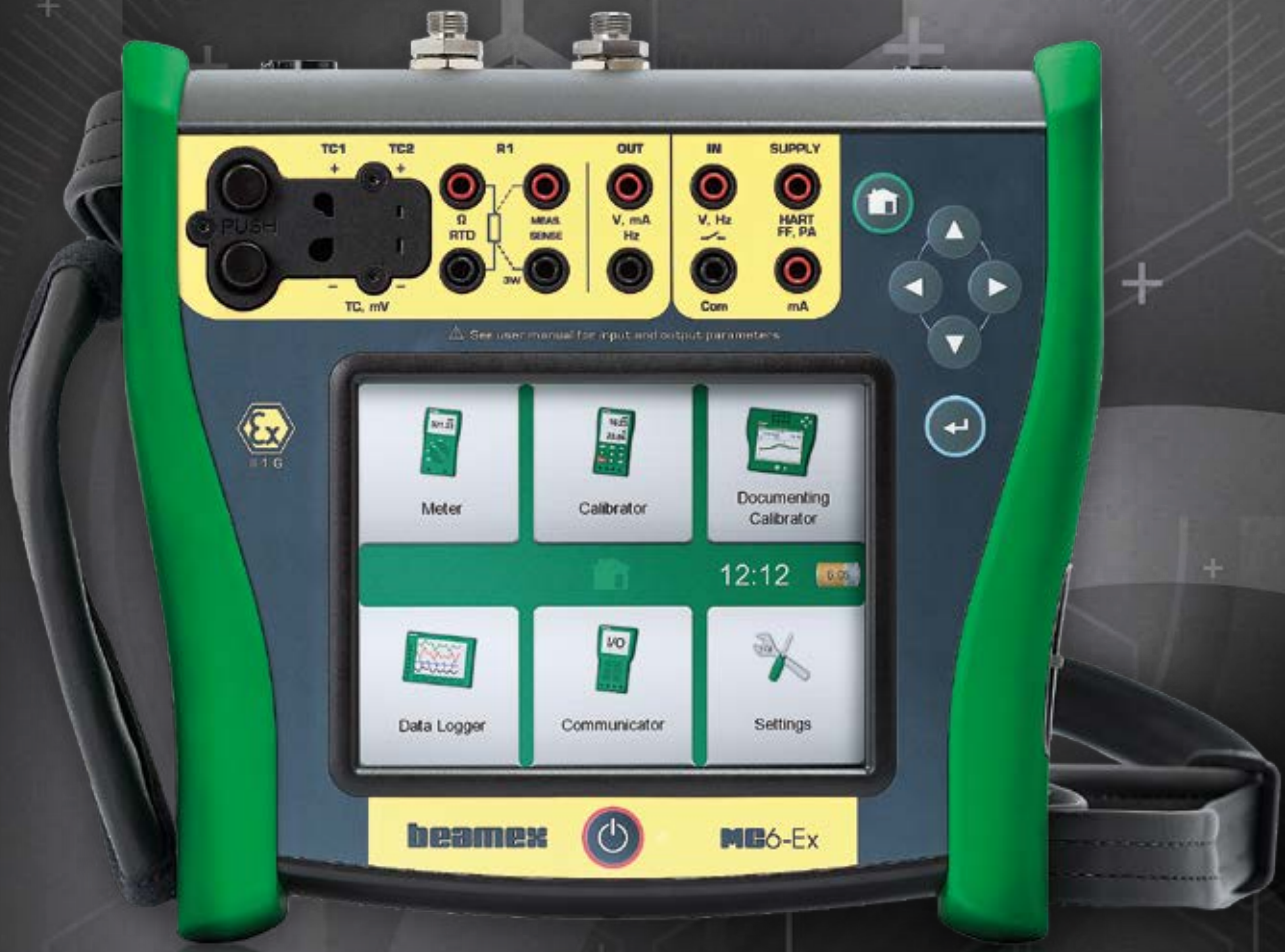
Beamex MC6-Ex

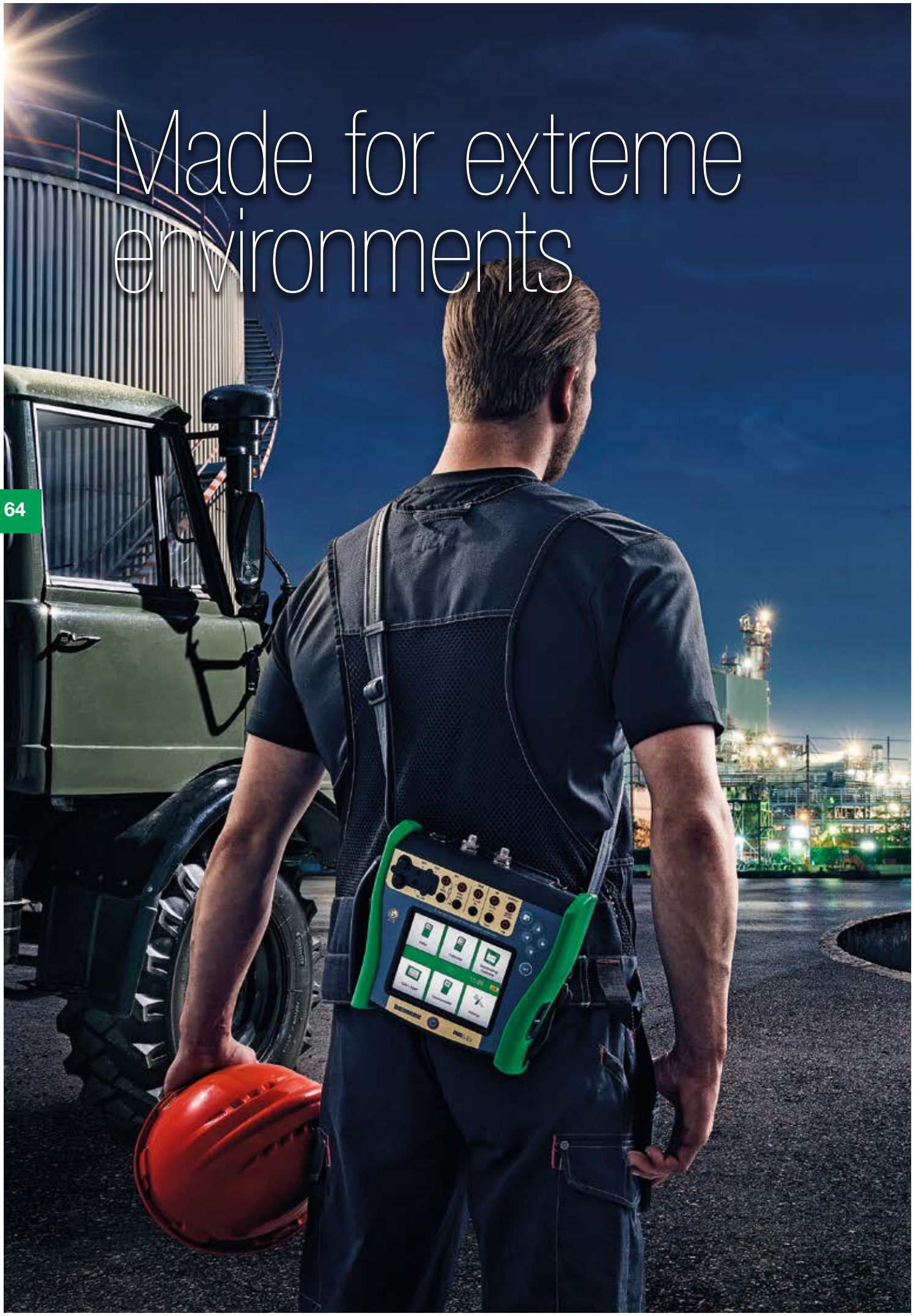
INTRINSICALLY SAFE ADVANCED FIELD CALIBRATOR AND COMMUNICATOR



The safest choice for hazardous areas

beamex

Made for extreme environments



Designed for use in extreme environments

No other Ex-calibrator can outperform the MC6-Ex in terms of functionality and accuracy. The ATEX, IECEx and North American certified MC6-Ex is designed for use in potentially explosive environments, such as offshore and on-shore oil and gas platforms, oil refineries, chemical and petrochemical plants where inflammable gases may be present. It can also be used in the pharmaceutical industry, within energy production and gas processing industry.

With MC6-Ex no hot-work permits are needed nor additional safety equipment, such as gas detectors. The risk of harming other Ex equipment or damaging their safety protection circuits are limited. MC6-Ex is a very safe and easy choice when entering any hazardous zone, as it is approved for the tightest zone, Zone 0.

The MC6-Ex is an advanced, high-accuracy calibrator and communicator with outstanding functionality. It is a documenting, multifunction calibrator and communicator that offers calibration capabilities for pressure, temperature and various electrical signals. It also contains a fieldbus communicator for HART, FOUNDATION Fieldbus and Profibus PA instruments.

The robust IP65-rated dust- and water-proof casing, ergonomic design and ease-of-use make it an ideal measurement device for field use. The powerful NiMH battery provides a long operation time and can be quickly charged. You can also charge a spare battery separately, and replace it in the field when needed. The battery must be charged in safe area only. The MC6-Ex 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.

The MC6-Ex is a documenting calibrator that 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. USB devices must not be used in hazardous areas, and Bluetooth communication must only be used in safe areas.

MC6-Ex main features

Intrinsically safe

The MC6-Ex is an ATEX, IECEx, and North American-certified calibrator and communicator. It can be used safely even in the most demanding hazardous areas.

High accuracy

The MC6-Ex is a reliable and stable calibrator with unmatched accuracy for demanding industrial conditions. Each MC6-Ex is delivered with a traceable, accredited calibration certificate as standard as proof of its accuracy.

Advanced functionality

The MC6-Ex offers calibration capabilities for pressure, temperature, and various electrical signals and includes a multi-bus communicator.

Enhanced usability

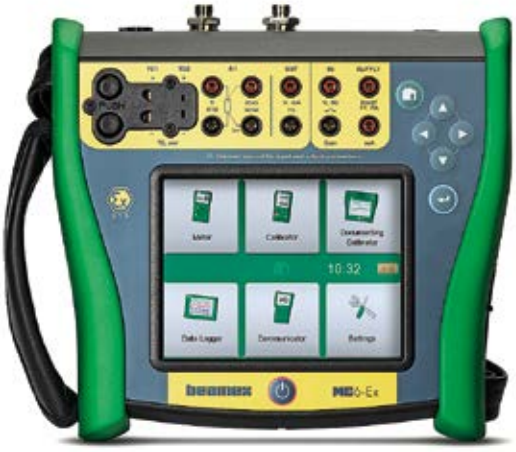
The MC6-Ex offers several intuitive user interface modes that are optimized for different use cases, available in multiple languages and guides you step-by-step in your calibration work.

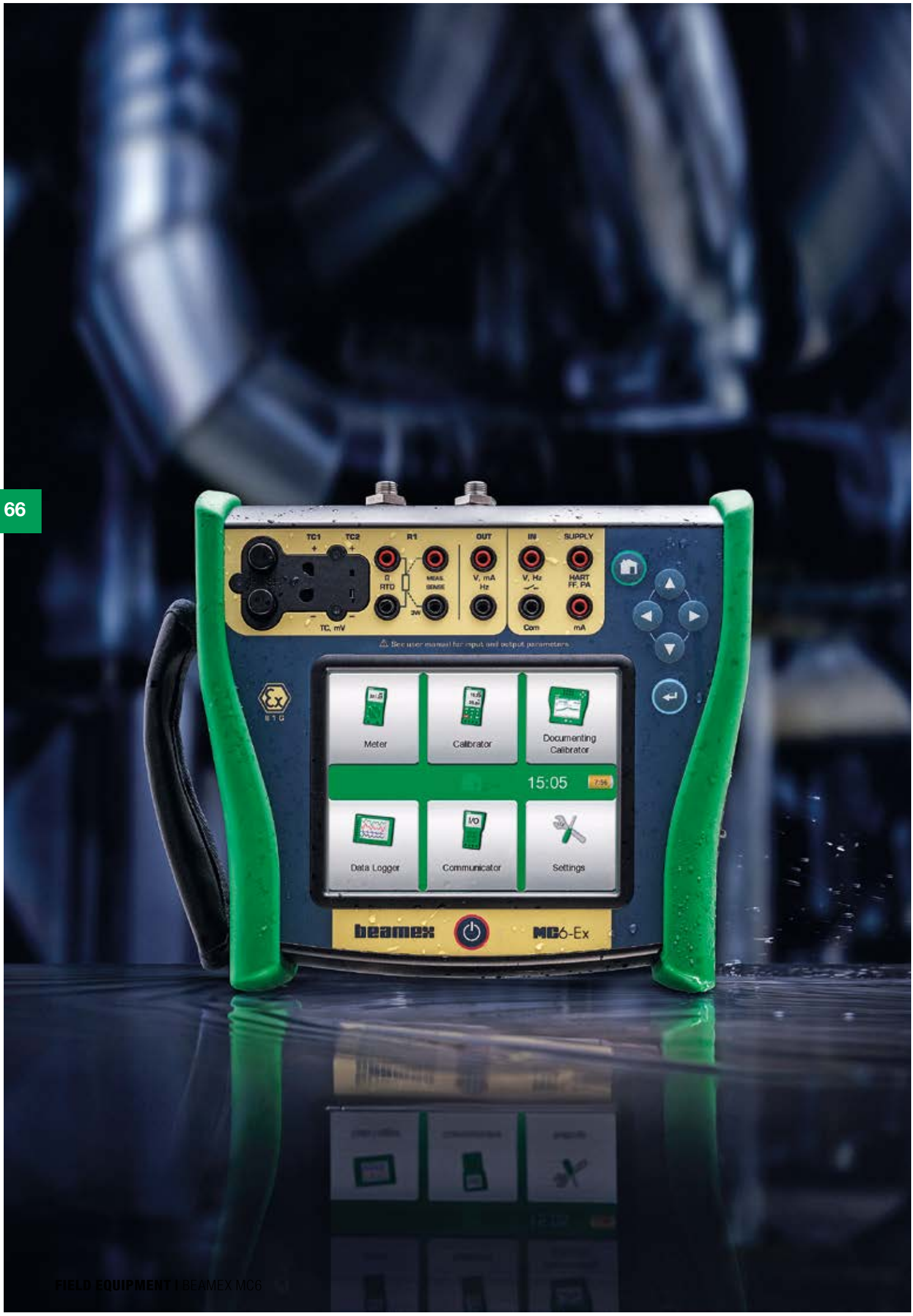
Field communicator

The MC6-Ex contains a multi-bus field communicator for HART, FOUNDATION Fieldbus, and Profibus PA protocols to calibrate, configure, and trim your smart instruments.

Digital data flow

The MC6-Ex is a documenting calibrator that communicates with Beamex calibration management software, enabling a fully digitalized calibration process.




TC1
TC2
R1
OUT
IN
SUPPLY
Ω
RTD
MEAS.
SENSE
3W
V, mA
Hz
V, Hz
HART
FF, PA
Com
mA
TC, mV
Meter
Calibrator
Documenting
Calibrator
15:05
Data Logger
Communicator
Settings
beamex
MC6-Ex

The safest choice for hazardous areas

Accuracy guaranteed

The MC6-Ex is probably the most accurate advanced process calibrator and communicator available. As proof of this, each MC6-Ex calibrator 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). The MC6-Ex has specifications for 1-year total uncertainty.

1 Year Uncertainty figures:

- Pressure uncertainty starting from ±(0.01% FS + 0.025% of reading).
- Temperature – RTD temperature measurement uncertainty starting from ±0.015 °C.
- Electrical – current measurement uncertainty starting from ±(1 µA + 0.01% of reading).

Safe calibration in extreme environments

The MC6-Ex is an intrinsically safe, ATEX, IECEx and North American certified Ex ia IIC T4 Ga – classified advanced multifunction field calibrator. It is designed for use in extreme environments, such as offshore platforms, oil refineries, chemical and petrochemical plants where inflammable gases may be present. The robust IP65-rated dust- and water-proof casing, along with integrated impact protectors, makes the MC6-Ex an ideal calibrator for use in wet and dusty environments subject to wide temperature variations.

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

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-Ex, 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.

The MC6-Ex multi-bus 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-Ex, and therefore the very same device can be used as a HART, FOUNDATION Fieldbus and Profibus PA communicator. With the MC6-Ex, all parameters in all blocks of a fieldbus instrument can be accessed. Its' memory stores device descriptions for the fieldbus instruments. New device description files are available on the Beamex website and can easily be downloaded into the calibrator's memory.

Digitalize your calibration process

MC6-Ex 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. USB devices must not be used in hazardous areas, and Bluetooth communication must only be used in safe areas.

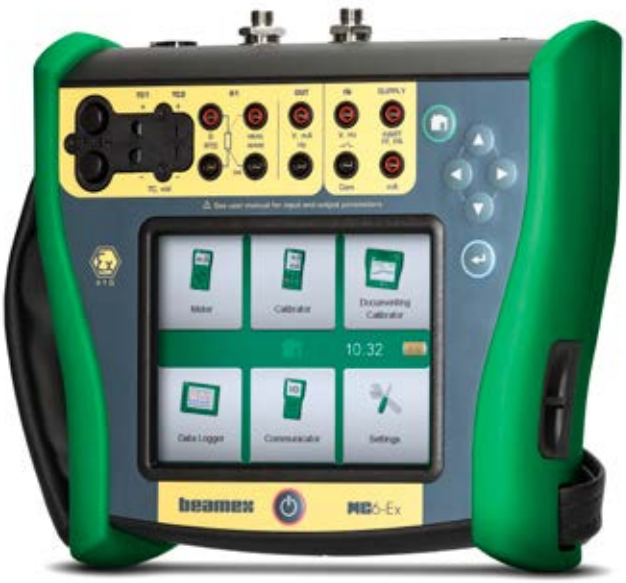
Use calibration management software to manage what, how, and when to calibrate, and execute the calibration with the MC6-Ex according to your pre-configured calibration procedure – even fully automatically. Maintain the full calibration history in LOGiCAL or CMX.

User-friendly interface

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

Automated temperature and pressure calibrations

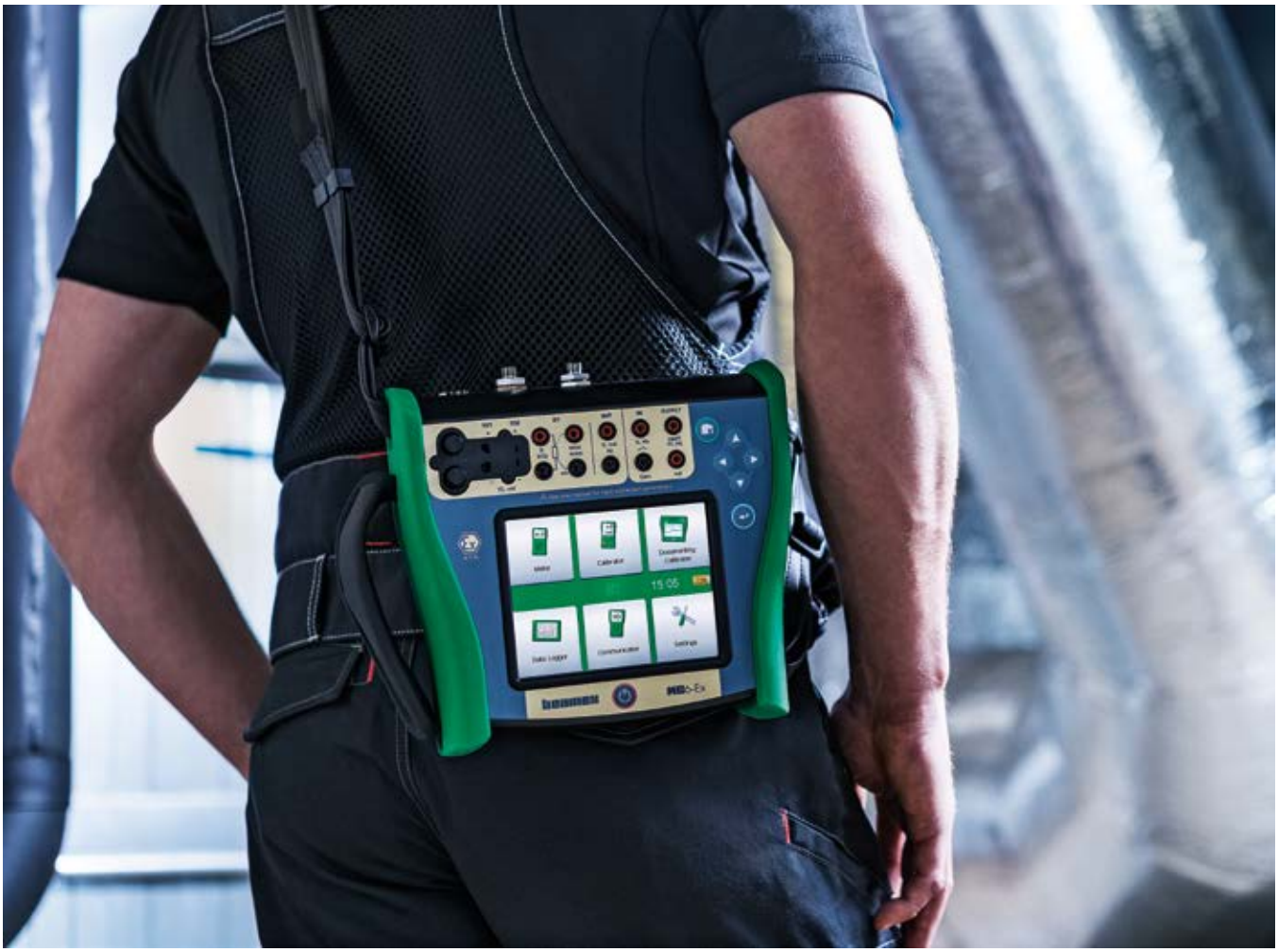
The MC6-Ex can communicate with selected pressure controllers and temperature dry-blocks to automate calibrations. MC6-Ex can send setpoints to controllers and read the output from the device under test automatically. Controllers must only be used in safe areas.



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

GENERAL			
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	2.5 … 2.9 kg (5.5 … 6.4 lb)		
Dimensions (D x W x H)	207 mm x 231 mm x 80 mm (8.15" x 9.09" x 3.15")		
Battery type	Rechargeable NiMh, 4200 mAh, 9.6 V		
Charging time	10 hours from 0 to 100% at 0…30 °C (32…86 °F). Must be done only in safe areas.		
Charger supply	100 … 240 VAC, 50 … 60 Hz		
Battery operation time	4…8 h (Heavy / Normal usage)		
Operating temperature	–10 … 50 °C		
Operating temperature while charging batteries	0 … 40 °C		
Storage temperature	–20 … 60 °C		
Specifications valid	–10 … 50 °C, unless other mentioned		
Humidity	0 … 80% R.H. non condensing		
Warmup time	Specifications valid after a 5 minute warmup period		
Max. input voltage	30 V AC, 30 V DC		
Ex safety	ATEX directive 2014/34/EU		
Ex marking	⟨Ex⟩ II 1 G	Ex ia IIC T4 Ga	Ta = –10 °C … 50 °C
Ex marking (North America)	Class I, Zone 0, AEx ia IIC T4 Ga Class I, Division 1, Groups A-D, T4 Tamb –10 °C to 50 °C, Intrinsically Safe, Sécurité intrinsèque		
ATEX certification	EN IEC 60079-0:2018	EN 60079-11:2012	Certificate No. EESF 18 ATEX 071X
IECEx certification	IEC 60079-0:2017, Edition:7.0	IEC 60079-11:2011, Edition:6.0	Certificate No. IECEx EESF 18.0033X
North American certification (SGS)	UL 913, 8th Ed. Rev. December 6, 2019 UL 60079-0 7th Ed. Rev. April 15, 2020 CAN/CSA C22.2 No. 60079-0:19 UL 60079-11, 6th Ed. 02/15/2013 CAN/CSA C22.2 No. 60079-11:14 Certificate No SGSNA/18/SUW/00222X		
RoHS compliance	Directive 2011/65/EU as amended by (EU) 2015/863, EN IEC 63000:2018		
Safety	Directive 2014/35/EU, EN 61010-1:2010 + A1:2019 + AC:2019-04		
EMC	Directive 2014/30/EU, EN IEC 61326-1:2021		
Ingress protection	IP 65, IEC/EN 60529		
Drop test	1 meter drop test		
Max altitude	3000 m (9842 ft)		
Display update rate	3 / second		
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 (±500 mV and ±30 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 loop supply (HART impedance or FF/PA impedance)
- Voltage generation (±500 mV and –1.5…10.5 VDC)
- Current generation (0 … 25 mA) (active/passive, i.e. Internal or external supply)
- Resistance measurement, two simultaneous channels (0 … 4 kΩ)
- Resistance simulation (0 … 4 kΩ)
- RTD measurement, two simultaneous channels
- RTD simulation
- TC measurement, two simultaneous channels (universal connector/mini-plug)
- TC simulation
- Frequency generation (0 … 10 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 [2]	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
PB-Ex	EXTB-IS	kPa a mbar a psi a	70 … 120 700 … 1200 10.15 … 17.4	0.01 0.1 0.001	0.05 kPa 0.5 mbar 0.0073 psi
P10mD-Ex	EXT10mD-IS	kPa diff mbar diff iwc diff	±1 ±10 ±4	0.0001 0.001 0.001	0.05% Span + 0.1% RDG
P100m-Ex	EXT100m-IS	kPa mbar iwc	0 … 10 0 … 100 0 … 40	0.0001 0.001 0.001	0.025% FS + 0.025% RDG
P400mC-Ex	EXT400mC-IS	kPa mbar iwc	±40 ±400 ±160	0.001 0.01 0.001	0.02% FS + 0.025% RDG
P1C-Ex	EXT1C-IS	kPa bar psi	±100 ±1 –14.5 … 15	0.001 0.00001 0.0001	0.015% FS + 0.025% RDG
P2C-Ex	EXT2C-IS	kPa bar psi	–100 … 200 –1 … 2 –14.5 … 30	0.001 0.00001 0.0001	0.01% FS + 0.025% RDG
P6C-Ex	EXT6C-IS	kPa bar psi	–100 … 600 –1 … 6 –14.5 … 90	0.01 0.0001 0.001	0.01% FS + 0.025% RDG
P20C-Ex	EXT20C-IS	kPa bar psi	–100 … 2000 –1 … 20 –14.5 … 300	0.01 0.0001 0.001	0.01% FS + 0.025% RDG
P60-Ex	EXT60-IS	kPa bar psi	0 … 6000 0 … 60 0 … 900	0.1 0.001 0.01	0.01% FS + 0.025% RDG
P100-Ex	EXT100-IS	MPa bar psi	0 … 10 0 … 100 0 … 1500	0.0001 0.001 0.01	0.01% FS + 0.025% RDG
P160-Ex	EXT160-IS	MPa bar psi	0 … 16 0 … 160 0 … 2400	0.0001 0.001 0.01	0.01% FS + 0.025% RDG
–	EXT250-IS	MPa bar psi	0 … 25 0 … 250 0 … 3700	0.001 0.01 0.1	0.015% FS + 0.025% RDG
–	EXT600-IS	MPa bar psi	0 … 60 0 … 600 0 … 9000	0.001 0.01 0.1	0.015% FS + 0.025% RDG
–	EXT1000-IS	MPa bar psi	0 … 100 0 … 1000 0 … 15000	0.001 0.01 0.1	0.015% FS + 0.025% RDG

[1] Uncertainty includes reference standard uncertainty, hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period (k=2).
[2] Every internal/external gauge pressure module's range may be displayed also in absolute pressure if the barometric module (PB-Ex or EXTB-IS) is installed/ connected.

Maximum number of internal pressure modules is 2 gauge/differential pressure modules and one barometric (PB-Ex) 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/cm^2, kgf/cm^2, kgf/m^2, kp/cm^2, lbf/ft^2, psi, at, torr, atm, ozf/in^2, iwc, inH_2O, ftH_2O, mmH_2O, cmH_2O, mH_2O, mmHg, cmHg, mHg, inHg, mmHg(0 °C), inHg(0 °C), mmH_2O(60°F), mmH_2O(68°F), mmH_2O (4 °C), cmH_2O(60°F), cmH_2O(68°F), cmH_2O(4 °C), inH_2O(60°F), inH_2O(68°F), inH_2O(4 °C), ftH_2O(60°F), ftH_2O(68°F), ftH_2O(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-Ex/EXTB-IS: 1200 mbar abs (35.4 inHg abs).
P10mD-Ex/EXT10mD-IS: 200 mbar (80 iwc).
EXT600-IS: 900 bar (13000 psi).
EXT1000-IS: 1000 bar (15000 Psi).

PRESSURE MEDIA
Modules up to P6C-Ex/EXT6C-IS: dry clean air or other clean, inert, non-toxic, non-corrosive gases.
Modules P20C-Ex/EXT20C-IS and higher: clean, inert, non-toxic, non-corrosive gases or liquids.

WETTED PARTS
AISI316 stainless steel, Hastelloy, Nitrile rubber

PRESSURE CONNECTIONS
PB-Ex/EXTB-IS: 10/32" (M5) female.
P10mD-Ex/EXT10mD-IS: 2 x adapters for 1/8" ID hose (3,2 mm).
P100m-Ex/EXT100m-IS to P20C-Ex/EXT20C-IS: Bx G1/8" male compatible with Beamex 40 bar hoses.
P60-Ex, P100-Ex, P160-Ex: Bx 1215 male compatible with Beamex 630 bar hoses.
EXT60-IS to EXT1000-IS: G1/4" B male.

TC MEASUREMENT & SIMULATION

TC1 measurement & simulation / TC2 measurement

TYPE	RANGE (°C)	RANGE (°C)	1 YEAR UNCERTAINTY (±) [1]
B[2]	0 … 1820	0 … 200 200 … 500 500 … 800 800 … 1820	[3] 2.0 °C 0.8 °C 0.5 °C
R[2]	–50 … 1768	–50 … 0 0 …150 150 … 400 400 … 1768	1.0 °C 0.7 °C 0.45 °C 0.4 °C
S[2]	–50 … 1768	–50 … 0 0 … 100 100 … 300 300 … 1768	0.9 °C 0.7 °C 0.55 °C 0.45 °C
E[2]	–270 … 1000	–270 … –200 –200 … 0 0 … 1000	[3] 0.07 °C + 0.06% RDG 0.07 °C + 0.005% RDG
J[2]	–210 … 1200	–210 … –200 –200 … 0 0 … 1200	[3] 0.08 °C + 0.06% RDG 0.08 °C + 0.006% RDG
K[2]	–270 … 1372	–270 … –200 –200 … 0 0 … 1000 1000 … 1372	[3] 0.1 °C + 0.1% RDG 0.1 °C + 0.007% RDG 0.017% RDG
N[2]	–270 … 1300	–270 … –200 –200 … –100 –100 … 0 0 … 800 800 … 1300	[3] 0.2% RDG 0.15 °C + 0.05% RDG 0.15 °C 0.07 °C + 0.01% RDG
T[2]	–270 … 400	–270 … –200 –200 … 0 0 … 400	[3] 0.1 °C + 0.1% RDG 0.1 °C
U[4]	–200 … 600	–200 … 0 0 … 600	0.1 °C + 0.07% RDG 0.1 °C
L[4]	–200 … 900	–200 … 0 0 … 900	0.08 °C + 0.04% RDG 0.08 °C + 0.005% RDG
C[5]	0 … 2315	0 … 1000 1000 … 2315	0.3 °C 0.027% RDG
G[6]	0 … 2315	0 … 60 60 … 200 200 … 400 400 … 1500 1500 … 2315	[3] 1.0 °C 0.5 °C 0.3 °C 0.02% RDG
D[5]	0 … 2315	0 … 140 140 … 1200 1200 … 2100 2100 … 2315	0.4 °C 0.3 °C 0.024% RDG 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) Uncertainty includes reference standard uncertainty, hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period (k=2).
2) IEC 60584, NIST MN 175, BS 4937, ANSI MC96.1
3) ±0.007% of thermovoltage + 4 µV
4) DIN 43710
5) ASTM E 988 – 96
6) ASTM E 1751 – 95e1

Measurement input impedance	> 10 MΩ
Simulation maximum load current	1 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)	1 YEAR UNCERTAINTY (±) [1]
Pt50(385)	–200 … 850	–200 … 270 270 … 850	0.03 °C 0.012% RDG
Pt100(375) Pt100(385) Pt100(389) Pt100(391) Pt100(3926)	–200 … 850	–200 … 0 0 … 850	0.015 °C 0.015 °C + 0.012% RDG
Pt100(3923)	–200 … 600	–200 … 0 0 … 600	0.015 °C 0.015 °C + 0.012% RDG
Pt200(385)	–200 … 850	–200 … –80 –80 … 0 0 … 260 260 … 850	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	0.01 °C 0.02 °C 0.045 °C + 0.019% RDG
Pt500(385)	–200 … 850	–200 … –120 –120 … –50 –50 … 0 0 … 850	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	0.008 °C 0.03 °C 0.04 °C 0.04 °C + 0.019% RDG
Ni100(618)	–60 … 180	–60 … 0 0 … 180	0.012 °C 0.012 °C + 0.006% RDG
Ni120(672)	–80 … 260	–80 … 0 0 … 260	0.012 °C 0.012 °C + 0.006% RDG
Cu10(427)	–200 … 260	–200 … 260	0.16 °C

R1 Simulation

SENSOR TYPE	RANGE (°C)	RANGE (°C)	1 YEAR UNCERTAINTY (±) [1]
Pt50(385)	–200 … 850	–200 … 270 270 … 850	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	0.05 °C 0.05 °C + 0.014% RDG
Pt100(3923)	–200 … 600	–200 … 0 0 … 600	0.05 °C 0.05 °C + 0.014% RDG
Pt200(385)	–200 … 850	–200 … –80 –80 … 0 0 … 260 260 … 850	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	0.015 °C 0.03 °C 0.05 °C + 0.019% RDG
Pt500(385)	–200 … 850	–200 … –120 –120 … –50 –50 … 0 0 … 850	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	0.011 °C 0.03 °C 0.043 °C 0.043 °C + 0.019% RDG
Ni100(618)	–60 … 180	–60 … 0 0 … 180	0.042 °C 0.037 °C + 0.001% RDG
Ni120(672)	–80 … 260	–80 … 0 0 … 260	0.042 °C 0.037 °C + 0.001% RDG
Cu10(427)	–200 … 260	–200 … 260	0.52 °C

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

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

FEATURE	SPECIFICATION
RTD Measurement current	Pulsed, bi-directional 0.2 mA
4-wire connection	Measurement specifications valid
3-wire measurement	Add 13.5 mΩ
Max resistance excitation current	2 mA (0…200 Ω), 1 mA (200…400 Ω), 0.5 mA (400…2000 Ω), 0.25 mA (2000…4000 Ω). Iexc × Rsim < 1.0 V
Min resistance excitation current	≥ 0.1 mA
Simulation settling time with pulsed excitation current	< 2 ms
Supported units	°C, °F, Kelvin, °Ré, °Ra

INTERNAL REFERENCE JUNCTION

TC1 & TC2

RANGE	1 YEAR UNCERTAINTY (±) [1]
–10…50 °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 Internal Reference Junction uncertainty together as a root sum of the squares.

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

RESISTANCE SIMULATION

R1 (0…4000 Ω)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
0…100 Ω	0.001 Ω	20 mΩ
100…400 Ω	0.001 Ω	10 mΩ + 0.01% RDG
400…4000 Ω	0.01 Ω	20 mΩ + 0.015% RDG

FEATURE	SPECIFICATION
Max resistance excitation current	2 mA (0 … 200 Ω), 1 mA (200 … 400 Ω), 0.5 mA (400 … 2000 Ω), 0.25 mA (2000 … 4000 Ω). Iexc × Rsim < 1.0 V
Min resistance excitation current	≥0.1 mA
Settling time with pulsed exitation current	<2 ms
Supported units	Ω, kΩ

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

VOLTAGE MEASUREMENT

IN (–30…30 V)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
–30.3 V … –5 V	0.0001 V	0.25 mV + 0.006% RDG
–5 V … –500 mV	0.00001 V	0.25 mV + 0.006% RDG
–500 mV … +500 mV	0.000001 V	5 uV + 0.006% RDG
+500 mV … +5 V	0.00001 V	0.25 mV + 0.006% RDG
+5 V … +30.3 V	0.0001 V	0.25 mV + 0.006% RDG

FEATURE	SPECIFICATION
Input impedance	> 1 MΩ
Supported units	V, mV, µV

CURRENT MEASUREMENT

IN (–100…100 mA)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
–101 … –25 mA	0.001 mA	1 uA + 0.01% RDG
–25 … 25 mA	0.0001 mA	1 uA + 0.01% RDG
+25 … +101 mA	0.001 mA	1 uA + 0.01% RDG

FEATURE	SPECIFICATION
Input impedance	< 10 Ω
Supported units	mA, µA

INTERNAL LOOP SUPPLY

FEATURE	SPECIFICATION
Internal Loop supply	19 V ±10% (12 V@max 50 mA)
Internal Loop supply (fieldbus module installed)	19 V ±10% (12 V@max 25 mA)
Output impedance	130 Ω
Output impedance in HART compatible mode	260 Ω
Output impedance in FF/PA compatible mode	130 Ω

FREQUENCY MEASUREMENT

IN (0.0027…50 000 Hz)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
0.0027 … 0.5 Hz	0.000001 Hz	0.000002 Hz + 0.002% RDG
0.5 … 5 Hz	0.00001 Hz	0.00002 Hz + 0.002% RDG
5 … 50 Hz	0.0001 Hz	0.0002 Hz + 0.002% RDG
50 … 500 Hz	0.001 Hz	0.002 Hz + 0.002% RDG
500 … 5 000 Hz	0.01 Hz	0.02 Hz + 0.002% RDG
5000 … 51 000 Hz	0.1 Hz	0.2 Hz + 0.002% RDG

FEATURE	SPECIFICATION
Input impedance	115 kΩ
Trigger level	Dry contact 1 V, wet contact –1…14 V
Minimum signal amplitude	1.0 Vpp (<10 kHz), 1.2 Vpp (10…50 kHz)
Supported units	Hz, kHz, cph, cpm, 1/Hz(s), 1/kHz(ms), 1/MHz(µs)

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

SWITCH SENSING

FEATURE	SPECIFICATION
Test Voltage, Dry contact (Trigger level)	2.3 V, 0.1 mA (1 V)
Trigger level, Wet contact	–1 … 14 V
Input impedance	115 kΩ

VOLTAGE MEASUREMENT

TC1 & TC2 (–500 mV…500 mV)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
–510 … +510 mV	0.001 mV	4 uV + 0.007% RDG

FEATURE	SPECIFICATION
Input impedance	> 10 MΩ
Supported units	V, mV, µV
Connector	TC1: Universal TC connector, TC2: TC Miniplug

VOLTAGE GENERATION

TC1 (–500 mV…500 mV)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
–500 … +500 mV	0.001 mV	4 uV + 0.007% RDG

FEATURE	SPECIFICATION
Maximum load current	1 mA
Load effect	< 5 µV/mA
Supported units	V, mV, µV

VOLTAGE GENERATION

OUT (–1.5…10.5 V)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
–1.5 … 10.5 V	0.00001 V	0.1 mV + 0.007% RDG

FEATURE	SPECIFICATION
Maximum load current	1 mA
Short circuit current	> 40 mA
Load effect	< 20 µV/mA
Supported units	V, mV, µV

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

CURRENT GENERATION

OUT (0…25 mA)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
0 … 25 mA	0.0001 mA	1 uA + 0.01% RDG

FEATURE	SPECIFICATION
Internal loop supply	9.0 V @ 1 mA, 6.0 V @ 20 mA
Max load impedance (source)	300 Ω @ 20 mA
Max external loop supply	30 VDC
Supported units	mA, µA

FREQUENCY GENERATION

OUT (0.0005…10 000 Hz)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
0.0005 … 0.5 Hz	0.000001 Hz	0.000002 Hz + 0.002% RDG
0.5 … 5 Hz	0.00001 Hz	0.00002 Hz + 0.002% RDG
5 … 50 Hz	0.0001 Hz	0.0002 Hz + 0.002% RDG
50 … 500 Hz	0.001 Hz	0.002 Hz + 0.002% RDG
500 … 5000 Hz	0.01 Hz	0.02 Hz + 0.002% RDG
5000 … 10,000 Hz	0.1 Hz	0.2 Hz + 0.002% RDG

FEATURE	SPECIFICATION
Maximum load current	1 mA
Wave forms	Positive square, symmetric square
Output amplitude positive square wave	0 … 10.5 Vpp
Output amplitude symmetric square wave	0 … 4 Vpp
Amplitude accuracy	< 15% of amplitude @ 0.0005 … 3000 Hz < 50% of amplitude @ 3000 … 10000 Hz
Duty cycle	3000 … 10,000 Hz (50%) 100 … 3000 Hz (40 … 60%) 10 … 100 Hz (10 … 90%) 0.0005 … 10 Hz (1 … 99%)
Supported units	Hz, kHz, cph, cpm, 1/Hz(s), 1/kHz(ms), 1/MHz(µs)

RESISTANCE MEASUREMENT

R1 & R2 (0…4000 Ω)

RANGE	RESOLUTION	1 YEAR UNCERTAINTY (±) [1]
–1 … 100 Ω	0.001 Ω	6 mΩ
100 … 110 Ω	0.001 Ω	0.006% RDG
110 … 150 Ω	0.001 Ω	0.007% RDG
150 … 300 Ω	0.001 Ω	0.008% RDG
300 … 400 Ω	0.001 Ω	0.009% RDG
400 … 4040 Ω	0.01 Ω	12 mΩ + 0.015% RDG

FEATURE	SPECIFICATION
Measurement current	Pulsed, bi-directional, 0.2 mA
4-wire connection	Measurement specifications valid
3-wire measurement	Add 13.5 mΩ
Supported units	Ω, kΩ

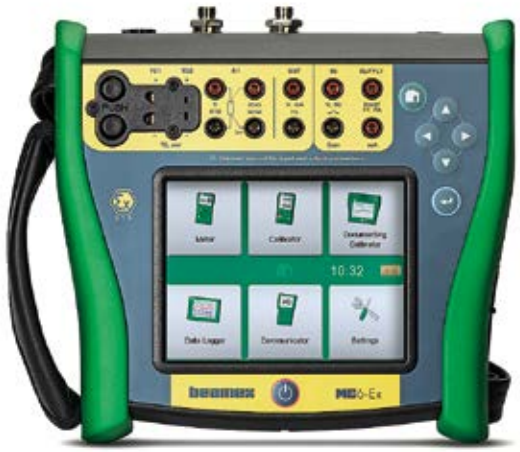
1) Uncertainty includes reference standard uncertainty, hysteresis, non-linearity, repeatability and typical long-term stability for the mentioned period (k=2).

Options, accessories and services

The MC6-Ex is a configurable product, and its capabilities can be expanded with software and hardware options. The MC6-Ex can also be used together with various complementary products, such as EXT-IS Intrinsically Safe 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.

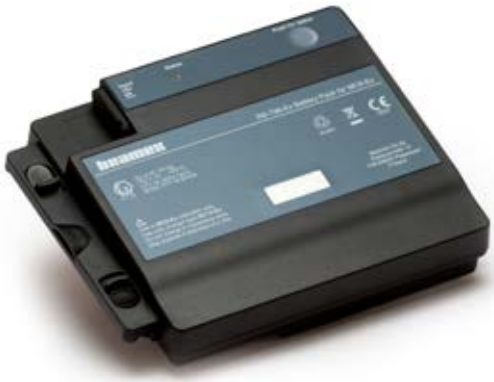
OPTIONS

- Optional internal pressure modules (up to two 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



STANDARD ACCESSORIES

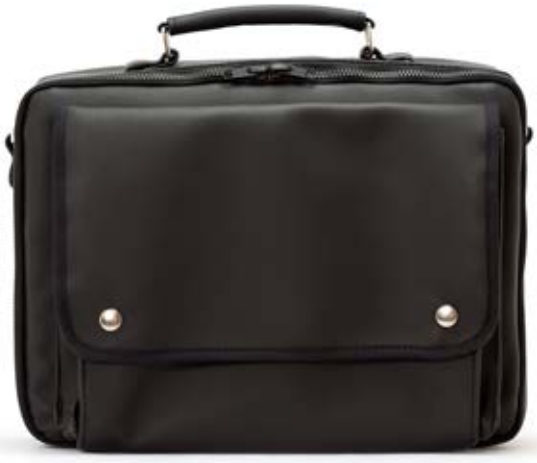
- Accredited calibration certificate
- User manual, various languages available
- Safety information leaflet and EC declaration
- USB communication cable
- Hand and shoulder straps (installed)
- Internal NiMH battery pack (installed)
- Battery charger with country-specific plug
- Test leads and clips



OPTIONAL ACCESSORIES

- Soft carrying case
- Spare battery pack
- EXT cable for connecting external pressure modules
- Pressure hoses and fittings

Please see full list of available accessories and spare parts in th Beamex webshop: ***shop.beamex.com/***



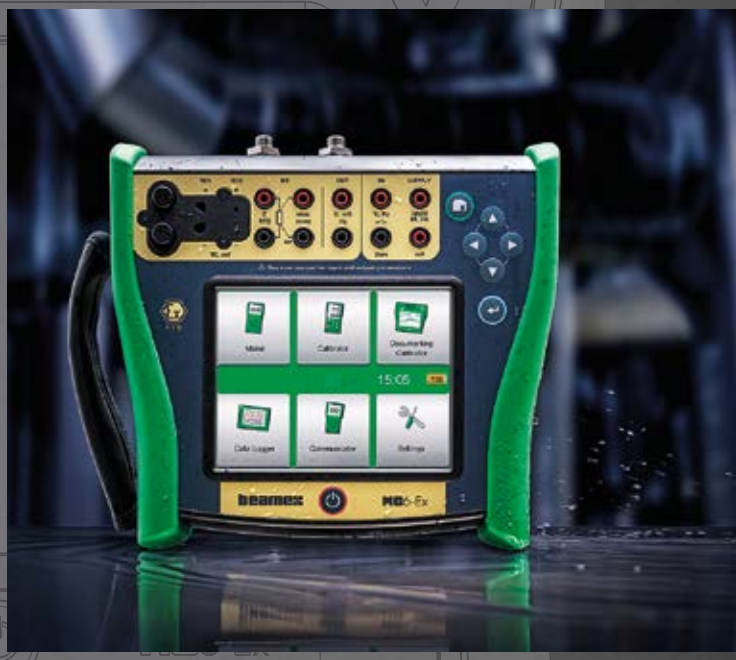
AVAILABLE SERVICES

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

SUMMARY

Beamex MC6-Ex

INTRINSICALLY SAFE ADVANCED FIELD CALIBRATOR AND COMMUNICATOR



The Beamex MC6-Ex is the world's most accurate intrinsically safe field calibrator and communicator. It is ATEX, IECEx, and North American certified and can be used in all hazardous areas. It offers calibration capabilities for pressure, temperature, and various electrical signals, and can be used as a multi-bus communicator for fieldbus instruments.

The safest choice

If you use a non-Ex calibrator in hazardous areas, you spend time and effort on hot work permits and using gas detectors – an intrinsically safe calibrator is an easier and safer choice. The MC6-Ex is the safest choice for all your hazardous areas

Ready for the field

The MC6-Ex is a multifunction process calibrator and field communicator in one device, meaning you have less to carry in the field. Being an intrinsically safe device with excellent Ex rating, the MC6-Ex makes your life easier as you don't need to worry about additional safety features.

A better way to calibrate

The MC6-Ex ensures accurate measurements and low calibration uncertainty in potentially explosive environments. Each MC6-Ex is calibrated in the Beamex Accredited Calibration Laboratory, making your field calibrations traceable.

Digital data flow

The MC6-Ex 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. Our world-leading experts can help you get the most out of your calibrator throughout its entire lifecycle with calibration and repair services, training, and calibration consultancy.

Main features

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

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