MCX II

Portable documenting calibrator

- Eliminates field calibration errors
- Reduces instrumentation maintenance costs
- Over 90 Input/Output ranges: Pressure, Temperature, Electrical and Frequency
- Interchangeable pressure modules -14.7 to 5000 psi
- HART® module for Smart transmitters
- Memory card for procedure and data transfer

A Modular option

MCX II

Portable documenting calibrator

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.
- Minimising down time and maximising 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% Rdg +/-0.003% FS for mA measurement 0.05% Rdg for pressure measurement,
Input:	mA, mV, volts, T/C's, RTD's, pressure, ohms, frequency and switch state.
Output:	mA, mV, volts, T/C's, RTD's, ohms, and frequency.
Pressure modules:	Interchangeable single and dual ranges from -14.7 to 5000 psi 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 P100 probe.
Data storage:	1 Mbyte PCMCIA card.
Data transfer:	PCMCIA card or RS 232 interface.
PC software:	Linkpak-W and Intecal-W.

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 4mm gold plated sockets which are separated and clearly labelled. 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.


Multi-lingual firmware supported by Linkpak-W and Intecal-W calibration software.
LCD contrast control and backlight On/Off
Rotating control panel provides optimal viewing angle for bench top or field use.
Numerical keys for entering values
LCD screen protected by a scratch resistant anti-reflection window
Shoulder strap secured to MCX II
Input terminals
Output terminals
Pressure module (Optional)
mA input fuseholder
RS 232 connector
HART® communicator terminals (A retrofitable option)
Memory card (Supplied with Linkpak-W and Intecal-W options)
Power On/Off
External power indicator
Charging indicator
Temperature probe
UNIMAT
MCX-II
INPUT
OUTPUT
pressure module
DIGITAL COMMUNICATOR
POWER
1 Mbyte

MCX II

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 to 5000 psi
- 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.

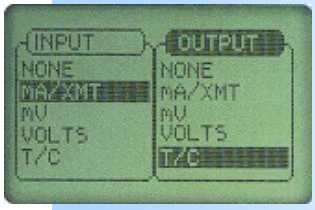
Operating and connection errors such as loop resistance mismatch and cold junction temperature sensor absence are reported.

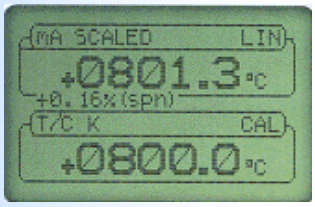
The KEYSTROKING memory enables instant recall of previously stored user tests.

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.

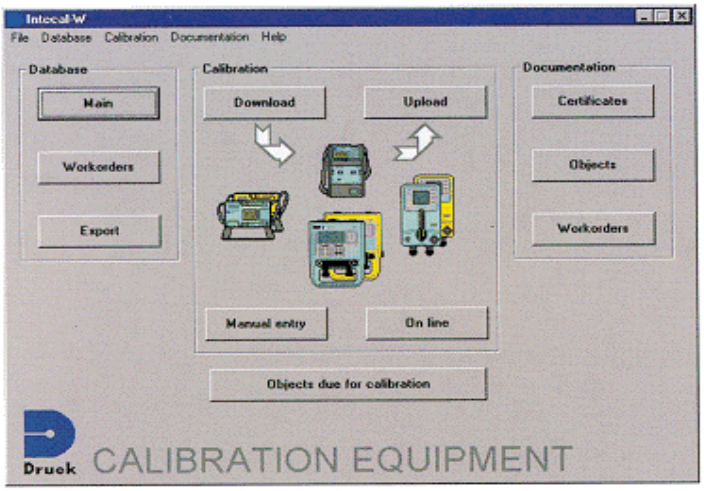
In calibration mode the MCX II simulates the temperature signal to the transmitter and simultaneously measures the output. The display shows both the mV output and mA input scaled in °C or °F for easy comparison. The error between the two values is displayed as a percentage of a span or reading. The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





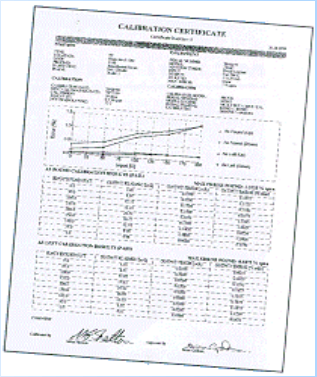
Pressure and RTD calibration modes operate in a similar way. The connection of 2, 3 and 4 wire RTD's is detected automatically, a feature unique to Druck portable field calibrators.

CALIBRATION TO ISO 9000 AND SIMILAR APPROVALS



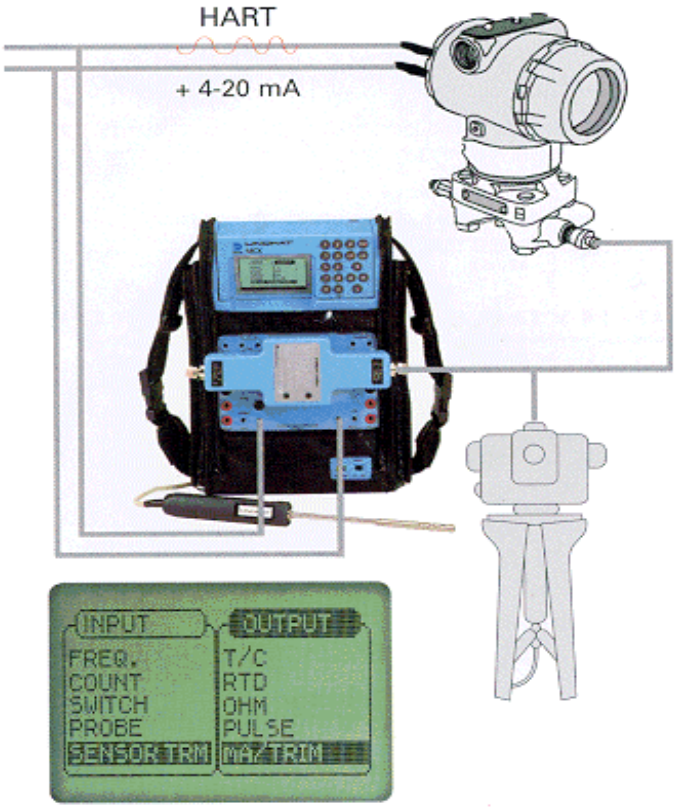
Linkpak-W and Intecal-W Calibration Software reduce the burden imposed by quality systems, saving both time and money. Documentation quality is improved by the elimination of data errors and the production of clear traceable calibration records.

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.



Linkpak-W and Intecal-W have export facilities for moving data into other applications and databases. Many third party packages are now directly compatible with the MCX II and other Druck calibrators.

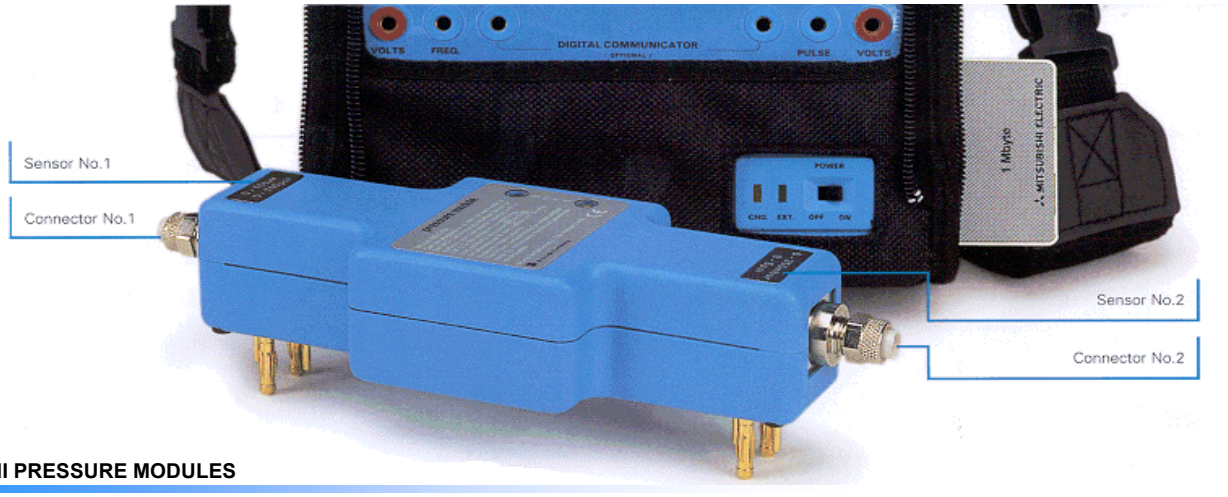
CALIBRATING SMART HART TRANSMITTERS



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.

ADD THE MODULE, ENHANCE THE MCX-II



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% F.S. 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 Linkpak-W or Intecal-W the PASS/FAIL status is also reported.

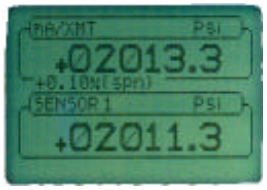
Interchangeability

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.

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 Linkpak-W or Intecal-W 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	±0.1% FS	0.00015 psi	#612	
0 - 5 psi	±0.0015 psi ± 1 digit	0.00005 psi	#611	#611A
0 - 20 psi	±0.05% rdg. ±0.01% fs.	0.0002 psi	#600	#600A
0 - 30 psi	±0.05% rdg. ±0.01% fs.	0.0003 psi	#601	#601A
0 - 50 psi	±0.05% rdg. ±0.01% fs.	0.001 psi	#620	#620A
0 - 100 psi	±0.05% rdg. ±0.01% fs.	0.01 psi	#602	#602A
0 - 150 psi	±0.05% rdg. ±0.01% fs.	0.01 psi	#603	#603A
0 - 200 psi	±0.05% rdg. ±0.01% fs.	0.01 psi	#621	#621A
0 - 300 psi	±0.05% rdg. ±0.01% fs.	0.01 psi	#607	#607A
0 - 500 psi	±0.05% rdg. ±0.01% fs.	0.01 psi	#622	#622A
0 - 600 psi	±0.05% rdg. ±0.01% fs.	0.01 psi	#604	#604A
0 - 1000 psi	±0.05% rdg. ±0.01% fs.	0.1 psi	#605	#605A
0 - 1750 psi	±0.05% rdg. ±0.01% fs.	0.1 psi	#606	
0 - 2000 psi	±0.05% rdg. ±0.01% fs.	0.1 psi	#623	
0 - 3000 psi	±0.05% rdg. ±0.01% fs.	0.1 psi	#624	
0 - 5000 psi	±0.05% rdg. ±0.01% fs.	0.1 psi	#625	



Pressure connection	P/N
1/8" NPTF 316L, Hastelloy and viton. Max. 10,000 psi	616

Ordering Information

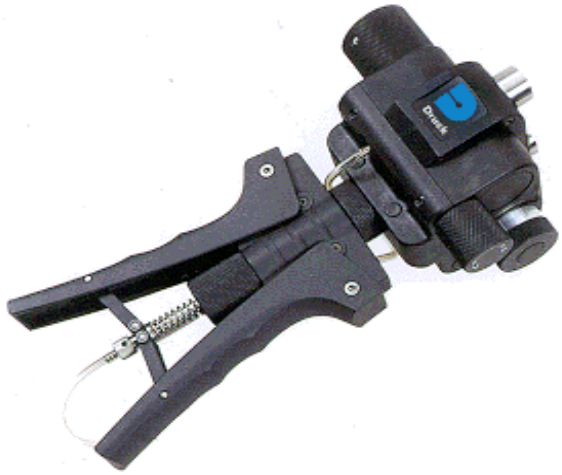
MCX-PM (Pressure Module) includes; operating manual, calibration traceability certificate. A calibration report/certificate with data is optional.

Please state ordering code as follows:

MCX - PM - Sensor1 - Sensor2

Note: Position 1 is lefthand side

PV411 (4 IN 1) PNEUMATIC AND HYDRAULIC HAND PUMP



The revolutionary PV 411 (4 In 1) multi-function pressure generator is a remarkable hand pump for generating vacuum, gas and hydraulic pressures. A single PV 411 replaces four conventional hand pumps and sets new standards of performance in each of the following disciplines:

Vacuum: 28.5 inHg
Low pressure (gas): in H_2O range fine control
Medium pressure (gas): 600 psi
Hign pressure (hydraulic): 10,000 psi

The PV 411 is the ideal pressure source for calibrations and tests using MCX II pressure modules. For more information please refer to the PV 411 data sheet.

MCX II

Standard Specification

Druck

MEASURE

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

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

SOURCE

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

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

TEMPERATURE

RTD	Range	1 Year Accuracy		Resolution
		Measure	Source	
Pt1000 ①	-200 … 400 °C	0.1 °C	0.1 °C	0.1 °C
Pt500 ①	-200 … 850 °C	0.1 °C	0.1 °C	0.1 °C
Pt200 ①	-200 … 850 °C	0.2 °C	0.3 °C	0.1 °C
Pt100 ①	-200 … 850 °C	0.15 °C	0.12 °C	0.03 °C
Pt50 ①	-200 … 850 °C	0.25 °C	0.2 °C	0.06 °C
D-100 ②	-200 … 649 °C	0.15 °C	0.12 °C	0.03 °C
Ni100 ③	-60 … 250 °C	0.1 °C	0.1 °C	0.1 °C
Ni120 ④	-80 … 260 °C	0.1 °C	0.1 °C	0.1 °C
Cu10 ⑤	-200 … 260 °C	1.0 °C	1.5 °C	0.3 °C

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

T/C	Range	1 Year Accuracy		Resolution
		Measure	Source	
J ①	-210 … 1200 °C	0.1 °C	0.1 °C	0.1 °C
L ②	-200 … 900 °C	0.1 °C	0.1 °C	0.1 °C
K ①	-270 … 1372 °C	0.1 °C	0.1 °C	0.1 °C
T ①	-270 … 400 °C	0.1 °C	0.1 °C	0.1 °C
U ②	-200 … 600 °C	0.1 °C	0.1 °C	0.1 °C
B ①	50 … 1820 °C	0.4 °C	0.4 °C	0.1 °C
R ①	-50 … 1769 °C	0.5 °C	0.5 °C	0.1 °C
S ①	-50 … 1769 °C	0.5 °C	0.5 °C	0.1 °C
E ①	-270 … 1000 °C	0.1 °C	0.1 °C	0.1 °C
N ①	-270 … 1300 °C	0.1 °C	0.1 °C	0.1 °C
C	0 … 2320 °C	0.2 °C	0.2 °C	0.1 °C
D	0 … 2495 °C	0.2 °C	0.2 °C	0.1 °C

①= IEC 584, ② = DIN 43710

Best case, Mid Range accuracies +1 LSD

Note: Internal cold junction compensation error +/- 0.2°C (± 0.4°F)

SPECIAL FEATURES

Temperature units
°C or °F

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
5 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 24Vdc 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 Mbyte of data storage - see option (A3)

Computer interface
RS 232 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 Graphic LCD with backlight

Readout
Typically 5 readings/ second

ENVIRONMENTAL

Calibration reference
22°C +/- 1°C (72°F +/-2°F), R.H. 45% +/- 15%

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

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

Humidity:
0 - 90% non condensing

Sealing
Generally to NEMA 12 (IP53)

Conformity
EN50081-1, EN50082-1, CE Marked

Physical
1.1 lb, 10.5 in x 6.3 in x 2.0/3.2 in

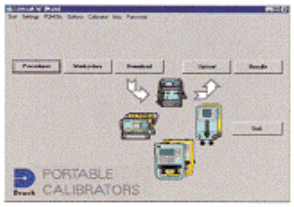
Power supply
6 x 1.5 V alkaline “C” cells 6 x 1.2 V Ni-Cad “C” cells

MCX II

Options and related products

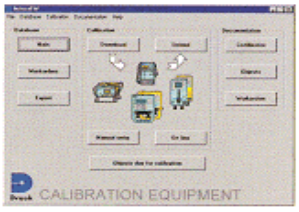
OPTIONS

(A1) **Linkpak-W calibration software (P/N LPDPI)**
Developed to help 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 605, DPI 615, TRX-II and the MCX II. Calibration results, including files from the DPI 610, are uploaded to the PC via the RS 232 interface (or PCMCIA card) for analysis and to print calibration certificates.



Visit www.druckinc.com for Linkpak-W demonstration

(A2) **Intecal-W calibration database software (P/N ICDPI)**
Builds on the basic concept of Linkpak-W supporting both portable field calibrators and on-line workshop calibrators; manual data entry is also a key feature for recording data. Intecal-W is a simplified calibration management software which enables a high productivity of calibration scheduling/work and documentation. Device information, calibration procedures and results are stored in an instrument database. Multiple databases can be created for organising client accounts, processes or areas. Extensive management features provided include a database search engine, time based calibration due queries and standard reports.



Visit www.druckinc.com for Intecal-W demonstration

(A3) **Documenting release key (P/N 405-A014)**
A PCMCIA card which adds full documenting capabilities to the MCX II with 1 Mbyte of memory for procedures and results. Each MCX II requires a key to work with PC based software. RS 232 cable provided.

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

(C) **HART® digital communicator (P/N 405-A003)**
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 191-A012)**
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 feet.

(E) **Battery charger/eliminator (P/N 191-A005 110V)**
This 110V 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 220V version.

ACCESSORIES

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

CALIBRATION STANDARDS

Calibrators manufactured by Druck are calibrated against precision calibration equipment traceable to National Institue of Standards and Technology (NIST).

RELATED PRODUCTS

Portable field calibrators
Druck manufacture a wide range of portable pressure, temperature and electrical field calibrators. A selection of these are shown below.

Laboratory and workshop instruments
Druck also manufacture a wide range of pressure indicators and controllers. This includes Pressurements industrial deadweight testers and Ruska precision controllers and primary standard piston gauges.

Pressure transducers and transmitters
Druck instruments complement an extensive range of pressure transducers and transmitters, utilized in a variety of aerospace, automotive, depth level and process applications.

Please refer to manufacturer for further information on related products.

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 required. For options (A1) or (A2) please order option (A3) for each MCX II.
   Note: options should be ordered as separate line items.

Continuing development sometimes necessitates specification changes without notice.

Druck is an ISO 9001 registered company

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