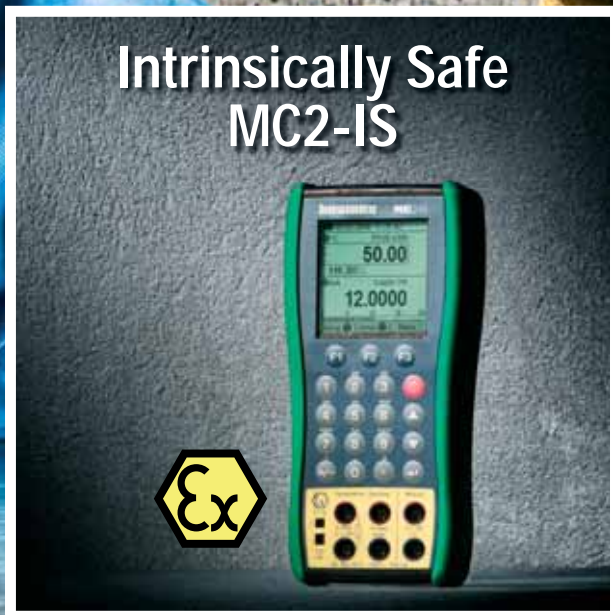


# MC2

Practical tools for field calibration



# Beamex® MC2: Practicality for calibration

Practicality in calibration. The Beamex® MC2 series includes three different hand-held calibrators for field use: the MC2 Pressure/Electrical Calibrator, the MC2 Temperature/Electrical Calibrator and the MC2 Multifunction Calibrator. The MC2 is a compact-sized and easy-to-use hand-held calibrator. It has a large graphical display, a menu-based interface and full numerical keyboard. Being a Beamex calibrator, MC2 represents the high, uncompromised quality standards evident in other Beamex calibration equipment.



# Beamex® MC2-IS: Practical tool for calibration in hazardous environments

The Beamex® MC2-IS Intrinsically Safe Multifunction Calibrator is an ATEX and IECEx certified calibrator designed for use in potentially explosive environments such as offshore platforms, oil refineries, chemical and petrochemical plants where inflammable gases may be present. It connects to almost 20 available Beamex intrinsically safe external pressure modules. The calibrator has a compact size and design.

*Beamex® MC2 and Beamex® MC2-IS – a series of 4 different practical calibrators.*

# The MC2 series includes four different portable calibrators



## MC2 Main features

Available in three versions:  
 MC2 Pressure/Electrical Calibrator  
 MC2 Temp./Electrical Calibrator  
 MC2 Multifunction Calibrator

Internal / external pressure modules

Compact size and design

User-friendly

## MC2-IS Main features



ATEX and IECEx certified Intrinsically Safe Multifunction Process Calibrator

Connects to almost 20 available Beamex intrinsically safe external pressure modules

Compact size and design

User-friendly

## MC2 Feature comparison

Features	MC2-PE Pressure / Electrical	MC2-TE Temperature / Electrical	MC2-MF Multifunction	MC2-IS Intrinsically Safe
Internal pressure module	•	-	•	(barometric only)
Connection for external pressure modules	•	•	•	•
Current measurement (with internal and external supply)	•	•	•	•
Voltage measurement	•	•	•	•
Frequency measurement	•	•	•	•
Pulse counting	•	•	•	•
Switch sensing	•	•	•	•
Internal HART® compatible 24 VDC loop supply	•	•	•	•(1)
Current generation (with internal and external supply)	-	•	•	•(2)
Voltage generation	-	•	•	•
Frequency generation	-	•	•	•
Pulse generation	-	•	•	•
mV measurement / simulation	-	•	•	•
Resistance measurement / simulation	-	•	•	•
RTD measurement / simulation	-	•	•	•
TC measurement / simulation	-	•	•	•

1) 20 VDC loop supply

2) With external supply

# Features of the MC2 and MC2-IS



## Accuracy guaranteed

The Beamex® MC2 and Beamex® MC2-IS calibrators are extremely accurate process calibrators. As proof of this, each MC2 and MC2-IS calibrator is delivered with a traceable, accredited calibration certificate.



## Compact and user-friendly

The MC2 and MC2-IS calibrators are compact-sized, lightweight portable calibrators with a large graphical display and multilingual interface. They have a full numerical keyboard. Using the MC2 and MC2-IS is quick and easy.



## Robust field calibrator

The MC2 and MC2-IS are robust and made for tough use. The impact protectors and membrane keyboard make them field compatible and weatherproof.



## Wide range of configuration possibilities

The MC2 and MC2-IS provide a number of configuration possibilities, such as both internal and external pressure modules. For instance, the MC2-IS connects to almost 20 available Beamex intrinsically safe external pressure modules.




## Make it safe with the MC2-IS

The MC2-IS is an intrinsically safe, ATEX and IECEx certified, multifunction calibrator. It is designed for use in potentially explosive environments, such as offshore platforms, oil refineries, chemical and petrochemical plants where inflammable gases may be present.



# MC2 - General specifications for all models

## General Specifications

General	MC2	MC2-IS
Display	60 mm x 60 mm (2.36" x 2.36"), 160 x 160 pixels LCD	60 mm x 60 mm (2.36" x 2.36"), 160 x 160 pixels LCD
Weight	720 ... 830 g (1.59 ... 1.83 lbs)	1070 g (2.3 lbs)
Dimensions	215 mm (8.5") x 102 mm (4") x 49 mm (1.9") (d/w/h)	215 mm (8.5") x 102 mm (4") x 49 mm (1.9") (d/w/h)
Keyboard	Membrane keyboard	Membrane keyboard
Battery type	Rechargeable NiMH, 4000 mAh, 3.6V DC	Rechargeable NiMH, 1700 mAh, 4.8V DC
Charging time	5 hours	16 hours
Charger supply	100...240 VAC, 50-60 Hz	100...240 VAC, 50-60 Hz
Battery operation	13 ... 24 hours in measurement mode, back light off. 8 ... 12 hours when sourcing an average of 12 mA to loop, with back light on.	12 hours in measurement mode. 8 hours when sourcing an average of 12 mA to loop.
Operating temperature	-10...50°C (14...122°F)	-10...50°C (14...122°F)
Operating temperature when charging batteries	0 ... 35°C (32...95°F)	0 ... 35°C (32...95°F) (Must be charged at a non Ex area.)
Storage temperature	-20 to 60°C (-4 to 140°F)	-20 to 60°C (-4 to 140°F)
Humidity	0 to 80% R.H. non condensing	0 to 80% R.H. non condensing
Warmup time	Specifications valid after a 5 minute warmup period.	Specifications valid after a 5 minute warmup period.
Max. input voltage	30 V AC, 60 V DC	30 V DC
Safety	Directive 73/23/EEC, EN 61010-1	Directive 73/23/EEC, EN 61010-1
EMC	Directive 89/336/EEC, EN 61326	Directive 89/336/EEC, EN 61326
Ex	-	ATEX:  II 1 G T4 Ga (T <sub>a</sub> = -10 ... +50°C) IECEX: Ex ia IIC T4 Ga (T <sub>a</sub> = -10 ... +50°C)
Warranty	Standard: 2 years for MC2; 1 year for battery pack. <sup>1)</sup>	Standard: 2 years for MC2-IS; 1 year for battery pack. <sup>1)</sup>

1) The warranty of the MC2 and MC2-IS will be extended up to 6 years if the product is calibrated on a yearly basis at Beamex's Calibration Laboratory

## Voltage measurement –1...60 V DC (MC2-IS -1...30 V DC)

Range MC2	Range MC2-IS	Resolution	1 Year Uncertainty(±) <sup>(2)</sup>
±0.25 V	±0.25 V	0.001mV	0.02% RDG + 5 µV
±(0.25 ... 1 V)	±(0.25 ... 1 V)	0.01 mV	0.02% RDG + 5 µV
1 ... 25 V	1 ... 30 V	0.1 mV	0.02% RDG + 0.25 mV
25 ... 60 V	-	1 mV	0.02% RDG + 0.25 mV

Feature	Specification
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Input impedance	>1 MΩ
Supported units	V, mV, µV
Display update rate	3 / second

## mA measurement ±100 mA

Range	Resolution	1 Year Uncertainty(±) <sup>(2)</sup>
±25mA	0.0001 mA	0.02% RDG + 1.5 µA
±(25 ... 100 mA)	0.001 mA	0.02% RDG + 1.5 µA

Feature	Specification
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Input impedance	< 7.5 Ω
Supported units	mA, µA
Display update rate	3 / second

## Loop supply

Feature	Specification MC2	Specification MC2-IS
Maximum output current	> 25 mA, short circuit protected	> 25 mA, short circuit protected
Output voltage	24 V ± 10%	20 V ± 10% @ 0 mA, > 12 V @ 20 mA
Output impedance in HART® compatible mode	300 Ω ± 20%	none

2) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period. (k=2).

# Electrical measurements

## Frequency measurement 0.0027 ... 50 000 Hz

Range	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
0.0027 ... 0.5 Hz	0.000001 Hz	0.01% RDG
0.5 ... 5 Hz	0.00001 Hz	0.01% RDG
5 ... 50 Hz	0.0001 Hz	0.01% RDG
50 ... 500 Hz	0.001 Hz	0.01% RDG
500 ... 5000 Hz	0.01 Hz	0.01% RDG
5000 ... 50000 Hz	0.1 Hz	0.01% RDG

Feature	Specification
Temperature coefficient	Specification valid from -10 to 50°C (14 ... 122°F)
Input impedance	> 1 MΩ
Trigger level	-1...14 V in 1 V steps and open collector inputs
Minimum signal amplitude	2 Vpp (< 10 kHz), 3 Vpp (10...50 kHz)
Supported units	Hz, kHz, cph, cpm, 1/Hz (s), 1/kHz (ms), 1/MHz (μs)
Gate period	267 ms + 1 signal period

1) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period. (k=2)

## Pulse counting 0 ... 9 999 999 pulses

Feature	Specification
Range	0 to 9 999 999 pulses
Input impedance	> 1 MΩ
Trigger level	-1 ... 14 V in 1 V steps and open collector inputs
Minimum signal amplitude	2 Vpp (pulse length > 50 μs), 3 Vpp (pulse length 10 ... 50 μs)

## Switch test

Feature	Specification	MC2	MC2-IS
Potential free contacts	Test voltage (Trigger level)	3 V, 0.13 mA (1 V) or 24 V, 35 mA (2 V)	3 V, 0.08 mA (1 V) or 20 V, 25 mA (2 V)
Voltage level detection	Trigger level Input impedance	-1...14 V in 1 V steps > 1 MΩ	-1...14 V in 1 V steps > 1 MΩ



# Pressure Measurements

## Internal Pressure Modules (IPM)

Internal Module MC2 <sup>(3)</sup>	Internal Module MC2-IS <sup>(4)</sup>	Unit	Range <sup>(2)</sup>	Resolution	1 Year Uncertainty(±) <sup>(1)</sup>
IPM200mC	-	kPa mbar iwc	±20 ±200 ±80	0.001 0.01 0.01	0.05% RDG + 0.05% FS
IPM2C	-	kPa bar psi	-100 to 200 -1 to 2 -14.5 to 30	0.01 0.0001 0.001	0.05% FS
IPM20C	-	kPa bar psi	-100 to 2000 -1 to 20 -14.5 to 300	0.1 0.001 0.01	0.05% FS
IPM160	-	MPa bar psi	0 ... 16 0 ... 160 0 ... 2400	0.001 0.01 0.1	0.05% FS
Barometric option	Barometric option -IS	Also enables absolute pressure measurement for the above pressure inputs. When using the barometric option, add 0.1 kPa (0.0146 psi) uncertainty for absolute pressure measurement.			

Feature	Specification
Temperature coefficient	< ±0.001% RDG /°C outside 15 ... 35°C. < ±0.0006% RDG /°F outside 59 ... 95°F
Maximum overpressure	2 × Range
Pressure port	G 1/8" female (G 1/8 (ISO 228/1) 60° internal cone adaptor, except IPM160)
Media compatibility	Wetted parts: AISI316 stainless steel, Nitrile rubber.
Supported pressure units	Pa, hPa, kPa, MPa, mbar, bar, lbf/ft <sup>2</sup> , psi, ozf/in <sup>2</sup> , gf/cm <sup>2</sup> , kgf/m <sup>2</sup> , kp/cm <sup>2</sup> , at, mmH <sub>2</sub> O, cmH <sub>2</sub> O, mH <sub>2</sub> O, iwc, ftH <sub>2</sub> O, mmHg, cmHg, mHg, inHg, mmHg(0°C), inHg(0°C), mmH <sub>2</sub> O(4°C; 60°F; 68°F/20°C), cmH <sub>2</sub> O(4°C; 60°F; 68°F/20°C), inH <sub>2</sub> O(4°C; 60°F; 68°F/20°C), ftH <sub>2</sub> O(4°C; 60°F; 68°F/20°C), torr, atm, + four (4) user-configurable units
Display update rate	2.5 / second

## External Pressure Modules (EXT) Standard Accuracy

Non Intrinsically Safe	Intrinsically Safe	Range <sup>(2)</sup>		Resolution	1 Year Uncertainty(±) <sup>(1)</sup>
EXT200mC-s	EXT200mC-s-IS	±200 mbar	±80 iwc	0.01 mbar 0.01 iwc	0.05% RDG + 0.05% FS
EXT2C-s	EXT2C-s-IS	-1 ... 2 bar	-14.5 ... 30 psi	0.0001 bar 0.001 psi	0.05% FS
EXT20C-s	EXT20C-s-IS	-1 ... 20 bar	-14.5 ... 300 psi	0.001 bar 0.01 psi	0.05% FS
EXT160-s	EXT160-s-IS	0 ... 160 bar	0 ... 2400 psi	0.01 bar 0.1 psi	0.05% FS

## External Pressure Modules (EXT) High Accuracy

Non Intrinsically Safe	Intrinsically Safe	Range <sup>(2)</sup>		1 Year Uncertainty(±) <sup>(1)</sup>
Barometric	Barometric-IS	800 ... 1200 mbar abs	23.6 ... 35.4 inHg a	0.5 mbar (0.015 inHg)
EXT10mD	EXT10mD-IS	±10 mbar differential	±4 iwc differential	0.1% RDG + 0.05% Span
EXT100m	EXT100m-IS	0 ... 100 mbar gauge	0 ... 40 iwc	0.025% RDG + 0.025% FS
EXT400mC	EXT400mC-IS	±400 mbar	±160 iwc	0.025% RDG + 0.02% FS
EXT1C	EXT1C-IS	±1 bar	-14.5 ... 15 psi	0.025% RDG + 0.015% FS
EXT2C	EXT2C-IS	-1 ... 2 bar	-14.5 ... 30 psi	0.025% RDG + 0.01% FS
EXT6C	EXT6C-IS	-1 ... 6 bar	-14.5 ... 90 psi	0.025% RDG + 0.01% FS
EXT20C	EXT20C-IS	-1 ... 20 bar	-14.5 ... 300 psi	0.025% RDG + 0.01% FS
EXT60	EXT60-IS	0 ... 60 bar	0 ... 900 psi	0.025% RDG + 0.01% FS
EXT100	EXT100-IS	0 ... 100 bar	0 ... 1500 psi	0.025% RDG + 0.01% FS
EXT160	EXT160-IS	0 ... 160 bar	0 ... 2400 psi	0.025% RDG + 0.01% FS
EXT250	EXT250-IS	0 ... 250 bar	0 ... 3700 psi	0.025% RDG + 0.015% FS
EXT600	EXT600-IS	0 ... 600 bar	0 ... 9000 psi	0.025% RDG + 0.015% FS
EXT1000	EXT1000-IS	0 ... 1000 bar	0 ... 15000 psi	0.025% RDG + 0.015% FS

1) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period. (k=2)

2) The internal pressure module's range may also be displayed in absolute pressure if a barometric module is used.

3) The MC2 Calibrator can hold one internal pressure module and the barometric option.

4) The MC2-IS does not have any internal pressure modules, but it does have a barometric option.

All external pressure modules (EXT) are also compatible with Beamex MC4, MC5, MC5-IS and MC5P Calibrators.

# Electrical generation, measurement and simulation

## mV measurement (T/C-terminals) -25 ... 150 mV

Range	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
-25 ... 150 mV	0.001 mV	0.02% RDG + 4 µV

Feature	Specification
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Input impedance	> 10 MΩ
Supported units	V, mV, µV
Display update rate	3 / second

## mV generation (T/C-terminals) -25 ... 150 mV

Range	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
-25 ... 150 mV	0.001 mV	0.02 % RDG + 4 µV

Feature	Specification
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Maximum load current	MC2: 5 mA MC2-IS: 1 mA
Load effect	< 5µV/mA
Supported units	V, mV, µV

## Voltage generation -3 ... 12 V (MC2-IS: -3 ... 11 V)

Range MC2	Range MC2-IS	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
±0.25 V	±0.25 V	0.01 mV	0.02 % RDG + 0.1 mV
-3 ... -0.25 V	-3 ... -0.25 V	0.1 mV	0.02 % RDG + 0.1 mV
0.25 ... 12 V	0.25 ... 11 V	0.1 mV	0.02 % RDG + 0.1 mV

Feature	Specification
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Maximum load current	MC2: 5 mA MC2-IS: 1 mA
Load effect	< 50 µV/mA
Supported units	V, mV, µV

## mA generation (source/sink) 0 ... 25 mA (MC2-IS: only sink)

Range	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
0 ... 25 mA	0.0001 mA	0.02 % RDG + 1.5 µA

Feature	Specification MC2	Specification MC2-IS
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Max load impedance (source)	750 Ω (0 ... 20 mA), 600 Ω (20 ... 25 mA)	none
Max loop voltage (sink)	60 V	30 V
Supported units	mA, µA	mA, µA

1) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period. (k=2).



# Electrical generation, measurement and simulation

## Resistance measurement 0 ... 4000 Ω

Range	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
0 ... 250 Ω	1 mΩ	4-wire connection: 0.02 % RDG + 3.5 mΩ
250 ... 2650 Ω	10 mΩ	3-wire connection: 0.02% RDG + 13.5 mΩ
2650 ... 4000 Ω	100 mΩ	

Feature	Specification
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Measurement current	Pulsed, bi-directional 1 mA (0..500 Ω), 0.2 mA (>500 Ω).
Supported units	Ω, kΩ
Display update rate	3 / second

## Resistance simulation 0 ... 4000 Ω

Range	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
0 ... 400 Ω	10 mΩ	0.04 % RDG or 30 mΩ (Whichever is greater)
400 ... 4000 Ω	100 mΩ	0.04 % RDG or 30 mΩ (Whichever is greater)

Feature	Specification MC2-IS	Specification MC2-IS
Temperature coefficient	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F	< ±0.0015% RDG / °C outside of 18 ... 28°C < ±0.0008% RDG / °F outside of 64.4 ... 82.4°F
Maximum Resistance excitation current	5 mA (0 ... 650 Ω) I <sub>exc</sub> × R <sub>sim</sub> < 3.25 V (650 ... 4000 Ω)	4 mA (0 ... 812 Ω) I <sub>exc</sub> × R <sub>sim</sub> < 3.25 V (812 ... 4000 Ω)
Settling time (pulsed currents)	1 ms	1 ms
Supported units	Ω, kΩ	Ω, kΩ

## Frequency generation 0.0005 ... 10 000 Hz

Range	Resolution	1 Year Uncertainty(±) <sup>1)</sup>
0.0005 ... 0.5 Hz	0.000001 Hz	0.01% RDG
0.5 ... 5 Hz	0.00001 Hz	0.01% RDG
5 ... 50 Hz	0.0001 Hz	0.01% RDG
50 ... 500 Hz	0.001 Hz	0.01% RDG
500 ... 5000 Hz	0.01 Hz	0.01% RDG
5000 ... 10000 Hz	0.1 Hz	0.01% RDG

Feature	Specification MC2	Specification MC2-IS
Temperature coefficient	Specification valid from -10 to 50°C (14 ... 122°F)	Specification valid from -10 to 50°C (14 ... 122°F)
Maximum load current	5 mA	1 mA
Output amplitude positive square wave	0 .. 12 V <sub>pp</sub> ±(0.2 V+5%)	0 .. 11 V <sub>pp</sub> ±(0.2 V+5%)
Output amplitude symmetric square wave	0 .. 6 V <sub>pp</sub> ±(0.2 V+5%)	0 .. 5.5 V <sub>pp</sub> ±(0.2 V+5%)
Duty cycle	1 ... 99 % (0.0009 ... 500 Hz), high / low time: min 25μs, max 1165 s	1 ... 99 % (0.0009 ... 500 Hz), high / low time: min 25μs, max 1165 s
Supported units	Hz, kHz, cph, cpm, 1/Hz (s), 1/kHz (ms), 1/MHz (μs)	Hz, kHz, cph, cpm, 1/Hz (s), 1/kHz (ms), 1/MHz (μs)
Jitter	< 0.28 μs	< 0.28 μs

## Pulse generation 0 ... 9 999 999 pulses

Feature	Specification MC2-IS	Specification MC2-IS
Range	0 to 9 999 999 pulses	0 to 9 999 999 pulses
Resolution	1 pulse	1 pulse
Maximum load current	5 mA	1 mA
Output amplitude positive pulse	0 ... 12 V <sub>pp</sub> ±(0.2 V+5%)	0 ... 11 V <sub>pp</sub> ±(0.2 V+5%)
Output amplitude symmetric pulse	0 ... 6 V <sub>pp</sub> ±(0.2 V+5%)	0 ... 5.5 V <sub>pp</sub> ±(0.2 V+5%)
Pulse frequency	0.0005 ... 10 000 Hz	0.0005 ... 10 000 Hz
Duty cycle	1 ... 99 % (0.0009 ... 500 Hz), high / low time: min 25μs, max 1165 s	1 ... 99 % (0.0009 ... 500 Hz), high / low time: min 25μs, max 1165 s

1) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period. (k=2).

# Temperature measurement and simulation

## Thermocouple measurement and simulation

Thermocouple types available as standard			
Type	Range (°C)	Range (°C)	1 Year Uncertainty (±) <sup>(1)</sup>
B <sup>(2)</sup>	0 ... 1820	0...200	<sup>(3)</sup>
		200...400	2.0 °C
		400...1820	1.0 °C
R <sup>(2)</sup>	-50 ... 1768	-50...0	1.0 °C
		0...100	0.8 °C
		100...1768	0.6 °C
S <sup>(2)</sup>	-50 ... 1768	-50...0 0...1768	1.0 °C 0.7 °C
E <sup>(2)</sup>	-270 ... 1000	-270...-200 -200...1000	<sup>(3)</sup> 0.25 °C
J <sup>(2)</sup>	-210 ... 1200	-210...1200	0.3 °C
K <sup>(2)</sup>	-270 ... 1372	-270...-200	<sup>(3)</sup>
		-200...1000	0.3 °C
		1000...1372	0.4 °C
N <sup>(2)</sup>	-270 ... 1300	-270...-200 -200...1300	<sup>(3)</sup> 0.4 °C
T <sup>(2)</sup>	-270 ... 400	-270...-200	<sup>(3)</sup>
		-200...-100	0.3 °C
		-100...400	0.2 °C
U <sup>(4)</sup>	-200 ... 600	-200...-100	0.3 °C
		-100...600	0.2 °C
L <sup>(4)</sup>	-200 ... 900	-200... 900	0.25°C
C <sup>(5)</sup>	0 ... 2315	0 ... 1000	0.4 °C
		1000 ... 2000	0.8 °C
		2000 ... 2315	1.2 °C
G <sup>(6)</sup>	0 ... 2315	0 ... 100	<sup>(3)</sup>
		100 ... 2315	1.0 °C
D <sup>(5)</sup>	0 ... 2315	0 ... 1000	0.4 °C
		1000 ... 2000	0.8 °C
		2000 ... 2315	1.2 °C

Feature	Measurement	Simulation
Resolution	0.01 °C	0.01 °C
Temperature coefficient	< ±0.0015% of thermovoltage / °C outside of 18...28°C < ±0.0008% of thermovoltage / °F outside of 64.4 ...82.4°F	< ±0.0015% of thermovoltage / °C outside of 18...28°C < ±0.0008% of thermovoltage / °F outside of 64.4 ...82.4°F
Input impedance	>10 MΩ	-
Supported units	°C, °F, K	°C, °F, K
Display update rate	3 / second	-
Maximum load current	-	MC2: 5 mA MC2-IS: 1 mA
Load effect	-	< 5 µV/mA

## Internal Reference Junction

Range (°C)	1 Year Uncertainty
-10 ... 50 °C	±0.25 °C

- 1) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period. (k=2).  
Uncertainty does not include reference junction uncertainty.
- 2) IEC 584, NIST MN 175, BS 4937, ANSI MC96.1
- 3) ±0.02 % of thermovoltage + 4 µV
- 4) DIN 43710
- 5) ASTM E 988 - 96
- 6) ASTM E 1751 - 95e1

# Temperature measurement and simulation

## RTD measurement and simulation

Sensor Type	Range	Resolution	Measurement 1 Year Uncertainty ( $\pm$ ) <sup>(1)</sup>	Simulation 1 Year Uncertainty ( $\pm$ ) <sup>(1, 2)</sup>
Pt 50 ... 1000	-200 ... 200 °C	0.01 °C	0.1 °C	0.15 °C
	200 ... 600 °C	0.01 °C	0.2 °C	0.25 °C
	600 ... 850 °C	0.01 °C	0.3 °C	0.35 °C
Ni 100	-60 ... 180 °C	0.01 °C	0.1 °C	0.15 °C
Ni 120	-80 ... 260 °C	0.01 °C	0.1 °C	0.15 °C
Cu10	-200 ... 260 °C	0.01 °C	0.2 °C	0.8 °C

Feature	Measurement	Simulation
Temperature coefficient	< $\pm 0.0015\%$ of resistance / °C outside of 18 ... 28°C < $\pm 0.0008\%$ of resistance / °F outside of 64.4 ... 82.4°F	< $\pm 0.0015\%$ of resistance / °C outside of 18 ... 28°C < $\pm 0.0008\%$ of resistance / °F outside of 64.4 ... 82.4°F
Measurement current	Pulsed, 1 mA (0..500 $\Omega$ ), 0.2 mA (>500 $\Omega$ ).	-
Maximum Resistance excitation current	-	MC2: 5 mA (0 ... 650 $\Omega$ ) $I_{exc} \times R_{sim} < 3.25 \text{ V}$ (650 ... 4000 $\Omega$ )  MC2-IS: 4 mA (0 ... 812 $\Omega$ ) $I_{exc} \times R_{sim} < 3.25 \text{ V}$ (812 ... 4000 $\Omega$ )
Supported units	°C, °F, K	°C, °F, K
Display update rate	3 / second	-

RTD types available as standard				
Pt50 (385)	Pt400 (385)	Pt100 (3926)	Pt100 (3923)	Cu10 (427)
Pt100 (385)	Pt500 (385)	Pt100 (391)	Ni100 (618)	
Pt200 (385)	Pt1000 (385)	Pt100 (375)	Ni120 (672)	

1) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period. (k=2).

2) Specification valid with an excitation current >0.2 mA (0..400  $\Omega$ ), >0.1 mA (400 ... 4000  $\Omega$ )

## Standard Accessories

- User guide
- Calibration certificate
- Internal rechargeable NiMH battery pack + battery charger
- Test leads and clips
- USB cable
- Adapter pressure connector - from G1/8" female to G 1/8" male with 60° internal cone (included in MC2-PE and MC2-MF models)
- Product safety information and EC declaration of conformity (included in MC2-IS)

## Optional Accessories

- Pressure T-hose
- Soft carrying case
- Connection cable for external pressure modules
- Dry battery cartridge (not in MC2-IS)
- Calibration handpumps

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