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"Excellence in measurements"

NEW

# Microcal 8

Multifunction Calibrator

## MULTIFUNCTION CALIBRATOR

- Accuracy up to ±0.03% 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 backlited
- Rubber protection holster
- Generate ramp and cycles
- Measure and simulate simultaneously for certificate the transmitters
- Measure and simulate simultaneously of Tc, rtd, mA e V


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MULTIFUNCTION
CALIBRATORS

# MicroCal 8
# Multifuction calibrator

## General

The hand-held indicator-simulator MicroCal 8, is multifunction instrument
designed to check and to calibrate your test and process equipment.
MicroCal 8 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.

MicroCal 8 is a portable calibrator able to measure and to generate simultaneously on 2 isolated channels.
It has a wide backlighted 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), resistance signals and also resistive probes and thermocouples.

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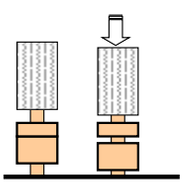
## Advanced Features

"Push&Lock" system

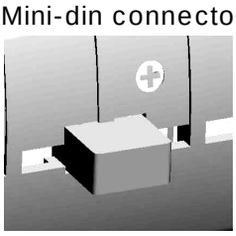
This unique system is used by pushing on the terminal's top, by inserting:
- Wires with a diameter up to 3 mm,
- Compensated thermocouple connectors,
- Pin terminal on front panel,

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 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 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 allows curve generation to be remade.

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

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## Table of ranges and accuracies

| Probes | Range IN | Resolution | Accuracy IN |
|---|---|---|---|
| K | - 250 - 200°C | 0,2°C | 1,00°C |
| | - 200 - 120°C | 0,1°C | 0,30°C |
| | - 120 - 0°C | 0,05°C | 0.15°C |
| | +0 +1372°C | 0,05°C | 0,03 %L + 0,1°C |
| T | - 250 - 200°C | 0,2°C | 0,80°C |
| | - 200 - 100°C | 0,05°C | 0,30°C |
| | - 100 +80°C | 0,05°C | 0,03 %L + 0,15°C |
| | +80 +400°C | 0,05°C | 0,03 %L + 0,10°C |
| J | - 210 - 120°C | 0,05°C | 0,25°C |
| | - 120 - 0°C | 0,05°C | 0.15°C |
| | +0 +1200°C | 0,05°C | 0,03 %L + 0,10°C |
| E | - 250 - 200°C | 0,1°C | 0,60°C |
| | - 200 - 100°C | 0,05°C | 0,25°C |
| | - 100 +1000°C | 0,05°C | 0,03 %L + 0,1°C |
| R | - 50 +150°C | 0,5°C | 0,90°C |
| | +150 +550°C | 0,2°C | 0,45°C |
| | +550 +1500°C | 0,1°C | 0.60°C |
| | +1500 +1768°C | 0,1°C | 0.80°C |
| S | - 50 +150°C | 0,5°C | 0,80°C |
| | +150 +550°C | 0,2°C | 0,45°C |
| | +550 +1450°C | 0,1°C | 0.65°C |
| | +1450 +1768°C | 0,1°C | 0.85°C |
| B | +400 +900°C | 0,2°C | 0,90°C |
| | +900 - 1820°C | 0,1°C | 0,65°C |
| U | - 200 +100°C | 0,05°C | 0,25°C |
| | - 100 +660°C | | 0.03%R + 0.11 |
| L | - 200 +900°C | 0,05°C | 0,3°C |
| C | - 20 +1700°C | 0,1°C | 0,03 %R+ 0,35°C |
| | +1700 +2 310°C | 0,1°C | 0,07 %R |
| N | - 240 - 190°C | 0,2°C | 0,45%R |
| | - 190 - 110°C | 0,1°C | 0,20%R |
| | - 110 – 0°C | 0,05°C | 0,04%R + 0.15°C |
| | +0 +1000°C | 0,05°C | 0,03 %R + 0,12°C |
| | +1000 +1300°C | 0,05°C | 0,03 %R+ 0,15°C |
| Platino | - 100 +1400°C | 0,05°C | 0,03 %R + 0,15°C |
| Mo | 0 +1375°C | 0,05°C | 0,03 %R + 0,20°C |
| NiMo/NiCo | - 50 +1410°C | 0,05°C | 0,03 %R + 0,30°C |
| D | +0 +310°C | 0,1°C | 0,035 %R +0,30°C |
| | +310 +2315°C | 0,05°C | 0,035 %R +0,30°C |
| G | +0 +100°C | 0,5°C | 2,4°C |
| | +100 +300°C | 0,2°C | 0,6°C |
| | +300 +1300°C | 0,05°C | 0,03 %R + 0,30°C |
| | +1300 +1800°C | 0,05°C | 0,03 %R+ 0,30°C |
| | +1800 +2315°C | 0,05°C | 0,05 %R |

| Probes | Range OUT | Resolution | Accuracy OUT |
|---|---|---|---|
| K | - 240 - 50°C | 0,2°C | 0,70°C |
| | - 50 - 0°C | 0,1°C | 0,15°C |
| | +0 +1372°C | 0,05°C | 0,03 %R + 0,1°C |
| T | - 240 - 100°C | 0,2°C | 0,60°C |
| | +0 +400°C | 0,05°C | 0,03 %R+ 0,15°C |
| J | - 210 - 0°C | 0,05°C | 0,30°C |
| | +0 +1200°C | 0,05°C | 0,03 %R+ 0,10°C |
| E | - 240 +40°C | 0,1°C | 0,25°C |
| | +40 +1000°C | 0,05°C | 0,03 %R+ 0,20°C |
| R | - 50 +350°C | 0,5°C | 0,03 %R + 0,50°C |
| | +350 +900°C | 0,2°C | 0,03 %R + 0,30°C |
| | +900 +1768°C | 0,1°C | 0,03 %R + 0,30°C |
| S | - 50 +120°C | 0,5°C | 0,8°C |
| | +120 +450°C | 0,2°C | 0,02 %R + 0,40°C |
| | +450 +1768°C | 0,1°C | 0,03 %R+ 0,30°C |
| B | +400 +850°C | 0,2°C | 0,03 %R + 0,7°C |
| | +850 +1820°C | 0,1°C | 0,03 %R+ 0,3°C |
| U | - 200 - 0°C | 0,05°C | 0,20°C |
| | +0 600°C | 0,05°C | 0,03 %R+ 0,15°C |
| L | - 200 +900°C | 0,05°C | 0,30°C |
| C | - 20 +800°C | 0,1°C | 0,50°C |
| | +800 +1540°C | 0,1°C | 0,03 %R+ 0,5°C |
| | +1540 +2 310°C | 0,1°C | 0,05 %R+ 0,5°C |
| N | - 240 +10°C | 0,05°C | 0,40 %R + 0,1°C |
| | +0 +1300°C | 0,05°C | 0,03 %R + 0,12°C |
| Platino | - 100 +1400°C | 0,05°C | 0,03 %R + 0,15°C |
| Mo | 0 +1375°C | 0,05°C | 0,03 %R + 0,20°C |
| NiMo/NiCo | - 50 +1410°C | 0,05°C | 0,03 %R + 0,30°C |
| D | +0 +310°C | 0,1°C | 0,035 %R +0,30°C |
| | +310 +2315°C | 0,05°C | 0,035 %R +0,30°C |
| G | +0 +100°C | 0,5°C | 2,4°C |
| | +100 +300°C | 0,2°C | 0,6°C |
| | +300 +1300°C | 0,05°C | 0,03 %R + 0,30°C |
| | +1300 +1800°C | 0,05°C | 0,03 %R+ 0,30°C |
| | +1800 +2315°C | 0,05°C | 0,05 %R+ 0,5°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.

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## Table of ranges and accuracies

| Probes | Range IN | Resolution | Accuracy IN |
|---|---|---|---|
| Pt 50 (a = 3851) | - 220°C + 1200°C | 0,01°C | 0,03 %R + 0,06°C |
| Pt 100 (a = 3851) | - 220°C + 1200°C | 0,01°C | 0,03 %R + 0,05°C |
| JPt 100 (a = 3916) | - 200°C + 510°C | 0,01°C | 0,03 %R + 0,05°C |
| Pt 100 (a = 3926) | - 210°C + 850°C | 0,01°C | 0,03 %R + 0,05°C |
| Pt 200 (a = 3851) | - 220°C + 600°C | 0,01°C | 0,03 %R + 0,12°C |
| Pt 500 (a = 3851) | - 220°C + 1200°C | 0,01°C | 0,03 %R + 0,07°C |
| Pt 1000 (a = 3851) | - 220°C + 1200°C | 0,01°C | 0,03 %R + 0,05°C |
| Ni 100 (a = 618) | - 60°C + 180°C | 0,01°C | 0,03 %R + 0,03°C |
| Ni 120 (a = 672) | - 40°C + 205°C | 0,01°C | 0,03 %R + 0,03°C |
| Ni 1000 (a = 618) | - 60°C + 180°C | 0,01°C | 0,03 %R + 0,03°C |
| Cu 10 (a = 427) | - 70°C + 150°C | 0,1°C | 0,03 %R + 0,18°C |
| Cu 50 (a = 428) | - 50°C + 150°C | 0,01°C | 0,03 %R + 0,06°C |

| Probes | Range OUT | Resolution | Accuracy OUT |
|---|---|---|---|
| Pt 50 (a = 3851) | - 220°C + 1200°C | 0,03°C | 0,03 %R + 0,18°C |
| Pt 100 (a = 3851) | - 220°C + 850°C | 0,02°C | 0,03 %R + 0,12°C |
| Pt 100 (a = 3916) | - 200°C + 510°C | 0,02°C | 0,03 %R + 0,12°C |
| Pt 100 (a = 3926) | - 210°C + 850°C | 0,02°C | 0,03 %R + 0,12°C |
| Pt 200 (a = 3851) | - 220°C + 1200°C | 0,10°C | 0,03 %R + 0,33°C |
| Pt 500 (a = 3851) | - 220°C + 1200°C | 0,03°C | 0,03 %R + 0,18°C |
| Pt 1000 (a = 3851) | - 220°C + 850°C | 0,02°C | 0,03 %R + 0,08°C |
| Ni 100 (a = 618) | - 60°C + 180°C | 0,01°C | 0,03 %R + 0,08°C |
| Ni 120 (a = 672) | - 40°C + 205°C | 0,01°C | 0,03 %R + 0,08°C |
| Ni 1000 (a = 618) | - 60°C + 180°C | 0,01°C | 0,03 %R + 0,08°C |
| Cu 10 (a = 427) | - 70°C + 150°C | 0,01°C | 0,03 %R + 0,10°C |
| Cu 50 (a = 428) | - 50°C + 150°C | 0,03°C | 0,03 %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)

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## Table of ranges and accuracies

| Range IN | Resolution | Accuracy IN | Notes |
|---|---|---|---|
| 100mV [-100mV +100mV] | 1 mV | 0,030% + 3 mV | Rin > 10 MW |
| 1V [-100mV +1V] | 10 mV | 0,030% + 20 mV | Rin > 10 MW |
| 20V -100mV 20 V | 1 mV | 0,030% +2 mV | Rin = 1MW |
| 24 mA 0mA 24mA | 1 mA | 0,030% + 2 mA | Rin < 30 W |
| 4-20 mA 3,2mA 24mA | 1 mA | 0,030% + 2 mA | Rin < 30 W |
| 0-20 mA 0mA 24mA | 1 mA | 0,030% + 2 mA | Rin < 30 W |
| 400 Ohm 0 Ohm to 400 Ohm | 1 mOhm | 0,012% + 10 mOhm | Measure current = 0,25 mA |
| 4000 Ohm 0 Ohm 4000 Ohm | 10 mOhm | 0,012%+ 100 mOhm | Measure current = 0,25 mA |

| Range OUT | Resolution | Accuracy OUT | Notes |
|---|---|---|---|
| **100 mV** [-100mV to +100mV] | 1mV | 0,03 %L + 3 mV | Min load = 1KOhm |
| **2 V** [-100mV to +2V] | 10 mV | 0,03 %L + 20 mV | Min loadf = 2 KOhm |
| **10 V** [-100mV to +10V] | 100 mV | 0,03 %L + 200 mV (1) | Min load = 4 KOhm |
| **24 mA** [da 0 a 24mA] | 1mA | 0,03 %L + 2 mA | |
| **4-20 mA** [da 3,2 a 24mA] | 1mA | 0,03 %L + 2 mA | |
| **0-20 mA** [da 0 a 24mA] | 1mA | 0,03 %L + 2 mA | Active loop (+24V ON) Passive loop (+24V OFF) |
| **40 Ohm** | 1mOhm | 0,03 %L + 3 mOhm (1) 0,03 %L + 10 mOhm (2) | (1) Iext from 10 mA (2) Iext from 1mA |
| **400 Ohm** | 10 mOhm | 0,03 %L + 20 mOhm(1) 0,03 %L + 30 mOhm (2) | (1) Iext from 1mA /10 mA (2) Iext from 0.1mA / 1mA |
| **4000 Ohm** | 100 mOhm | 0,03 %L + 300 mOhm | Iext from 0.1to 1mA |

## Technical specification:

Measure and generate Tc, rtd, mV and mA
Automatic ramps or steps outputs with function for valves verification
Scale function
Continuity test
250 Ω series resistor for HART devices.
Scale function
5 lenguages menu
Supply: Ni-MH battery pack with charger
Autonomy:up to 10 houres
Reference condition: 23°C ± 5°C, relative humidity: 45 % to 75 %
Nominal using conditions: -10°C up to + 50°C, relative humidity: 20 % up to 80 % without condensation.
Limit stocking and transporting conditions: - 30°C up to + 60°C (without battery).
Dimensions: 210mm x 110mm x 50mm
Weight: 900g
Electrical security according to EN 61010
Electromagnetic compatibility of electrical equipment according to EN61326

## Ordering Codes:

3908 - A - 1 - 1\ENG

- Instruction manual (english)
- 1-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:
- Transport case for MicroCal (8AN605)0
- USB link for MicroCal 8 (ER 49504-000)
- Set of 6 measuring cables with removable (ACL9311)

Standard supply:
MicroCal 8 is supplied in standard with 6 testing leads, a quick battery charging system, traceable calibration certificate andan instruction manual

Specifications may change without notice

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"Excellence in measurements"

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