DBC SERIES

Druck

DBC 150/650 Series

Dry block temperature calibrators

- Ranges from -45 to 650°C
- Rapid heating, cooling and settling
- Reads set temperature and device output simultaneously
- Measures reference probe, RTD's, T/C's, mA, mV and ohms
- Switch test, ramp, step and preset functions
- Automated calibration via RS 232

DBC 150/650 Series

Dry block temperature calibrators

SETTING THE STANDARD FOR DRY BLOCK CALIBRATORS

Druck, a leading manufacturer of portable and workshop calibrators, has redefined the term "temperature calibrator" with the introduction of the DBC series. This innovative calibrator combines a highly stable temperature source with precision measurement of temperature probe signals, providing a truly stand-alone temperature calibrator suitable for laboratory, workshop and portable use.

The product range includes Temperature Source (TS) and Temperature Calibrator (TC) versions. Each version is available with a choice of two temperature ranges for use up to 150°C (DBC 150) or alternatively 650°C (DBC 650).

Druck control technology ensures rapid settling time, excellent set-point stability and high accuracy. For improved measurement uncertainty, a traceable PT 100 reference probe can be positioned directly into the well insert. The probe output is measured and displayed by the DBC.

The TC version is a complete calibration system which simultaneously controls the reference temperature whilst measuring the device under test. In addition, loop power is provided for transmitters. In calibration mode the percentage error or temperature deviation is displayed together with the input and output readings.

DBC Series - key features

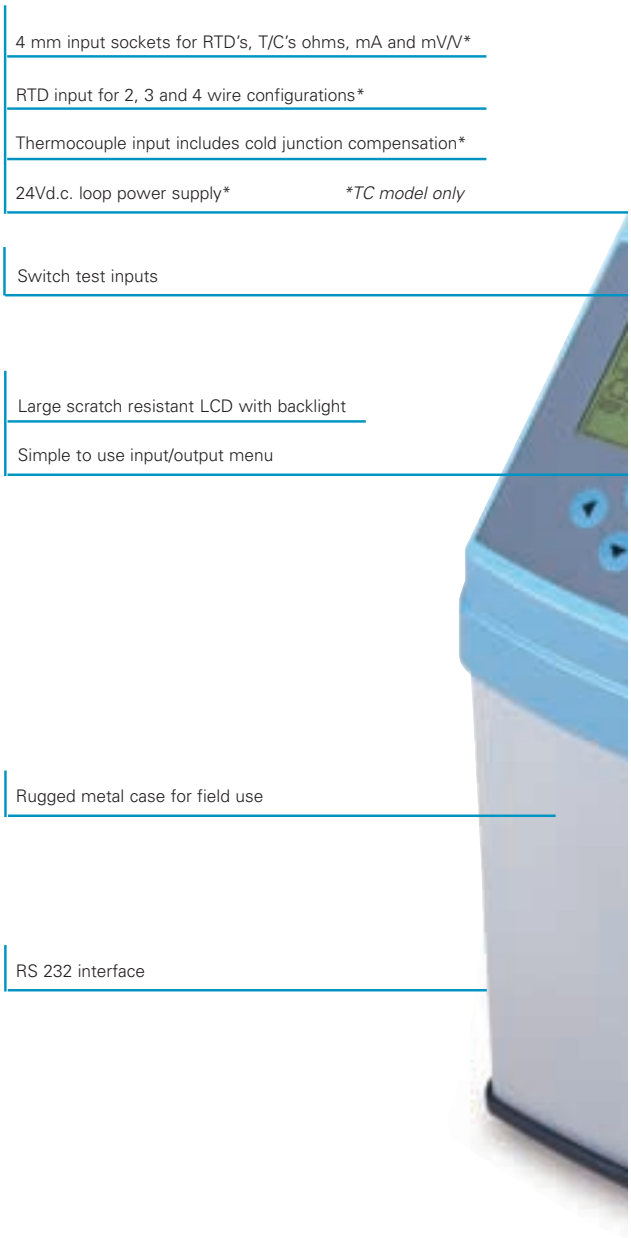
Ranges:	DBC150: -45 (below ambient) to 150°C. DBC 650: 50 to 650°C.
Fast response:	Rapid heating, cooling and settling.
Stability:	Druck control technology provides excellent temperature stability.
Reference probe:	PT 100 reference probe input.
RS 232 interface:	Allows fully automated PC control.
Switch test:	Open/closed detection with hysteresis displayed.
Ramp, preset, step:	Programmable Ramp, Preset recall and calibration Step sequences.
Reduction Inserts:	A wide range of standard interchangeable inserts are available. Inserts can also be supplied to specific requirements.
Easy to use:	Full numeric keypad and input/output menu.

TC version - additional features

The calibrator version includes the following features in addition to those listed above:

Electrical Inputs:	Measures RTD's, T/C's, mV/V, mA and ohms.
Dual Readout:	Simultaneous reading of source temperature and device output.
Error Analysis:	Percentage error and deviation calculations.
Loop Power:	24 Vd.c supply.

The DBC series are rugged, easy to use and designed to give years of reliable service. Stand alone operation eliminates the need for secondary equipment, making the DBC one of the most cost-effective temperature calibration systems available.



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Multi-lingual user interface supported by Intecal-W calibration software

Safe to touch “cool” surface

Large dry well with interchangeable inserts

Integral handle for portability - even when hot

PT 100 input for traceable reference probe

Full numeric tactile keypad

Dedicated Preset, Ramp, Step and Switch Test keys

Thermal barrier between heat source and control electronics

Mains input connector

DBC 150/650 Series

Applications

MULTIFUNCTION DRYBLOCK CALIBRATORS

The DBC series comprises of two models, the DBC TS Temperature Source and the stand alone DBC TC Temperature Calibrator. They are designed for calibrating and maintaining temperature elements, probes, transmitters and thermostats. The two models share the same temperature control technology and differ only in electrical measurement capabilities.

DBC TS Temperature Source

The DBC TS temperature source uses an internal high accuracy sensor to measure the equalisation block temperature. Alternatively, for direct measurement of the insert temperature, a PT 100 electrical input is provided. Traceable reference probes are available. A switch detection input is supported with a fully automatic switch test facility.

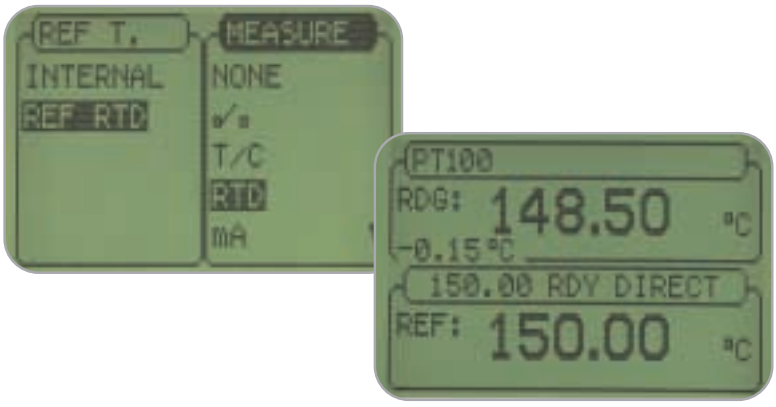
DBC TC Temperature Calibrator

The DBC TC temperature calibrator adds electrical measurement capabilities for RTD's, thermocouples, mA, mV/V and ohms. 24V loop power is also provided. The dual parameter display is quickly configured from the input/output menu to read the reference temperature, the device output and the error. This is a self-contained temperature calibration system for stand-alone operation.

Calibrating RTD Sensors and Thermocouple Sensors

With conventional dryblock calibrators, ancillary indicators are usually required to measure sensor outputs. The DBC TC temperature calibrator can measure 5 types of RTD and 11 types of thermocouple. It supports 2, 3, and 4 wire RTD configurations and provides automatic cold junction compensation for thermocouples.

Preset temperatures can be programmed to standard test points for quick recall when required.



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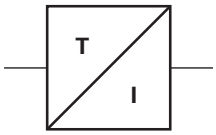
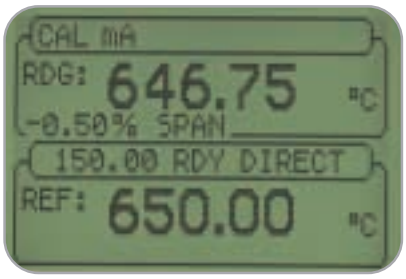
Calibrating Temperature Transmitters

Many temperature transmitters are supplied complete with the sensing element and it is common practice to calibrate the complete device.

The DBC TC temperature calibrator measures the transmitter output, powers the loop and calculates the error.

The **Step** function quickly divides specific transmitter ranges into temperature calibration points.

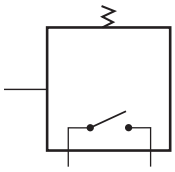




Testing Switches

Temperature switches, although simple devices, are difficult to maintain and conventional test methods often yield inaccurate results.

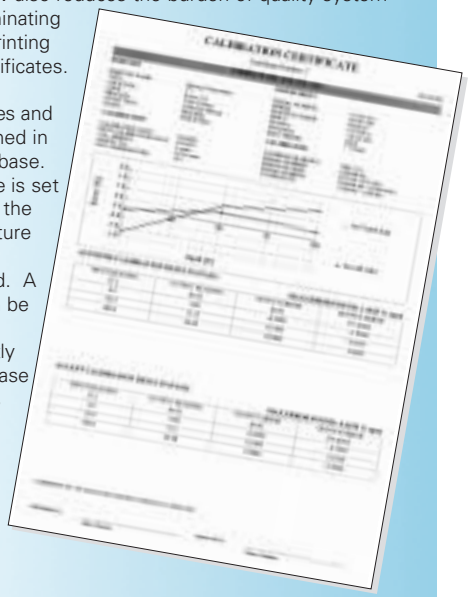
To save time and provide highly accurate results for compliance with quality systems, the DBC ramps through the switching points, captures the temperatures and displays the hysteresis value.



ISO 9000 compliant Calibration Software

Intecal-W Calibration Management Software substantially reduces the time to calibrate temperature sensors and virtually all process instrumentation. Reducing calibration time reduces maintenance costs, but Intecal-W also reduces the burden of quality system compliance by eliminating human error and printing clear traceable certificates.

Calibration procedures and schedules are defined in an instrument database. A stable temperature is set by the DBC before the reference temperature and device output values are recorded. A certificate can then be generated and the results subsequently added to the database history, for analysis and certificate printing.



DBC 150/650 Series

Improving measurement uncertainties

Inserts

Three pre-drilled inserts are available to accommodate a wide variety of industrial probes. By selecting the most closely fitting insert for the reference probe and probe under test the uncertainties of measurement can be kept to a minimum.

Careful design of the insert ensures temperature uniformity across the diameter and by positioning a reference probe to the same depth as the probe under test, measurement uncertainties can be further reduced.

Inserts can be machined to specific requirements. This provides flexibility for testing multiple probes simultaneously or for the best fit for non standard probe diameters.

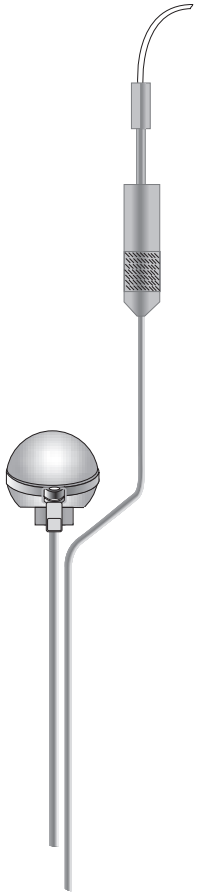
Blank inserts are also available for customisation.

Reference Probes

The DBC's internal control sensor provides an accurate measurement of temperature in the well insert, but higher accuracy calibrations with reduced uncertainties are achieved by using the optional PT 100 reference probes.

These high accuracy traceable probes measure the insert temperature at the same relative position as the device under test. The errors due to the insertion depth of the device under test and due to the temperature gradient between the insert and the control sensor can be eliminated.

Three probes are available to suit different applications. Probe options B1 and B3 are angled to provide transmitter head clearance (see diagram). The DBC can be programmed with the correction coefficients for a preferred probe.



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Standard specification

GENERAL SPECIFICATIONS

DBC 150 TS and DBC 150 TC general specifications	
Range	-45 (below ambient) to 150°C
Stability	0.03°C
Resolution	0.01°C
Accuracy	0.3°C (display accuracy including internal sensor)
Uniformity	0.15°C (averaged between 10% and 80% of total depth)
Heating Time	14 minutes from 20 to 120°C
Cooling Time	22 minutes from 25 to -20°C
PT 100 input accuracy	0.2°C including option B1. See RTD PT 100 below for accuracy excluding probe
Power supply	Switch selectable 85 to 125/200 to 265 Vac 50/60 Hz

DBC 650 TS and DBC 650 TC general specifications	
Range	50 to 650°C
Stability	0.05°C (or 0.15°C from 50 to 70°C)
Resolution	0.01°C
Accuracy	0.5°C (display accuracy including internal sensor)
Uniformity	0.25°C (averaged between 10% and 80% of total depth)
Heating Time	22 minutes from 25 to 650°C
Cooling Time	27 minutes from 600 to 100°C (with optional cooling probe)
PT 100 input accuracy	0.3°C including option B2. See RTD PT 100 below for accuracy excluding probe
Power supply	Switch selectable 85 to 125/200 to 265Vac 50/60Hz

ADDITIONAL SPECIFICATIONS - TC VERSIONS ONLY

Input	Range	Resolution	Accuracy (90 days)	Accuracy (1 year)
RTD				
PT 100	-99 to 750°C	0.01°C	0.04°C	0.15°C
PT 200, PT 500	-99 to 750°C	0.1°C	0.1°C	0.3°C
PT 1000	-99 to 550°C	0.1°C	0.1°C	0.3°C
Ni 100	-60 to 250°C	0.01°C	0.05°C	0.15°C
Thermocouple				
T/C K, J, N, E	-99 to 990°C	0.1°C	0.1°C	0.3°C
T/C S, R	-50 to 100°C	0.1°C	0.3°C	1°C
	100 to 990°C	0.1°C	0.2°C	0.6°C
T/C B	200 to 500°C	0.1°C	0.8°C	2.5°C
	500 to 990°C	0.1°C	0.5°C	1.5°C
T/C C	0 to 990°C	0.1°C	0.2°C	0.6°C
T/C T	-99 to 400°C	0.1°C	0.1°C	0.3°C
T/C L	-99 to 800°C	0.1°C	0.1°C	0.3°C
	800 to 900°C	0.1°C	0.3°C	0.9°C
T/C U	-99 to -50°C	0.1°C	0.2°C	0.6°C
	-50 to 0°C	0.1°C	0.1°C	0.3°C
	0 to 500°C	0.1°C	0.1°C	0.3°C
	500 to 600°C	0.1°C	0.3°C	0.9°C
Electrical				
Voltage	0 to 12V	0.001V	0.01 + 0.01	0.03 + 0.03
	0 to 79.2mV	0.001mV	0.003 + 0.002	0.01 + 0.006
Current	0 to 24mA	0.001mA	0.005 + 0.005	0.015 + 0.015
Ohms	0 to 400V	0.01V	0.003 + 0.003	0.01 + 0.01

1. T/C and RTD accuracies include electrical and conversion table uncertainty.
2. T/C total accuracy not including CJ compensation.
3. RTD total accuracy measured at 0.2mA excitation
4. Electrical accuracies are defined as %reading and % Full Scale.

REFERENCE PROBES

Parameter	Option B1	Option B2	Option B3
Range	-50 to 400°C	-50 to 650°C	-50 to 650°C
Probe Type	PT 100 (EN 60751)	PT 100 (EN 60751)	PT 100 (EN 60751)
Length	400 mm	400 mm	350 mm
Measuring Length	Tip to 23mm	Tip to 23mm	Tip to 15mm
Diameter	4.75 mm	4.8 mm	4.75 mm
Accuracy	Class A	Class A	Class A
Sheath	AISI 316	Alumina (DIN 710)	AISI 316
Cable	1 m low loss cable terminated in 4 pin connector to suit DBC		
Certification	3 points		2 points

WELL INSERTS

Inserts		Hole Diameters
DBC 150 Ⓢ	DBC 650 Ⓢ	5, 6.6, 9.8 mm
Option C1	Option C2	5, 13 mm
Option C3	Option C4	3.4, 5, 5, 8.2 mm
Option C5	Option C6	Blank
Option C7	Option C8	Custom machined (please refer to Druck)

Ⓢ Supplied as standard.
DBC 150 insert material: aluminium. DBC 650 insert material: bronze.

STANDARD FEATURES

Display
60 x 40 mm graphic LCD with backlight.

Keypad
21 keys including full numeric keypad and special function keys for Step, Ramp, Preset Recall and Switch Test. Key tone on/off.

User interface
Easy to use input/output menu.

Language
Selectable languages English, French, German, Italian, Portuguese and Spanish.

Units
°C, °F and K

Reference probe input
PT 100 input. 4 wire mating connector supplied. User programmable correction coefficients.

Switch test
Continuity check with buzzer. Captures open/closed temperatures and records hysteresis.

Percentage steps
20, 25, 33 and 50% divisions of user entered span. Up/down arrows activate.

Temperature steps
Programmable temperature steps. Up/down arrows activate.

Ramp
Programmable ramp rate (0.1 to 10°C/min) and end points.

Presets
Five programmable preset temperatures for instant recall using #1 to #5 keys.

RS 232 interface
Bi-directional RS 232 interface for on-line PC control.

Well dimensions
30 x 160 mm, maximum insertion depth 155 mm.

Reference standards
EN 60584-1: 1997-10 (thermocouples)
EN 60751-1: 1998-05 (PT 100).

ENVIRONMENTAL

Calibration reference
22°C.

Operating temperature
0 to 50°C (external ambient).

Conformity
EN 61010-1: 1997-10
EN 50081-1: 1997-06
EN 50082-1: 1997-05
CE marked.

Physical
9.5 kg, 322 x 156 x 328 mm.

DBC 150/650 Series

Options and related products

Druck

OPTIONS

(A) Intecal-W calibration database software

Intecal-W Windows based software supports both portable field calibrators and online 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 increases the productivity of calibration scheduling, calibration work and documentation tasks. 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 for an Intecal-W demonstration

(B) Reference probes (refer to specification page for option code)

Pt 100 reference probes for directly measuring the insert temperature. Each probe is provided with a traceable calibration certificate. The high accuracy options (B1 and B2) are supplied in a protective case. Option (B3) is a low cost probe for applications where accuracy is less critical. The probes connect directly to the DBC Pt 100 reference input.

(C) Well inserts (refer to specification page for option code)

Four optional inserts are available to suit different applications and test devices. The "C7" and "C8" type inserts can be drilled to specific requirements (please contact Druck). The "C5" and "C6" type inserts are blank for user customisation.

(D) Fast cooling probe

This 3.4 mm diameter cooling probe fits any insert and allows air to be blown through the block to speed cooling.

(E) Transit case

An aluminium case designed to offer maximum protection to the DBC during transportation. This case has a carrying handle and is secured by two lockable safety catches. Case dimensions: 465 x 350 x 145 mm, weight 4.3kg.

ACCESSORIES

Each DBC is supplied with a user guide, certificate of calibration, insert extraction tool, test leads, mains lead and RS 232 lead.

CALIBRATION STANDARDS

Instruments 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 are Pressurements industrial deadweight testers and Ruska high precision controllers and primary standard piston gauges.

Multifunction temperature calibrators

The MCX II and TRX II are portable documenting calibrators for calibrating and maintaining instrumentation and process control loops; the ideal complement to the DBC series.

Pressure transducers and transmitters

Druck manufacture a wide range of pressure transducers and transmitters including HART®/Smart devices.
Please refer to Druck for further information.

ORDERING INFORMATION

Please state the following (where applicable):

1. Full DBC type number e.g. DBC 650 TC.
2. Options. If required, option (A) should be ordered as a separate item.

Continuing development sometimes necessitates specification changes without notice.

Druck

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