illuminated

❷ Test connection via 8 safety sockets (2 channels)

❸ Keypad
Key operation

❹ ABS plastic with protective cover

Contents

- 4 x 1.5 V AAA batteries
- 2 sets with safety instrument leads (4 mm) and alligator clips
- Nylon pouch
- Plastic case (optional)
- Works certificate / DAkkS calibration certificate (optional)

Types MC Multi

❶ Multifunction display
Double LCD, 2 x 6-digit, illuminated

❷ Test connection via 8 safety sockets (2 channels) incl. Push Lock

❸ Keypad
Function keys, navigator, numeric keypad

❹ ABS plastic with protective cover

❺ PC connection USB Type B

Contents

- Rechargeable battery including power adapter 230 VAC / 12 VDC
- 4 sets with safety instrument leads (4 mm) and alligator clips (optional)*
- Test certificate (optional)
- Plastic case (optional)
- Software / data cable (optional)
- Works certificate / DAkkS calibration certificate (optional)

* Type EC 10 with single LCD.

Simulator selection table

	BASIC			SOLID	
	EC RTD	EC TC	EC mAV.2	EC 10	EC 25
Signals					
Resistance thermometer	✓			✓	✓
Resistance signals	✓			✓	✓
Thermocouples		✓		✓	✓
Thermovoltage signals		✓		✓	✓
Continuity measurement			✓	✓	✓
Current signals			✓		✓
Voltage signals			✓		✓
Frequency / Pulse					✓
Pressure measurement					
Functions					
High-speed call function			✓		✓
Step function			✓		✓
Ramp function			✓		✓
Synthesiser function					
Averaging function				✓	✓
Measured value hold function				✓	✓
Measured value min. / max.					
User-defined characteristic					
Single-point linearisation (offset)					
Multipoint linearisation					
PC connection (USB)					
HART compatible					
Protection Data memory Value					
Table and graphics					
Parallel signal processing					✓
Connection via Push & Lock					
Configuration memory					
Calibration routines					
External pressure modules					

				PREMIUM	
	UC mAV.2	UC RTD.2	UC TC.2	MC 50.2	MC 75.2
		✓		✓	✓
		✓		✓	✓
			✓	✓	✓
			✓	✓	✓
	✓			✓	✓
	✓			✓	✓
	✓			✓	✓
				✓	✓
					✓
	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓
		✓	✓	✓	✓
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		✓	✓		✓
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					✓
					✓