

SIGNAL CALIBRATORS

MicroCal Series



Palm-Top Multifunction Calibrator

Single and Dual Channels Process Calibrator

Features

- Simultaneous measurement & simulation
- Electrical and thermoelectrical signals
- Direct 2-wire current loop power supply
- Accuracies up to 0.01% rdg.
- ITS90 and IPTS68 linearization
- RS232 serial interface

General Performance

The palm-top indicator-simulator series **MicroCal**, are multifunction instrument designed to check and to calibrate your test and process equipment. MicroCal calibrators 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 have been developed using the most advanced microprocessor technology to provide high accuracy on extended ranges and a powerful operating flexibility. The case, made in shock-resistant ABS, is ergonomically designed for easy practical use. The instruments are powered by four Ni-MH rechargeable batteries; an external battery charger is supplied as a standard accessory.

Display & Keyboard

The high contrast alphanumeric LCD display with dot matrix (7x5 dots per character-16 characters) allows easy readings, even in poor light conditions, and simultaneously indicates the active function (measured or simulated), engineering unit and type of sensor or signal. A thermoformed metal-click tactile polycarbonate membrane keyboard, with a working life of one million operations per key, seals the internal electronics from the surrounding environment. Contact closure of membrane keys is acknowledged, as a coded signal, directly by the microprocessor. Two membrane slide-wires allow operator setting of the simulation value.

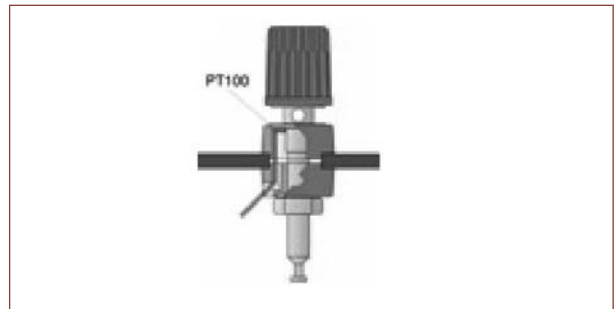
Source & Measure

Each instrument, through a menu-driven procedure, allows measurement or simulation of mV, V, mA (active and passive current loop), Ω , and any normalized IEC, DIN and JIS thermoelectric sensor J, K, T, R, S, B, C, U, L, N, E, F, G, D, Pt100, Ni100 and Ni120. IPTS68 and ITS90 linearization are memory stored and can be selected through the keyboard. The microprocessor performs automatic polynomial linearization and cold junction compensation to assure high accuracy. $^{\circ}\text{C}$ or $^{\circ}\text{F}$ selection can be made through a reconfiguration set-up. The simulation-measurement of resistance and temperature with resistance thermometer uses a special proprietary active circuit.



Cold Junction Compensation

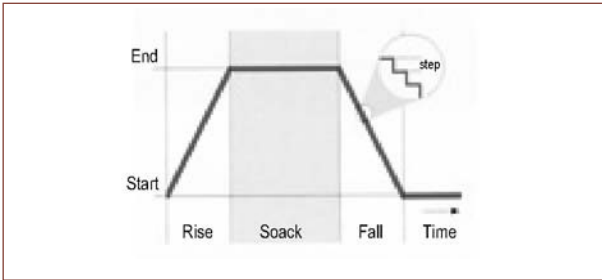
An unique internal automatic R_j compensation system allows the MicroCal to provide accurate input and output readings over wide operating conditions, with a temperature range from -5 $^{\circ}\text{C}$ to +50 $^{\circ}\text{C}$. Further, external compensation is available with temperature adjustable from -50 $^{\circ}\text{C}$ to +100 $^{\circ}\text{C}$.



General Information

Simulation Programs

- Menu-driven simulation program set-up to generate:
- a continuous or step ramp output where the total time, the start point, the end point and the size of the step are requested by the set-up procedure to run the program;
 - a continuous programmable cycle (rise, soak, fall);
 - a manual repeat increment through eyboard;
 - an automatic sequence of up to 60 stored values (20 groups of 3 memories) for 7 different simulation programs.



CalpMan 2000 Calibration Software

Standard Agencies and Quality Auditors require the collection, organisation and analysis of traceability documents, CalpMan 2000 (Calibration Procedure Manger) is the software package able to manage all the calibration activities as required by the regulations. Using the Windowstrm software, it is easy to set both simple and complex testing procedure using different instruments. It is possible, using the standard instrument drivers, to use all of Eurotron temperature, pressure, and signal calibrators to test instruments in your laboratory and process. You can set the complete calibration procedure on PC, save and recall it every time you want; and run the procedure in laboratory synchronising the instruments using RS232, save data in the Hard-disk and print the documentation to show the results in compliance with ISO 9000 requirements.

EMC Conformity

Each instrument has been developed and tested for compliance with the directive 89/336/CEE Electromagnetic Compatibility (CE mark).

Report of Calibration

Each instrument is factory calibrated against Eurotron Standards, that are periodically certified by an International recognized Laboratory to ensure traceability, and shipped with a Report of Calibration stating the nominal and actual values and the deviation errors.

Eurotron Quality System

Research, development, production, inspection and certification activities are defined by methods and procedures of the Eurotron Quality System. Eurotron system has been inspected for compliance and certified ISO9001:2000 by GASTEC.

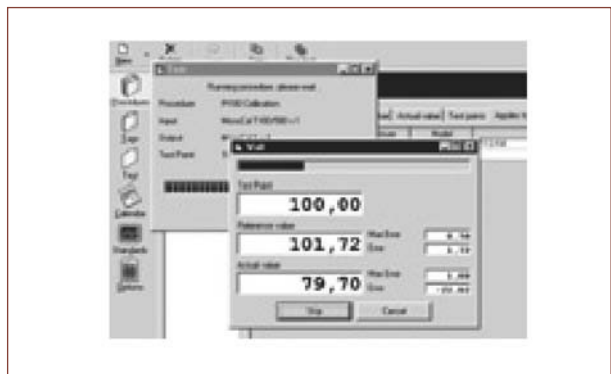
Three models

MicroCal palm-top series includes 3 different calibrators to select in instrument more suitable for your specific application. High accuracy and stability are the key and the important technical specifications.

MicroCal 1+ TRX is an accurate ($\pm 0.03\%$ of reading) and 2 channels hand held calibrator. It is the best solution in all check outs, measuring and simulating. Channel 1 can be configured both as input or output for: millivolt, volt, milliampere (active and passive loop), ohm, thermocouples and resistance thermometers. Channels 2 can be configured as input for Volt (up to 30V) and miliampere (active and passive loop).

MicroCal 2+ is an highly accurate ($\pm 0.02\%$ of reading) and powerful 2 channels hand held calibrator. It is the best solution in all check outs, measuring and simulating. Channel 1 can be configured both as input or output for: millivolt, volt, milliampere (active and passive loop), ohm, thermocouples and resistance thermometers. Channel 2 can be configured as input for Volt (up to 30V) and milliampere (active and passive loop).

MicroCal 10+ is and highly accurate ($\pm 0.02\%$ of reading) and powerful one channel hand held calibrator. It can be configured both as input or output for: millivolt, volt, milliampere (active and passive loop), ohm, thermocouples and resistance thermometers.



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Specifications

Each instrument is supplied with rechargeable battery pack and line charger, Soft Vinyl case, Report of Calibration and instruction manual.

International Temperature Scale:	Both IPTS 68 and ITS 90
Reference Junction Compensation (Rj):	Internal automatic form -5°C to +50°C (+23°F to +122°F) External programmable from -50°C to +100°C (-58°F to +212°F)
Reference Junction accuracy:	±0.15°C / °C for temperature exceed the +18°C to +28°C (64°F to 82°F) band
Common Mode Rejection:	> 130 dB at 50/60 Hz 1 Hz
Normal Mode Rejection:	> 65 dB at 50/60 Hz 1 Hz
Temperature stability:	for temperature exceeding the +18°C to +28°C (64°C to 82°F) band Span: ±0.003% of rdg/°C (Channel 1 only) ±0.015% of rdh/°C (Channel 2 only) Zero: ±0.2V/°C (Channel 1 only) ±0.5mV/°C or 0.4 A/°C (Channel 2 only)
Rtd and Ω measurement excitation current:	0.25mA
Rtd and Ω simulation excitation current:	From 0.2 to 3 mA
Rtd cable compensation error:	±0.005°C/Ω of total cable resistance
Rtd cable compensation limit:	100Ω each wire
Shunt resistance (mA range):	38Ω (Channel 1 only) 105Ω (Channel 2 only)
mA measurement and generation	Active and Passive loop
Input impedance:	10 MΩ 1 MΩ (10 V range and Channel 2 only)
Output Impedance (mV and Tc):	< 0.5Ω with a maximum current of 0.5 mA
Maximum resistance load:	1000Ω at 20 mA
Maximum input overvoltage:	50V 5 V (Rtd ranges only)
Maximum input overcurrent:	100 mA 6 mA (Rtd ranges only)
Source resistance effect:	1 μV/1000Ω
Engineering unit indications:	4 characters directly on the display
Power supply:	n. 4 rechargeable Ni-MH battery Mains operation and battery charge 100, 115, 230 V 50/60 Hz
Recharging time:	max 12 h at 90%
Battery life:	12 h on measuring mode - 4 h on 20mA passive loop
Display:	High contrast alphanumeric LCD with backlight device
Operative ambient temperature:	From -10°C to 50°C (15°F to 122°F)
Storage temperature:	From -30°C to 60°C (-22°F to 140°F)
Case:	ABS 120 x 60 x 230 mm
Weight:	Net 1 kg Gross 1.5 kg



Ordering Code

MicroCal 1+ TRX	Cat. 3906 TRX - A - B
MicroCal 2+	Cat. 3920 - A - B
MicroCal 10+	Cat. 3910 - A - B
Table A	Battery charger power supply
1	115V 50/60 Hz - USA mains plu
2	230V 50/60 Hz - Schuko mains plug
3	230V 50/60 Hz - UK mains plug
4	230V 50/60 Hz - European mains plug
5	100V 50/60 Hz - USA/Japan mains plug
Table B	Options
1	Eurotron Report of calibration
3	ABS case (instead of Vinyl case)
4	Electrical test leads kit
5	Thermocouple compensated cables kit (Tc J, T, K and S)
9	Special

Table of Ranges and Accuracies

Sensor or parameter	Total Range	Accuracy Range	Resolution	MicroCal 1+ TRX Accuracy (% of rdg)	MicroCal 2+ Accuracy (% of rdg)	MicroCal 10+ Accuracy (% of rdg)	
TC type J	°C	-210 to +1200	-170 to 1200	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
	°F	-346 to +2192	-274 to 2192	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
TC type K	°C	-270 to +1370	-120 to 1300	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	-346 to +2192	-274 to 2192	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
TC type T	°C	-270 to +400	-120 to +400	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	-454 to +752	-184 to 752	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
TC type R	°C	0 to +1760	+500 to +1700	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
	°F	+32 to +3200	+932 to +3092	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
TC type S	°C	0 to +1760	+800 to +1760	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
	°F	+32 to +3200	+1472 to +3200	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
TC type B	°C	+200 to +1820	+1000 to +1820	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
	°F	+392 to +3308	+1472 to +3308	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
TC type C	°C	0 to +2300	0 to +2300	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
	°F	+32 to +4172	+32 to +4172	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
TC type G	°C	0 to +2300	+200 to +2300	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
	°F	+32 to +4172	+392 to +4172	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
TC type D	°C	0 to +2300	0 to +2200	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
	°F	+32 to +4172	+32 to +3992	0.1	±0.03% (3)	±0.02% (3)	±0.02% (3)
TC type U	°C	-200 to +400	-120 to +400	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	-328 to +752	-184 to +752	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
TC type L	°C	-200 to +760	-180 to +760	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	-328 to +1400	-292 to +1400	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
TC type N	°C	0 to +1300	0 to +1300	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	-32 to +2372	+32 to +2372	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
TC type E	°C	-270 to +1000	-150 to +1000	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	-454 to +1832	-238 to +1852	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
TC type F	°C	0 to +1400	0 to +1400	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	+32 to +2552	+32 to +2552	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
Pt100 IEC	°C	-200 to +850	+200 to +600	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
	°F	-328 to +1562	-328 to +1112	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
Pt100 JIS	°C	-200 to +850	-200 to +600	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
	°F	-328 to 1562	-328 to +1112	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
Pt100 US	°C	-200 to +850	-200 to +600	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
	°F	+328 to +1562	-328 to +1112	0.1	±0.03% (2)	±0.02% (2)	±0.02% (2)
Ni100	°C	-60 to +180	-60 to +180	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	-76 to +356	-76 to +356	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
Ni120	°C	0 to +150	0 to +150	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
	°F	+32 to +302	+32 to +302	0.1	±0.03% (1)	±0.02% (1)	±0.02% (1)
mV	-18 to +21	-18 to +21	1µV	±(0.02%+3µV)	±(0.01%+3µV)	±(0.01%+3µV)	
mV	0 to +100	0 to +21	1µV	±(0.02%+3µV)	±(0.01%+3µV)	±(0.01%+3µV)	
		21 to +53	10µV	±(0.02%+3µV)	±(0.01%+3µV)	±(0.01%+3µV)	
		53 to +100	10µV	±(0.02%+6µV)	±(0.01%+6µV)	±(0.01%+6µV)	
mV	0 to +1000	21 to +53	100µV	±(0.02%+60µV)	±(0.01%+40µV)	±(0.01%+40µV)	
V	0 to 10	0 to 10	1µV	±(0.02%+0.4mV)	±(0.02%+0.4mV)	±(0.01%+0.4mV)	
mA	0 to 21	0 to 21	10mΩ	±(0.02%+0.5µA)	±(0.02%+0.5µA)	±(0.02%+0.5µA)	
Ω (IN)	0 to 400	0 to 400	10mΩ	±(0.02%+38mΩ)	±(0.02%+38mΩ)	±(0.02%+38mΩ)	
Ω (OUT)	0 to 400	0 to 400		±(0.03%+78mΩ)	±(0.03%+78mΩ)	±(0.03%+78mΩ)	
CHANNEL 2 (measure only)							
mA	0 to +22	0 to +22	1µA	±(0.03%+1µA)	±(0.02%+1µA)		
V	0 to 30	0 to 30	1mV	±(0.03%+1.2mV)	±(0.02%+1.2mV)		

Note:

- The relative accuracies shown are stated for 360 days and operative conditions from +18°C to 28°C (+64°F to +84°F).
- Typical 90 days relative accuracy can be estimated by dividing the “% of rdg” specification by 1.8.
- Typical 2 year relative accuracy can be estimated by multiplying the “% of rdg” specification by 1.5.
- All input ranges: additional error 1 digit.
- Eurotron traceability chart and uncertainty can be supplied on request.

- (1) zero error 0.1°C
- (2) zero error 0.15°C
- (3) zero error 0.5°C

