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Features

- Eliminates field calibration errors
- Reduces instrumentation maintenance costs
- Over 90 input/output ranges: pressure, temperature, electrical, and frequency
- Interchangeable pressure modules -14.7 psi to 5000 psi (-1 bar to 350 bar)
- HART® module for Smart transmitters
- Memory card for procedure and data transfer

Applications

Multi-Function Portable Calibrator
The MCX II has been designed for ease of use while meeting a wide range of application needs including calibration, maintenance and commissioning. The dual parameter display shows the input and output values in large clear digits with all applicable information such as the units of measurement and range. Using the rotating display, the rear face electrical connectors and wide neck strap, the instrument can be safely worn around the neck or fastened to a suitable pipe or valve. This leaves the operators hands free at all times and prevents dangerous dropages.

Some of the capabilities include:
- Input/output mA
- Input/simulate 12 types of T/C
- Input/simulate 9 types of RTD
- Input/output frequency and pulses
- Simulate transmitter input and measure transmitter output
- Input/output mV/V
- Input/output resistance
- Measure pressure: -14.7 psi to 5000 psi (-1 bar to 350 bar)
- Test switches: captures values on contact change
- Trim smart HART transmitters

Easy to operate
The easy to operate menu driven software enables the MCX II to be set-up very quickly. Simply scroll through the input and output menus to select the required parameters.

Operating and connection errors such as loop resistance mismatch and cold junction temperature sensor absence are reported.

The Keystroking memory enables instant recall of previously stored user tests.

MCX II

Druck Portable Documenting Calibrator

MCX II is a Druck product.
Druck has joined other GE high-technology sensing businesses under a new name—GE Industrial, Sensing.

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A Calibration Workshop in a Single Instrument

The Druck MCX II portable documenting calibrator is the most comprehensive field calibration tool available. It is the culmination of many years combined field experience with the Druck and Unomat series of portable pressure, temperature and electrical calibrators.

Designed for field use, this rugged, self-contained, battery powered package simulates and reads RTD's, thermocouples and resistance, as well as sourcing and reading milliamps, millivolts, volts and frequency. With interchangeable single and dual sensor pressure modules over 90 input and output ranges are available.

The MCX II saves time and money with the calibration, maintenance and commissioning of instrumentation for process plants, production lines, utility processing and distribution by:

- Reducing the burden imposed by quality systems such as ISO 9000.
- Reducing calibration, maintenance and commissioning time.
- Reducing documentation time and errors.
- Replacing several standard test instruments.
- Reducing test instrument calibration costs.
- Minimizing down time and maximizing efficient field usage.

For example, a typical thermocouple transmitter calibration can take one hour using a mV source, look-up tables and a milliammeter. In just five minutes the MCX II can make an automatic calibration and document the results while virtually eliminating human errors.

A PCMCIA memory card provides data storage and gives total flexibility to suit different working practices. By simply exchanging PCMCIA cards, the MCX II can remain permanently in the field and when compared to serial data transfer methods this can save one to two hours a day. With a single item to calibrate the cost of re-calibration is reduced and the inconvenience of down time is minimized.

HART Communicator for SMART Transmitters

The HART communicator allows digital field adjustment of smart transmitters. Typical adjustments to sensor and analogue trims can take up to 40 minutes using conventional test equipment and a hand held communicator. With a single MCX II this time can be reduced to less than 10 minutes, including a fully documented calibration.

High Precision and Multi-Functional

Typical Accuracy	0.01% reading ±0.003% full scale (FS) for mA measurement 0.05% reading for pressure measurement, mA, mV, volts
Input	mA, mV, volts, T/Cs, RTDs, pressure, ohms, frequency and switch state.
Output	mA, mV, volts, T/Cs, RTDs, ohm and frequency
Pressure Modules	Interchangeable single and dual ranges from -14.7 to 5000 psi (-1 to 350 bar) including gauge, absolute and differential
HART Communicator	HART digital communicator for SMART transmitters
C/J Compensation	Internal, external and manual
Loop Power	Dual 24 VDC
Temperature Probe	1/5 DIN accuracy PT100 probe
Data Storage	1 Mbyte PCMCIA card
Data Transfer	PCMCIA card or RS232 interface
PC Software	Intecal

Easy-to-Use

The multi-lingual user interface is an easy to use Input/Output menu with dual parameter readout. The Input and Output connectors are standard 4 mm gold plated sockets which are separated and clearly labeled. The rugged impact resistant enclosure is surrounded by a durable protective carry case which allows access to all the instrument features and provides convenient pockets for storing test leads and accessories. Whether the MCX II is horizontal or vertical the rotatable display provides the optimal viewing angle. On the bench, test leads and pressure modules connect to the front face. In the field, with the MCX II held vertically by the wide neck strap, the connections are made to the rear face. With safety a major design concern, these features reduce the possibility of dropping equipment as the operators hands are kept free.

Temperature transmitter simulation and calibration

Direct connection of thermocouple compensation wires eliminates the need for special connectors. The cold junction temperature is continuously monitored and compensated for, even under the transient conditions experienced by a field calibrator. This is the most reliable and accurate cold junction compensation method found in a portable field calibrator.

In calibration mode the MCX II simulates the temperature signal to the transmitter and simultaneously measures the output. The display shows both the mV output and mA input scaled in °C or °F for easy comparison. The error between the two values is displayed as a percentage of a span or reading. The pass/fail status is also displayed when running pre-defined procedures from Intecal. For convenience, dual 24 VDC loop power supplies are available.

Pressure and RTD calibration modes operate in a similar way. The connection of two, three and four-wire RTD's is detected automatically, a feature unique to Druck portable field calibrators.

Calibration to ISO 9000 and Similar Approvals

Intecal reduces the burden imposed by quality systems, saving both time and money. Documentation quality is improved by the elimination of data errors and the production of clear traceable calibration records.

An instrument database defines the calibration procedures and interval. Instruments can be batched into work orders representing, for example, the work for one technician in one day. These work orders are downloaded to the PCMCIA card for use with any MCX II available in the field. The calibration routines are performed automatically and the results are stored on the PCMCIA card. The card is then returned to the PC, independently of the MCX II, for the documentation to be completed.

Many third party packages are now directly compatible with the MCX II and other Druck calibrators.

Calibrating Smart HART Transmitters

The optional HART digital communicator when installed in the MCX II replaces the need for a separate hand held communicator. It can greatly reduce HART transmitter maintenance times and provides a high level of protection by preventing changes in the field to the device identity, range, set-up and characterization. The MCX II communicates digitally with the HART transmitter to establish device parameters such as tag number, serial number and range. It acts as an electronic 'screwdriver' for adjusting both the sensor and mA trims. This operation is essential if the correct performance of HART transmitters is to be maintained.

The HART digital communicator is compatible with a number of smart HART transmitters. Please contact your nearest sales office for an up to date list.

MCX II Pressure Modules

High Accuracy
Single or dual range pressure modules can be configured to provide over 400 combinations for gauge, absolute and differential pressure measurement. With typical accuracies better than 0.05% of reading ±0.01% FS these expand the MCX II capabilities even further. Modern pressure instrumentation can be easily maintained, even smart pressure transmitters when using the optional HART communicator.

In pressure calibration mode the MCX II displays the applied pressure and also the corresponding mA output (converted into pressure for easy comparison).

Additionally, the error between these values is also shown as a percentage of span or reading and when used with Intecal the pass/fail status is also reported.

Interchangeability
The pressure modules fit directly onto the instrument front or rear casing suitable for benchtop or field operation and when not in use simply attach to the MCX II carry case.

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Advanced Druck sensors and their performance characteristics are stored inside each compact pressure module, enabling convenient use on any MCX II without re-calibration.

When used with Intecal calibration procedures, any module range not conforming to the procedure is reported. For traceability, the serial numbers of both the pressure module and MCX II are recorded together with the calibration results.

Pressure range	Accuracy	Measurement Resolution	Sensor P/N (Gauge)	Sensor P/N (Absolute)
-14.7-0 psi (-1-0 bar)	±0.1% FS	0.00015 psi (0.02 m bar)	#612	
0-5 psi (0-1400 mbar)	±0.0015 psi (±0.1 mbar) ± 1 digit	0.00005 psi (0.02 m bar)	#611	#611A
0-20 psi (0-1400 mbar)	±0.05% rdg. ±0.01% FS	0.0002 psi (0.02 mbar)	#600	#600A
0-30 psi (0-2 bar)	±0.05% rdg. ±0.01% FS	0.0003 psi (0.02 mbar)	#601	#601A
0-50 psi (0-3.5 bar)	±0.05% rdg. ±0.01% FS	0.001 psi (0.1 mbar)	#620	#620A
0-100 psi (0-7 bar)	±0.05% rdg. ±0.01% FS	0.01 psi (0.1 mbar)	#602	#602A
0-150 psi (0-10 bar)	±0.05% rdg. ±0.01% FS	0.01 psi (0.1 mbar)	#603	#603A
0-200 psi (0-14 bar)	±0.05% rdg. ±0.01% FS	0.01 psi (0.2 mbar)	#621	#621A
0-300 psi (0-20 bar)	±0.05% rdg. ±0.01% FS	0.01 psi (0.2 mbar)	#607	#607A
0-500 psi (0-35 bar)	±0.05% rdg. ±0.01% FS	0.01 psi (1 mbar)	#622	#622A
0-600 psi (0-40 bar)	±0.05% rdg. ±0.01% FS	0.01 psi (1 mbar)	#604	#604A
0-1000 psi (0-70 bar)	±0.05% rdg. ±0.01% FS	0.1 psi (1 mbar)	#605	#605A
0-1750 psi (0-120 bar)	±0.05% rdg. ±0.01% FS	0.1 psi (10 mbar)	#606	
0-2000 psi (0-135 bar)	±0.05% rdg. ±0.01% FS	0.1 psi (10 mbar)	#623	
0-3000 psi (0-200 bar)	±0.05% rdg. ±0.01% FS	0.1 psi (10 mbar)	#624	
0-5000 psi (0-350 bar)	±0.05% rdg. ±0.01% FS	0.1 psi (10 mbar)	#625	

Pressure connection	P/N
1/8 in NPTF or G 1/8 female	
316L, Hastelloy and viton	
Max. 10,000 psi (689.74 bar)	616

Ordering Information

MCX-PM (Pressure Module) includes; operating manual, calibration traceability certificate. A calibration report/certificate with data is optional.

Please state ordering code as follows:
MCX-PM–Sensor 1–Sensor 2–Connector 1–Connector 2

Position 1 is left hand side

Pneumatic and Hydraulic Test Kits

PV210 Low Pressure Pneumatic Hand Pump
- 45 psi (3 bar)
- 90% vacuum

PV211 Pneumatic Hand Pump
- 350 psi (25 bar)
- 96% vacuum

PV212 High Pressure Hydraulic Hand Pump
15,000 psi (1000 bar)

PV411A Multi-Function Hand Pump
- 800 psi (60 bar) pneumatic
- 10,000 psi (700 bar) hydraulic
- 95% vacuum
- Low pressure with excellent sensitivity
- Vacuum priming for hydraulic systems

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MCX II Specifications

Input	Range	1 Year Accuracy	Resolution	Remarks
mV (autoranging)	0 to 100 mV	0.004% + 0.004%	0.001	R – input > 20 MΩ
	100 to 600 mV	0.005% + 0.005%	0.01	
V (autoranging)	0 to 6 V	0.009% + 0.003%	0.0001	R – input > 1 MΩ
	6 to 60 V	0.009% + 0.003%	0.001	
mA	0 to 52 mA	0.010% + 0.003%	0.001	R – input 2.5Ω fused
Ohms (autoranging)	0 to 400 Ω	0.010% + 0.005%	0.01	at 0.9 mA excitation
	400 to 2000 Ω	0.010% + 0.005%	0.1	at 0.9 mA excitation
Frequency (autoranging)	0 to 655 Hz	0.01 Hz	0.01	R – input > 300 kΩ
	655 to 1310 Hz	0.1 Hz	0.1	R – input > 300 kΩ
	1310 to 10,000 Hz	1 Hz	1	R – input > 300 kΩ
Counts/Minute	0 to 6 x10^5	1 c/min	1	R – input > 300 kΩ
Counts/Hour	0 to 10^7 –1	1 c/hour	1	R – input > 300 kΩ
Totalizing Counter	0 to 10^8 - 1	infinite	1	R – input > 300 kΩ

Accuracy (% of reading + % of range + 1 LSD)

Source

Output	Range	1 Year Accuracy	Resolution	Remarks
mV	-10 to 100 mV	0.003% + 0.004%	0.001	R – output < 0.2 Ω
V	0 to 12 V	0.004% + 0.002%	0.0001	R – output < 0.2 Ω
mA	0 to 24 mA	0.012% FS	0.001	R – max 900 Ω
Ohms	0 to 400 Ω	0.005% + 0.008%	0.01	at 1 mA excitation
	0 to 2000 Ω	0.010% FS	0.1	at 1 mA excitation
Pulse	0 to 10^8 –1	infinite	1	0 to 24 V/ 34mA max
Frequency	0 to 100 Hz	0.01 Hz	0.01	0 to 24 V/ 34 mA max
	0 to 10,000 Hz	1 Hz	1	0 to 24 V/ 34 mA max
Pulses/Min	0 to 6000	1 p/min	1	0 to 24 V/ 34 mA max
Pulses/Hour	0 to 99,999	36 p/hour	1	0 to 24 V/ 34 mA max

Accuracy (% of reading + % of range + 1 LSD)

Temperature

RTD	Range	1 Year Accuracy Measure	1 Year Accuracy Source	Resolution
Pt 1000 (1)	-328 to 752°F (-200 to 400°C)	0.2°F (0.1°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
Pt 500 (1)	-328 to 1562°F (-200 to 850°C)	0.2°F (0.1°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
Pt 200V (1)	-328 to 1562°F (-200 to 850°C)	0.4°F (0.2°C)	0.5°F (0.3°C)	0.2°F (0.1°C)
Pt 100 (1)	-328 to 1562°F (-200 to 850°C)	0.27°F (0.15°C)	0.22°F (0.12°C)	0.06°F (0.03°C)
Pt 50 (1)	-328 to 1562°F (-200 to 850°C)	0.45°F (0.25°C)	0.36°F (0.2°C)	0.11°F (0.06°C)
D-100 (2)	-328 to 1200°F (-200 to 649°C)	0.27°F (0.15°C)	0.22°F (0.12°C)	0.06°F (0.03°C)
Ni100 (3)	-76 to 482°F (-60 to 250°C)	0.2°F (0.1°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
Ni120 (4)	-112 to 500°F (-80 to 260°C)	0.2°F (0.1°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
Cu10 (5)	-328 to 500°F (-200 to 260°C)	1.8°F (1.0°C)	2.7°F (1.5°C)	0.6°F (0.3°C)

(1) = IEC 751, (2) = JIS 1604-1989, (3) = DIN 43760, (4)= MINCO 7, (5)= MINCO 16-9

TC	Range	1 year Accuracy Measure/Source	Resolution
J (1)	-346 to 2192°F (-210 to 1200°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
L (2)	-328 to 1652°F (-200 to 900°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
K (1)	-454 to 2502°F (-270 to 1372°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
T (1)	-454 to 752°F (-270 to 400°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
U (2)	-328 to 1112°F (-200 to 600°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
B (1)	122 to 3308°F (50 to 1820°C)	0.7°F (0.4°C)	0.2°F (0.1°C)
R (1)	-58 to 3216°F (-50 to 1769°C)	0.9°F (0.5°C)	0.2°F (0.1°C)
S (1)	-58 to 3216°F (-50 to 1769°C)	0.9°F (0.5°C)	0.2°F (0.1°C)
E (1)	-454 to 1832°F (-270 to 1000°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
N (1)	-454 to 2372°F (-270 to 1300°C)	0.2°F (0.1°C)	0.2°F (0.1°C)
C	32 to 4208°F (0 to 2320°C)	0.4°F (0.2°C)	0.2°F (0.1°C)
D	32 to 4523°F (0 to 2495°C)	0.4°F (0.2°C)	0.2°F (0.1°C)

(1) = IEC 584, (2) = DIN 43710
Best case, Mid Range accuracies +1 LSD
Internal cold junction error ±0.4°F (±0.2°C)

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MCX II Specifications

Special Features

Temperature units
°F or °C

Temperature scales
IPTS 68 or ITS 90 selectable

Pressure units
10 units

Step
10 programmable, 10%, 20%, 25%. Manual step or adjustable timer

Ramp
Fully programmable travel time (up/down and dwell)

Scaling
Five digits and sign on all electrical ranges

Temperature transmitter calibration
Both input and output readings in temperature units
Calibration feature extended for all output functions

Temperature transmitter simulation
mA output reads in temperature units

Loop power
Dual 24 VDC Loop power supplies

Signal converter
Converts any input into any output, fully isolated

Keystroking
Storage for 10 user defined test configurations

Switch test
Display freezes on open and close action

Data storage
1 MB of data storage—see option (A3)

Computer interface
RS232 and PCMCIA card—see option (A3)

PCMCIA station
PCMCIA card type 1 or 2—activated by option (A3)

Language
English, French, German, Italian, Portuguese, and Spanish

Power management
Auto backlight off, battery low indicator

Display

Panel
2.6 in x 1.6 in (66 mm x 40 mm), graphic LCD with backlight

Readout
Typically five readings/second

Environmental

Calibration reference
72°F (22°C) ±2°F (±1°C), RH 45% ±15%

Accuracies
Accuracies true for 60°F to 80°F (17°C to 27°C). Outside these limits add 0.00025%°F (0.0005%/°C) typically

Reference for all electrical parameters only.

Temperature
Operation: 15°F to 120°F (-10°C to 50°C)

Humidity
0 to 90% non-condensing

Conformity
EN50081-1, EN50082-1, CE Marked

Physical
Weight: 5.5 lb (2.2 kg)
Size: 10.5 in x 6.3 in x 2.0/3.2 in (265 mm x 160 mm x 56/80 mm)

Power supply
6 x 1.5 V alkaline “C” cells or 6 x 1.2 V Ni-Cad “C” cells

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MCX II Specifications

Options

(A1) Intecal for Industry (P/N Intecal-Ind)
Developed to meet the growing demand on industry to comply with quality systems and calibration documentation. Test procedures are created in a Windows® based application and devices due for calibration are reported and grouped into work orders for transfer to the DPI 325, DPI 335, DPI 605, DPI 615, TRX II and MCX II. Calibration results are uploaded to the PC for analysis and to print calibration certificates.

Visit www.gesensing.com for more information and free download.

(A2) Intecal Calibration Management Software (P/N 7000-Intecal)
Builds on the concept of Intecal for industry supporting both portable calibrators and on-line workshop instruments. Intecal is a simple-to-use calibration management software, that enables a high productivity of scheduling, calibration and documentation.

Visit www.gesensing.com for more information and free download.

(A3) Documenting Release Key (P/N Key MCX)
A PCMCIA card which adds full documenting capabilities to the MCX II with 1 MB of memory for procedures and results. Each MCX II requires a key to work with PC based software. RS 232 cable provided. Require for use with Intecal or third party software.

(B) Interchangeable Pressure Modules (P/N (refer to table)
Single or dual range pressure modules with sensor ranges from -14.7 psi to 5000 psi (-1 bar to 350 bar) including gauge and absolute versions.

(C) HART Digital Communicator (P/N 155)
For full calibration and adjustment of HART transmitters without a separate digital communicator. It can also be retrofitted by the user.

(D) High Accuracy Temperature Probe (P/N 170)
A hand held PT100 1/5 DIN reference temperature probe for measuring ambient air temperatures during calibrations or at thermocouple remote cold junctions. Cable length 4.5 ft (1.5 m).

(E) Battery Charger/Eliminator (P/N 13603 state 110 V or 230 V)
This 110 V adapter can either power the MCX II from line voltage or recharge Ni-cad batteries (batteries not supplied). The MCX II can be recharged and operated simultaneously. Refer to factory for 220 V version.

Accessories

Carrying case, test leads, user guide, handbook, batteries and calibration certificate of conformance supplied as standard (calibration report with data is optional).

Calibration Standards

Calibrators manufactured by Druck are calibrated against precision calibration equipment traceable to International Standards.

Ordering Information

Please state the following (where applicable):
1. Model number MCX II.
2. Options, including part numbers. For MCX II pressure modules please refer to the ordering code tables and state the pressure range/s and process connection/s required. For options (A1) or (A2) please order (A3) for each MCX II.

Options should be ordered as separate line items.