



WORKSHOP EQUIPMENT

The Beamex range of modular calibration and electrical test benches, temperature blocks, automatic pressure controllers and complete instrument workshops



beamex
WORLD-CLASS CALIBRATION SOLUTIONS

Workshop equipment

Beamex is a technology and service company that develops, manufactures and markets high-quality calibration equipment, software, systems and services for the calibration and maintenance of process instruments. The company is a leading worldwide provider of integrated calibration solutions that meet even the most demanding requirements.

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Success stories

10,000 companies worldwide use Beamex calibration solutions. Now you can read some of these success stories.

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Solutions

Beamex solutions for paperless calibration as well as configuration and calibration of smart instruments.

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MCS200 modular test and calibration system

Beamex MCS200 is a modular test and calibration system for workshops and laboratories. MCS200 offers efficient and ergonomic facilities for the maintenance of process instruments.

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MC6 Workstation

Beamex MC6 communicates with the pressure measurement modules, automatic pressure controllers, temperature blocks and calibration management software.

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MB metrology temperature block

Beamex MB metrology temperature block is a portable temperature dry block delivering bath-level accuracy for industrial applications.

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FB field temperature block

Beamex FB field temperature block is an ideal temperature block for industrial field use. Lightweight and easy to carry, Beamex FB is a fast-acting dry block which still provides excellent accuracy.

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Smart reference probes

The Beamex smart reference probe is a high-quality and extremely stable PRT probe with an integrated memory that stores the individual sensor coefficients.

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POC6 automatic pressure controller

Beamex POC6 is an accurate and user-friendly automatic pressure output controller, providing regulated output from vacuum to 100 bar (1450 psi).

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Complete instrument workshops

Beamex is a world-class specialist when it comes to supplying instrument and electrical workshop solutions for new industrial plants and for existing plants that are looking to modernize their workshops.

SUCCESS STORIES



4

OIL AND GAS INDUSTRY Essar Oil Limited, India

Essar Oil Limited, part of Essar group, has a world-class 20-million tonne (405,000 barrels per day) refinery. It currently yields 300,000 bpd at Vadinar in Gujarat, which is being progressively expanded to a capacity of 36 million tonnes (750,000 bpd). It has the capacity to produce petrol and diesel suitable for use in India and advanced international markets. Refining capacity will also include LPG, Naphtha, light diesel oil, Aviation Turbine Fuel (ATF) and kerosene.

The Essar Oil Limited, Vadinar refinery site, has approximately 15,000 instruments that are calibrated periodically. All of the instruments are calibrated using secondary calibrators. The Beamex test and calibration bench system is used to recalibrate all these secondary calibrators. In addition to calibration, the system also facilitates electrical and electronic repair and testing. A similar Beamex test and calibration bench system has also been purchased to the Essar Power Limited, Salaya and Essar Power Limited, Mahan facilities.

Solution

- Beamex test and calibration bench system
 - including HART option
 - fully automatic pressure and temperature calibration
- Beamex CMX Professional calibration management software
- Beamex PG hand-pump kits
- Beamex professional services

Main benefits

- Extreme accuracy
- Centralized, server-based calibration management system
- Time savings due to automated pressure and temperature calibration capability
- Communication with temperature bath
- Reliable, user-friendly system



AVIATION INDUSTRY GKN Aerospace, UK

GKN Aerospace is one of the world's largest independent first-tier suppliers to the global aviation industry using advanced manufacturing technologies to supply high-value, integrated assemblies in both metallic and composite materials, employing approximately 12,000 people in more than 30 facilities across four continents. GKN Aerospace is a leader in wing technology, thanks to its continuous progress in manufacturing processes.

Calibrating process instruments is a function that helps maintain high quality standards in the manufacturing process. Calibration documentation plays a major role, as all calibration data must be documented until 10 years after the life of an aircraft.

With a calibration management system providing excellent calibrator communication, GKN Aerospace Filton is able to automate the pre-defined calibration procedures. In addition, calibration management software is used to produce dispatch sheets, position labels, work lists for each area and the weekly and monthly report sheets.

Solution

- Beamex calibration bench system
- CMX calibration management software
- Portable MC5 documenting multifunction calibrators
- Portable MC4 documenting process calibrators
- Accessories: calibration hand-pumps, etc.

Main benefits

- Ability to automate certain calibration procedures due to excellent communication between calibrators and calibration management software
- A calibration system that meets high standards
- Electronic storage of calibration data is easy and safe

SOLUTIONS

PAPERLESS CALIBRATION

A paperless calibration system comprising documenting calibrators and calibration software improves quality and cuts costs. The business benefits are significant for companies that use software-based calibration systems. The entire calibration process – from initial recording of calibration data to historical trend analysis – will take less time, while virtually eliminating mistakes and manual errors.

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RELATED PRODUCTS

Beamex MC6 Workstation

Beamex MC6 calibrator

Beamex MC5-IS calibrator

Beamex MC4 calibrator

Beamex CMX Light calibration software

Beamex CMX Professional calibration software

Beamex CMX Enterprise calibration software

Beamex Business Bridge



Traditional paper-based systems

While using a manual, paper-based system requires little or no investment in new technology or IT systems, it is extremely labor-intensive and means that historical trend analysis of calibration results becomes very difficult. In addition, accessing calibration data quickly is not easy. Paper systems are time consuming, they soak up lots of company resources and manual (typing) errors are commonplace. Dual effort and the re-keying of calibration data into multiple databases become significant costs to the business.

Business benefits of paperless calibration

The business benefits of a paperless calibration system are significant. The entire calibration process – from initial recording of calibration data to historical trend analysis – will take less time, virtually eliminating mistakes and manual errors, which results in higher quality of gathered data. In turn, this means that operators, engineers and management will have more confidence in the data, particularly when it comes to plant audits. In addition, this greater confidence in calibration data leads to a better understanding and analysis of business performance and KPIs (particularly if the calibration software is integrated into other business IT system, such as a CMMS) leading to improved processes, increased efficiency and reduced plant downtime.

STEP-BY-STEP

BEAMEX ICS INTEGRATED CALIBRATION SOLUTION

THE CALIBRATION PROCESS

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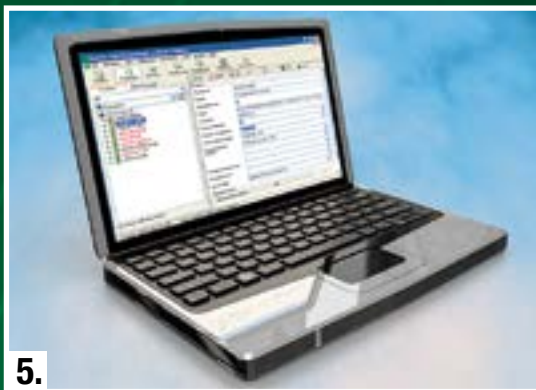
The Beamex CMX alerts what needs to be calibrated and when

- Easy, fast and efficient
- No need to search archived paper files



Download calibration procedures and instructions from the software to the MC6

- Fast procedure
- No pen, paper or notepads needed



Create, store and manage calibration information safely and efficiently with the software

- All calibration data is stored and managed in the CMX database
- Calibration certificates, reports and labels in electronic format, on paper or both
- All documentation in the CMX is auditable and traceable (e.g. ISO 17025, cGMP, 21 CFR Part 11)



Integration to a maintenance management system

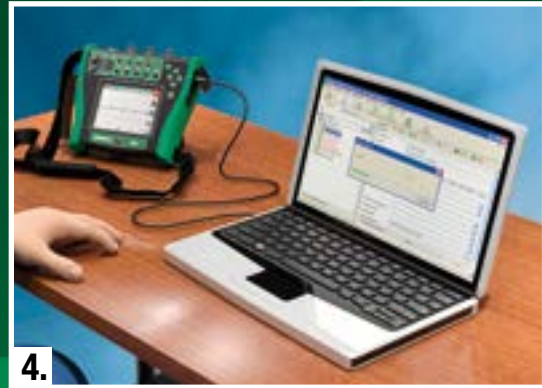
- Plant hierarchy and work orders are stored in ERP/CMMS (e.g. SAP, Maximo) and from there transferred to the CMX, which stores all calibration procedures, standards and results
- When calibration work has been performed, the CMX sends acknowledgement of the calibration back to ERP/CMMS



3.

Perform instrument calibration and data collection with the MC6

- The MC6 replaces many individual measurement devices and calibrators
- Automated calibration is fast



4.

Upload calibration results to the software

- Automatically download calibration results back to the software
- Data transfer is fast and efficient, writing mistakes are eliminated



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SOLUTIONS

CALIBRATION AND CONFIGURATION OF SMART INSTRUMENTS

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Fieldbus is becoming more and more common in today's instrumentation and fieldbus transmitters must also be calibrated. The fieldbus functionality includes reading the digital output of the fieldbus transmitter, changing the configurations of transmitters and trimming of transmitters.



RELATED PRODUCTS

Beamex MC6 Workstation

Beamex MC6 calibrator

Beamex MC5-IS calibrator





Fieldbus transmitters must also be calibrated

Are you aware that fieldbus transmitters need to be calibrated just like any other transmitters? The main difference between fieldbus and conventional transmitters is that the output signal is a fully digital fieldbus signal. Although modern fieldbus transmitters have been improved compared to older transmitter models, it does not eliminate the need for calibration. Major time-savings can also be achieved by using the MC6 HART and/or Fieldbus functionality to enter transmitter data into the MC6 memory where the data can then be populated to the CMX calibration software instead of manually entering the data into the calibration database.

There are no such instruments, neither digital nor analog, that would remain stable indefinitely. Therefore, the “digitality” of an instrument does not mean that calibration is unnecessary. There are also many other reasons, such as quality systems and regulations, that make the periodic calibrations compulsory.

Beamex's fieldbus calibration solution

Beamex offers two products for calibrating fieldbus transmitters: MC5-IS (intrinsically safe) and MC6. The MC6 is a one-of-a-kind measurement device being an advanced calibrator and full multi-bus communicator. The MC5-IS and MC6 can be used to calibrate HART, FOUNDATION Fieldbus H1 and Profibus PA instruments.





MCS200

MODULAR CALIBRATION SYSTEM



MCS200 is a modular test and calibration system for workshops and laboratories

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MCS200 modular test a

MCS200 OFFERS EFFICIENT AND ERGONOMIC FACILITIES FOR PROCESS INSTRUMENT MAINTENANCE.

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MULTIPLE APPLICATIONS

MCS200 modular test and calibration system offers a solution for a large variety of applications, such as calibration of pressure, temperature and electrical signals; electrical tests and measurements; maintenance & testing of single and three-phase motors and other electronic devices; soldering and desoldering, educational use, etc.

FLEXIBLE AND ERGONOMIC

The advanced design of the MCS200 table frame and module rack offers many advantages such as easier installation, height adjustable tabletop and module rack, dual panel possibility, 2 benches – 3 legs solution, LED lighting and movable accessories under the tabletop.

nd calibration system



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VERSATILE

The module rack hosts a great variety of modules including calibration modules, AC & DC power supplies, multimeters, function generators, oscilloscopes, etc. This makes the MCS200 test and calibration system ideal for both instrument and electrical workshops, as well as for laboratory use.

ESD PROTECTED

Electrostatic discharges cause problems to electrical components, e.g. in repair and production facilities. MCS200 is a safe choice for places where sensitive components are handled. MCS200 test and calibration system and its accessories are supplied with an electrically semiconducting coat of paint. For full ESD protection, a semiconducting tabletop, ESD wrist straps, mats and grounding sets are available.

Built to meet your specific requirements

BEAMEX HAS VARIOUS SAMPLE LAYOUTS FOR INDUSTRY-SPECIFIC AND APPLICATION-SPECIFIC MCS200 MODULAR TEST AND CALIBRATION SYSTEM

16 EXAMPLE WORKSTATIONS

1.



PRESSURE CALIBRATION BENCH

Highly accurate pressure calibration facility for ranges from vacuum to 1000 bar.

APPLICATIONS

- Periodic calibration of process instruments, such as:
 - Pressure transmitters, sensors, gauges, switches, recorders
 - Differential pressure transmitters
 - I/P converters
 - HART, Profibus PA, FOUNDATION Fieldbus instruments

2.



TEMPERATURE CALIBRATION BENCH

Efficient calibration of temperature and electrical instruments.

APPLICATIONS

- Periodic calibration of process instruments, such as:
 - Temperature transmitters, sensors, indicators, switches, recorders
 - Thermocouples and RTD's
 - Electrical limit switches
 - Frequency meters, tachometers, pulse meters
 - HART, Profibus PA, FOUNDATION Fieldbus instruments

3.



ELECTRICAL AND ELECTRONIC REPAIR BENCH

ESD-protected facility for safe handling of PCBs and components.

APPLICATIONS

- Testing and maintenance of electrical and electronic devices
- Soldering and de-soldering of surface-mounted and traditional electronic components



4.



HEAVY-DUTY 3- PHASE BENCH

**Heavy-duty workbench
for testing and maintenance.**

APPLICATIONS

- Testing electrical equipment up to 16A, such as electrical motors, tools, extension cables, heaters and coolers
- Soldering and de-soldering

5.



CALIBRATION TROLLEY

**Movable trolley with
accurate and versatile
calibration modules.**

APPLICATIONS

- Periodic calibration of process instruments, such as:
 - Pressure transmitters, sensors, gauges, switches, recorders, I/P converters
 - Temperature transmitters, sensors, indicators, switches, recorders
 - Thermocouples and RTD's
 - Electrical limit switches
 - Frequency meters, tachometers, pulse meters
 - HART, Profibus PA, FOUNDATION Fieldbus instruments

6.



MOTOR TESTING TROLLEY

**Functional tests of 3-phase
electrical motors up to 100 kW
(without load).**

APPLICATIONS

- Functional tests are necessary after repair, maintenance or longer storage of electrical motors
- Measurements during motor test run:
 - Temperature
 - Rotation speed
 - Overall vibration
 - Bearing condition
- Voltage, current, frequency, etc.

Calibration modules

Beamex POC6 automatic pressure output modules

Beamex POC6 is an accurate and user-friendly automatic pressure controller, providing regulated output from vacuum to 100 bar (1450 psi). POC6 is designed for applications requiring automatic pressure testing and calibration.



Pressure measurement modules

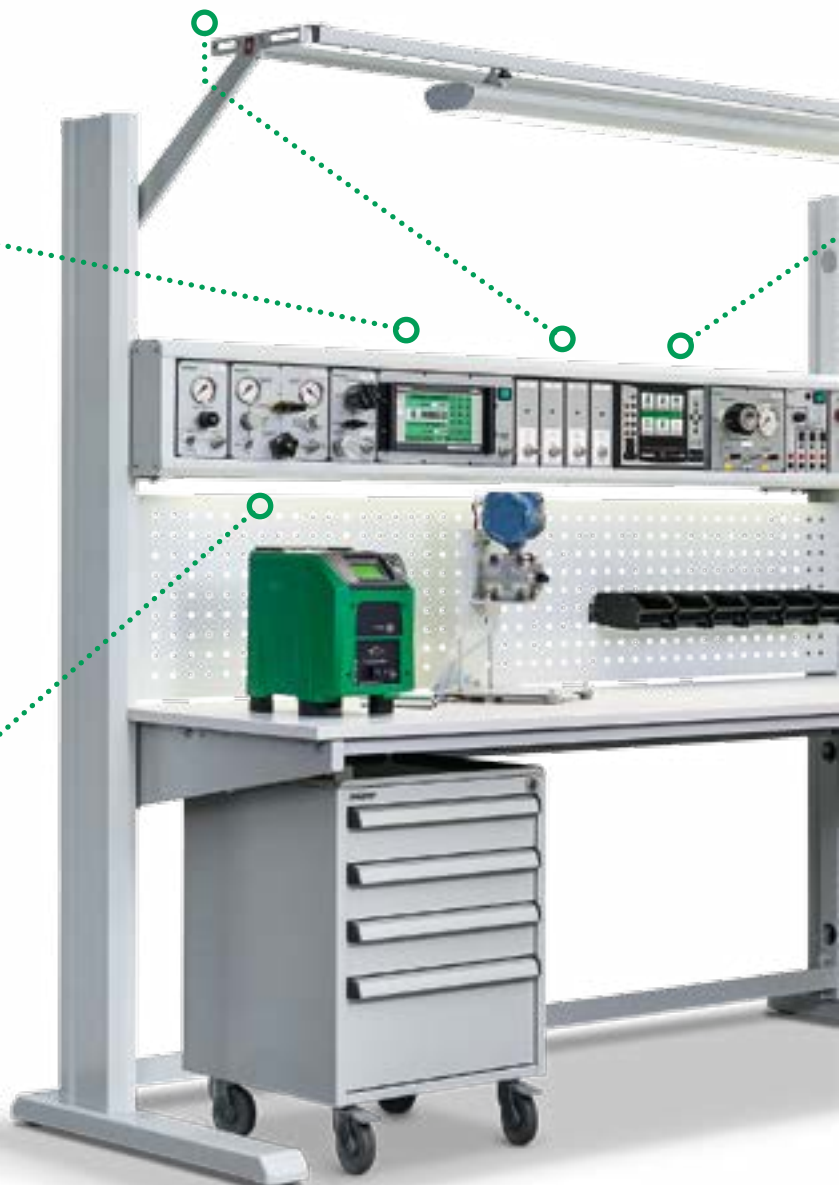
The P (pressure measurement) modules ranging from -1 to 600 bar (external modules up to 1000 bar) incorporate advanced pressure measurement technology resulting in only a few P modules being required to cover a wide pressure range with excellent levels of uncertainty. The low pressure measurement modules are provided with built-in relief valves for over pressure protection.



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Pressure output modules

The PO (pressure output) modules are designed to regulate vacuum and pressure sources with high precision.



Beamex MC6 Workstation host module

With its large color touchscreen the MC6 Workstation is the host module for temperature, electrical and pressure calibration. The MC6 communicates with the pressure measurement modules, automatic pressure controllers, temperature blocks and calibration management software.



Module specifications

BEAMEX MC6 WORKSTATION ADVANCED WORKSTATION CALIBRATOR AND COMMUNICATOR

Beamex MC6 workstation is an advanced, high-accuracy calibrator and communicator. It offers calibration capabilities for pressure, temperature and various electrical signals. The MC6 also contains a full 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 MC6 is one device with several different operation modes, which means that it is fast and easy to use. The operation modes are: meter, calibrator, documenting calibrator, data logger and fieldbus communicator.

MC6 communicates with automatic pressure controllers and temperature dry blocks enabling fully automatic calibration.

In addition, the MC6 communicates with Beamex CMX calibration software, enabling paperless calibration.

Summary of measurement, generation and simulation functions

- Pressure measurement
- Voltage measurement and generation
- Current measurement and generation
- Frequency measurement and generation
- Pulse counting and generation
- Switch state sensing
- Built-in 24 VDC loop supply
- Resistance measurement (two simultaneous channels) and simulation
- RTD measurement (two simultaneous channels) and simulation
- TC measurement (two simultaneous channels) and simulation
- HART communicator
- FOUNDATION Fieldbus communicator
- Profibus PA communicator

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PRESSURE MEASUREMENT MODULES

The pressure modules ranging from -1 to 600 bar incorporate advanced pressure measurement technology resulting in only a few modules being required to cover a wide pressure range with excellent uncertainty.

The barometric module measures the ambient barometric pressure. When the barometric module is incorporated in the system, the ranges of all other pressure measurement modules can be displayed both in gauge and absolute pressure.

The read out from pressure modules is displayed in the MC6.



PRESSURE OUTPUT MODULES

The PO modules are designed to regulate vacuum and pressure sources with high precision. For pressures up to 20 bar (290 psi), a regulator in combination with an adjustable volume is used to help achieve the exact pressure. The high-pressure modules are provided with high-pressure regulators combined with ball valves for coarse adjustment and needle valves for fine adjustment. The pressure supply module PS7 provides a basic pressure supply for devices such as I/P, E/P, etc.



MODULE	RANGE
P08C	-1 to 8 bar g / -14.5 to 116 psi
P020	0 to 20 bar g / 0 to 290 psi
P060	0 to 60 bar g / 0 to 870 psi
P0160	0 to 160 bar g / 0 to 2320 psi
P0250	0 to 250 bar g / 0 to 3625 psi
PS7	0 to 7 bar g / 0 to 100 psi

AUTOMATIC PRESSURE OUTPUT MODULES

Beamex POC6 is an accurate and user-friendly automatic pressure controller, providing regulated output from vacuum to 100 bar (1450 psi). POC6 is designed for applications requiring automatic pressure testing and calibration. POC6 communicates with Beamex MC6 calibration host module (optional). POC6 automatically regulates the pressure output signal according to commands from MC6, enabling fully automated calibration of pressure transmitters and other pressure instruments.



FEATURE	SPECIFICATION
Output range	± 1 bar (±14.5 psi) -1 to 6 bar (-14.5 to 87 psi) -1 to 20 bar (-14.5 to 290 psi) -1 to 70 bar (-14.5 to 1015 psi) -1 to 100 bar (-14.5 to 1450 psi) Special range within -1 to 100 bar (-14.5 to 1450 psi)
Precision	< 0.015% FS
1 year uncertainty	< 0.025% FS

Specifications

MC6 WORKSTATION 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	5.5. kg (12 lb)
Dimensions	250 mm x 200 mm x 305 mm (W x H x D) (9.84 in x 7.87 in x 12.01 in)
Battery type	(9.84 in x 7.87 in x 12.01 in)
Charging time	Approximately 4 hours
Charger supply	100...240 VAC, 50–60 Hz
Battery operation	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...113 °F)
Specifications valid	–10...45 °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, 60 V DC
Display update rate	3 readings/second
Safety	Directive 2006/95/EC, EN 61010-1:2001
EMC	Directive 2004/108/EC, EN 61326-1:2006
Vibration	IEC 60068-2-64. Random, 2 g, 5...500 Hz
Max altitude	3,000 m (9,842 ft)
Warranty	Warranty 3 Years. 1 year for battery pack. Warranty extension programs are also available.

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MEASUREMENT, GENERATION AND SIMULATION FUNCTIONS

- Pressure measurement (internal/external pressure modules)
 - Voltage measurement (± 1 V and $-1 \dots 60$ 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 $-3 \dots 24$ 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

PRESSURE MODULE	UNIT	RANGE ⁽³⁾	RESOLUTION	ACCURACY ⁽¹⁾ (±)	1 YEAR UNCERTAINTY (±) ⁽²⁾
PB	kPa a	70 to 120	0.01	0.3 mbar	0.05 kPa 0.5 mbar 0.0073 psi
	mbar a	700 to 1200	0.1		
	psi a	10.15 to 17.4	0.001		
P10mD	kPa diff	±1	0.0001	0.05% Span	0.05% Span + 0.1% RDG
	mbar diff	±10	0.001		
	iwc diff	±4	0.001		
P100m	kPa	0 to 10	0.0001	0.015% FS + 0.0125% RDG	0.025% FS + 0.025% RDG
	mbar	0 to 100	0.001		
	iwc	0 to 40	0.001		
P400mC	kPa	±40	0.001	0.01% FS + 0.0125% RDG	0.02% FS + 0.025% RDG
	mbar	±400	0.01		
	iwc	±160	0.001		
P1C	kPa	±100	0.001	0.007% FS + 0.0125% RDG	0.015% FS + 0.025% RDG
	bar	±1	0.00001		
	psi	-14.5 to 15	0.0001		
P2C	kPa	-100 to 200	0.001	0.005% FS + 0.01% RDG	0.01% FS + 0.025% RDG
	bar	-1 to 2	0.00001		
	psi	-14.5 to 30	0.0001		
P6C	kPa	-100 to 600	0.01	0.005% FS + 0.01% RDG	0.01% FS + 0.025% RDG
	bar	-1 to 6	0.0001		
	psi	-14.5 to 90	0.001		
P20C	kPa	-100 to 2000	0.01	0.005% FS + 0.01% RDG	0.01% FS + 0.025% RDG
	bar	-1 to 20	0.0001		
	psi	-14.5 to 300	0.001		
P60	kPa	0 to 6000	0.1	0.005% FS + 0.0125% RDG	0.01% FS + 0.025% RDG
	bar	0 to 60	0.001		
	psi	0 to 900	0.01		
P100	MPa	0 to 10	0.0001	0.005% FS + 0.0125% RDG	0.01% FS + 0.025% RDG
	bar	0 to 100	0.001		
	psi	0 to 1500	0.01		
P160	MPa	0 to 16	0.0001	0.005% FS + 0.0125% RDG	0.01% FS + 0.025% RDG
	bar	0 to 160	0.001		
	psi	0 to 2400	0.01		
P250	MPa	0 to 25	0.001	0.007% FS + 0.0125% RDG	0.015% FS + 0.025% RDG
	bar	0 to 250	0.01		
	psi	0 to 3700	0.1		
P600	MPa	0 to 60	0.001	0.007% FS + 0.01% RDG	0.015% FS + 0.025% RDG
	bar	0 to 600	0.01		
	psi	0 to 9000	0.1		
EXT1000	MPa	0 to 100	0.001	0.007% FS + 0.01% RDG	0.015% FS + 0.025% RDG
	bar	0 to 1000	0.01		
	psi	0 to 15000	0.1		

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

²⁾ Uncertainty includes 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 installed pressure modules is 10 pcs.

Beamex EXT external pressure modules can also be used with MC6 Workstation.

OVER-PRESSURE PROTECTION

The pressure measurement modules from P100m to P6C are provided with internal safety valves for over-pressure protection.

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 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

AISI316 stainless steel, Hastelloy, Nitrile rubber

PRESSURE CONNECTION

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

P10mD/EXT10mD: Two M5 (10/32") female threads with hose nipples included.

P100m/EXT100m to P20C/EXT20C: G1/8" (ISO228/1) female. A conical 1/8"

BSP male with 60° internal cone adapter included for Beamex hose set.

P60, P100, P160: G1/8" (ISO228/1) female.

EXT60 to EXT1000: G 1/4" (ISO228/1) 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 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

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

Resolution 0.001 °C.

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

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). $I_{exc} * R_{sim} < 3.25 \text{ V}$ (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 uncertainty together as a root sum of the squares.

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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 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	

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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 hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period (k=2).

FREQUENCY MEASUREMENT

IN (0.0027...51000 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...5000 Hz	0.01 Hz	0.02 Hz + 0.001% RDG	0.02 Hz + 0.002% RDG
5000...51000 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...50000 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
5000...50000 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)

PULSE COUNTING

IN (0...9 999 999 pulses)

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 hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period (k=2).

PULSE GENERATION

OUT (0...9 999 999 pulses)

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...10000 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...4040 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

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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...4000 Ω	0.01 Ω	10 mΩ + 0.008% RDG	20 mΩ + 0.015% RDG

Max resistance excitation current	5 mA (0...650 Ω). $I_{exc} * R_{sim} < 3.25 \text{ V}$ (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 hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period (k=2).



Beamex MB

METROLOGY TEMPERATURE BLOCK



Portable temperature dry block delivering bath-level accuracy for industrial applications

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11790865407465486
780740234025402132132131
525879558136458734657
00534875733878534900

Highly accurate temperature dry block

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Portable temperature dry block delivering bath-level accuracy for industrial applications

The Beamex metrology temperature block (MB) is a user friendly and highly accurate temperature dry block. It delivers bath-level accuracy in a convenient dry block with temperature ranges from -45 °C ... $+700\text{ °C}$ (-49 °F ... $1,292\text{ °F}$). It enables you to take laboratory-level accuracy with you out into the field.

Main features of MB

Part of the Beamex ICS integrated calibration solution

The MB temperature block communicates with MC6 Workstation enabling fully automatic temperature calibration.

High accuracy and stability

With a conventional dry block, you typically needed an external reference sensor if you wanted better accuracy. The Beamex MB has accurate internal temperature measurement and display accuracy up to $\pm 0.1\text{ °C}$, so you can get high accuracy even without an external reference sensor. With the unique temperature control techniques the Beamex MB has excellent stability up to $\pm 0.005\text{ °C}$. This kind of stability has usually been found only in baths, not in dry blocks.

Built-in high-accuracy reference input

In order to receive the best accuracy from the MB, there is a possibility to connect an external reference sensor into the reference sensor connection (R model). This eliminates the need for a separate reference thermometer. The reference sensor measurement is accurate up to $\pm 0.006\text{ °C}$. ITS-90 or CVD coefficients can be used to compensate any sensor errors.

Axial uniformity

With the unique dual zone control and extended well depth, the Beamex MB has an excellent axial uniformity up to $\pm 0.02\text{ °C}$.

Radial uniformity

Radial uniformity is the temperature difference between the holes in the insert. It is naturally crucial that the reference sensor and the sensor being tested are at the same temperature. The Beamex MB offers radial uniformity up to $\pm 0.01\text{ °C}$.

Immersion Depth

The Beamex MB series provides immersion depth up to 203 mm (160 mm in MB140), which, together with the control techniques, provides more stable calibration. Moreover, a deeper immersion depth reduces the stem conduction error (heat loss into the atmosphere), especially in higher temperatures.

Loading

With the extended well depth and the dual zone temperature control feature, the Beamex MB can correct the effect of loading and provides loading specifications up to $\pm 0.005\text{ °C}$.



Beamex MB series specifications

	MB140	MB155	MB425	MB700
Temperature range at 23 °C	-45 °C to 140 °C (-49 °F to 284 °F)	-30 °C to 155 °C (-22 °F to 311 °F)	35 °C to 425 °C (95 °F to 797 °F)	50 °C to 700 °C ³⁾ (122 °F to 1292 °F)
Display accuracy	±0.1 °C Full range	±0.1 °C Full range	±0.1 °C to 100 °C ±0.15 °C to 225 °C ±0.2 °C to 425 °C	±0.2 °C to 425 °C ±0.25 °C to 660 °C
Stability	±0.005 °C Full range	±0.005 °C Full range	±0.005 °C to 100 °C ±0.008 °C to 225 °C ±0.01 °C to 425 °C	±0.005 °C to 100 °C ±0.01 °C to 425 °C ±0.03 °C to 700 °C
Axial uniformity 40 mm (1.6 in)	±0.08 °C to -35 °C ±0.04 °C to 0 °C ±0.02 °C to 50 °C ±0.07 °C to 140 °C	±0.025 °C to 0 °C ±0.02 °C to 50 °C ±0.05 °C to 155 °C	±0.05 °C to 100 °C ±0.09 °C to 225 °C ±0.17 °C to 425 °C	±0.09 °C to 100 °C ±0.22 °C to 425 °C ±0.35 °C to 700 °C
Radial uniformity	±0.01 °C Full range	±0.01 °C Full range	±0.01 °C to 100 °C ±0.02 °C to 225 °C ±0.025 °C to 425 °C	±0.01 °C to 100 °C ±0.025 °C to 425 °C ±0.04 °C to 700 °C
Loading effect (with a 6.35 mm reference probe and three 6.35 mm probes)	±0.02 °C to -35 °C ±0.005 °C to 100 °C ±0.01 °C to 140 °C	±0.005 °C to 0 °C ±0.005 °C to 100 °C ±0.01 °C to 155 °C	±0.01 °C Full range	±0.02 °C to 425 °C ±0.04 °C to 700 °C
Hysteresis	±0.025 °C	±0.025 °C	±0.04 °C	±0.07 °C
Immersion depth	160 mm (6.3 in)	203 mm (8 in)	203 mm (8 in)	203 mm (8 in)
Resolution	0.001 °C / °F			
Display	LCD, °C or °F, user-selectable			
Key pad	Ten key with decimal and +/- button. Function keys, menu key, and °C / °F key.			
Insert OD dimensions	30.0 mm (1.18 in)	30.0 mm (1.18 in)	30.0 mm (1.18 in)	29.2 mm (1.15 in)
Cooling time	44 min: 23 °C to -45 °C 19 min: 23 °C to -30 °C 19 min: 140 °C to 23 °C	30 min: 23 °C to -30 °C 25 min: 155 °C to 23 °C	220 min: 425 °C to 35 °C 100 min: 425 °C to 100 °C	235 min: 700 °C to 50 °C 153 min: 700 °C to 100 °C
Heating time	32 min: 23 °C to 140 °C 45 min: -45 °C to 140 °C	44 min: 23 °C to 155 °C 56 min: -30 °C to 155 °C	27 min: 35 °C to 425 °C	46 min: 50 °C to 700 °C
Size (H x W x D)	366 x 203 x 323 mm (14.4 x 8 x 12.7 in)			
Weight	14.2 kg (31.5 lb)	14.6 kg (32 lb)	12.2 kg (27 lb)	14.2 kg (31.5 lb)
Power requirements	230 VAC (±10%), 550 W 115 VAC (±10%), 550 W	230 VAC (±10%), 550 W 115 VAC (±10%), 550 W	230 VAC (±10%), 1025 W 115 VAC (±10%), 1025 W	230 VAC (±10%), 1025 W 115 VAC (±10%), 1025 W
Computer interface	RS-232			
Calibration	Accredited calibration certificate provided			
Environmental operating conditions	5 °C to 40 °C, 0% to 80% RH (non-condensing)			
Specifications valid in environmental conditions	18 °C...28 °C			

3) Calibrated to 660 °C; reference thermometer recommended at higher temperatures.

R MODEL SPECIFICATIONS	MB
Resistance range	0 Ω to 400 Ω
Resistance accuracy ¹⁾	0 Ω to 20 Ω: ±0.0005 Ω 20 Ω to 400 Ω: ±25 ppm of reading
Characterizations	ITS-90, CVD, Resistance
Temperature accuracy (100 ohm PRT) ²⁾	Below zero: ±(0.006 °C + 0.001% of temperature reading) Above zero: ±(0.006 °C + 0.003% of temperature reading)
Sensor connection	4-wire, 6-pin Lemo
Calibration	Accredited calibration certificate provided

1) Measurement accuracy specifications apply within the specified environmental operating conditions and assume 4-wires for PRTs.

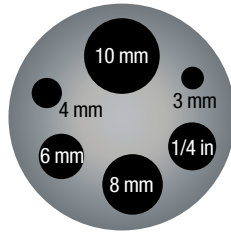
2) The built-in reference thermometer readout accuracy does not include the sensor probe accuracy.

Inserts

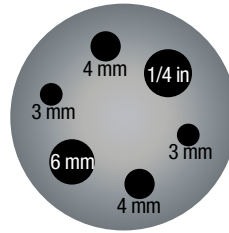
INSERTS FOR MB MODELS

INSERT	MODEL	DESCRIPTION
MH1	All models	Multihole, metric / reference; ¼", 3 mm, 4 mm, 6 mm, 8 mm, 10 mm
MH2	All models	Multihole, metric / reference; ¼", 2x3 mm, 2x4 mm, 6 mm
B	All models	Blank
Special	All models	Special

Please contact Beamex for custom inserts.



MH1



MH2

STANDARD ACCESSORIES

- Power Cord
- RS-232 Cable
- User Guide
- Accredited Calibration Certificate
- LEMO Connector for reference sensor (R models only)
- Block Insulator (in MB140, MB155 and MB425)
- Tongs (insert removal tool)

OPTIONAL ACCESSORIES

- Transport Case for temperature block
- Inserts
- Beamex Smart Reference Probes



Beamex FB

FIELD TEMPERATURE BLOCK



Lightweight, highly accurate temperature dry block for industrial field use

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An ideal temperature block for industrial field use



Lightweight, highly accurate temperature dry block for industrial field use

The Beamex field temperature block (FB) is an ideal temperature block for industrial field use. It is lightweight and easy to carry. It is an extremely quick dry block, yet it provides excellent accuracy.

Main features of the Beamex FB

Lightweight, portable

The Beamex FB field temperature block is ideal for industrial field use. It only weighs about 8 kg (18 lb), and it is small enough to carry around.

Speed

The Beamex FB is extremely quick to reach various temperatures, i.e. it cools down to $-25\text{ }^{\circ}\text{C}$ ($-13\text{ }^{\circ}\text{F}$) in 15 minutes and heats up to $+660\text{ }^{\circ}\text{C}$ ($+1,220\text{ }^{\circ}\text{F}$) in 15 minutes. This saves time and increases productivity.

Accuracy and performance

The Beamex FB is an easily portable unit that also provides excellent calibration accuracy. The display accuracy is up to $\pm 0.2\text{ }^{\circ}\text{C}$ and its control technology provides great stability up to $\pm 0.01\text{ }^{\circ}\text{C}$. The dual zone controlled block provides excellent axial uniformity up to $\pm 0.04\text{ }^{\circ}\text{C}$ and radial uniformity up to $\pm 0.01\text{ }^{\circ}\text{C}$.

Smart reference sensors

The Beamex FB has an internal reference thermometer (in R models), which enables connections to the Beamex smart reference sensors. These sensors have a memory that contains all of the sensor correction data. This enables the use of the reference sensor as a real plug-and-play.

Accredited calibration

Each Beamex FB field temperature block is delivered with an accredited calibration certificate.

Usability

The large LCD display, function keys and multilingual, menu-based user interface makes the Beamex FB easy to use. A graphic and audible stability indicator lets you know when a block is stable. The HOT warning light indicates when the block is hot (over $+50\text{ }^{\circ}\text{C}$). It blinks as long as the block is too hot to touch, even when the unit is switched off or when the mains cable is disconnected.

Part of the Beamex ICS integrated calibration solution

The communication port enables communication with selected Beamex MC calibrators for automation calibration and documentation, making the Beamex FB products part of the Beamex ICS integrated calibration solution. Combined with the Beamex MC6 calibrator, loop calibrations are possible with conventional, HART and Fieldbus temperature transmitters with sensors.



Beamex FB series specifications

	FB150	FB350	FB660
Temperature range at 23 °C	-25 °C to 150 °C (-13 °F to 302 °F)	33 °C to 350 °C (91 °F to 662 °F)	50 °C to 660 °C (122 °F to 1220 °F)
Display accuracy	±0.2 °C Full range	±0.2 °C Full range	±0.35 °C at 50 °C ±0.35 °C at 420 °C ±0.5 °C at 660 °C
Stability	±0.01 °C Full range	±0.02 °C at 33 °C ±0.02 °C at 200 °C ±0.03 °C at 350 °C	±0.03 °C at 50 °C ±0.05 °C at 420 °C ±0.05 °C at 660 °C
Axial uniformity at 40 mm (1.6 in)	±0.05 °C Full range	±0.04 °C at 33 °C ±0.1 °C at 200 °C ±0.2 °C at 350 °C	±0.05 °C at 50 °C ±0.35 °C at 420 °C ±0.5 °C at 660 °C
Radial uniformity	±0.01 °C Full range	±0.01 °C at 33 °C ±0.015 °C at 200 °C ±0.02 °C at 350 °C	±0.02 °C at 50 °C ±0.05 °C at 420 °C ±0.10 °C at 660 °C
Loading effect (with a 6.35 mm reference probe and three 6.35 mm probes)	±0.006 °C Full range	±0.015 °C Full range	±0.015 °C at 50 °C ±0.025 °C at 420 °C ±0.035 °C at 660 °C
Hysteresis	±0.025 °C	±0.06 °C	±0.2 °C
Immersion depth	150 mm (5.9 in)		
Insert OD dimensions	30 mm (1.18 in)	25.3 mm (0.996 in)	24.4 mm (0.96 in)
Heating time	16 min: 23 °C to 140 °C 23 min: 23 °C to 150 °C 25 min: -25 °C to 150 °C	5 min: 33 °C to 350 °C	15 min: 50 °C to 660 °C
Cooling time	15 min: 23 °C to -25 °C 25 min: 150 °C to -25 °C	32 min: 350 °C to 33 °C 14 min: 350 °C to 100 °C	35 min: 660 °C to 50 °C 25 min: 660 °C to 100 °C
Resolution	0.01 °C / °F		
Display	LCD, °C or °F user-selectable		
Size (H x W x D)	290 mm x 185 mm x 295 mm (11.4 x 7.3 x 11.6 in)		
Weight	8.16 kg (18 lb)	7.3 kg (16 lb)	7.7 kg (17 lb)
Power requirements	230 V (±10%) 50/60 Hz, 575 W 100 V to 115 V (±10%) 50/60 Hz, 635 W	230 V (±10%), 50/60 Hz, 1800 W 100 V to 115 V (±10%), 50/60 Hz, 1400 W	230 V (±10%), 50/60 Hz, 1800 W 100 V to 115 V (±10%), 50/60 Hz, 1400 W
Computer interface	RS-232	RS-232	RS-232
Calibration	Accredited calibration certificate provided		
Environmental operating conditions	0 °C to 50 °C, 0% to 90% RH (non-condensing)		
Specifications valid in environmental conditions	13 °C...33 °C		

R MODEL SPECIFICATIONS	FB
Resistance range	0 Ω to 400 Ω
Resistance accuracy ¹⁾	0 Ω to 42 Ω: ±0.0025 Ω 42 Ω to 400 Ω: ±60 ppm of reading
Characterizations	ITS-90, CVD, IEC-60751, resistance
Temperature accuracy (100 ohm PRT) ²⁾	±(0.015 °C + 0.008% of temperature reading)
Sensor connection	4-wire, 6-pin Smart Lemo
Calibration	Accredited calibration certificate provided

1) Measurement accuracy specifications apply within the specified environmental operating conditions and assume 4-wires for PRTs.

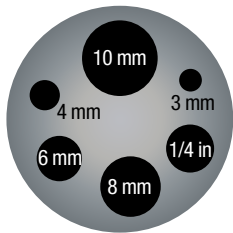
2) The built-in reference thermometer readout accuracy does not include the sensor probe accuracy.

Inserts

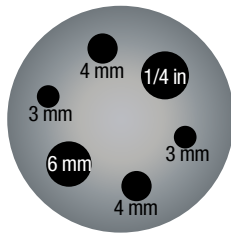
INSERTS FOR FB MODELS

INSERT	MODEL	DESCRIPTION
MH1	FB150	Multihole, metric / reference; ¼", 3 mm, 4 mm, 6 mm, 8 mm, 10 mm
MH1	FB350, FB660	Multihole, metric / reference; ¼", 4 mm, 6 mm, 8 mm, 10 mm
MH2	All models	Multihole, metric / reference; ¼", 2x3 mm, 2x4 mm, 6 mm
B	All models	Blank
Special	All models	Special

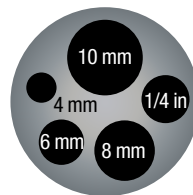
Please contact Beamex for custom inserts.



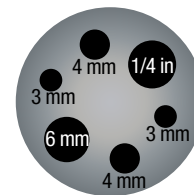
FB150-MH1



FB150-MH2



FB350-MH1, FB660-MH1



FB350-MH2, FB660-MH2

STANDARD ACCESSORIES

- Power Cord
- RS-232 Cable
- User Guide
- Accredited Calibration Certificate
- LEMO Connector for reference sensor (R models only)
- Block Insulator (in FB150)
- Tongs (insert removal tool)

OPTIONAL ACCESSORIES

- Transport Case for temperature block
- Inserts
- Beamex Smart Reference Probes



BEAMEX SMART REFERENCE PROBES



Smart reference probes

The Beamex smart reference probe is a high-quality and extremely stable PRT probe with an integrated memory that stores the individual sensor coefficients. The sensor works as plug-and-play with Beamex FB series of temperature blocks (R model). The temperature block automatically reads the sensor coefficients from the sensor and makes the necessary adjustments. This eliminates the need to enter the coefficients manually.

The sensor can also be used with the Beamex MB series of temperature blocks (R model). The sensor coefficients can be manually entered via the MB user interface. The sensor is available as a 300 mm straight version or a 90° bent version, making it an ideal reference sensor for the Beamex temperature block. The smart reference probe is also compatible with MC6 Workstation.

MAIN FEATURES:

- Temperature range $-200\text{ °C} \dots 420\text{ °C} / 660\text{ °Ct}$
- High stability, up to $\pm 0.007\text{ °C}$
- 300 mm straight and 90° bent versions
- Accredited calibration certificate with data and ITS-90 coefficients included as standard



MODEL	DESCRIPTION
RPRT-420-300	Reference PRT, max 420 °C, length 300 mm, straight
RPRT-420-230A	Reference PRT, max 420 °C, length 230 mm (before angle), 90° angled
RPRT-660-300	Reference PRT, max 660 °C, length 300 mm, straight
RPRT-660-230A	Reference PRT, max 660 °C, length 230 mm (before angle), 90° angled

SPECIFICATIONS

PARAMETER	RPRT-420-300 & RPRT-420-230A	RPRT-660-300 & RPRT-660-230A
Temperature range	-200 to 420 °C	-200 to 660 °C
Nominal resistance at 0.010 °C	100 Ω ±0.5 Ω	100 Ω ±0.5 Ω
Temperature coefficient	0.003925 Ω/Ω/°C	0.0039250 Ω/Ω/°C
Sheath diameter x length	Straight: 6.35 mm ±0.08 mm x 305mm ±3 mm (0.25 in ±0.003 x 12 in ±0.13 in) Angled: 6.35 mm ±0.08 mm x 300 mm ±6 mm (0.25 in ±0.003 x 11.75 in ±0.25 in)	6.35 mm ±0.08 mm x 305 mm ±0.08 mm (0.25 in ±0.003 x 12 in ±0.13 in)
Short-term repeatability ¹⁾	±0.007 °C at 0.010 °C ±0.013 °C at max temp	±0.007 °C at 0.010 °C ±0.013 °C at max temp
Drift ²⁾	±0.007 °C at 0.010 °C ±0.013 °C at max temp	±0.007 °C at 0.010 °C ±0.013 °C at max temp
Hysteresis	±0.010 °C maximum	±0.010 °C maximum
Sensor length	50.8 mm (2.0 in)	30 mm ±5 mm (1.2 in ±0.2 in)
Sensor location	9.5 mm ±3.2 mm from tip (0.375 in ±0.13 in)	3 mm ±1 mm from tip (0.1 in ±0.1 in)
Sheath material	Inconel 600	Inconel 600
Maximum immersion (nominal)	Straight: 305 mm (12 in) Angled: 210 mm (8.3 in)	Straight: 305 mm (12 in) Angled: 210 mm (8.3 in)
Minimum immersion (<5 mK error)	102 mm (4.0 in)	100 mm (3.9 in)
Minimum insulation resistance	500 MΩ at 23 °C	500 MΩ at 23 °C, 10 MΩ at 670 °C
Transition junction temperature range ³⁾	-50 °C to 150 °C	-50 °C to 200 °C
Transition junction dimensions	Straight: 76.2 mm x 10.7 mm (3.0 in x .38 in) Angled: 70 mm x 10.6 mm (2.8 in x .42 in)	71 mm x 12.5 mm (2.8 in x .42 in)
Typical response time	8 seconds	12 seconds
Self heating (in 0 °C bath)	60 mW/°C	50 mW/°C
Lead-wire cable	Teflon cable, Teflon insulated, 24 AWG stranded, silverplated copper	Teflon cable, Teflon insulated, 24 AWG stranded, silver plated copper
Lead-wire length	1.8 m (6 ft)	1.8 m (6 ft)
Lead-wire temperature range	-50 °C to 150 °C	-50 °C to 250 °C

1) Three thermal cycles from min to max temp, includes hysteresis, 95% confidence

2) After 100 hrs at max temp, 95% confidence

3) Temperatures outside this range will cause irreparable damage. For best performance, transition junction should not be too hot to touch.



Beamex POC6

AUTOMATIC PRESSURE CONTROLLER

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780740234825402132132131



Pressure calibration made fast and easy

An accurate and user-friendly automatic pressure output controller

The Beamex POC6 is an accurate and user-friendly automatic pressure output controller, providing regulated output from vacuum to 100 bar (1450 psi). The POC6 can be delivered as a panel mounted to the Beamex MCS200 modular test and calibration system or as a portable desk top version.

The POC6 can be used as a stand-alone pressure controller or it can be integrated into the Beamex calibration system. Together with the MC6 and Beamex CMX calibration software, the POC6 offers a fully automated, integrated solution for performing, documenting and managing calibrations easily, efficiently and accurately.

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Main features of the POC6

User friendly

With its touch screen, the POC6 is fast and efficient to use.

Panel mounted to a Beamex workstation

The POC6 can be used as panel mounted to a Beamex MCS200 modular test and calibration system.

Portable desk top version

The POC6 can also be used as a desk top pressure controller, which makes it a very mobile solution.

Part of Beamex ICS integrated calibration solution

Together with the Beamex MC6 Workstation calibrators as well as the Beamex CMX calibration software, the POC6 offers an integrated, automated calibration system for performing, documenting and managing calibrations easily and efficiently.



General specifications

FEATURE	SPECIFICATION
Display	7.0" color LCD with touch screen
Weight	Approx. 9.1 kg (20 lbs)
Dimensions	Portable: 228(w) x 148(h) x 310(d) mm (without handle) Panel mounting: 321(w) x 200(h) mm
Digital interface	RS232, Ethernet, IEEE-488
Power consumption	Max. 90 VA
Warranty	2 years
Supported user interface languages	English, German, French, Spanish, Italian, Chinese, Russian, Japanese, Polish, Portuguese, Korean
Communication emulation	DPI510
Connections	Pressure supply, Vacuum supply, Test port All connections 7/16"-20 SAE

SPECIFICATIONS

FEATURE	SPECIFICATION
Output range	± 1 bar (±14.5 psi) -1 to 6 bar (-14.5 to 87 psi) -1 to 20 bar (-14.5 to 290 psi) -1 to 70 bar (-14.5 to 1015 psi) -1 to 100 bar (-14.5 to 1450 psi) Special range within -1 to 100 bar (-14.5 to 1450 psi)
Precision	< 0.015 % FS
1 year uncertainty	< 0.025 % FS
Pressure units	33 selectable and 2 programmable
Control stability	< 0.004 % FS
Slew rate	< 3 sec. (regarding a 10 % press. increase in a 250 ml test volume)
Control range maximum	From 0 up to 100 % FS
Test volume	50 to 1,000 ccm (without throttle)
Pressure media	Clean dry non-corrosive gases
Overpressure protection	Safety relief valve
Resolution	4 to 6 digits
Measuring rate	25/sec
Max overpressure	Supply port 110 % FS Test port max. 105 % FS
Supply pressure range	Minimum 100%, Maximum 110% of nominal pressure range
Compensated temperature range	15 to 45 °C
Operation temperature	0... 50°C

INSTALLATION ALTERNATIVES

- Portable unit
- Panel mounted to a workstation or mobile trolley

STANDARD ACCESSORIES

- User guide
- Accredited calibration certificate
- Mains cable
- Connecting kits for:
 - High pressure and vacuum supply or
 - Low pressure and vacuum supply
 - Appropriate pressure adapters and hoses

OPTIONS

- Barometric precision reference
 - enables absolute range
- Panel mounting kit
- Bezel and handle
- Carrying case

Calibration accessories

Electrical and other equipment

MAIN SUPPLY UNITS

The main supply unit powers the modules installed in the MCS200 modular test and calibration system. Each type of main supply unit includes a mains switch, emergency off switch, internal socket outlets for device modules, thermal overload and fault current protections, and earth terminal screw. More features are available depending on the model.



POWER SUPPLY MODULES

Many types of power supplies can be integrated into the MCS200 workstation, such as variable and constant AC & DC supplies, dual power supplies, programmable DC supplies, isolated supply outlets, variable 3-phase AC supplies and 3-phase connections.



MEASURING EQUIPMENT

Various types of measuring equipment can be included in the module rack, such as digital multimeters, oscilloscopes, function generators / frequency counters, power analysers etc., providing an ergonomic and efficient measuring facility.



SOLDERING EQUIPMENT

The MCS200 workstation can be fitted with soldering/desoldering stations, fume extraction equipment, vision accessories, infrared soldering and preheat system etc., enabling soldering and desoldering of surface mounted and traditional electronic components.



ESD EQUIPMENT

ESD equipment available for the MCS200 workstation removes the problems caused by electrostatic discharges into sensitive components. The range of ESD equipment includes semiconducting laminated tabletops, semiconducting mats under the bench, wrist straps, grounding sets, etc. All metal parts of the workstation are ESD painted as standard.



ACCESSORIES

A large variety of fittings and accessories are available for the MCS200 Workstation, such as drawer units, steel shelves, pick-up boxes, swivel stands, PC racks, tool holders, chairs, etc.



Complete instrument workshops



High-quality, instrument and electrical workshops
delivered as a customized solution

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Complete instrument workshops

HIGH-QUALITY INSTRUMENT AND ELECTRICAL WORKSHOPS DELIVERED AS A CUSTOMIZED SOLUTION

The ideal instrument and electrical workshop is designed to meet the specific needs of an industrial plant in addition to having high-performing, reliable measurement equipment and systems delivering improved efficiency and quality.

Beamex is a world-class specialist when it comes to supplying instrument and electrical workshops for new industrial plants and for existing plants that are looking to modernize their workshops. Whether it is a single workstation or an entire workshop, Beamex will be your partner in the different phases regarding design, planning, detailed specifications and documentation,

installation, training, supplying of high-quality equipment and accessories, and lastly, after sales services.

There are hundreds of Beamex workshops installed and in use in more than 50 countries. Our workshops are highly popular especially in power plants, oil, gas, petrochemical and chemical plants, offshore platforms and thermal and combined power plants.

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Typical Beamex workshops customers come from following industries:

- Oil & Gas
- Petrochemical & Chemical
- Offshore platforms
- Power plants

According to Beamex customer survey 2012

95% will probably recommend Beamex to a colleague.

95% say that using Beamex products has improved the efficiency of their calibration procedures.

90% say that using Beamex products has resulted in cost savings.

97% claim that using Beamex products has improved the quality of their calibration system.

BEAMEX – YOUR PARTNER IN EVERY PHASE OF THE INSTRUMENT & ELECTRICAL WORKSHOP PROJECT

Planning and specification

Visualize your future workshop

The Beamex workshop solution: equipment & software

High-quality, customized system to improve efficiency and quality

Project documentation

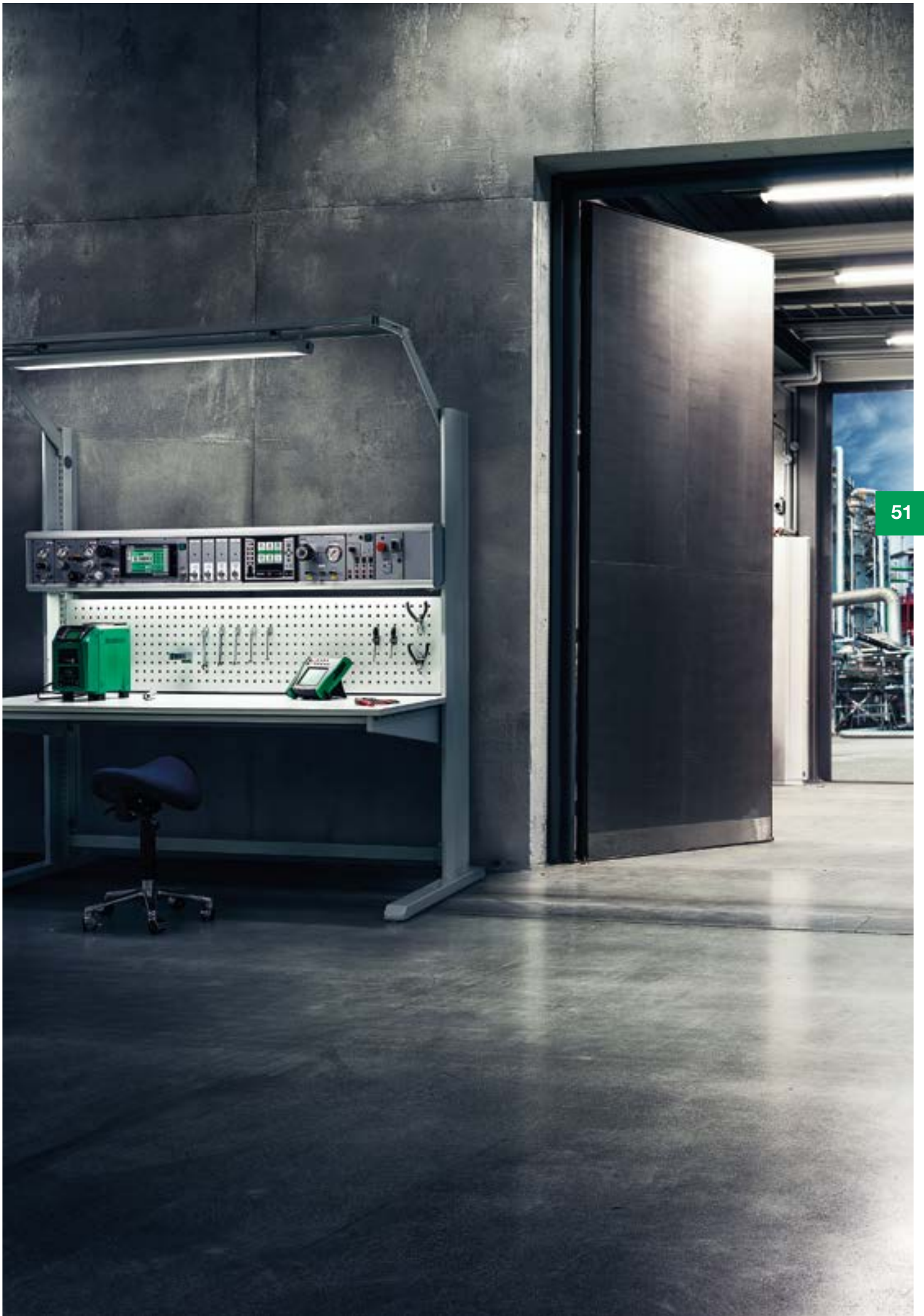
Complete vendor drawings and data are available to meet project requirements

Implementation and start-up

Fast and efficient implementation

After sales services

Support when the system is in use



PLANNING AND SPECIFICATION

Visualize your future workshop

Good design is half the work. When designing and planning a workshop, Beamex helps by providing its knowledge and workshop layout services. Module by module, the workstation layout outlines and visualizes the specifications of a Beamex workstation.

Specifying the equipment

Beamex has vast experience in specifying comprehensive solutions for workshops and laboratories. This specification work includes analysis of functions performed in the workshop and type of equipment needed, clarification of electrical requirements and vacuum & pressure supplies, selection of workstation frames efficiently fitting to the premises, and specification of modules, options, accessories, portable equipment, tools, storage systems and spare parts. Professional specification work results in meeting user requirements in the most efficient way and ensuring a fully compatible system.

The available sample layouts include:

- Calibration workstations
- Electrical and electronic workstations
- Motor testing workstations and trolley
- Soldering workstations
- Power plant workstations

THE BEAMEX WORKSHOP SOLUTION: EQUIPMENT & SOFTWARE

*High-quality, customized system
to improve efficiency and quality*

- Total calibration supplier
- For calibration, electrical and electronic maintenance, and motor testing
- A combination of workstations, portable calibrators, calibration software, accessories and professional services
- The most automated, integrated system available
- Modular design allows user-specific configuration
- Many different types of applications
- Safe, ergonomic and reliable

PROJECT DOCUMENTATION

Documentation available to meet project requirements

An important part of a workshop project is documentation. Beamex can provide documentation regarding specifications, layout planning, calibration certificates, factory acceptance tests (FAT), commissioning, instruction guides, training materials and workstation certificates.

IMPLEMENTATION AND START-UP

Fast and efficient implementation

Training

Training ensures that both equipment users and managers will obtain the necessary skills to use the calibration system to its fullest potential. The training courses combine hands-on workshops with classroom lectures and presentations. Training increases your knowledge and productivity and can be provided by a Beamex professional or by a Beamex authorized partner who is able to offer training courses in your local language.

Training workshops:

- Last from 1 to 5 days, depending on the amount of different equipment
- Start with demonstrations made by the instructor
- Hands-on, supervised learning
- Question & answer sessions
- All training material available on paper
- Provide a certificate upon workshop completion

Delivery, installation & commissioning

Beamex's installation services ensure that your new instrument & electrical workshop is up and running in no time.

Installation services available for:

- Beamex MCS200 modular test and calibration system
- Beamex CMX calibration software
- Database conversions
- CMX integration to a management system (CMMS)
- User-specific customizations for CMX (e.g. certificates, user-interface)

Example of workshop solution



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AFTER SALES SERVICES

Support when the system is in use

Program updates

Regular program updates to calibrators and calibration software keep the system constantly up-to-date with new added features.

Spare parts

Beamex provides spare parts for all their products.

Re-calibration and repair

Regular re-calibrations maintain a high quality of specifications. Beamex offers service and re-calibrations through its accredited calibration laboratory.

Help Desk

Beamex's dedicated support staff consists of highly qualified professionals who deliver technical solutions quickly and efficiently. Help Desk support services are available by email, fax and telephone.

Support from local Beamex partner

Local Beamex support is available through Beamex's global and qualified partner network.

WORKSTATIONS



PORTABLE CALIBRATORS



PROFESSIONAL SERVICES



CALIBRATION SOFTWARE



beamex

WORLD-CLASS CALIBRATION SOLUTIONS

www.beamex.com