

# TRX II

## TRX II Series

Portable Documenting Calibrator



- Simulates and Reads RTD's and thermocouples
- Sources and reads Millivolts, Volts, Milliamps, Ohms and frequency
- Measures pressure -1 to 700 Bar
- Dual readout: measure and source
- Dual storage for field calibrations
- Data transfer via RS 232 or PCMCIA card
- Intrinsically safe version



# TRX II Series

## Portable documenting calibrator

### A NEW STANDARD FOR PORTABLE MULTIFUNCTION CALIBRATORS

The Druck TRX II portable documenting calibrator is the culmination of many years of combined field experience with the Druck and Unomat series of calibrators.

This one self-contained, battery powered package simulates and measures RTD's, thermocouples and resistance, as well as sourcing and reading milliamps, millivolts, volts and frequency. The rugged design includes an impact resistant enclosure which is fastened to the carrying case for convenience and safety. Dedicated alphanumeric and documenting keypads surround a large LCD panel with dual readout and backlight (not IS version). The source and measure connectors are kept separate and a 24V (12V IS version) output is provided for loop power.

The TRX II's extensive measurement capabilities can include pressure measurement by connecting Druck pressure sensors which have been digitally characterised to give high accuracy.

The Intrinsically Safe version is a complete maintenance tool and portable calibration standard, for process instruments and control loops in hazardous 'Zoned' areas. Certified to CENELEC standards, the TRX II IS can reduce the response time to breakdowns and emergencies by removing the need for 'Hot Permits' and gas detection equipment. It gives peace of mind to all those responsible for safety in hazardous areas.

This highly accurate and easy to use documenting calibrator gives improved data quality and quicker calibration time since data can be uploaded and downloaded via the PCMCIA card (not IS version) or the RS232 interface.

#### High performance and multi-functional

Typical accuracies:	0.01% reading $\pm 0.01\%$ FS for mA measurement.
Measure:	0.05% FS for pressure measurement mA, mV, volts, T/C's, RTD's, pressure, ohms, frequency and switch state.
Source:	mA, mV, volts, T/C's, RTD's, ohms and frequency
Remote pressure sensors:	70 mbar to 700 bar including gauge, absolute and differential
Loop power:	24 Vdc (12 Vdc IS version)
Data storage:	1 Mbyte PCMCIA card (IS version has fixed 4 Mbyte internal memory)
Data transfer:	RS 232 or PCMCIA card


#### Simple to operate

The key to the simple operation of the TRX II is the structured menu. Input and output readings are displayed simultaneously for test modes such as T-I and P-I, allowing quick comparison of the values. Used in conjunction with Linkpak-W or Intecal-W calibration software, the TRX II will perform automatic calibrations from pre-defined procedures, calculating and reporting errors to the operator and storing the results. Whether used manually or automatically, the TRX II saves time and eliminates human errors.

The TRX II provides simple and flexible data transfer to fit in with most working practices. Information can be reviewed on screen or transferred to and from the TRX II using the RS 232 interface. Alternatively, without docking the instrument to a PC, data can be transferred by exchanging PCMCIA cards.

The operating system works in several languages and can be relied upon time and time again for field calibration in extreme conditions.



Intrinsically Safe version supplied in a yellow enclosure 

 Multilingual firmware supported by Linkpak-W and Intecal-W calibration software

Connectors for external pressure sensor

Direct connection for T/C compensation wires

Cold junction compensation at point of contact

Shoulder strap

PCMCIA slot for card types 1 or 2 (Not IS version)

LCD screen protected by a scratch resistant anti-reflection window

Backlight key (Not IS version)

Input connectors

RS 232 for Data transfer

Numerical keys for entering values

Carry case secured to TRX II

Output connectors

User guide for quick reference in the field

# TRX II Series

## Applications

### MULTIFUNCTION PORTABLE CALIBRATOR

The TRX II has been designed for ease of use whilst meeting a wide range of application needs including calibration, maintenance and commissioning. The dual parameter display shows the measured and sourced values in large clear digits with all applicable information such as the units of measurement and range. With safety in mind, construction of the shoulder strap allows hands free operation whilst maintaining display visibility.

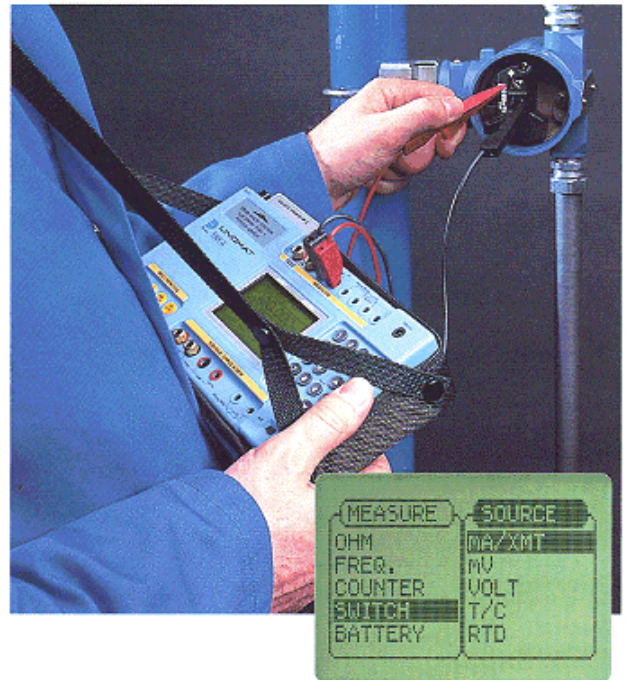
#### Some of the capabilities

- Measure/source mA
- Measure/simulate 12 types of T/C
- Measure/simulate 9 types of RTD
- Measure/source frequency and pulses
- Simulate transmitter input and measure transmitter output
- Measure/source mV/V
- Measure/source resistance
- Measure pressure: -1 to 700 bar
- Test switches: captures values on contact change

#### Easy to operate

The easy to operate menu driven software enables the calibrator to be set up very quickly. Simply scroll through the menus and select the appropriate 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 SENSOR SIMULATION AND LOOP CHECKING

The auto step and ramp modes enable a single technician to test and commission control loops. The calibrator is left to generate a pre-programmed output, while the technician checks the signal further down the loop. End to end control loop performance can be checked with one instrument by simulating a temperature signal at the start of the loop. When troubleshooting apply a three step approach.

#### Step one:

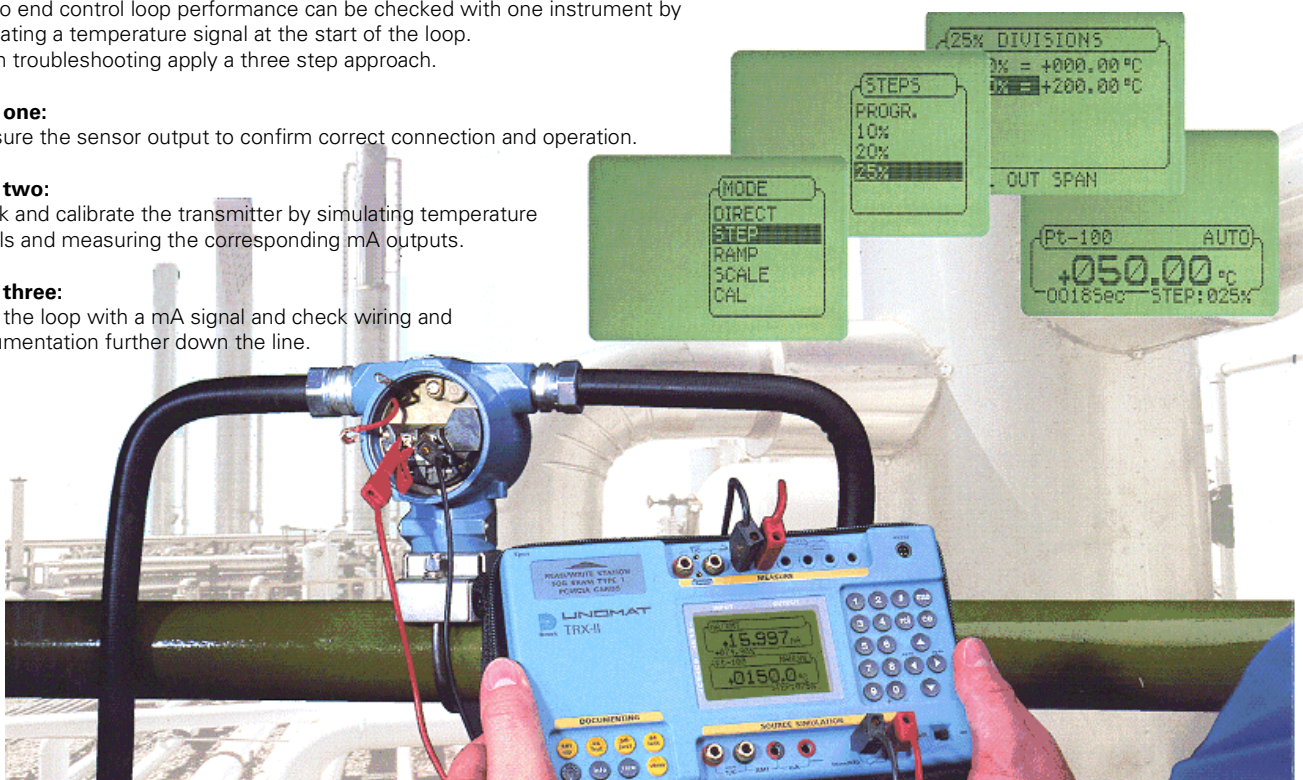
Measure the sensor output to confirm correct connection and operation.

#### Step two:

Check and calibrate the transmitter by simulating temperature signals and measuring the corresponding mA outputs.

#### Step three:

Feed the loop with a mA signal and check wiring and instrumentation further down the line.



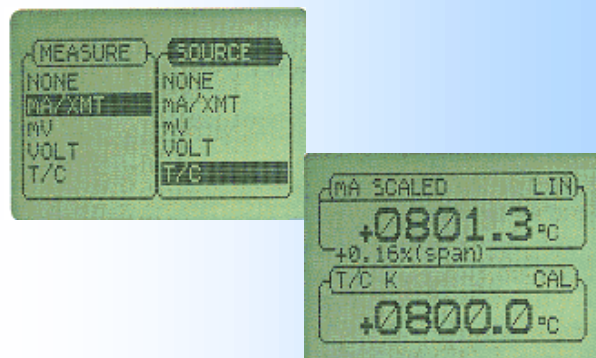
## TEMPERATURE TRANSMITTER SIMULATION AND CALIBRATION



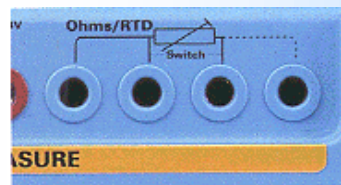
Direct connection of thermocouple compensation wires eliminates the need for special connectors and reduces additional cold junction errors. This is the most reliable and accurate method of monitoring cold junction temperatures in a portable field calibrator.

In calibration mode the display shows all the required information. Both mV and mA values are displayed in °C for easy comparison, along with the calculated error expressed as % of span or reading.

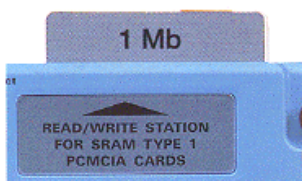
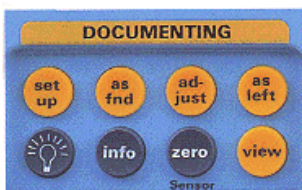
The TRX II will simulate the temperature signal to the transmitter to be calibrated and will simultaneously measure and display the output.



The connection of 2, 3 and 4 wire RTD's is detected automatically, a feature unique to Druck portable field calibrators.



## CALIBRATION FOR ISO 9000



Dedicated keys for documenting field calibrations eliminate human errors. The 'AS FND' (as found) and 'AS LEFT' keys start the respective procedures for storing calibration data which can be recalled using the 'VIEW' key.

PCMCIA cards represent the most efficient data transfer media. Docking of the calibrator with the PC is unnecessary as a card containing calibration data can be exchanged for another containing new procedures/work orders, enabling technicians and calibrators to spend more time in the field. (Note the TRX II IS has a fixed internal memory)

Data is transferred to the PC from the PCMCIA card or the RS 232 interface for analysis, certificate printing and archiving. Exporting facilities are provided for wordprocessor and spreadsheet applications or in-house maintenance systems.



## REMOTE PRESSURE SENSORS

Remote pressure sensors offer a cost effective means of expanding the capabilities of the TRX II, or TRX II IS, for example:

- Calibration of pressure transmitters
- Testing pressure switches
- For differential pressure applications
- For flow measurement calibrations

The capability of the TRX II can be extended by adding up to 8 external pressure sensors (connected one at a time). With ranges from 70 mbar to 700 bar and all welded stainless steel construction, sensors can be chosen to suit many applications. For convenience, a single detachable cable assembly (part No.230) connects any of the standard remote pressure sensors to the TRX II. Druck has applied the latest technology and production techniques to develop these sensors which are digitally corrected for non-linearity and temperature effects.

### Specifications

Over 50 sensor ranges are available including gauge, absolute and differential versions and with accuracy better than 0.05% FS, (70 mbar range 0.1% FS) even the most up to date pressure instrumentation can be maintained and calibrated.

### Pressure ranges (optional)

Gauge	Part No.	Absolute	Part No.	Differential	Part No.
0 - 70 mbar	# 800	0 - 350 mbar	# 853	0 - 350 mbar	# 900
0 - 175 mbar	# 801	0 - 700 mbar	# 854	0 - 700 mbar	# 901
0 - 200 mbar	# 802	0 - 1 bar	# 855	0 - 1 bar	# 902
0 - 350 mbar	# 803	0 - 1.4 bar	# 856	0 - 1.5 bar	# 903
-700 700 mbar	# 804	0 - 2 bar	# 857	0 - 2 bar	# 904
-1 1 bar	# 805	0 - 3 bar	# 858	0 - 3.5 bar	# 905
-1 1.4 bar	# 806	0 - 4 bar	# 859	0 - 5 bar	# 906
-1 2 bar	# 807	0 - 5 bar	# 860	0 - 7 bar	# 907
-1 3 bar	# 808	0 - 7 bar	# 861	0 - 10 bar	# 908
-1 4 bar	# 809	0 - 10 bar	# 862	0 - 15 bar	# 909
-1 5 bar	# 810	0 - 14 bar	# 863	0 - 20 bar	# 910
-1 7 bar	# 811	0 - 20 bar	# 864	0 - 35 bar	# 911
-1 10 bar	# 812	0 - 30 bar	# 865		
-1 14 bar	# 813	0 - 35 bar	# 866		
0 - 20 bar	# 814	0 - 40 bar	# 867		
0 - 30 bar	# 815	0 - 70 bar	# 868		
0 - 35 bar	# 816				
0 - 40 bar	# 817				
0 - 70 bar	# 818				
0 - 120 bar	# 819				
0 - 140 bar	# 820				
0 - 160 bar	# 821				
0 - 200 bar	# 822				
0 - 350 bar	# 823				
0 - 400 bar	# 824				
0 - 500 bar	# 825				
0 - 700 bar	# 826				

### Comments

Maximum line pressure 35 bar  
Differential ranges uni-directional use only

**Pressure connection:** G<sup>1</sup>/<sub>4</sub> (female)  
two adaptors are provided to convert to G<sup>1</sup>/<sub>4</sub>B (male) and 1/4NPT (male).

1.5 metre cable part No.230 a detachable PTFE cable assembly to connect the remote pressure sensors to the TRX II.

## PNEUMATIC AND HYDRAULIC HAND PUMP

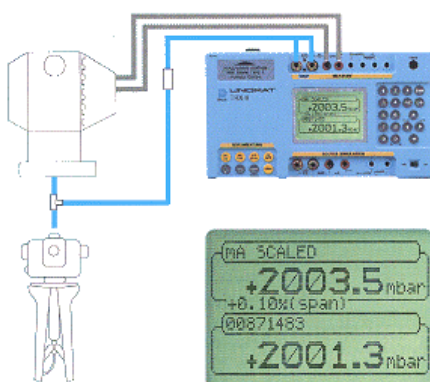


The revolutionary PV 411 (4 In 1) multi-function pressure generator is a remarkable hand pump for generating vacuum, gas and hydraulic pressures. A single PV 411 replaces four conventional hand pumps and sets new standards of performance in each of the following disciplines:

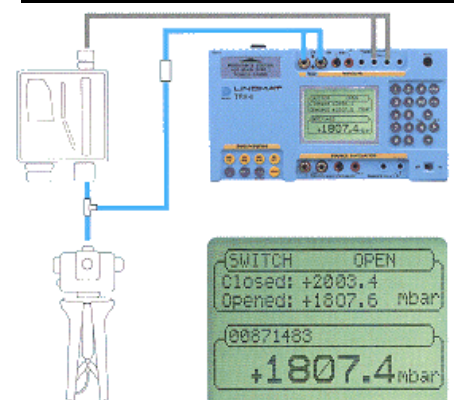
Vacuum:	95%
Low pressure (gas):	<0.1 mbar sensitivity
Medium pressure (gas):	60 bar
High pressure (hydraulic):	700 bar

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

### APPLICATION: Pressure transmitter



### Pressure Switch



# TRX II Series

## Standard Specification



### MEASURE

Input	Range	1 Year Accuracy	Resolution	Remarks
mV	0 ... 100 mV	0.02% + 0.01%	0.001	R – input > 20 M Ohm
	100 ... 600 mV	0.025% + 0.005%	0.01	
V	0 ... 6 V	0.025% + 0.005%	0.0001	R – input > 1 M Ohm
	6 ... 60 V	0.05% + 0.005%	0.001	
mA	0 ... 52 mA	0.01% + 0.01%	0.001	R – input 2,5 Ohm fused
	0 ... 400 Ohm	0.005% + 0.02%	0.01	at 0.9 mA excitation
Ohms	400 ... 2000 Ohm	0.02% + 0.015%	0.1	at 0.9 mA excitation
	0 ... 655 Hz	0.006%	0.01	R – input > 300 k Ohm
Frequency	655 ... 1310 Hz	1 Hz	0.1	R – input > 300 k Ohm
	1310 ... 20,000 Hz	1 Hz	1	R – input > 300 k Ohm
	0 ... 6 x 10 <sup>7</sup>	1 c/min.	1	R – input > 300 k Ohm
Counts/minute	0 ... 10 <sup>7</sup> -1	1 c/hour	1	R – input > 300 k Ohm
Counts/hour	0 ... 10 <sup>7</sup> -1	infinite	1	R – input > 300 k Ohm
Totalising	0 ... 10 <sup>7</sup> -1			

Accuracy ( % of reading + % of range)

### SOURCE

Output	Range	1 Year Accuracy	Resolution	Remarks
mV	-10 ... 100 mV	0.01% + 0.005%	0.001	R – output < 0.2 Ohm
V	0 ... 12 V	0.01% + 0.005%	0.0001	R – output < 0.2 Ohm
mA	0 ... 24 mA (21mA IS)	0.01% + 0.02%	0.001	R – max 900 OhmA (600IS)
	0 ... 400 Ohm	0.005% + 0.02%	0.01	at 1 mA excitation
Ohms	0 ... 2000 Ohm	0.02% + 0.015%	0.01	at 1 mA excitation
	0 ... 10 <sup>7</sup> -1	Infinite	1	0 ... 24V/ 34 mA max.*
Pulse Frequency	0 ... 100 Hz	0.01 Hz ± 1 LSD	0.01	0 ... 24V/ 34 mA max.*
	0 ... 20,000 Hz	1 Hz	1	0 ... 24V/ 34 mA max.*
pulses/min	0 ... 6000	1 p/min	1	0 ... 24V/ 34 mA max.*
pulses/hour	0 ... 99,9999	36 p/hour	1	0 ... 24V/ 34 mA max.*

Accuracy ( % of reading + % of range)

\*12V/25mA max. for IS version

### TEMPERATURE

RTD	Range	1 Year Accuracy		Resolution
		Measure	Source	
Pt1000 ①	-200/400 °C	0.2 °C	0.2 °C	0.1 °C
Pt500 ①	-200/850 °C	0.4 °C	0.4 °C	0.1 °C
Pt200 ①	-200/850 °C	0.6 °C	0.6 °C	0.1 °C
Pt100 ①	-200/850 °C	0.25 °C	0.25 °C	0.03 °C
Pt50 ①	-200/850 °C	0.5 °C	0.5 °C	0.06 °C
D-100 ②	-200/630 °C	0.25 °C	0.25 °C	0.03 °C
Ni100 ③	-60/250 °C	0.2 °C	0.2 °C	0.1 °C
Ni120 ④	-20/250 °C	0.2 °C	0.2 °C	0.1 °C
Cu10 ⑤	-200/260 °C	2.0 °C	2.0 °C	0.3 °C

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

Best case, Mid Range accuracies

T/C	Range	1 Year Accuracy		Resolution
		Measure	Source	
J ①	-210 ... 1200 °C	0.5 °C	0.3 °C	0.1 °C
L ②	-200 ... 900 °C	0.3 °C	0.2 °C	0.1 °C
K ①	-250 ... 1370 °C	0.6 °C	0.3 °C	0.1 °C
T ①	-250 ... 400 °C	0.3 °C	0.2 °C	0.1 °C
U ②	-200 ... 600 °C	0.3 °C	0.2 °C	0.1 °C
B ③	250 ... 1820 °C	1.0 °C	0.6 °C	0.1 °C
R ①	-50 ... 1768 °C	1.0 °C	0.6 °C	0.1 °C
S ①	-50 ... 1768 °C	1.4 °C	0.7 °C	0.1 °C
E ①	-250 ... 1000 °C	0.4 °C	0.2 °C	0.1 °C
N ①	-200 ... 1300 °C	0.6 °C	0.3 °C	0.1 °C
C ①	0 ... 2320 °C	1.0 °C	0.5 °C	0.1 °C
D ①	0 ... 2495 °C	1.0 °C	0.5 °C	0.1 °C

① = IEC 584, ② = DIN 43710

Best case, Mid Range accuracies

**Note:** Thermocouple accuracies do not include cold junction compensation errors

### SPECIAL FEATURES

#### Temperature units

°C or °F

#### Temperature scales

IPTS 68 or ITS 90 selectable

#### Pressure units

15 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

#### Signal converter

Converts any input into any output, fully isolated

#### Keystroking

Storage for 9 user defined test configurations

#### Switch test

Display freezes on open and closed with Switch resistance measurement

#### Data Log

TRX II : 1 Mbyte of data storage via PCMCIA card

TRX II IS: 4 Mbyte of internal memory.

#### Computer interface

RS 232 and PCMCIA card (RS232 only for IS version)

#### PCMCIA station (not IS version)

PCMCIA card type 1 or 2

#### Language

English, French, German, Italian, Portuguese and Spanish

#### Power management

Auto backlight OFF, battery low indicator and status from menu.

### DISPLAY

#### Panel

66 x 40mm Graphic LCD with backlight (backlight not available on IS version)

#### Readout

Typically 5 readings/ second

### ENVIRONMENTAL

#### Calibration reference

22 deg. °C ±1°C, R.H. 45% ±10%

#### Accuracies

Accuracies true for 17°C to 27°C. Outside these limits add 0.0005%/°C typically. Reference for all electrical parameters only.

#### Temperature

Operation: -10°C to 50°C

#### Humidity:

0 - 90% non condensing

#### Sealing

IP 53

#### Conformity

EN50081-1, EN50082-1, CE Marked

#### Intrinsically Safe version:

Certified for use in hazardous areas to EEx ia IIC T5.

#### Physical

1.2 kg, 210 x 120 x 50 mm

#### Power Supply

4 x 1.5 V alkaline cells or 4 x 1.2 V Ni-Cad cells.

For IS version internal NiMH rechargeable battery (charger supplied as standard).

# TRX II Series

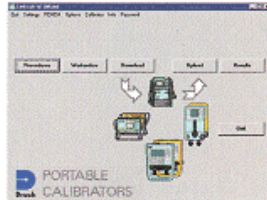
## Options and related products



### OPTIONS

#### A1) Linkpak W calibration software (P/N LINKW)

Developed to help meet the growing demand on industry to comply with quality systems and calibration documentation. Test procedures are created on screen in a Windows® based utility 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. Calibration results, including files from the DPI 610 are uploaded to the PC, via the R3 232 interface or PCMCIA card, for analysis and to print calibration certificates.



Visit [www.druck.com](http://www.druck.com) for Linkpak-W demonstration

#### A2) Intecal-W calibration database software (P/N INTEW)

Intecal-W Windows based software 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 an easy to learn and easy to use calibration management software for process plants, workshops, contractors, manufacturers and service companies. It offers high productivity of calibration scheduling, calibration work and documentation. Device information, calibration procedures and calibration results are stored in an instrument database and multiple databases can be created for organising client accounts, processes or areas. Extensive management features are provided including a database search engine, time based calibration due queries and standard reports.



Visit [www.druck.com](http://www.druck.com) for Intecal-W demonstration

#### B) Remote pressure sensors P/N (refer to pressure range table)

Sensors from 70 mbar to 700 bar are available for use with the TRX II. The calibrator has a single remote channel which can be configured for use with up to 8 sensors (one at a time). At least one cable assembly (Part No. 230) should be ordered to connect any of the standard remote pressure sensors to the TRX II.

#### C) Charger/Eliminator P/N 13603 state 110 or 230 Vac (supplied as standard with TRX II IS)

This is a dual function adaptor. It can either power the TRX II from line voltage or it can recharge batteries. The charger and adaptor circuits are separate, allowing the user to recharge and operate the unit simultaneously.

### ACCESSORIES

The TRX II is supplied with carrying case, test leads, user guide, handbook and calibration certificate as standard. The TRX II IS is supplied with a battery charger/eliminator as standard.

### CALIBRATION STANDARDS

Calibrators manufactured by Druck Limited are calibrated against precision calibration equipment traceable to international standards.

### 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 comprehensive range of pressure indicators and controllers. Included in this range are the Pressurements industrial deadweight testers and the Ruska high precision controllers and primary standard piston gauges.

#### Pressure Transducers and transmitters

Druck instruments complement an extensive range of pressure transducers and transmitters, including the RTX and Smart/Hart® STX process pressure transmitters. Please refer to manufacturer for further information on related products.

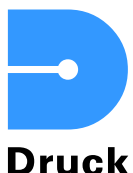
### ORDERING INFORMATION

Please state the following (where applicable):

1. Model number TRX II or for the IS version TRX II IS. For TRX II IS please state charger supply voltage 230 or 110V ac.
2. Options, including part numbers. For remote pressure sensors please also state the pressure range required.

**Note:** Options should be ordered as separate items.

**Continuing development sometimes necessitates specification changes without notice.**



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