

MC2

Practical tools for field calibration.



- MC2 Pressure/Electrical Calibrator
- MC2 Temperature/Electrical Calibrator
- MC2 Multifunction Calibrator



beamex

MC2: Practicality for Calibration

There are a few must-have tools for an instrument technician: the MC2 is definitely one of them. The 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. An MC2 is a compact and easy-to-use, hand-held calibrator.

Once you begin using any of the MC2 calibrators, you will notice it is a straightforward, user-friendly calibrator. First of all, the MC2 is compact in size and design. It is easy to carry and use. Secondly, the MC2 has a large graphical display, a menu-based



interface and full numerical keyboard. Performing calibrations is quick and simple. In addition to this, the standard rechargeable battery and battery charger facilitate active use of MC2. Thirdly, the MC2 has impact protectors and a membrane keyboard. This makes MC2 a robust, weatherproof calibrator made to withstand tough use. Although the MC2 is a straightforward, practical calibrator, it still provides a wide range of functions and possibilities for calibrating.

Being a Beamex calibrator, MC2 represents the high, uncompromised quality standards evident in other Beamex calibration equipment. It is another MC calibrator you can rely on and a calibrator that completes your range of MC calibrators.

The MC2 Series Includes Three Different Portable Calibrators



MC2 Pressure/Electrical Calibrator, MC2 Temperature/Electrical Calibrator and MC2 Multifunction Calibrator.
A series of practical, compact and user-friendly portable calibrators for field use.

MC2 Feature comparison

Features	MC2 Pressure/Electrical Calibrator	MC2 Temperature/Electrical Calibrator	MC2 Multifunction Calibrator
Internal pressure module	•	-	•
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	•	•	•
Current generation (with internal and external supply)	-	•	•
Voltage generation	-	•	•
Frequency generation	-	•	•
Pulse generation	-	•	•
mV measurement / simulation	-	•	•
Resistance measurement / simulation	-	•	•
RTD measurement / simulation	-	•	•
TC measurement / simulation	-	•	•

Features of the MC2 Calibrator



1. MC2 has a large graphical display with a multilingual interface. The interface is menu-based, which makes the MC2 extremely user-friendly.

2. MC2 provides a number of configuration possibilities, such as both internal and external pressure modules.

3. MC2 is robust and made for tough use. The impact protectors and membrane keyboard make it field compatible and weatherproof.

4. MC2 has a full numerical keyboard. Entering numbers is both quick and easy.

Other Advanced Features

Feature	Specification
Error % display	When calibrating a transmitter, the transmitter's output may be displayed in an error % unit rather than in an engineering unit.
Error display in input or output units	When calibrating a transmitter, the transmitter's output may be displayed as error in input or output engineering units.
%-display	Any measurement or generation may be presented as a percent within the user-programmable range.
Scaling	A versatile, programmable scaling function allows the user to scale any measured or generated unit into any custom unit. Scaling also includes a rooting transfer function for flow applications, as well as custom transfer functions.
User setups	The unit has a large number of user-configurable setups that make it easy to save and quickly recall the desired configuration.
Leak testing	The leak test function indicates the pressure drop and leak rate during the user-programmable period.
Step and Ramp	The unit includes versatile and programmable automatic step and ramp generation function, as well as manual step function.
Programmable alarms	Any measurement can be programmed to have an alarm based on the measurement value or on its rate of change.
Damping	Programmable damping allows the user to select different filterings for the measurements.
Bar graph	The bar graph allows the user to display the measurement or generation as an analogue bar, including programmable starting and ending points.
Difference	Difference measurement allows the user to measure the difference between two pressure modules.
Deviation	The deviation function allows the user to display a deviation between a given reference value and the actual measurement.
Redundancy	Redundancy measurement allows the user to measure the same pressure using two pressure modules (internal and external) simultaneously. The unit's alarms sounds if the readings excessively differ from each other.
Additional information	The unit also allows the user to view various pieces of additional additional information such as Min / Max / Rate / Internal temperature / Thermocouple's thermovoltage / RTD sensor's resistance /, etc.
Games	The unit even includes two games.

MC2 - General specifications for all models

General Specifications

Feature	Specification
Display	60 mm x 60 mm (2.36" x 2.36"), 160 x 160 pixels, back lit LCD
Weight	720 ... 830 g (1.59 ... 1.83 lbs)
Dimensions	215 mm (8.5") x 102 mm (4") x 49 mm (1.9") (d/w/h)
Keyboard	Membrane keyboard
Battery type	Rechargeable NiMH pack, 4000 mAh, 3.6V DC
Charging time	5 hours
Charger supply	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.
Battery operation with optional dry battery cartridge and 4 alkaline AA cells	4 ... 8 hours in measurement mode, back light off. 3 ... 4 hours when sourcing an average of 12 mA to loop, with back light on.
Operating temperature	-10 ... 50°C (14 ... 122°F)
Operating temp. while charging batteries	0 ... 35°C (32 ... 95°F)
Storage temperature	-20 ... 60°C (-4 ... 140°F)
Humidity	0 to 80% R.H. non-condensing
Warm-up time	Specifications valid after a 5-minute warm-up period.
Max. input voltage	30 V AC, 60 V DC
Safety	Directive 73/23/EEC, EN 61010-1
EMC	Directive 89/336/EEC, EN 61326

Voltage measurement –1...60 V DC

Range	Resolution	1 Year Uncertainty(±) ¹⁾
±0.25 V	0.001mV	0.02% RDG + 5 µV
±(0.25 ... 1 V)	0.01 mV	0.02% RDG + 5 µV
1 ... 25 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(±) ¹⁾
±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
Maximum output current	> 25 mA, short circuit protected
Output voltage	24 V ± 10%
Output impedance in HART® compatible mode	300 Ω ± 20%

1) 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(±) ¹⁾
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

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	
Potential free contacts	Test Voltage (Current)	2.8 V (0.13 mA) or 24 V (35 mA)
Voltage level detection	Input impedance	> 1 MΩ
	Trigger level	-1 ... 14 V in 1 V steps



Pressure Measurements

Internal Pressure Modules (IPM)

Internal Module ³	Unit	Range ²	Resolution	1 Year Uncertainty(±) ¹
IPM200mC	kPa	±20	0.001	0.05% RDG + 0.05% FS
	mbar	±200	0.01	
	iwc	±80	0.01	
IPM2C	kPa	-100 to 200	0.01	0.05% FS
	bar	-1 to 2	0.0001	
	psi	-14.5 to 30	0.001	
IPM20C	kPa	-100 to 2000	0.1	0.05% FS
	bar	-1 to 20	0.001	
	psi	-14.5 to 300	0.01	
IPM160	MPa	0 ... 16	0.001	0.05% FS
	bar	0 ... 160	0.01	
	psi	0 ... 2400	0.1	

Barometric option 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/ft², psi, ozf/in², gf/cm², kgf/cm², kgf/m², kp/cm², at, mmH₂O, cmH₂O, mH₂O, iwc, ftH₂O, mmHg, cmHg, mHg, inHg, mmHg(0°C), inHg(0°C), mmH₂O(4°C; 60°F; 68°F/20°C), cmH₂O(4°C; 60°F; 68°F/20°C), inH₂O(4°C; 60°F; 68°F/20°C), ftH₂O(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

External Module	Range ²		Resolution	1 Year Uncertainty(±) ¹
EXT200mC-s	±200 mbar	±80 iwc	0.01 mbar 0.01 iwc	0.05% RDG + 0.05% FS
EXT2C-s	-1 ... 2 bar	-14.5 ... 30 psi	0.0001 bar 0.001 psi	0.05% FS
EXT20C-s	-1 ... 20 bar	-14.5 ... 300 psi	0.001 bar 0.01 psi	0.05% FS
EXT160-s	0 ... 160 bar	0 ... 2400 psi	0.01 bar 0.1 psi	0.05% FS

External Pressure Modules (EXT) High Accuracy

Module	Range ²	1 Year Uncertainty(±) ¹	
Barometric	800 ... 1200 mbar abs	23.6 ... 35.4 inHg a	0.5 mbar (0.015 inHg)
EXT10mD	±10 mbar differential	±4 iwc differential	0.1% RDG + 0.05% Span
EXT100m	0 ... 100 mbar gauge	0 ... 40 iwc	0.04% RDG + 0.025% FS
EXT400mC	±400 mbar	±160 iwc	0.04% RDG + 0.02% FS
EXT1C	±1 bar	-14.5 ... 15 psi	0.04% RDG + 0.01% FS
EXT2C	-1 ... 2 bar	-14.5 ... 30 psi	0.04% RDG + 0.01% FS
EXT6C	-1 ... 6 bar	-14.5 ... 90 psi	0.04% RDG + 0.01% FS
EXT20C	-1 ... 20 bar	-14.5 ... 300 psi	0.04% RDG + 0.01% FS
EXT60	0 ... 60 bar	0 ... 900 psi	0.04% RDG + 0.01% FS
EXT100	0 ... 100 bar	0 ... 1500 psi	0.04% RDG + 0.01% FS
EXT160	0 ... 160 bar	0 ... 2400 psi	0.04% RDG + 0.013% FS
EXT250	0 ... 250 bar	0 ... 3700 psi	0.04% RDG + 0.015% FS
EXT600	0 ... 600 bar	0 ... 9000 psi	0.04% RDG + 0.015% FS
EXT1000	0 ... 1000 bar	0 ... 15000 psi	0.04% 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

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

Electrical generation, measurement and simulation

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

Range	Resolution	1 Year Uncertainty(±) ¹⁾
-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(±) ¹⁾
-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	5 mA	
Load effect	< 5µV/mA	
Supported units	V, mV, µV	

Voltage generation -3 ... 12 V

Range	Resolution	1 Year Uncertainty(±) ¹⁾
±0.25 V	0.01 mV	0.02 % RDG + 0.1 mV
-3 ... -0.25 V	0.1 mV	0.02 % RDG + 0.1 mV
0.25 ... 12 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	5 mA	
Load effect	< 50 µV/mA	
Supported units	V, mV, µV	

mA generation (source/sink) 0 ... 25 mA

Range	Resolution	1 Year Uncertainty(±) ¹⁾
0 ... 25 mA	0.0001 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	
Max load impedance (source)	800 Ω (0 ... 20 mA), 640 Ω (20 ... 25 mA)	
Max loop voltage (sink)	60 V	
Supported units	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(\pm) ¹⁾
0 ... 250 Ω	1 m Ω	4-wire connection: 0.02 % RDG + 3.5 m Ω
250 ... 2650 Ω	10 m Ω	3-wire connection: 0.02% RDG + 13.5 m Ω
2650 ... 4000 Ω	100 m Ω	

Feature	Specification
Temperature coefficient	< $\pm 0.0015\%$ RDG / °C outside of 18 ... 28°C < $\pm 0.0008\%$ 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 , k Ω
Display update rate	3 / second

Resistance simulation 0 ... 4000 Ω

Range	Resolution	1 Year Uncertainty(\pm) ¹⁾
0 ... 400 Ω	10 m Ω	0.04 % RDG or 30 m Ω (Whichever is greater)
400 ... 4000 Ω	100 m Ω	0.04 % RDG or 30 m Ω (Whichever is greater)

Feature	Specification
Temperature coefficient	< $\pm 0.0015\%$ RDG / °C outside of 18 ... 28°C < $\pm 0.0008\%$ RDG / °F outside of 64.4 ... 82.4°F
Maximum Resistance excitation current	5 mA (0 ... 650 Ω) $I_{exc} \times R_{sim} < 3.25$ V (650 ... 4000 Ω)
Settling time (pulsed currents)	1 ms
Supported units	Ω , k Ω

Frequency generation 0.0005 ... 10 000 Hz

Range	Resolution	1 Year Uncertainty(\pm) ¹⁾
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
Temperature coefficient	Specification valid from -10 to 50°C (14 ... 122°F)
Maximum load current	5 mA
Output amplitude positive square wave	0 .. 12 Vpp $\pm(0.2$ V+5%)
Output amplitude symmetric square wave	0 .. 6 Vpp $\pm(0.2$ V+5%)
Duty cycle	1 ... 99 % (0.0009 ... 500 Hz), high / low time: min 25 μ s, max 1165 s
Supported units	Hz, kHz, cph, cpm, 1/Hz (s), 1/kHz (ms), 1/MHz (μ s)
Jitter	< 0.28 μ s

Pulse generation

Feature	Specification
Range	0 to 9 999 999 pulses
Resolution	1 pulse
Maximum load current	5 mA
Output amplitude positive pulse	0 .. 12 Vpp $\pm(0.2$ V+5%)
Output amplitude symmetric pulse	0 .. 6 Vpp $\pm(0.2$ V+5%)
Pulse frequency	0.0005 ... 10 000 Hz
Duty cycle	1 ... 99 % (0.0009 ... 500 Hz), high / low time: min 25 μ s, 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 (±) ⁽¹⁾
B ⁽²⁾	0 ... 1820	0...200	⁽³⁾
		200...400	2.0 °C
		400...1820	1.0 °C
R ⁽²⁾	-50 ... 1768	-50...0	1.0 °C
		0...100	0.8 °C
		100...1768	0.6 °C
S ⁽²⁾	-50 ... 1768	-50...0	1.0 °C
		0...1768	0.7 °C
E ⁽²⁾	-270 ... 1000	-270...-200 -200...1000	⁽³⁾ 0.25 °C
J ⁽²⁾	-210 ... 1200	-210...1200	0.3 °C
K ⁽²⁾	-270 ... 1372	-270...-200	⁽³⁾
		-200...1000	0.3 °C
		1000...1372	0.4 °C
N ⁽²⁾	-270 ... 1300	-270...-200	⁽³⁾
		-200...1300	0.4 °C
T ⁽²⁾	-270 ... 400	-270...-200	⁽³⁾
		-200...-100	0.3 °C
		-100...400	0.2 °C
U ⁽⁴⁾	-200 ... 600	-200...-100 -100...600	0.3 °C 0.2 °C
L ⁽⁴⁾	-200 ... 900	-200... 900	0.25°C
C ⁽⁵⁾	0 ... 2315	0 ... 1000	0.4 °C
		1000 ... 2000	0.8 °C
		2000 ... 2315	1.2 °C
G ⁽⁶⁾	0 ... 2315	0 ... 100	⁽³⁾
		100 ... 2315	1.0 °C
D ⁽⁵⁾	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	-	5 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) ⁽¹⁾	Simulation 1 Year Uncertainty (\pm) ^(1, 2)
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 Ω), 0.2 mA (>500 Ω).	-
Maximum Resistance excitation current	-	5 mA (0 ... 650 Ω) $I_{exc} \times R_{sim} < 3.25 \text{ V}$ (680 ... 4000 Ω)
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 Ω), >0.1 mA (400 ... 4000 Ω)

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 PE and MF models)

Optional Accessories

- Pressure T-hose
- Soft carrying case
- Connection cable for external pressure modules
- Dry battery cartridge
- Calibration handpumps





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Portable calibrators

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