

Microcal 8 Plus

Multifunction Calibrator



MULTIFUNCTION CALIBRATOR

Accuracy up to $\pm 0.012\%$ of reading

Light, rugged and ergonomic

Ready to use on field and in laboratory

Push & Lock connectors, TC e Banana (4 mm)

Two Channels High accuracy

Auto-detect rtd wires

Set the generated values with alphanumeric Key-Pad

Large graphic display backlit

Rubber protection holster

Generate ramp and cycles

Measure and simulate simultaneously for certificate the transmitters

Measure and simulate simultaneously of Tc, rtd,Hz, mA e V

External pressure sensors

Measurement data recording





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General

The hand-held indicator-simulator MicroCal 8 Plus, is multifunction instrument designed to check and to calibrate your test and process equipment. MicroCal 8 Plus meet, in a modern and practical way, the everyday needs of Quality and Maintenance instrumentation engineers, both in laboratory and in field work. Accurate, compact, rugged, easy to use; the ideal solution to measure and simulate: millivolt, volt, milliampere (active and passive loop), ohm, temperatures with thermocouples, temperatures with resistance thermometers, frequency and pressure (with ext. sensors).

MicroCal 8 Plus is a portable calibrator able to measure and to generate simultaneously on 2 isolated channels.

It has a wide backlit display with high contrast to be used for application in dark room.

Full protected by the sheath, a keypad in lexan protects it from dirties and numerical keypad knocked up is usable even using protective gloves.

It is able to measure and generate voltage, current (active and passive loop), frequency, pressure (with ext. sensors), resistance signals and also resistive probes and thermocouples.

MicroCal 8 Plus is able to record up to 10.000 data and with a DATACAL software becomes a documenting calibrator able to generate calibration certificate.





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Advanced Features

"Push&Lock" system

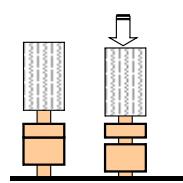
This unique system is used by pushing on the terminal's top, by inserting:

- Wires with a diameter up to 3 mm,
- Compensated thermocouple connectors,
- Pin terminal on front panel,

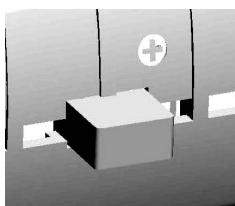
Wires are tighten between 2 brass plates which provide an great thermal gradient, so that allows a very good cold junction compensation for thermocouples.

Microcal 8 allows 4mm connectors and also security connectors to be connected on the front panel.

Push&Lock connector



Mini-din connector



Display

MicroCal 8 Plus dual display indicates permanently the measurement value, and also the emitted value, the gauge and the used functions.

On the top date, time and also external temperature are also indicated.

During measuring average, maximum, minimum and the number of measurements are displayed on the left. While for emission this part of screen displays all details of ramps, steps and constant value emission functions.

Drop-down menus are used with the navigator, and an on-line help is available to make easier connections of probes and wires.



File Menu:

User can save up to 10 full configurations of the instruments and recall them whenever. Configurations can be saved and recalled in function of user and of use. Configurations include all programming done on instrument, as the range.

Contrast adjustment:

Screen's contrast can be adjusted whenever to fit with measurement environment

Screen Backlighting:

Time of backlighting can be programmed to save battery

Autonomy: MicroCal 8 Plus autonomy is 8 hours in the worst condition of use

Scaling:

In measurement and simulation, scaling allows process signals to be displayed in % of FS or in all other unit. This function also allows sensors to be corrected after a calibration

Relative measurement:

Programming of a reference value different from the one of the instrument (NUL function)
Substracting of constant value by measuring or programming it from a measured value(TARE function)

Square root:

In current measurement and simulation, this function allows to take into account a quadratic signal coming from transmitter of type ?P

Statistical functions:

Average, minimum, maximum and also number of measurements done are always displayed.

Reset key allows values to be updated.

Simulation Menu:

Simulation value is set by entering value on keypad or by changing the according digit with the cursor

Ramps generation:

Starting, ending and length time values of simple or cyclic ramps can be set to do simulation.

Number of ramps can also be adjusted in case of cyclic ramps for any signals.

Steps simulation:

2 modes are proposed.
Program mode: Starting value, number of steps and the length time have to be set

Manual mode: User has about a hundred of preset values

In current simulation, user will have some additional preset values in function of range and according to 0%, 25%, 50%, 75% and 100% from selected gauge. Choice is done between gauges:

0-20mA: linear or quadratic

4-20mA: linear or quadratic

Synthesizer:

With 100 values manually set, MicroCal 8 Plus allows curve generation to be remade.

Transmitter function:

MicroCal 8 Plus is able to be used as a transmitter.
Measurement input is copied on the output with scaling.

Memory:

MicroCal 8 Plus can record data automatically or on user request. 10.000 data can be stored and displayed on the screen as curve or list, and is possible download this data with DATACAL Light software.

Calibration software:

DATACAL software, with Micorcal 8 Plus, is able to certificate all the transmitters and trasducers. With the software is possible to have a calibration certificate.



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Table of ranges and accuracies

Measurement				Generation		
Type	Range	Resolution	Accuracy / 1 yr	Range	Resolution	Accuracy / 1 yr
K	- 250 to - 200°C	0,2°C	0,80°C	- 240 to - 50°C	0,2°C	0,60°C
	- 200 to - 120°C	0,1°C	0,25°C	- 50 to - 0°C	0,1°C	0,10°C
	- 120 to - 0°C	0,05°C	0,1°C	+ 0 to + 1 372°C	0,05°C	0,013 % R + 0,08°C
	+ 0 to + 1 372°C	0,05°C	0,013 % R + 0,08°C			
T	- 250 to - 200°C	0,2°C	0,70°C	- 240 to - 100°C	0,2°C	0,40°C
	- 200 to - 120°C	0,05°C	0,25°C	- 100 to - 0°C	0,05°C	0,10°C
	- 120 to - 50°C	0,05°C	0,10°C	+ 0 to + 400°C	0,05°C	0,013 % R + 0,08°C
	- 50 to + 400°C	0,05°C	0,013 % R + 0,08°C			
J	- 210 to - 120°C	0,05°C	0,25°C	- 210 to - 0°C	0,05°C	0,20°C
	- 120 to - 0°C	0,05°C	0,09°C	+ 0 to + 1 200°C	0,05°C	0,013 % R + 0,07°C
	+ 0 to + 1 200°C	0,05°C	0,013 % R + 0,07°C			
E	- 250 to - 200°C	0,1°C	0,45°C	- 240 to - 100°C	0,10°C	0,25°C
	- 200 to - 100°C	0,05°C	0,15°C	- 100 to + 40°C	0,10°C	0,10°C
	- 100 to - 0°C	0,05°C	0,07°C	+ 40 to + 1 000°C	0,05°C	0,013 % R + 0,05°C
	+ 0 to + 1 000°C	0,05°C	0,013 % R + 0,05°C			
R	- 50 to + 150°C	0,5°C	0,80°C	- 50 to + 350°C	0,5°C	0,5°C
	+ 150 to + 550°C	0,2°C	0,013 % R + 0,35°C	+ 350 to + 900°C	0,2°C	0,013 % R + 0,35°C
	+ 550 to + 1 768°C	0,1°C	0,013 % R + 0,2°C	+ 900 to + 1 768°C	0,1°C	0,013 % R + 0,20°C
S	- 50 to + 150°C	0,5°C	0,80°C	- 50 to + 120°C	0,5°C	0,8°C
	+ 150 to + 550°C	0,2°C	0,013 % R + 0,35°C	+ 120 to + 450°C	0,2°C	0,013 % R + 0,35°C
	+ 550 to + 1 768°C	0,1°C	0,013 % R + 0,25°C	+ 450 to + 1 768°C	0,1°C	0,013 % R + 0,25°C
B	+ 400 to + 900°C	0,2°C	0,013 % R + 0,4°C	+ 400 to + 850°C	0,2°C	0,013 % R + 0,4°C
	+ 900 to + 1 820°C	0,1°C	0,013 % R + 0,2°C	+ 850 to + 1 820°C	0,1°C	0,013 % R + 0,2°C
U	- 200 to + 660°C	0,05°C	0,15°C	- 200 to + 600°C	0,05°C	0,15°C
L	- 200 to + 900°C	0,05°C	0,2°C	- 200 to + 900°C	0,05°C	0,2°C
C	- 20 to + 900°C	0,1°C	0,25°C	- 20 to + 900°C	0,1°C	0,25°C
	+ 900 to + 2 310°C	0,1°C	0,013 % R + 0,15°C	+ 900 to + 2 310°C	0,1°C	0,013 % R + 0,15°C
N	- 240 to - 190°C	0,2°C	0,5°C	- 240 to - 190°C	0,2°C	0,3°C
	- 190 to - 110°C	0,1°C	0,15°C	- 190 to - 110°C	0,1°C	0,15°C
	- 110 to - 0°C	0,05°C	0,08°C	- 110 to - 0°C	0,05°C	0,08°C
	+ 0 to + 1 300°C	0,05°C	0,013 % R + 0,06°C	+ 0 to + 1 300°C	0,05°C	0,013 % R + 0,06°C
PI	- 100 to + 1 400°C	0,05°C	0,3°C	- 100 to + 1 400°C	0,05°C	0,3°C
Mo	0 to + 1 375°C	0,05°C	0,013 % R + 0,06°C	0 to + 1 375°C	0,05°C	0,013 % R + 0,06°C
NiMo/NiCo	- 50 to + 1 410°C	0,05°C	0,013 % R + 0,30°C	- 50 to + 1 410°C	0,05°C	0,013 % R + 0,30°C

Accuracy is warranted for reference junction (RJ) at 0°C

With use of internal RJ (except couple B) add a additional uncertainty of 0,3°C

CJC localisation can be selected by keypad programming, except for couple B:

External at 0°C, internal (temperature compensation of instrument's terminals) or by temperature programming

Temperature coefficient: <10% of accuracy / °C. Display unit: °C and F.

Measurement			
Range	Resolution	Accuracy / 1 yr	Remarks
±100mV	1 µV	0,013% R + 3 µV	Rin > 10 M?
±1V	10 µV	0,013% R + 20 µV	Rin > 10 M?
±10V	100 µV	0,015% R + 200 µV	Rin = 1M?
±50V	1 mV	0,015% R + 2 mV	Rin = 1M?

Generation			
Range	Resolution	Accuracy / 1 yr	Remarks
100mV	1 µV	0,013% R + 3 µV	Load 1K?
2V	10 µV	0,013% R + 30 µV	Load 2K?
20V	100 µV	0,015% R + 300 µV	Load 4K?



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Type	Range	Resolution Measurement	Accuracy / 1 yr	Resolution Generation	Accuracy generation / 1 yr
Pt 50 ($\alpha = 3850$)	- 220°C + 1 200°C	0,01°C	0,012 % R+ 0,06°C	0,03°C	0,014 % R+ 0,18°C
Pt 100 ($\alpha = 3850$)	- 220°C + 1 200°C	0,01°C	0,012 % R+ 0,05°C	0,02°C	0,014 % R+ 0,12°C
JPt 100 ($\alpha = 3916$)	- 200°C + 510°C	0,01°C	0,012 % R+ 0,05°C	0,02°C	0,014 % R+ 0,12°C
Pt 100 ($\alpha = 3926$)	- 210°C + 850°C	0,01°C	0,012 % R+ 0,05°C	0,02°C	0,014 % R+ 0,12°C
Pt 200 ($\alpha = 3851$)	- 220°C + 600°C	0,01°C	0,012 % R+ 0,12°C	0,10°C	0,014 % R+ 0,33°C
Pt 500 ($\alpha = 3850$)	- 220°C + 1 200°C	0,01°C	0,012 % R+ 0,07°C	0,03°C	0,014 % R+ 0,18°C
Pt 1 000 ($\alpha = 3851$)	- 220°C + 1 200°C	0,01°C	0,012 % R+ 0,05°C	0,02°C	0,014 % R+ 0,08°C
Ni 100 ($\alpha = 618$)	- 60°C + 180°C	0,01°C	0,012 % R+ 0,03°C	0,01°C	0,014 % R+ 0,08°C
Ni 120 ($\alpha = 672$)	- 40°C + 205°C	0,01°C	0,012 % R+ 0,03°C	0,01°C	0,014 % R+ 0,08°C
Ni 1 000 ($\alpha = 618$)	- 60°C + 180°C	0,01°C	0,012 % R+ 0,03°C	0,01°C	0,014 % R+ 0,08°C
Cu 10 ($\alpha = 427$)	- 70°C + 150°C	0,1°C	0,012 % R+ 0,18°C	0,01°C	0,014 % R+ 0,10°C
Cu 50 ($\alpha = 428$)	- 50°C + 150°C	0,01°C	0,012 % R+ 0,06°C	0,03°C	0,014 % R+ 0,15°C

Resistive probes measurements in 2,3 or 4 wires: automatic recognition of number of connected wires, with indication on screen

Temperature coefficient: < 10 % of accuracy /°C.

The accuracy in table above is given for a sensor connection in 4 wires

Take into account peculiar error of temperature sensor used and implementation conditions

Measurement current: 0.01mA to 1mA

Establishing time: <1ms for simulation (simulation on quick transmitters)

Measurement			
Range	Resolution	Accuracy / 1 yr	Remarks
400 Ohm	1 mOhm	0.012% R+ 10 mOhm	Measurement current = 0.25 mA
4000 Ohm	10 mOhm	0.012% R+ 100 mOhm	Measurament current = 0.25 mA

Generation			
Range	Resolution	Accuracy / 1 yr	Remarks
400 Ohm	10 mOhm	0.014% + 30 mOhm	lext from 0.1 to 10 mA
4000 Ohm	100 mOhm	0.014%R + 300 mOhm	lext from 0.1 to 1 mA

Measurement		
Range	Resolution	Accuracy / 1 yr
20 kHz	< 0.01 Hz	0.005%R

Threshold triggering: 1V

Unite scale: pulse/min or Hz

Measurement on frequency signal and on dry contacts

Measurement for counting will be done on defined time or on infinite

Generation		
Range	Resolution	Accuracy / 1 yr
1000 Hz	< 0.01 Hz	0.005% R
10 kHz	1 Hz	0.005% R

Unite scale: pulse/min or Hz

Pulse emissions

Dry contact simulation

Max amplitude: 20V selectable by user





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Measurement				
Range	Resolution	Accuracy / 1 yr	Remarks	
±50mA	1 µA	0.018%R + 2 µA	Rin < 25 Ohm	

Generation		
Range	Resolution	Accuracy / 1 yr
24mA	1 µA	0.018%R + 2 µA

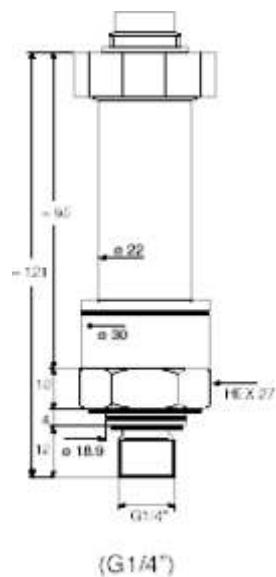
	0%	25%	50%	75%	100%
4-20mA lineare	4	8	12	16	20
0-20mA lineare	0	5	10	15	20
4-20mA quad.	4	5	8	13	20
0-20Ma quad.	0	1,25	5	11,25	20
4-20mA Test Valvole	3,8-4 -4,2	12		19,20,21	

External pressure sensors:

Range (Bar)	ABS	Relative
0 - 1	X	X
0 - 3	X	X
0 - 10	X	X
0 - 30	X	X
0 - 100	X	
0 - 300	X	
0 - 1000	X	

Resolution: 0,02% f.s.

Accuracy: 0,05% f.s. bei 0°C und 40°C; -0,1% f.s. zwischen -10°C + 10°C und 40°C bis 80°C



Ordering Codes:

MicroCal 8 Plus - A - 1 - 1\ENG

Instruction manual (english)

Traceable calibration certificate

Rubber holster

1-Battery pack+charger EU

2-Battery pack+charger UK

3-Battery pack+charger USA

4-Battery pack+charger Schuko

Accessories:

External pressure sensors:

- 0 - 1 Bar (g;abs)
- 0 - 3 Bar (g;abs)
- 0 - 10 Bar (g;abs)
- 0 - 30 Bar (g;abs)
- 0 - 100 Bar (abs)
- 0 - 300 Bar (abs)
- 0 - 1000 Bar (abs)

- Transport case for MicroCal 8 Plus (AN605)0

- USB link for MicroCal 8 Plus (ER 49504-000)

- Set of 6 measuring cables with removable (ACL9311)

- DATACAL Light software

- DATACAL software

Standard supply:

MicroCal 8 Plus is supplied in standard with 6 testing leads, a quick battery charging system, traceable calibration certificate and an instruction manual