

Beamex MC6

ADVANCED FIELD CALIBRATOR AND COMMUNICATOR



19

The impossible made possible:
combining advanced functionality with ease-of-use

CMX

LOGICAL

HART
COMMUNICATION PROTOCOL

PROFI
BUS

PROFI
BUS

beamex

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The impossible made possible: combining advanced functionality with ease-of-use

Beamex MC6 is an advanced, high-accuracy field calibrator and communicator. It offers calibration capabilities for pressure, temperature and various electrical signals. The MC6 also contains a fieldbus communicator for HART, FOUNDATION Fieldbus and Profibus PA instruments.

The usability and ease-of-use are among the main features of the MC6. It has a large 5.7" color touch-screen with a multilingual user interface. The robust IP65-rated dust- and water-proof casing, ergonomic design and light weight make it an ideal measurement device for field use in various industries, such as the pharmaceutical, energy, oil and gas, food and beverage, service as well as the petrochemical and chemical industries.

The MC6 is one device with five different user interface modes, which means that it is fast and easy to use, and you can carry less equipment in the field. The user interface modes are: Meter, Calibrator, Data Logger, Documenting Calibrator and Communicator. In addition, the MC6 communicates with Beamex CMX and LOGiCAL Calibration Management Software, enabling fully automated and digitalized calibration and documentation. Data can even be transferred wirelessly over Bluetooth.

In conclusion, the MC6 is more than a calibrator.



MC6 main features

High accuracy

Reliable and stable calibrator with unmatched accuracy for demanding industrial conditions.

Advanced functionality

Multifunction calibrator with calibration capabilities for pressure, temperature, and various electric signals.

Enhanced usability

This multilingual calibrator is optimized for different use cases and guides you step-by-step in your calibration work.

Field communicator

Multi-bus communicator for HART, FOUNDATION Fieldbus and Profibus PA instruments.

Digital data flow

Communicates with Beamex calibration management software for a fully digitalized calibration process.





High-accuracy, advanced field calibrator

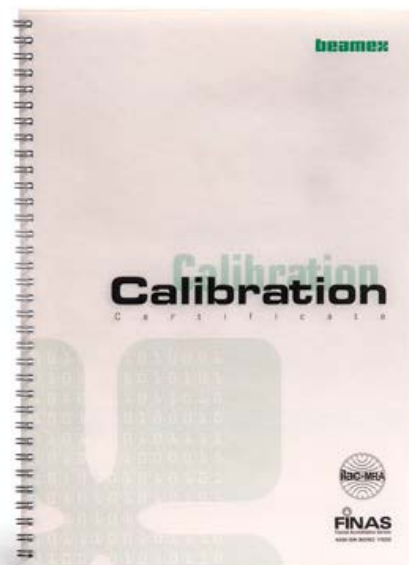
Accredited calibration certificate as standard

Each MC6 is delivered with a traceable, accredited calibration certificate as standard. The certificate includes calibration and uncertainty data from the calibration laboratory. The calibration laboratory's Scope of Accreditation can be found on Beamex's website (www.beamex.com).

Summary of accuracy figures

The MC6 has specifications for short-term accuracy and for 1-year total uncertainty. Brief summary of the accuracy figures:

- Pressure accuracy starting from $\pm(0.005\% \text{ FS} + 0.0125\% \text{ of reading})$.
- Temperature – RTD temperature measurement accuracy starting from $\pm 0.011 \text{ }^\circ\text{C}$.
- Electric – current measurement accuracy starting from $\pm(0.75 \text{ } \mu\text{A} + 0.0075\% \text{ of reading})$.



Designed for field use

User-friendly interface

The MC6 has a large 5.7" color touch-screen with high resolution and an effective adjustable backlight. In addition, the MC6 has a membrane keypad. A soft number keypad and alphabetical QWERTY text keypad will appear whenever necessary for easy number/text entries.

Robust, lightweight and ergonomic design

The MC6 is equipped with a durable rechargeable battery with up to two working days of operating time. The user interface keeps you up to date on the remaining operation time in hours and minutes, making it easy to follow how long the battery will last. Once the unit is switched on, it is ready to use in just a few seconds. The case is ergonomic and water-/dust-proof (IP65).



USER INTERFACE MODES

Meter

The meter mode is designed for quick and easy measurements of signals. Some multifunction calibrators are slow and difficult to use, so a simple multi-meter is used for quick measurements. The Meter mode is optimized for simple and easy metering, meaning one calibrator can be used for all measurements.



24

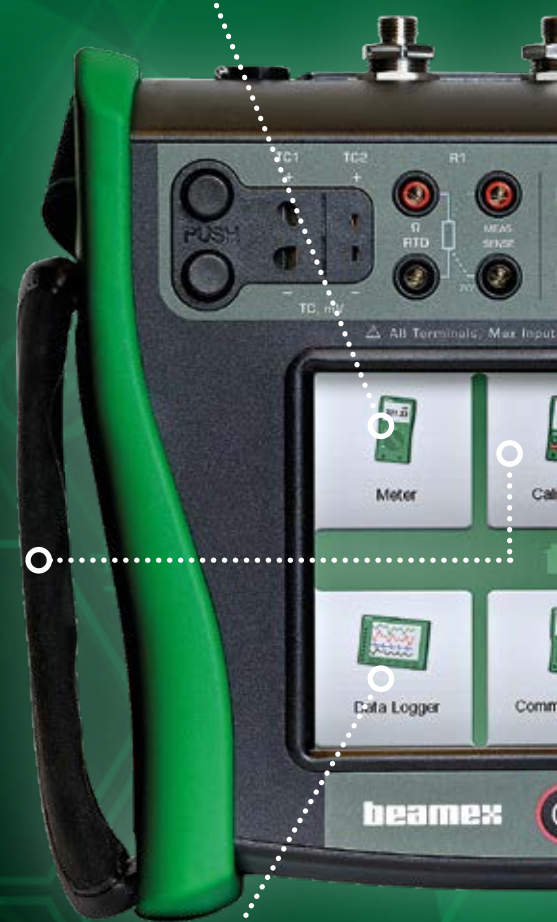
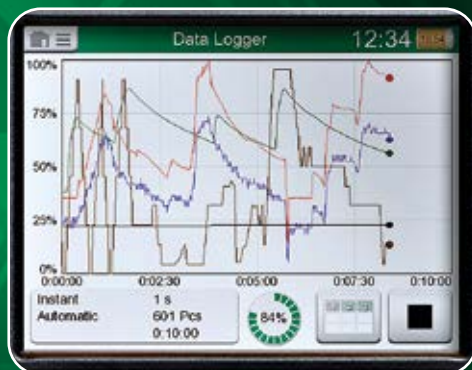
Calibrator

The Calibrator mode is designed for calibrating various process instruments. Often you need to check and calibrate process instruments, which typically have an input and an output. This means you either need two devices, or a single device capable of doing two things simultaneously. The Calibrator mode is optimized for this type of use.



Data Logger

The Data Logger is designed for logging up to nine measurements simultaneously. Often in industry, there is a need to measure signals for a certain period and to save the results for later analysis. This may be related to trouble-shooting, surveillance or calibration. The Data Logger mode is optimized for this type of use.





Documenting Calibrator

The Documenting Calibrator mode is designed for the documented and automated calibration of process instruments. With the Documenting Calibrator mode, the calibration process is guided, and the calibrator can automatically set the calibration points and document the results. The Documenting Calibrator mode also works together with calibration management software.



Communicator

The Communicator mode is designed to communicate with smart instruments. In today's process plants, smart instrumentation is being used to an increasing degree, so engineers need to use communicators or configuration software. Most of this instrumentation is HART, FOUNDATION Fieldbus or Profibus PA. The Communicator mode is optimized for communicator use to calibrate, configure, and trim your smart instruments.



Settings

The Settings mode allows you to edit the various settings of the calibrator. These settings include for example language selection, power management, regional settings, date & time and different maintenance settings.



Multi-bus field communicator for HART, FOUNDATION Fieldbus and Profibus PA instruments

Communicator

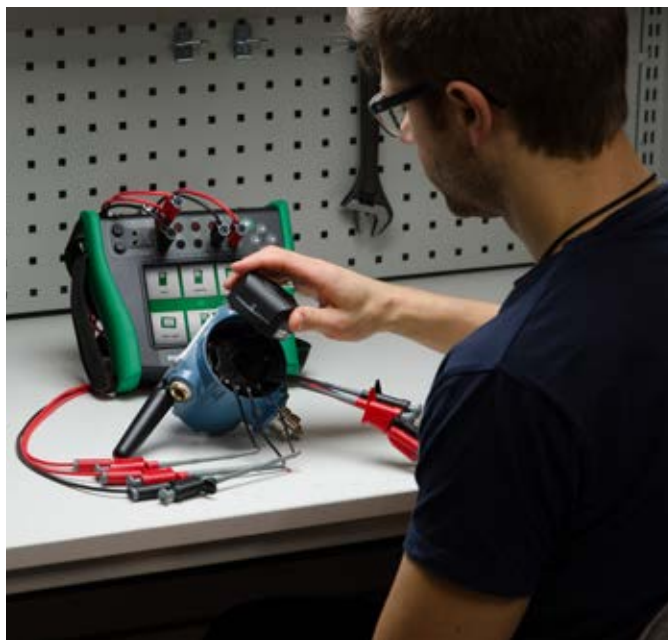
The communicator mode is a multi-bus communicator for HART, FOUNDATION Fieldbus and Profibus PA instruments. All of the communicator electronics for all protocols can be built into the MC6, including internal loop power supply with various required impedances for different buses, which means there is no need to use any external loop supply or resistors.

Multi-bus communicator

The MC6 communicator can be used with all types of fieldbus instruments, not only pressure and temperature transmitters. All 3 protocols can be simultaneously installed into an MC6, and therefore the very same device can be used as a HART, FOUNDATION Fieldbus and Profibus PA communicator. With the MC6, you can access all parameters in all blocks of a fieldbus instrument. Its memory stores device descriptions for the fieldbus instruments. New device description files are available on Beamex website and can be easily downloaded into calibrator's memory.

Automated temperature and pressure calibrations

The MC6 can communicate with selected pressure controllers and temperature dry-blocks to automate calibrations. MC6 can send setpoints to controllers and read the output from the device under test automatically. Use the MC6 together with a Beamex ePG electric pressure pump or other supported pressure controllers or temperature dry blocks for fully automatic pressure and temperature calibrations



Additional features

FEATURE	SPECIFICATION
Scaling	A versatile programmable scaling function allows user to scale any measurement or generation unit into any other unit. Supports also rooting transfer function for flow applications. Also, custom units and custom transfer functions are supported.
Alarm	An alarm that can be programmed with high or low limit, as well as slow rate or fast rate limit.
Leak test	A dedicated function that can be used to analyse a change in any measurement. Can be used for pressure leak testing as well as any stability testing.
Damping	A programmable damping allows user to filter any measurement.
Resolution	Possibility to change the resolution of any measurement by reducing or adding decimals.
Step	A programmable step function for any generation or simulation.
Ramp	A programmable ramp function for any generation or simulation.
Quick access	Possibility to set five (5) quick access buttons in generation to easily generate the programmed values.
Spinner	Possibility to easily step any digit in the generation value up or down.
Additional info	Allow user to see additional information in the screen such as: min, max, rate, average, internal temperature, RTD sensor's resistance, thermocouple's thermovoltage, range min/max, etc.
Function info	Displays more information on the selected function.
Connection diagrams	Displays a picture showing where to connect the test leads with the selected function.
Users	Possibility to create a list of persons in the documenting calibrator in order to easily select who did the calibration.
Custom pressure unit	Large number of user-defined pressure units can be created.
Custom RTD sensor	Unlimited number of user-defined RTD sensors can be created using the Callendar van Dusen coefficients.
Custom point sets	Unlimited number of user-defined point sets can be created in calibration of an instrument, or step generation.
Custom transfer function	Unlimited number of user-defined transfer functions can be created in calibration of an instrument or in scaling function.

Note: All features are not available in all user interface modes.



Specifications ⁽¹⁾

GENERAL SPECIFICATIONS

FEATURE	VALUE
Display	5.7" Diagonal 640 x 480 TFT LCD module
Touch panel	5-wire resistive touch screen
Keyboard	Membrane keyboard
Backlight	LED backlight, adjustable brightness
Weight	1.5...2.0 kg (3.3...4.4 lb)
Dimensions (D x W x H)	200 mm x 230 mm x 70 mm (7.87" x 9.06" x 2.76")
Battery type	Rechargeable lithium-ion battery, 4300 mAh, 11.1 V
Charging time	Approximately 4 hours
Charger supply	100...240 VAC, 50–60 Hz
Battery operation time	10...16 hours
Operating temperature	–10...45 °C (14...113 °F)
Operating temperature while charging batteries	0...30 °C (32...86 °F)
Storage temperature	–20...60 °C (–4...140 °F)
Specifications valid	–10...45 °C, unless other mentioned
Operating humidity	0...80% R.H. non-condensing
Computer interface	USB / Bluetooth
Calibration certificate	Accredited calibration certificate
Warmup time	Specifications valid after a 5 minute warmup period.
Max. input voltage	30 V AC, 60 V DC
Display update rate	3 readings/second
Safety	Please see EU/UKCA declaration on Beamex website
EMC	Please see EU/UKCA declaration on Beamex website
Ingress protection	IP65
RoHS compliance	Please see EU/UKCA declaration on Beamex website
Drop test	IEC 60068-2-32. 1 meter (3.28 ft)
Vibration	IEC 60068-2-64. Random, 2 g, 5...500 Hz
Max altitude	3000 m (9842 ft)
Warranty	Warranty 3 years. 1 year for battery pack.

¹⁾ All specifications are subject to change without further notice.

MEASUREMENT, GENERATION AND SIMULATION FUNCTIONS

- Pressure measurement (internal/external pressure modules)
 - Voltage measurement (± 1 V and $-1...60$ VDC)
 - Current measurement (± 100 mA) (internal or external supply)
 - Frequency measurement (0...50 kHz)
 - Pulse counting (0...10 Mpulse)
 - Switch state sensing (dry/wet switch)
 - Built-in 24 VDC loop supply (low impedance, HART impedance or FF/PA impedance)
 - Voltage generation (± 1 V and $-3...24$ VDC)
 - Current generation (0...55 mA) (active/passive, i.e. Internal or external supply)
 - Resistance measurement, two simultaneous channels (0...4 k Ω)
 - Resistance simulation (0...4 k Ω)
 - RTD measurement, two simultaneous channels
 - RTD simulation
 - TC measurement, two simultaneous channels (universal connector/mini-plug)
 - TC simulation
 - Frequency generation (0...50 kHz)
 - Pulse queue generation (0...10 Mpulse)
 - HART communicator
 - FOUNDATION Fieldbus communicator
 - Profibus PA communicator
- (Some of the above functions are optional)

PRESSURE MEASUREMENT

INTERNAL MODULES	EXTERNAL MODULES	UNIT	RANGE ⁽³⁾	RESOLUTION	ACCURACY ⁽¹⁾ (±)	1 YEAR UNCERTAINTY (±) ⁽²⁾
PB	EXT B	kPa a mbar a psi a	70 ... 120 700 ... 1200 10.15 ... 17.4	0.01 0.1 0.001	0.03 kPa 0.3 mbar 0.0044 psi	0.05 kPa 0.5 mbar 0.0073 psi
P10mD	EXT10mD	kPa diff mbar diff iwc diff	±1 ±10 ±4	0.0001 0.001 0.001	0.05% Span	0.05% Span + 0.1% RDG
P100m	EXT100m	kPa mbar iwc	0 ... 10 0 ... 100 0 ... 40	0.0001 0.001 0.001	0.015% FS + 0.0125% RDG	0.025% FS + 0.025% RDG
P400mC	EXT400mC	kPa mbar iwc	±40 ±400 ±160	0.001 0.01 0.001	0.01% FS + 0.0125% RDG	0.02% FS + 0.025% RDG
P1C	EXT1C	kPa bar psi	±100 ±1 -14.5 ... 15	0.001 0.00001 0.0001	0.007% FS + 0.0125% RDG	0.015% FS + 0.025% RDG
P2C	EXT2C	kPa bar psi	-100 ... 200 -1 ... 2 -14.5 ... 30	0.001 0.00001 0.0001	0.005% FS + 0.01% RDG	0.01% FS + 0.025% RDG
P6C	EXT6C	kPa bar psi	-100 ... 600 -1 ... 6 -14.5 ... 90	0.01 0.0001 0.001	0.005% FS + 0.01% RDG	0.01% FS + 0.025% RDG
P20C	EXT20C	kPa bar psi	-100 ... 2000 -1 ... 20 -14.5 ... 300	0.01 0.0001 0.001	0.005% FS + 0.01% RDG	0.01% FS + 0.025% RDG
P60	EXT60	kPa bar psi	0 ... 6000 0 ... 60 0 ... 900	0.1 0.001 0.01	0.005% FS + 0.0125% RDG	0.01% FS + 0.025% RDG
P100	EXT100	MPa bar psi	0 ... 10 0 ... 100 0 ... 1500	0.0001 0.001 0.01	0.005% FS + 0.0125% RDG	0.01% FS + 0.025% RDG
P160	EXT160	MPa bar psi	0 ... 16 0 ... 160 0 ... 2400	0.0001 0.001 0.01	0.005% FS + 0.0125% RDG	0.01% FS + 0.025% RDG
-	EXT250	MPa bar psi	0 ... 25 0 ... 250 0 ... 3700	0.001 0.01 0.1	0.007% FS + 0.0125% RDG	0.015% FS + 0.025% RDG
-	EXT600	MPa bar psi	0 ... 60 0 ... 600 0 ... 9000	0.001 0.01 0.1	0.007% FS + 0.01% RDG	0.015% FS + 0.025% RDG
-	EXT1000	MPa bar psi	0 ... 100 0 ... 1000 0 ... 15000	0.001 0.01 0.1	0.007% FS + 0.01% RDG	0.015% FS + 0.025% RDG

¹⁾ Accuracy includes hysteresis, nonlinearity and repeatability (k=2).

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

³⁾ Every internal/external gauge pressure module's range may be displayed also in absolute pressure if the barometric module (PB or EXT B) is installed/connected.

Maximum number of internal pressure modules is 3 gauge/differential pressure modules and one barometric (PB) module.

There is a connection for external pressure modules.

% RDG = Percentage of the actual pressure reading.

% FS = Percentage of the full scale range from zero to maximum.

% Span = Percentage of the total measurement range from minimum to maximum.

SUPPORTED PRESSURE UNITS

Pa, kPa, hPa, MPa, mbar, bar, gf/cm², kgf/cm², kgf/m², kp/cm², lbf/ft², psi, at, torr, atm, ozf/in², iwc, inH₂O, ftH₂O, mmH₂O, cmH₂O, mH₂O, mmHg, cmHg, mHg, inHg, mmHg(0 °C), inHg(0 °C), mmH₂O(60 °F), mmH₂O(68 °F), mmH₂O(4 °C), cmH₂O(60 °F), cmH₂O(68 °F), cmH₂O(4 °C), inH₂O(60 °F), inH₂O(68 °F), inH₂O(4 °C), ftH₂O(60 °F), ftH₂O(68 °F), ftH₂O(4 °C).
Large number of user pressure units can be created.

TEMPERATURE COEFFICIENT

<±0.001% RDG / °C outside 15–35 °C (59–95 °F).

P10mD / EXT10mD: < ±0.002% Span / °C outside 15–35 °C (59–95 °F).

MAX OVERPRESSURE

2 times the nominal pressure. Except the following modules;

PB/EXTB: 1200 mbar abs (35.4 inHg abs).

P10mD/EXT10mD: 200 mbar (80 iwc).

EXT600: 900 bar (13000 psi).

EXT1000: 1000 bar (15000 psi).

PRESSURE MEDIA

Modules up to P6C/EXT6C: dry, clean air or other clean, inert, non-toxic, non-corrosive gases.

Modules P20C/EXT20C and higher: clean, inert, non-toxic, non-corrosive gases or liquids.

WETTED PARTS

AlSi316 stainless steel, Hastelloy, Nitrile rubber.

PRESSURE CONNECTIONS

PB/EXTB: 10/32" (M5) female.

P10mD/EXT10mD: 2 x adapters for 1/8" ID hose (3,2 mm).

P100m/EXT100m to P20C/EXT20C: Bx G1/8" male compatible with Beamex 40 bar hoses.

P60, P100, P160: Bx 1215 male compatible with Beamex 630 bar hoses.

EXT60 to EXT1000: G1/4" B male.

TC MEASUREMENT & SIMULATION

TC1 measurement & simulation / TC2 measurement

TYPE	RANGE (°C)	RANGE (°C)	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY (±) ⁽²⁾	
B ⁽³⁾	0...1820	0...200	⁽⁸⁾	⁽⁴⁾	
		200...500	1.5 °C	2.0 °C	
		500...800	0.6 °C	0.8 °C	
		800...1820	0.4 °C	0.5 °C	
R ⁽³⁾	-50...1768	-50...0	0.8 °C	1.0 °C	
		0...150	0.6 °C	0.7 °C	
		150...400	0.35 °C	0.45 °C	
		400...1768	0.3 °C	0.4 °C	
S ⁽³⁾	-50...1768	-50...0	0.7 °C	0.9 °C	
		0...100	0.6 °C	0.7 °C	
		100...300	0.4 °C	0.55 °C	
		300...1768	0.35 °C	0.45 °C	
E ⁽³⁾	-270...1000	-270...-200	⁽⁸⁾	⁽⁴⁾	
		-200...0	0.05 °C + 0.04% RDG	0.07 °C + 0.06% RDG	
		0...1000	0.05 °C + 0.003% RDG	0.07 °C + 0.005% RDG	
J ⁽³⁾	-210...1200	-210...-200	⁽⁸⁾	⁽⁴⁾	
		-200...0	0.06 °C + 0.05% RDG	0.08 °C + 0.06% RDG	
		0...1200	0.06 °C + 0.003% RDG	0.08 °C + 0.006% RDG	
K ⁽³⁾	-270...1372	-270...-200	⁽⁸⁾	⁽⁴⁾	
		-200...0	0.08 °C + 0.07% RDG	0.1 °C + 0.1% RDG	
		0...1000	0.08 °C + 0.004% RDG	0.1 °C + 0.007% RDG	
		1000...1372	0.012% RDG	0.017% RDG	
N ⁽³⁾	-270...1300	-270...-200	⁽⁸⁾	⁽⁴⁾	
		-200...-100	0.15% RDG	0.2% RDG	
		-100...0	0.11 °C + 0.04% RDG	0.15 °C + 0.05% RDG	
		0...800	0.11 °C	0.15 °C	
800...1300	0.06 °C + 0.006% RDG	0.07 °C + 0.01% RDG			
	T ⁽³⁾	-270...400	-270...-200	⁽⁸⁾	⁽⁴⁾
			-200...0	0.07 °C + 0.07% RDG	0.1 °C + 0.1% RDG
0...400			0.07 °C	0.1 °C	
U ⁽⁵⁾	-200...600	-200...0	0.07 °C + 0.05% RDG	0.1 °C + 0.07% RDG	
		0...600	0.07 °C	0.1 °C	
L ⁽⁵⁾	-200...900	-200...0	0.06 °C + 0.025% RDG	0.08 °C + 0.04% RDG	
		0...900	0.06 °C + 0.002% RDG	0.08 °C + 0.005% RDG	
C ⁽⁶⁾	0...2315	0...1000	0.22 °C	0.3 °C	
		1000...2315	0.018% RDG	0.027% RDG	
G ⁽⁷⁾	0...2315	0...60	⁽⁸⁾	⁽⁴⁾	
		60...200	0.9 °C	1.0 °C	
		200...400	0.4 °C	0.5 °C	
		400...1500	0.2 °C	0.3 °C	
		1500...2315	0.014% RDG	0.02% RDG	
D ⁽⁶⁾	0...2315	0...140	0.3 °C	0.4 °C	
		140...1200	0.2 °C	0.3 °C	
		1200...2100	0.016% RDG	0.024% RDG	
		2100...2315	0.45 °C	0.65 °C	

Resolution 0.01 °C.

With internal reference junction please see separate specification.

Also other thermocouple types available as option, please contact Beamex.

¹⁾ Accuracy includes hysteresis, nonlinearity and repeatability (k=2).

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

³⁾ IEC 584, NIST MN 175, BS 4937, ANSI MC96.1

⁴⁾ ±0.007% of thermovoltage + 4 µV

⁵⁾ DIN 43710

⁶⁾ ASTM E 988 – 96

⁷⁾ ASTM E 1751 – 95e1

⁸⁾ ±0.004% of thermovoltage + 3 µV

Measurement input impedance	> 10 MΩ
Simulation maximum load current	5 mA
Simulation load effect	< 5 µV/mA
Supported units	°C, °F, Kelvin, °Ré, °Ra
Connector	TC1: Universal TC connector , TC2: TC Miniplug

RTD MEASUREMENT & SIMULATION

R1 & R2 measurement

SENSOR TYPE	RANGE (°C)	RANGE (°C)	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY (±) ⁽²⁾
Pt50(385)	-200...850	-200...270 270...850	0.025 °C 0.009% RDG	0.03 °C 0.012% RDG
Pt100(375) Pt100(385) Pt100(389) Pt100(391) Pt100(3926)	-200...850	-200...0 0...850	0.011 °C 0.011 °C + 0.009% RDG	0.015 °C 0.015 °C + 0.012% RDG
Pt100(3923)	-200...600	-200...0 0...600	0.011 °C 0.011 °C + 0.009% RDG	0.015 °C 0.015 °C + 0.012% RDG
Pt200(385)	-200...850	-200...-80 -80...0 0...260 260...850	0.007 °C 0.016 °C 0.016 °C + 0.009% RDG 0.03 °C + 0.011% RDG	0.01 °C 0.02 °C 0.02 °C + 0.012% RDG 0.045 °C + 0.02% RDG
Pt400(385)	-200...850	-200...-100 -100...0 0...850	0.007 °C 0.015 °C 0.026 °C + 0.01% RDG	0.01 °C 0.02 °C 0.045 °C + 0.019% RDG
Pt500(385)	-200...850	-200...-120 -120...-50 -50...0 0...850	0.008 °C 0.013 °C 0.025 °C 0.025 °C + 0.01% RDG	0.01 °C 0.02 °C 0.045 °C 0.045 °C + 0.019% RDG
Pt1000(385)	-200...850	-200...-150 -150...-50 -50...0 0...850	0.007 °C 0.018 °C 0.022 °C 0.022 °C + 0.01% RDG	0.008 °C 0.03 °C 0.04 °C 0.04 °C + 0.019% RDG
Ni100(618)	-60...180	-60...0 0...180	0.009 °C 0.009 °C + 0.005% RDG	0.012 °C 0.012 °C + 0.006% RDG
Ni120(672)	-80...260	-80...0 0...260	0.009 °C 0.009 °C + 0.005% RDG	0.012 °C 0.012 °C + 0.006% RDG
Cu10(427)	-200...260	-200...260	0.012 °C	0.16 °C

32

R1 Simulation

SENSOR TYPE	RANGE (°C)	RANGE (°C)	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY (±) ⁽²⁾
Pt50(385)	-200...850	-200...270 270...850	0.055 °C 0.035 °C + 0.008% RDG	0.11 °C 0.11 °C + 0.015% RDG
Pt100(375) Pt100(385) Pt100(389) Pt100(391) Pt100(3926)	-200...850	-200...0 0...850	0.025 °C 0.025 °C + 0.007% RDG	0.05 °C 0.05 °C + 0.014% RDG
Pt100(3923)	-200...600	-200...0 0...600	0.025 °C 0.025 °C + 0.007% RDG	0.05 °C 0.05 °C + 0.014% RDG
Pt200(385)	-200...850	-200...-80 -80...0 0...260 260...850	0.012 °C 0.02 °C 0.02 °C + 0.006% RDG 0.03 °C + 0.011% RDG	0.025 °C 0.035 °C 0.04 °C + 0.011% RDG 0.06 °C + 0.02% RDG
Pt400(385)	-200...850	-200...-100 -100...0 0...850	0.01 °C 0.015 °C 0.027 °C + 0.01% RDG	0.015 °C 0.03 °C 0.05 °C + 0.019% RDG
Pt500(385)	-200...850	-200...-120 -120...-50 -50...0 0...850	0.008 °C 0.012 °C 0.026 °C 0.026 °C + 0.01% RDG	0.015 °C 0.025 °C 0.05 °C 0.05 °C + 0.019% RDG
Pt1000(385)	-200...850	-200...-150 -150...-50 -50...0 0...850	0.006 °C 0.017 °C 0.023 °C 0.023 °C + 0.01% RDG	0.011 °C 0.03 °C 0.043 °C 0.043 °C + 0.019% RDG
Ni100(618)	-60...180	-60...0 0...180	0.021 °C 0.019 °C	0.042 °C 0.037 °C + 0.001% RDG
Ni120(672)	-80...260	-80...0 0...260	0.021 °C 0.019 °C	0.042 °C 0.037 °C + 0.001% RDG
Cu10(427)	-200...260	-200...260	0.26 °C	0.52 °C

For platinum sensors ITS-90 and Callendar van Dusen coefficients can be programmed. Also other RTD types available as option, please contact Beamex.

FEATURE	SPECIFICATION
RTD Measurement current	Pulsed, bi-directional 1 mA (0...500 Ω), 0.2 mA (> 500 Ω)
4-wire connection	Measurement specifications valid
3-wire measurement	Add 10 mΩ
Max resistance excitation current	5 mA (0...650 Ω). $I_{exc} \times R_{sim} < 3.25 \text{ V}$ (650...4000 Ω)
Min resistance excitation current	> 0.2 mA (0...400 Ω). > 0.1 mA (400...4000 Ω)
Simulation settling time with pulsed excitation current	< 1 ms
Supported units	°C, °F, Kelvin, °Ré, °Ra

INTERNAL REFERENCE JUNCTION TC1 & TC2

RANGE (°C)	ACCURACY ¹	1 YEAR UNCERTAINTY ²
-10...45°C	±0.10°C	±0.15°C

Specifications valid in temperature range: 15...35°C.

Temperature coefficient outside of 15...35°C: ±0.005°C/°C.

Specifications assumes that calibrator has stabilized in environmental condition, being switched on, for minimum of 90 minutes. For a measurement or simulation done sooner than that, please add uncertainty of 0.15°C.

In order to calculate the total uncertainty of thermocouple measurement or simulation with internal reference junction used, please add the relevant thermocouple uncertainty and the reference junction uncertainty together as a root sum of the squares.

VOLTAGE MEASUREMENT

IN (-1...60 V)

RANGE	RESOLUTION	ACCURACY ¹	1 YEAR UNCERTAINTY ²
-1.01...1 V	0.001 mV	3 μV + 0.003% RDG	5 μV + 0.006% RDG
1...60.6 V	0.01 mV	0.125 mV + 0.003% RDG	0.25 mV + 0.006% RDG
Input impedance		> 2 MΩ	
Supported units		V, mV, μV	

TC1 & TC2 (-1...1 V)

RANGE	RESOLUTION	ACCURACY ¹	1 YEAR UNCERTAINTY ²
-1.01...1.01 V	0.001 mV	3 μV + 0.004% RDG	4 μV + 0.007% RDG
Input impedance		> 10 MΩ	
Supported units		V, mV, μV	
Connector		TC1: Universal TC connector , TC2: TC Miniplug	

¹ Accuracy includes hysteresis, nonlinearity and repeatability (k=2).

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

VOLTAGE GENERATION

OUT (-3...24 V)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
-3...10 V	0.00001 V	0.05 mV + 0.004% RDG	0.1 mV + 0.007% RDG
10...24 V	0.0001 V	0.05 mV + 0.004% RDG	0.1 mV + 0.007% RDG
Maximum load current		10 mA	
Short circuit current		>100 mA	
Load effect		< 50 μ V/mA	
Supported units		V, mV, μ V	

TC1 (-1...1 V)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
-1...1 V	0.001 mV	3 μ V + 0.004% RDG	4 μ V + 0.007% RDG
Maximum load current		5 mA	
Load effect		< 5 μ V/mA	
Supported units		V, mV, μ V	

34

CURRENT MEASUREMENT

IN (-100...100 mA)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
-25...25 mA	0.0001 mA	0.75 μ A + 0.0075% RDG	1 μ A + 0.01% RDG
\pm (25...101 mA)	0.001 mA	0.75 μ A + 0.0075% RDG	1 μ A + 0.01% RDG
Input impedance		< 10 Ω	
Supported units		mA, μ A	
Loop supply		Internal 24 V \pm 10% (max 55 mA), or external max 60 VDC	

CURRENT GENERATION

OUT (0...55 mA)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
0...25 mA	0.0001 mA	0.75 μ A + 0.0075% RDG	1 μ A + 0.01% RDG
25...55 mA	0.001 mA	1.5 μ A + 0.0075% RDG	2 μ A + 0.01% RDG
Internal loop supply		24 V \pm 5%. Max 55 mA.	
Max load impedance w. internal supply		24 V / (generated current). 1140 Ω @ 20 mA, 450 Ω @ 50 mA	
Max external loop supply		60 VDC	
Supported units		mA, μ A	

¹⁾ Accuracy includes hysteresis, nonlinearity and repeatability (k=2).

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

FREQUENCY MEASUREMENT

IN (0.0027...51 000 Hz)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
0.0027...0.5 Hz	0.000001 Hz	0.000002 Hz + 0.001% RDG	0.000002 Hz + 0.002% RDG
0.5...5 Hz	0.00001 Hz	0.00002 Hz + 0.001% RDG	0.00002 Hz + 0.002% RDG
5...50 Hz	0.0001 Hz	0.0002 Hz + 0.001% RDG	0.0002 Hz + 0.002% RDG
50...500 Hz	0.001 Hz	0.002 Hz + 0.001% RDG	0.002 Hz + 0.002% RDG
500...5 000 Hz	0.01 Hz	0.02 Hz + 0.001% RDG	0.02 Hz + 0.002% RDG
5 000...51 000 Hz	0.1 Hz	0.2 Hz + 0.001% RDG	0.2 Hz + 0.002% RDG
Input impedance	>1 MΩ		
Supported units	Hz, kHz, cph, cpm, 1/Hz(s), 1/kHz(ms), 1/MHz(μs)		
Trigger level	Dry contact, wet contact -1...14 V		
Minimum signal amplitude	1.0 Vpp (<10kHz), 1.2 Vpp (10...50 kHz)		

FREQUENCY GENERATION

OUT (0.0005...50 000 Hz)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
0.0005...0.5 Hz	0.000001 Hz	0.000002 Hz + 0.001% RDG	0.000002 Hz + 0.002% RDG
0.5...5 Hz	0.00001 Hz	0.00002 Hz + 0.001% RDG	0.00002 Hz + 0.002% RDG
5...50 Hz	0.0001 Hz	0.0002 Hz + 0.001% RDG	0.0002 Hz + 0.002% RDG
50...500 Hz	0.001 Hz	0.002 Hz + 0.001% RDG	0.002 Hz + 0.002% RDG
500...5000 Hz	0.01 Hz	0.02 Hz + 0.001% RDG	0.02 Hz + 0.002% RDG
5 000...50 000 Hz	0.1 Hz	0.2 Hz + 0.001% RDG	0.2 Hz + 0.002% RDG
Maximum load current	10 mA		
Wave forms	Positive square, symmetric square		
Output amplitude positive square wave	0...24 Vpp		
Output amplitude symmetric square wave	0...6 Vpp		
Duty Cycle	1...99%		
Amplitude accuracy	< 5% of amplitude		
Supported units	Hz, kHz, cph, cpm, 1/Hz(s), 1/kHz(ms), 1/MHz(μs)		

35

PULSE COUNTING

IN (0...9 999 999 pulses)

FEATURE	SPECIFICATION
Input impedance	>1 MΩ
Trigger level	Dry contact, wet contact -1...14 V
Minimum signal amplitude	1 Vpp (< 10 kHz), 1.2 Vpp (10...50 kHz)
Max frequency	50 kHz
Trigger edge	Rising, falling

¹⁾ Accuracy includes hysteresis, nonlinearity and repeatability (k=2).

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

PULSE GENERATION

OUT (0...9 999 999 pulses)

FEATURE	SPECIFICATION
Resolution	1 pulse
Maximum load current	10 mA
Output amplitude positive pulse	0...24 Vpp
Output amplitude symmetric pulse	0...6 Vpp
Pulse frequency range	0.0005...10 000 Hz
Duty cycle	1...99%

RESISTANCE MEASUREMENT

R1 & R2 (0...4000 Ω)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
-1...100 Ω	0.001 Ω	4.5 mΩ	6 mΩ
100...110 Ω	0.001 Ω	0.0045% RDG	0.006% RDG
110...150 Ω	0.001 Ω	0.005% RDG	0.007% RDG
150...300 Ω	0.001 Ω	0.006% RDG	0.008% RDG
300...400 Ω	0.001 Ω	0.007% RDG	0.009% RDG
400...4 040 Ω	0.01 Ω	9 mΩ + 0.008% RDG	12 mΩ + 0.015% RDG

Measurement current	Pulsed, bi-directional 1 mA (0...500 Ω), 0.2 mA (>500 Ω)
Supported units	Ω, kΩ
4-wire connection	Measurement specifications valid
3-wire measurement	Add 10 mΩ

RESISTANCE SIMULATION

R1 (0...4000 Ω)

RANGE	RESOLUTION	ACCURACY ⁽¹⁾	1 YEAR UNCERTAINTY ⁽²⁾
0...100 Ω	0.001 Ω	10 mΩ	20 mΩ
100...400 Ω	0.001 Ω	5 mΩ + 0.005% RDG	10 mΩ + 0.01% RDG
400...4 000 Ω	0.01 Ω	10 mΩ + 0.008% RDG	20 mΩ + 0.015% RDG

Max resistance excitation current	5 mA (0...650 Ω), $I_{exc} \times R_{sim} < 3.25 \text{ V}$ (650...4000 Ω)
Min resistance excitation current	> 0.2 mA (0...400 Ω), >0.1 mA (400...4000 Ω)
Settling time with pulsed excitation current	< 1ms
Supported units	Ω, kΩ

¹⁾ Accuracy includes hysteresis, nonlinearity and repeatability (k=2).

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

Options, accessories and services

The MC6 is a configurable product, and its capabilities can be expanded with software and hardware options. The MC6 can also be used together with various complementary products, such as EXT External Pressure Modules or calibration pumps for various pressure ranges. A wide range of accessories are quickly and easily available in the Beamex webshop. Beamex also provides calibration services, repairs, and convenient service plans to help you keep your calibration equipment operating at its full potential throughout its lifetime.

OPTIONS

- Optional internal pressure modules (up to three gauge/differential pressure modules plus one barometric)
- Software options:
 - Data Logger
 - HART communicator
 - FOUNDATION Fieldbus communicator
 - Profibus PA communicator
 - Mobile Security Plus
 - Communication drivers for Beamex ePG, POC8 or FB/MB
 - Communication drivers for various 3rd party pressure controllers and temperature dry blocks
 - Wireless (Bluetooth) communication with Beamex Calibration Management Software



37

STANDARD ACCESSORIES

- Accredited calibration certificate
- User manual, various languages available
- USB communication cable
- Hand and shoulder straps (installed)
- Internal Li-ion battery (installed)
- Battery charger with country-specific plug
- Test leads and clips



OPTIONAL ACCESSORIES

- Various carrying cases
- EXT cable for connecting external pressure modules
- Pressure hoses and fittings

Please see full list of available accessories and spare parts in the Beamex webshop:

<https://shop.beamex.com/>

AVAILABLE SERVICES

- Care Plan or Calibration Plan
- Calibration and repair services
- Training services



Beamex MC6

ADVANCED FIELD CALIBRATOR AND COMMUNICATOR

Execute calibrations automatically, capture data digitally at source, and store calibration results securely. The Beamex MC6 is a high-accuracy field calibrator that offers calibration capabilities for pressure, temperature, and various electrical signals. It is also a multi-bus field communicator for fieldbus instruments.

38



Ready for the field

As a multifunction calibrator with built-in field communicator, the MC6 can replace several single-function devices, meaning you have less to carry in the field.

A better way to calibrate

The MC6 is a high-accuracy calibrator that ensures accurate measurements and low calibration uncertainty. It documents all your calibrations without any manual typing or use of pen and paper and automatically performs error calculation and pass/fail analysis.

Digital data flow

The MC6 is a documenting calibrator that digitally captures data at source and ensures a secure data flow between the calibrator and Beamex LOGiCAL or CMX Calibration Management Software.

Sustainable by design

Sustainability is a core component of the Beamex design philosophy. We want you to continue using your calibrators for many years, so they are designed to have a long service life and to be as easy as possible to repair, maintain, and upgrade.

Main features

- ▶ High accuracy
- ▶ Advanced functionality
- ▶ Enhanced usability
- ▶ Field communicator
- ▶ Digital data flow

