

MicroCal 200/200+ MicroCal 2000+

2 channel high accuracy
multifunction calibrators



Bulletin n.08-44.2 E



ISO 9001
registered by
GASTEC



Y2K compliant

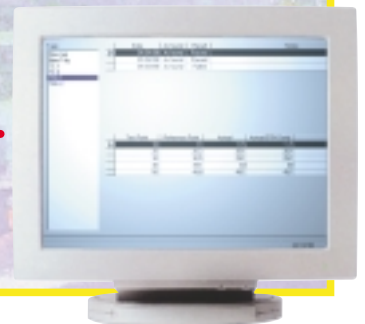
No doubt !
One of the most
accurate (0.0035% rdg)
portable calibrator
available today !

Calpman Plus
Software for automatic cali-
bration and documenting in
compliance with ISO9000

MicroCal PM200
Module to generate/measure
pressure



°C, °F, Ω , Hz
Tc, Rtd
mA, mV, V



MICROCAL

To keep your test and process equipment accurately calibrated for ISO 9000 compliance

Performance

The **MicroCal 200/200+** and **MicroCal 2000+** are two multifunction calibrators with insulated channels. They are portable and developed to meet the needs of instrumentation engineers and Quality managers, both in laboratory and in field work.

These units are accurate, rugged, compact and easy to use. They are the ideal solution to simulate and measure simultaneously: Voltage, current, resistance, thermocouple, resistance thermometers, frequency and pulse.

Advanced flexibility and high performance has been achieved using 32 bit microprocessor and a fast A/D conversion technology. The calibrators memory, has stored inside all data for normalised IEC, DIN and JIS thermoelectric sensors for both IPTS68 and ITS90 International Temperature Scale. The microprocessor performs automatic linearization and cold junction compensation to assure high accuracy. It is possible to set the calibrator to execute menu-driven calibration procedure for your instruments in field work. Both Channel 1 (Out) and Channel 2 (In) have the following operative mode capability:

- millivolt
- volt
- milliamper (active and passive loop)
- ohms
- temperature with thermocouples
- temperature with resistance thermometers
- frequency
- pulse

Remote auxiliary inputs are available for:

- **Relative humidity and temperature module**
- **Two internal sensor and built-in hand pump pressure module**

The ergonomic case design allows to use the calibrator in three different ways.

• Portable

Two different leather cases, with cover and shoulder strap, are available on request for instrument alone or instrument, printer and accessories. These are extremely useful for a practical use since they allow to leave one hand free for instrument tuning.

• Panel mounting

It requires a panel cutout of 242 x 88 mm. The instrument bezel flange butts against the front of the mounting plate; two optional lateral mounting brackets fit over the instrument rear panel

• Table top

The case is equipped with 2 pivot feet to change the vertical viewing angle when using the instrument on the top of a table.

Quality system

Research, development, production, inspection and certification activities are defined by methods and procedures of



the Eurotron Quality System inspected for compliance and certified ISO9001 by GASTEC, a Dutch notified body.

EMC Conformity

The instrument case, made in shock-resistant injection moulded ABS + polycarbonate has an internal metal coating to fulfil the prevision of the directive 89/336/CEE Electromagnetic Compatibility.



Panel mounting

Instrument highlight

Display & Keyboard

The large graphic display with backlight allows a simultaneous indication of the measured and the simulated values (large digit), together with all messages related to the signal as: engineering unit, type of sensor or signal, temperature scale, cold junction selection, battery level of charge, etc.

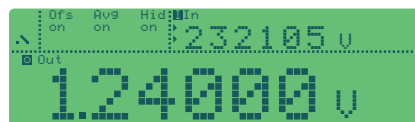
A swap key allow to change the position of the IN and OUT parameters on the display. The operative set-up mode is simplified by a sequence of menu pages that only require <Select> and <Enter> instructions. A full set of instruction pages are memory stored for direct operator assistance. The relevant instruction may be recalled through the <Help> key.

Comparative table	MicroCal 200	MicroCal 200+	MicroCal 2000+
Accuracy	0.02% rdg	0.01% rdg	0.0035% rdg
32-bit microprocessor and flash memory for firmware upgrading through serial interface	●	●	●
All normalized IEC, DIN, JIS thermocouples	●	●	●
Pt, Ni, Cu resistance thermometers	●	●	●
mA, mV, V, Ω, frequency, pulse, counter	●	●	●
IPTS 68 and ITS 90 linearization	●	●	●
Current output mode directly on active or passive loops	●	●	●
Bidirectional serial interface	Option	●	●
Communication bus for extension to pressure and other optional modules	●	●	●
Optional dedicated external impact type printer	Option	Option	Option
Panel mounting brackets	Option	Option	Option
Traceable Report of Calibration	●	●	●
RAM extension with PCMCIA memory card		●	●
Non volatile memory with real-time clock	Option	●	●
Logging and direct real-time graph with movable cursor to read the required actual value	Option	Option	●
mV and V I/O display	6 digits	6 digits	7 digits (0.1 μV)



Real time graphic logging

MicroCal 200/200+



MicroCal 2000



Digital interface

The instrument includes a full bidirectional TTL level digital interface for communication with a computer. A TTL/RS232 adaptor, normal or with galvanic insulation, is available on request.

Firmware

The firmware is stored inside a flash memory and allows a fast and easy upgrade of the instrument using a standard PC. Firmware includes the following capabilities:

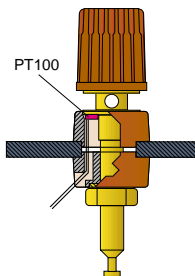
- multiple measurement and generation mode
- signal processing: filter, average, min, max
- PC downloadable test procedure
- DataLogger and graphic recorder
- switch test routine
- ramping and stepping for dynamic testing
- user definable linearisation
- user entry of probe specific calibration coefficients.

Scale factor - Square root

All non temperature ranges are fully programmable to read both input and output values in term of engineering unit. Four programmable alphanumeric characters are available on the display to show the symbol of the parameter (i.e. mbar, % RH, % CO, etc.) mA reading and output can be eg. related to flow when using a ΔP transmitter across a calibrated flange.

Rj compensation

Accurate and fast response compensation, through a special low thermal capacity design of binding posts, incorporates a thin film high accuracy Pt100 as cold junction reference. The internal reference allows the maximum accuracy for the -10°C to +55°C temperature



range. An external Pt100 sensor can be connected for special application (from -10 to +100°C). It is also possible to set manually the compensation temperature (from -50 to +100°C) by keyboard.

Transmitter simulation

The calibrator can be connected to your system inputs to simulate 4-20 mA transmitters. It has an adequate power to drive 20 mA with a load of 1000 Ω in source mode. For fast loop checks, preprogrammed steps can be recalled to output 4, 8, 12, 16 and 20 mA or % equivalent. Since the instrument has two separate channels, it is possible to read the error directly in % (In/Out). The operator can set and change temperature values while obtaining the equivalent output mA. The mA mode may be connected directly either on passive or on active current loop.

Frequency - Counts

The "Out" mode is designed to generate zero based square pulse, with an adjustable amplitude, at a fre-

quency up to 20 KHz. A preset number of pulses can be programmed and transmitted to test or to calibrate totalizers and counters. The instrument can be configured to measure frequency and count pulse (totalizer mode). Technical units in Hz, pulse/h and pulse/m. The threshold is adjustable from 0 to 20 V with 0.01 V resolution.

Calculated readings

To allow measurements of unstable input signals through a programmable averaging or min, max identification. A hold function is also present from keyboard or external contact instructions.

Programmable signal converter

The instrument can be used as a temporary signal converter replacement. Any input signal (including remote auxiliary inputs) can be converted into any of the available output signals. The galvanic insulation between the input and output channels allow to use this feature in field work applications also.

MICROCAL

To document the inspection and calibration activities



4 wire resistance thermometer

Although resistance and temperature with resistance thermometer may be measured with 2 or 3 wires standard connections. The instrument is designed also for 4 wire measurements to have more accuracy and use it as a reference for your calibrators.

Remote temperature probe

An high accuracy probe is available on request for general purpose temperature measurement and/or remote cold junction compensation.

Simulation capability

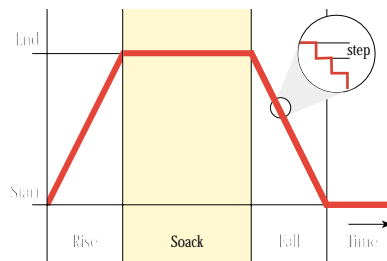
Menu-driven set up to generate:

- a continuous or step ramp output where the total time, the starting point, the final point and the size of the steps are requested by the set-up procedure to run the program;
- a continuous programmable cycle rises, soaks, falls; (see figure)
- the signal value setting uses a unique in-line single-digit setting mode or a direct numeric entry;

- direct keyboard access to n. 20 programmable memory stored values;

Report of Calibration

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



Pressure module

An optional pressure module is available with one or two internal sensors. The MicroCal PM200 is an intelligent module and it is used to extend the MicroCal capability to pressure in/out. MicroCal PM200 can incorporate pressure/vacuum pump, volume adjuster and ventilation valve. External sensors can be used to measure pressure up to 700bar. See MicroCal PM200 bulletin for more specifications.

Temperature modules

An optional set of temperature calibrator are available for Tc and Rtd certification. The MicroCal T series can be used together with a Personal Computer, a calibrator MicroCal 200/200+, a scanner, and a CalpMan Plus Windows® software package to improve a true automatic

temperature calibration system. Using the RS232 interfaces of the instruments it is possible to program through the PC the complete test procedure for your thermocouple or resistance thermometer to be certificate. The MicroCal 200/200+ and MicroCal 2000+ are able to read the testing thermo-elements with the desired accuracy and the software calculate the errors and prepare the certificate. See MicroCal T bulletin for more specifications.

LogMan Software

Supporting software for DOS/Windows to download logged data from internal memory to PC. Data can be saved on disks, loaded from disks, viewed in numeric or graphic mode and also printed in numeric or graphic mode.

LinMan Software

Supporting software for DOS/Windows to setup the instrument with Tcx, Rtdx special linearization. The program allows highly accurate temperature measurement with a calibrated Pt100 loading the coefficients of the Calibration Report.

CalpMan software

Standard Agencies and Quality Auditors require the collections, organization and analysis of traceability documents. A supporting software for DOS/Windows (Calpman - Calibration Procedure Manager) is available to transfer a selection of calibration routines (test points, error and warning bands, etc.) from a PC to the internal memory of the instrument in order to automate field calibrations. Select the appropriate tag number by keyboard directly, the



MICROCAL
Easy to use
Easy to order

ORDERING CODE

calibrator will ask you step by step for all operation and test and calibration data ("before" and "after" values) can be memory stored and after down-loaded to a PC to document the calibration activity.

CalpMan 2000 Software

Standard Agencies and Quality Auditors require, to keep the compliance with ISO 9000, collection, organisation and analysis of traceability documents. CalpMan 2000 Windows® based supporting software, is able to transfer a selection of calibration routines from a PC to the internal memory of the instrument in order to simplify field calibrations selecting the required TAG number.

Eurotron CalpMan 2000 grants the possibility to document the calibration/inspection activities.

Cat. 39xx – A – B – C – D

- cat. 3916** Microcal 200
- cat. 3918** Microcal 200+
- cat. 3928** MicroCal 2000+

Each instrument is supplied with a battery charger, a Report of Calibration and an Instruction Manual.

- II MicroCal 200+** is standard equipped with options: **A=2 e A=4**
- II MicroCal 2000+** is standard equipped with options and accessoires: **A=1, A=2, A=4, C=2 e C=3**

Table A	Options
0	None
1	Data logging function with LogMan software
2	Real time clock (Optional for MicroCal 200 only)
3	TTL/RS232 insulated converter
4	TTL/RS232 non insulated converter (Optional for MicroCal 200 only)

Table B	Line setting - Line cord plug
1	120 V 50/60Hz - USA plug
2	230 V 50/60Hz - Schuko plug
3	230 V 50/60Hz - UK plug
4	230 V 50/60Hz - European plug
5	100 V 50/60Hz - USA/Japan plug
9	special

Table C	Accessories
0	Onone
1	Leather case with shoulder strap (cat. BB880015) for instrument only
2	CalpMan Calibration procedure software for PC + TTL/RS232 converter (A=2 is required)
3	Special linearization (Tc x, Rtd x) LinMan Software for PC (TTL/RS232 converter is required)
4	External impact printer
5	Leather case with shoulder strap (cat. BB880011) for instrument and printer
6	Brackets for panel mounting

Table D	Report of Calibration
1	Eurotron Report
9	Special



CalpMan 2000



MicroCal PM200



MICROCAL

High technology
for daily use
in field and
laboratory

SPECIFICATIONS

IN/OUT parameters:	Signal type: mV, V, mA, Ω , K Ω , frequency, pulses
	thermocouples type: J, K, T, R, S, B, N, C, E, U, L, F, G, D
	resistance thermometers: Pt100 IEC, OIML, USLAB, US, SAMA, JIS, Pt200, 500, 1000, 1000 OIML Ni100, Ni120, Cu10, Cu100
Reference junction compensation:	internal automatic: from -10 °C to +55 °C
	external adjustable: from -50 °C to +100 °C
	remote with external Pt100: from -10 °C to +100 °C
Rj compensation drift:	± 0.015 °C/°C (da -10 °C a +55 °C)
Rj compensation error:	internal: ± 0.15 °C
	remote: ± 0.3 °C
Common mode rejection:	>140 dB at ac operation
Normal mode rejection:	>70 dB a 50 or 60 Hz
Temperature stability:	MicroCal 200/200+ for temperature exceeding the band +18°C to +28°C (from +64 °C to +84 °F)
	full scale: ± 8 ppm/°C
	zero: ± 0.2 μ V /°C
	MicroCal 2000+ for temperature exceeding the band +21°C to +25°C (from +70 °C to +77 °F)
	full scale: ± 3 ppm/°C
	zero: ± 0.2 μ V /°C
Output impedance (emf output):	< 0.5 Ω with 0.5 mA maximum current
Input impedance (mV, V and Tc ranges):	>10 M Ω
Input impedance (mA ranges):	<140 Ω @ 1 mA
Source resistance effects:	± 1 μ V error for 1000 Ω source resistance
Rtd and Ω simulation excitation current:	MicroCal 200/200+: from 0.01 to 5 mA
	MicroCal 2000+: from 0.01 to 2 mA
Rtd and Ω measurement excitation current:	~ 0.4 mA @ 400 Ω
	~ 0.04 mA @ 4000 Ω
Rtd connection:	2, 3, and 4 wires
Rtd cable compensation:	up to 100 Ω (each wire)
Rtd cable compensation error (Pt100):	± 0.005 °C/ Ω of total wire
Maximum load resistance:	1000 Ω @ 20 mA
Display:	graphic LCD 240 x 64 dots display with backlight device
Measurement sampling time:	250 ms
Output noise (at 300 Hz):	<2 μ Vpp for ranges up to 200 mV f.s.,
	<10 μ Vpp for ranges up to 2 V f.s.
	<80 μ Vpp for ranges up to 20 V f.s.
Digital interface:	full bidirectional TTL (a RS232 adapter normal or insulated, is available as an option)
Channel 1-Channel 2 insulation:	50 Vdc
Calculation functions:	hold, max, min, offset, average
Selection °C/°F/K:	through the configuration procedure
In/Out data memory:	20 data with manual or automatic recall
Logging mode:	1500 input data items (optional memory card for memory extension)
Convert function:	displays the electrical equivalent of the engineering unit
Scale factor:	5 different setting with zero and span programmable within -399999 and +999999
Square root:	in combination with scale factor
Calibration:	self learning technique with automatic procedure
Power supply:	external charger and rechargeable Ni-Cd battery
Self contained operation:	6h on Tc and mV input/output (backlight Off)
	3.5h with 20 mA simulation (backlight Off)
Recharging time:	5h at 90% and 6h at 99% with instrument switched off.
	The battery charging is active only with the instrument switched off.
Line operation:	100 - 120 - 230 Vac through the external battery charger
Line transformer insulation:	2500 Vac
Firmware release identification:	release code on the display
Operating environment temperature range:	from -10 °C to +55 °C (from 14 °C to 131 °F)
Storage temperature range:	from -30 °C to +60 °C (from -22 °C to 140 °F)
Case:	Injection moulded ABS with internal metal coating
Dimensions:	264 x 96 x 172 mm (DIN size)
Weights:	nett: 4 Kg gross: 5,5 Kg



MICROCAL

Accurate and Reliable

365 days a year

Table IN-OUT range

Sensor or parameter	Total range	Accuracy Range	Resolution	MicroCal 200		MicroCal 200+		MicroCal 2000+	
				Accuracy (% of rdg)	Accuracy (% of rdg)	Accuracy (% of rdg)	Accuracy (% of rdg)	Resolution	Accuracy (% of rdg)
Tc J	-210 ... 1200 °C	-190 ... 1200 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-350 ... 2200 °F	-310 ... 2192 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Tc K	-270 ... 1370 °C	-160 ... 1260 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	454 ... 2500 °F	256 ... 2300 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Tc T	-270 ... 400 °C	-130 ... 400 °C	0.01 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-454 ... 760 °F	-238 ... 752 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Tc R	-50 ... 1760 °C	150 ... 1760 °C	0.1 °C	± (0.02% +0.2 °C)	± (0.01% +0.2 °C)	0.01 °C	± (0.005% +0.2 °C)		
	-60 ... 3200 °F	302 ... 3200 °F	0.1 °F	± (0.02% +0.36 °F)	± (0.01% +0.36 °F)	0.1 °F	± (0.005% +0.36 °F)		
Tc S	-50 ... 1760 °C	170 ... 1760 °C	0.1 °C	± (0.02% +0.2 °C)	± (0.01% +0.2 °C)	0.01 °C	± (0.005% +0.2 °C)		
	-60 ... 3200 °F	338 ... 3200 °F	0.1 °F	± (0.02% +0.36 °F)	± (0.01% +0.36 °F)	0.1 °F	± (0.005% +0.36 °F)		
Tc B	50 ... 1820 °C	920 ... 1820 °C	0.1 °C	± (0.02% +0.3 °C)	± (0.01% +0.3 °C)	0.01 °C	± (0.01% +0.3 °C)		
	140 ... 3310 °F	1688 ... 3308 °F	0.1 °F	± (0.02% +0.54 °F)	± (0.01% +0.54 °F)	0.1 °F	± (0.01% +0.54 °F)		
Tc C	0 ... 2300 °C	0 ... 2000 °C	0.1 °C	± (0.02% +0.2 °C)	± (0.01% +0.2 °C)	0.1 °C	± (0.01% +0.2 °C)		
	32 ... 4172 °F	32 ... 3632 °F	0.1 °F	± (0.02% +0.36 °F)	± (0.01% +0.36 °F)	0.1 °F	± (0.01% +0.36 °F)		
Tc G	0 ... 2300 °C	190 ... 2300 °C	0.1 °C	± (0.02% +0.3 °C)	± (0.01% +0.3 °C)	0.1 °C	± (0.01% +0.3 °C)		
	32 ... 4172 °F	374 ... 4172 °F	0.1 °F	± (0.02% +0.54 °F)	± (0.01% +0.54 °F)	0.1 °F	± (0.01% +0.54 °F)		
Tc D	0 ... 2300 °C	0 ... 2130 °C	0.1 °C	± (0.02% +0.3 °C)	± (0.01% +0.3 °C)	0.1 °C	± (0.01% +0.3 °C)		
	32 ... 4172 °F	32 ... 3866 °F	0.1 °F	± (0.02% +0.54 °F)	± (0.01% +0.54 °F)	0.1 °F	± (0.01% +0.54 °F)		
Tc U	-200 ... 400 °C	-160 ... 400 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-330 ... 760 °F	-256 ... 752 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Tc L	-200 ... 760 °C	-200 ... 760 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-330 ... 1400 °F	-328 ... 1400 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Tc N	-270 ... 1300 °C	0 ... 1300 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-450 ... 2380 °F	32 ... 2372 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Tc E	-270 ... 1000 °C	-200 ... 1000 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-454 ... 1840 °F	-328 ... 1832 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Tc F	0 ... 1400 °C	0 ... 1400 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	32 ... 2560 °F	32 ... 2552 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Pt100 IEC OIML, a 3926	-200 ... 850 °C	-200 ... 850 °C	0.01 °C	± (0.02% +0.05 °C)	± (0.01% +0.05 °C)	0.01 °C	± (0.005% +0.05 °C)		
	-330 ... 1570 °F	-328 ... 1562 °F	0.1 °F	± (0.02% +0.09 °F)	± (0.01% +0.09 °F)	0.1 °F	± (0.005% +0.09 °F)		
Pt100 a 3902	-200 ... 650 °C	-200 ... 650 °C	0.01 °C	± (0.02% +0.05 °C)	± (0.01% +0.05 °C)	0.01 °C	± (0.005% +0.05 °C)		
	-330 ... 1210 °F	-328 ... 1210 °F	0.1 °F	± (0.02% +0.09 °F)	± (0.01% +0.09 °F)	0.1 °F	± (0.005% +0.09 °F)		
Pt100 JIS SAMA	-200 ... 600 °C	-200 ... 600 °C	0.01 °C	± (0.02% +0.05 °C)	± (0.01% +0.05 °C)	0.01 °C	± (0.005% +0.05 °C)		
	-330 ... 1120 °F	-328 ... 1112 °F	0.1 °F	± (0.02% +0.09 °F)	± (0.01% +0.09 °F)	0.1 °F	± (0.005% +0.09 °F)		
Pt 200	-200 ... 850 °C	-200 ... 850 °C	0.1 °C	± (0.02% +0.15 °C)	± (0.01% +0.15 °C)	0.01 °C	± (0.005% +0.15 °C)		
	-330 ... 1570 °F	-328 ... 1562 °F	0.1 °F	± (0.02% +0.27 °F)	± (0.01% +0.27 °F)	0.1 °F	± (0.005% +0.27 °F)		
Pt 500	-200 ... 850 °C	-200 ... 530 °C	0.1 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-330 ... 1570 °F	-328 ... 986 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
Pt1000 IEC OIML	-200 ... 850 °C	-200 ... 850 °C	0.01 °C	± (0.02% +0.1 °C)	± (0.01% +0.1 °C)	0.01 °C	± (0.005% +0.1 °C)		
	-330 ... 1570 °F	-328 ... 1562 °F	0.1 °F	± (0.02% +0.18 °F)	± (0.01% +0.18 °F)	0.1 °F	± (0.005% +0.18 °F)		
CU10	-70 ... 150 °C	-70 ... 150 °C	0.1 °C	± (0.02% +0.4 °C)	± (0.01% +0.4 °C)	0.1 °C	± (0.01% +0.4 °C)		
	-100 ... 310 °F	-94 ... 302 °F	0.1 °F	± (0.02% +0.72 °F)	± (0.01% +0.72 °F)	0.1 °F	± (0.01% +0.72 °F)		
CU100	-180 ... 150 °C	-180 ... 150 °C	0.1 °C	± (0.02% +0.05 °C)	± (0.01% +0.05 °C)	0.1 °C	± (0.01% +0.05 °C)		
	-300 ... 310 °F	-292 ... 302 °F	0.1 °F	± (0.02% +0.09 °F)	± (0.01% +0.09 °F)	0.1 °F	± (0.01% +0.09 °F)		
Ni100	-60 ... 180 °C	-60 ... 180 °C	0.1 °C	± (0.02% +0.05 °C)	± (0.01% +0.05 °C)	0.1 °C	± (0.01% +0.05 °C)		
	-80 ... 360 °F	-76 ... 356 °F	0.1 °F	± (0.02% +0.09 °F)	± (0.01% +0.09 °F)	0.1 °F	± (0.01% +0.09 °F)		
Ni120	0 ... 150 °C	0 ... 150 °C	0.1 °C	± (0.02% +0.05 °C)	± (0.01% +0.05 °C)	0.1 °C	± (0.01% +0.05 °C)		
	32 ... 310 °F	32 ... 302 °F	0.1 °F	± (0.02% +0.09 °F)	± (0.01% +0.09 °F)	0.1 °F	± (0.01% +0.09 °F)		
mV (I)		-20 ... +200mV	1 μV	± (0.02% +2 μV)	± (0.01% +2 μV)	0.1 μV	± (0.0035% +1 μV)		
mV (H)		-0.2 ... +2 V	10 μV	± (0.02% +10 μV)	± (0.01% +10 μV)	1 μV	± (0.005% +10 μV)		
V		-2 ... +20 V	0.1 mV	± (0.02% +0.08mV)	± (0.01% +0.08mV)	10 μV	± (0.005% +0.08mV)		
mA (In)		-5 ... +50 mA	0.1 μA	± (0.02% +0.4 μA)	± (0.01% +0.4 μA)	0.1 μA	± (0.005% +0.4 μA)		
mA (Out)		0 ... +50 mA	0.1 μA	± (0.02% +0.4 μA)	± (0.01% +0.4 μA)	0.1 μA	± (0.005% +0.4 μA)		
Ω IN		0 ... 500 Ω	1 mΩ	± 0.02% +12 mΩ	± (0.01% +12 mΩ)	1 mΩ	± (0.005% +12 mΩ)		
		0 ... 5000 Ω	0.01 Ω	± (0.02% +120 mΩ)	± (0.01% +120 mΩ)	0.01 Ω	± (0.005% +120 mΩ)		
Ω OUT		0 ... 500 Ω	1 mΩ	± (0.02% +20 mΩ)	± (0.01% +20 mΩ)	1 mΩ	± (0.005% +12 mΩ)		
		0 ... 5000 Ω	0.01 Ω	± (0.02% +200 mΩ)	± (0.01% +200 mΩ)	0.01 Ω	± (0.005% +120 mΩ)		
Frequency		1 ... 200 Hz	0.001 Hz	± (0.005% +0.001 Hz)	± (0.005% +0.001 Hz)	0.001 Hz	± (0.005% +0.001Hz)		
		1 ... 2000 Hz	0.01	± (0.005% +0.001 Hz)	± (0.005% +0.001 Hz)	0.01 Hz	± (0.005% +0.001Hz)		
		1 ... 20000 Hz	0.1 Hz	± (0.005% +0.001 Hz)	± (0.005% +0.001 Hz)	0.1 Hz	± (0.005% +0.001Hz)		
Pulse counter		0 ... 10 ⁹ counts	1 count	infinite	infinite	1 count	infinite		
Pulse (Out)		0 ... 6000 pulse/min	1 pulse/min	1 pulse / min	1 pulse / min	1 pulse/min	1 pulse / min		
		0 ... 36000 pulse/h	1 pulse/h	1 pulse / min	1 pulse / min	1 pulse/h	1 pulse / min		

- Note:
- The MicroCal 200/200+ relative accuracies shown above are stated for 360 days and the operative conditions are from +18°C to +28°C
 - The MicroCal 2000+ relative accuracies shown above are stated for 360 days and the operative conditions are from +21°C to +25°C
 - Typical 90 days relative accuracy can be estimated by dividing the "% of reading" specifications by 1.6.
 - Typical 2 years relative accuracy can be estimated by multiplying the "% of reading" specifications by 1.4.
 - All input ranges: additional error ± 1 digit.
 - Eurotron traceability chart and uncertainty can be supplied on request.



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