The **microK** Success Story

" The ground-breaking innovation and outstanding commercial success of the microK lead to a Queen's Award for Enterprise

...the highest honour that can be bestowed on a UK company "

Introducing the New microK² Precision Thermometry Bridges

The microK² precision thermometry bridge redefines excellence in temperature metrology. Building on nearly two decades of leadership, the updated microK² models continue to set the benchmark for accuracy, stability, and versatility. With superior performance, cutting-edge touchscreen technology, advanced processors, and modern software, the microK² is the preferred choice for metrologists worldwide.

Why Upgrade? – Evolving Excellence A Major Leap Forward After almost 20 years at the forefront of temperature metrology, the microK models have been significantly upgraded. These enhancements integrate today's most advanced technology, delivering smoother, faster operation and lower uncertainties.

NMI Acceptance and Independent Validation The microK's widespread acceptance within the international metrology community underscores its exceptional reliability, consistently confirmed through independent testing. Each microK undergoes rigorous testing with a Ratio Bridge Calibrator (RBC) during production to ensure top-tier performance. For further validation, our website provides links to relevant papers and studies

Designed by Metrologists, for Metrologists The new microK² has been designed with input from top metrologists, retaining the strengths of previous models while incorporating carefully selected improvements—ensuring that the best features remain intact.

Superior Performance The microK² models offer enhanced accuracy and stability, meeting the rigorous demands of primary and secondary thermometry applications. Uniquely, they remain drift-free in ratio measurements, ensuring consistent and reliable results.

Versatility for All Applications and Budgets Whether you require the ultra-low uncertainty of primary temperature metrology (less than 30ppb) or need reliable ratio measurements in a drift-free manner for other applications, the microK² range has you covered. From accredited laboratories to oceanographic research, aerospace, pharmaceuticals, and more, the microK² offers tailored solutions across a variety of budgets.

Experience the new standard in precision thermometry with the microK²—where cutting-edge technology meets proven performance.

NEW

Building on the trusted performance of the original, the new microK introduces enhanced accuracy, advanced usability, and greater flexibility, with the new benefits highlighted

Feature	microK²	microK (Previous Models)
Input Channels	Four, with Active Channel Indication	Three
Display	10.1” High Resolution Full Colour with Anti Glare and Touch Screen	6.4” VGA
Processor	ARM Coretex A9	ARM v5TE
Accuracy	Enhanced	
Keep Warm Current	Fully Adjustable to 14.2 mA	Fully Adjustable to 10 mA
Internal Resistors	3 - expandable to 8	3 or 5 Model Dependant

Extensive Testing and Third-Party Validation

The microK²’s performance has been extensively tested and validated by independent third parties, including NMIs and leading research organizations. Comprehensive evaluations confirm its reliability and precision. Explore our website for technical articles and papers that showcase the rigorous testing and validation behind the microK.

Please visit www.isotech.co.uk/evidence for more information

The microK Family

The microK family of precision thermometry bridges uses a completely new measurement technique to achieve accuracies of better than 0.03ppm.

The microK family includes models to suit all levels of temperature metrology from National Measurement Institutes to those wanting to make low uncertainty temperature measurements in a range of applications.

In addition to making the best resistance measurements, the microK makes high accuracy thermocouple measurements with a voltage uncertainty of <0.15μV. The microK can be used with all standard thermometer types including SPRTs, Industrial PRTs, Standard Thermocouples and Thermistors.

First introduced in 2006, the microK has proven use at the world's leading NMIs and many commercial laboratories.

NEW All microK² models Features Ethernet, two RS232 serial ports, three USB ports and an IEEE-488 interface. With additional remote commands for database configuration, ensuring seamless integration with existing lab setups

NEW Additional microK² Updates:

Robust Software Update Facility: Improved software update system with a rollback option guarantees safe and efficient updates, maintaining system integrity.

Enhanced Usability: Intuitive touch screen operation, extensive internal memory for data logging, and multiple connectivity options (Ethernet, RS232, USB, IEEE-488) to suit all communication requirements.

Active Channel Indicators: LED indicators on each channel provide immediate visual feedback on the active channel, enhancing usability and monitoring.

Performance by Design - Drift Free

The microK² retains the original mantra of '*Performance by Design,*' which was the driving force behind the development of the microK. From the outset, a deliberate decision was made: no tweak pots (used in AC bridges to correct for flux leakage), no software adjustments, no 'self-calibration'—just performance by design. The microK achieves its resistance ratio accuracy by design, not adjustment, and is uniquely drift-free.

To be clear, as a ratio bridge, the microK is inherently drift-free. This is a key advantage of the substitution topology employed, providing one of the microK's most exciting features: *long-term stability without drift*. It doesn't rely on compensation or adjustment circuits, it doesn't have software offsets, it doesn't self-calibrate, and it never needs adjusting or service engineering.

For more details, refer to 'Using a Substitution Measurement Topology to Eliminate the Effect of Common Mode Errors in Resistance Measurements used in Temperature Metrology,' available on the Isotech website, which also explains why the performance of the microK is superior to both DC potentiometric instruments and AC bridges.

Applications

- ITS-90 Fixed Point Calibration
- Comparison Calibration of Standard Thermometers
- Oceanography
- Aerospace
- Pharmaceutical
- Research

Key Features

Accuracy

Model	Ratio Accuracy ppb*	Equivalent Temperature Accuracy, WTP *[2]*
microK² ELITE	30	7.5
microK² 60	60	15

- **Resistance Thermometry**
  - 0.1Ω, 0.25Ω, 1Ω, 10Ω, 25.5Ω, 100Ω SPRTs
  - Industrial PRTs
  - Thermistors
- **Voltage Measurement**
  - Laboratory Standards: Platinum / Rhodium, Gold / Platinum and Base Metal, Accuracy to 0.15μV
- **Display Modes**
  - Numeric and Graphical
  - Ratio, Resistance, Voltage, °C, °F, K
- **Stable**
  - ZERO drift in ratio measurement
- **Four Input Channels**
  - Best Practice Ready
  - Expandable to 93
- **NEW Faster Operation**
  - The improved touchscreen interface makes operation faster, more intuitive, and efficient by automatically presenting relevant options as you navigate through the menus. Easily store all Standard Thermometers and Standard Resistors internally, and log data to either internal memory or a USB drive.
- **Reliable**
  - 21st Century Solid State Design, no moving parts

** At Ratio: 0.95 to 1.05*

Performance by Design - More Advantages

In making ratio measurements other benefits by design include:-

- **Zero Hysteresis**
  There is no hysteresis effect by design
- **Zero Channel to Channel Variation**
  Even with a microsKanner, as the channel expander duplicates the front end of the microK for each input rather than just being a switch box
- **Zero Temperature Coefficient**
  Temperature Coefficient is 0 ppm/°C, another benefit of the substitution technique. No need for warm up or stabilisation periods.
- **Complete Line Frequency Rejection**
  Total rejection of 50 and 60Hz line frequency

ADC

The microK² retains the groundbreaking ADC design first introduced in the original microK, delivering superior linearity and low noise through innovative techniques. These include advanced noise reduction, solid-state switching, enhanced guarding arrangements, and a sophisticated substitution topology to ensure zero drift.

At its core is the unique ADC, developed in collaboration with NPL (the UK's National Standards Laboratory) under their 'Technology Applied' scheme. This adaptation of the sigma-delta technique uses a 5-bit DAC instead of the conventional 1-bit DAC, employing pulse-width-modulation (PWM) to achieve precise timing. This enables remarkable accuracy, with a target of <0.03ppm, achieved through pulses with relative timing errors as low as 0.3ps—equivalent to light traveling 0.09mm

For more details, refer to 'Better Accuracy in Temperature Calibration and Measurement through a New Type of Analog-to-Digital Converter,' available on the Isotech website

NPL National Physical Laboratory
Technology Applied

Thermocouple Measurements

When used with an external 0°C cold junction reference unit (or by measuring the junction temperature with a PRT on another channel) the microK can be used for low uncertainty, precision thermocouple measurements. The microK is designed for ALL the thermometer types used in a laboratory including Standard Thermocouples. The voltage uncertainty is 0.15μV, equivalent to 0.006°C for a Platinum / Gold thermocouple at 1000°C.

When measuring the voltage from a thermocouple, it is common practice to reverse the input terminations and repeat the measurement in order to detect and/or compensate for any thermal EMFs or offsets inherent to the voltmeter instrument and its terminals. In the microK the input connections are automatically reversed immediately behind the input terminals. The user can, of course, still reverse the connections manually to gain confidence in the instrument, but it is no longer necessary to achieve low measurement uncertainty.

Keep Warm Currents

The microK includes keep-warm current sources to maintain the power in a PRT when it is not being measured, eliminating uncertainty resulting from power coefficients. Each channel, whether on the microK or a microsKanner can be individually programmed.

NEW microK² features an increased maximum current, rising from 10 mA to 14.2 mA, providing a broader range of options for determining self-heating.

Zero Current Resistance

The microK was the first Bridge to have the ability to automatically compute and display the zero current resistance with no manual correction.

Low Noise

The new ADC, together with the low noise pre-amplifiers used in the microK, means you achieve a lower measurement uncertainty in a shorter time. See the document "Noise Performance of microK 100" available on the Isotech website.

Understanding Specifications

It can be difficult to compare the published specifications from different manufacturers as there seems no common agreement on how to present the data. As Bridges can be used in different ways, tested in different ways and have different features, confusion can easily arise. Some specifications separate accuracy, linearity and noise. Some specify a figure only at the Water Triple Point (Unity Ratio) others over ranges. At Isotech we want to present a clear picture of what can be expected from a microK and are proud that independent evaluation has shown the microK to be working to better than our published specifications.

We specify the accuracy in ppm over the whole range of the SPRT, for a microK² ELITE this is 0.03ppm. It is given at $k=2$, 2 Sigma 95% confidence level.

We think this is a relevant, simple and transparent way of specifying the performance.

Take an example; a Primary Laboratory with a 25.5Ω SPRT and external 100Ω reference resistor. In such a situation 0.03ppm equates to 3μΩ or 0.03mK over the whole range. If we specify the accuracy just at the water triple point (a 25.5 Ohm SPRT used with a 25 Ohm Standard Resistor); then an error of 0.03ppm is equivalent to a resistance of 0.75μΩ, for a 25.5Ω SPRT, which is equivalent in temperature to 0.0075mK (7.5μK). Note that whilst we have specified a single value over the whole range the performance will be better close to zero and unity ratio. See table below.

Some other manufactures show figures only at the water triple point or unity gain ratio, some publish ratio accuracy valid only for a narrow operating condition. So it is important when comparing specifications to understand what is actually being claimed.

Comparing specifications can be challenging, but the best way to ensure accurate performance evaluation is by using the Ratio Bridge Calibrator (RBC). Test reports from the RBC provide reliable, detailed data, validating the microK's specifications and highlighting its real-world superiority. Visit www.isotech.co.uk/evidence for more on the RBC, why it's the best tool for evaluating thermometry bridges, and to access these reports.

Ease of Calibration

NEW

Only the internal reference resistors and thermocouple voltage reference need calibrating, with a documented, straightforward procedure. No special equipment is needed, and now microK² has built-in software for calibrating internal resistance and voltage standards. You just need a suitable voltage source for the thermocouple side and standard resistors for the internal resistors, available from Isotech. For ratio measurement, the microK is drift-free and requires no adjustments. Performance can be verified with complement and reciprocal tests using reference resistors or the RBC "Ratio Bridge Calibrator" by D. R. White, available from Isotech. Refer to the paper "A Method for Calibrating Resistance Thermometry Bridges" by D. R. White on the Isotech website.

< WEB LINKS

- Characterisation of a Selection of AC and DC Resistance Bridges for Standard Platinum Resistance Thermometry
- Performance Assessments Of Thermometer Resistance Bridges
- How to Calibrate Thermometry Bridges: Ensuring Accurate Temperature Measurements
- Better Accuracy in Temperature Calibration and Measurement through a New Type of Analog-to-Digital Converter
- Using a Substitution Measurement Topology to Eliminate the Effect of Common Mode Errors in Resistance Measurements used in Temperature Metrology
- Cost Effective Techniques used to Validate the Performance of the microK Resistance Thermometry Instrument with sub mK Uncertainty
- A Simple Resistance Network for Calibrating Resistance Bridges

High Speed Measurements

<1s per channel for voltage

<2s per channel for resistance

AC Bandwidth Setting	Time to take single (s) measurement	Equivalent microK Samples / Reading (s)
0.02 Hz	50	25
0.1 Hz	10	5
0.5 Hz	2	1

The microK delivers fast sub-ppm measurements with an innovative filtering system that adjusts the number of samples per reading instead of bandpass filters. With a scanner, the microK outpaces AC Bridges, which need 2-3 minutes to settle after transitions. The microK's substitution technique, switching multiple times per second, eliminates recovery time, making it much faster in multiplexing applications.

Noise Immunity

The microK delivers outstanding EMC (electromagnetic compatibility) performance, ensuring minimal radiated emissions and strong immunity to electromagnetic interference. This enables the microK to achieve <0.1 ppm measurements in real-world environments while fully complying with International EMC Directives.

Extensive testing with long cables connected to both the inputs and PC interfaces ensures that such loads do not compromise accuracy. This performance represents a significant improvement over older bridge designs it replaces, reaffirming the microK's position as a leader in precision metrology.

Comprehensive Internal Reference Resistors

NEW microK² has three internal reference resistors (25Ω, 100Ω, 400Ω) and has an option to add further internal resistors, to a maximum of 8, to suit the widest range of thermometer types.

The internal reference resistors which allow a wide range of resistance thermometers to be used with a microK without the need for an external resistor. The use of an external or internal resistor depends both on the mode of use and the required uncertainty. Consider an example; comparison calibration of SPRTs. In this case best practise is to directly compare the Standard Thermometer with the thermometer under test. The uncertainty is largely determined by the calibration of the Standard Thermometer and no reference resistor is needed, either external or internal. A benefit of the microK over a traditional bridge is that by using one of the internal standards the microK can be programmed to display either the temperature or resistance of the standard probe along with the ratio of the thermometer under test to the standard. Again in this application an external resistor is not required. The value of the reference resistor is not important when comparing thermometers as long as it is stable during the period of the measurement, which is just a few seconds. Provided that the thermometers all have the same or similar resistance to temperature characteristics, any change in the reference resistor from its original calibration are negated as the shift in the thermometer under test will be equivalent to the shift in the standard. Another example; if an NMI is using a microK to disseminate the ITS-90 temperature scale and makes absolute measurements at fixed points then a temperature controlled external standard resistor should be used in line with good laboratory practise. For applications in between, it is necessary to consider the specification of the internal reference resistors with the required uncertainty.

NEW

UPGRADED INPUT CONNECTORS >

The microK² features upgraded binding posts connectors that retain the gold-plated tellurium-copper for low thermal EMFs and precise thermocouple measurements. The improved non-rotating clamp mechanism prevents wire damage and ensures smoother operation. These versatile gold-plated connectors accept 4mm plugs, spades, or bare wires. With a 3/4" separation, they are compatible with standard 4mm to BNC adapters, allowing the use of thermometers with any termination type.

What are the advantages of the microK over conventional ratio bridges?

- Support for both Resistance and Thermocouple Thermometers: The microK² models support SPRTs, PRTs, thermistors, and thermocouples, unlike competitors that only support resistance thermometers.
- Simple Touch Screen operation with easy to use interface and data logging options.
- NEW Full colour high-resolution 10.1-inch TFT LCD touch screen, durable design with anti-glare treatment, ensuring clear and responsive use in any lighting
- Can connect USB Memory Stick, Keyboard, Mouse, without the need of a USB hub
- Built in database for all your thermometers and reference resistors
- The microK does not use tapped transformers restricting its measurement range
- Wide range of resistance, 0 - 500 kΩ
- No Moving Parts
- Displays Temperature, Resistance and Ratio
- Statistical Mode
- Chart Display
- No PC needed, the display can show temperature and resistance in addition to ratio
- Cost Saving

microK or AC Bridge?

The sense current in the microK's bridge circuit is a square wave AC signal. This measurement system is usually referred to as a switched DC bridge (the term AC Bridge is normally reserved for bridges that use a sinusoidal sense current). The new techniques used in the microK overcome the limitations of earlier designs, matching the performance of the best AC Bridges whilst offering a number of advantages, not least that of zero drift.

Drift

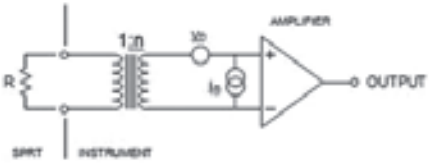
AC Bridges utilise an inductive divider, which is drift free as the turns ratio on a transformer is a constant. However, leakage flux means that AC Bridges do not inherently provide a unity ratio reading with a 1:1 turns ratio. So a correction circuit is employed to compensate, and this correction circuit is adjusted with a tweak pot. Additionally, AC bridges use many tens of potentiometers that are set up during manufacture in order to align internal filters and null out offsets. During transportation and over time these can drift out of adjustment and a specialist engineer is needed to make internal adjustments to the AC Bridge.

In comparison the microK has no potentiometers, no select on test components or software offsets -in ratio measurement it *is inherently drift free by design.*

Noise

It has been claimed that AC Bridges have the best noise performance but again the microK's innovative design sets new standards. Firstly all the microK family utilise a fast ADC that allows the sense current reversal to operate at 6-10Hz avoiding the 1/f flicker noise of many conventional switched DC systems.

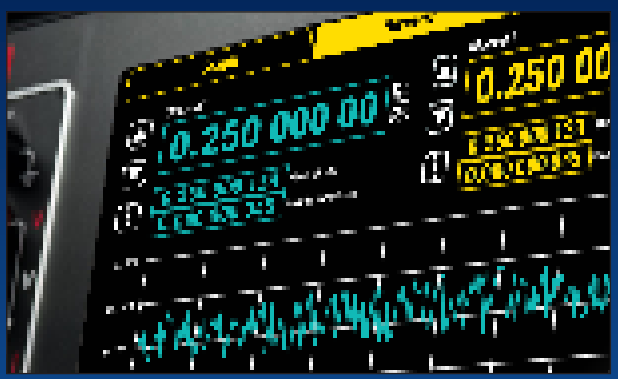
Secondly, to match the performance of the most sophisticated (and expensive) AC Bridges a new technique of Parallel Analogue Processing was developed for the microK² ELITE and microK² 60 models.



Noise Impedance Matching in AC Resistance Bridges

The best AC bridge designs use "noise impedance matching" to minimise the noise contribution of the semiconductors used in the amplifier. Since the waveforms in an AC bridge are sinusoidal, a transformer can be used at the input to the amplifier to reduce the input voltage noise at the expense of current noise.

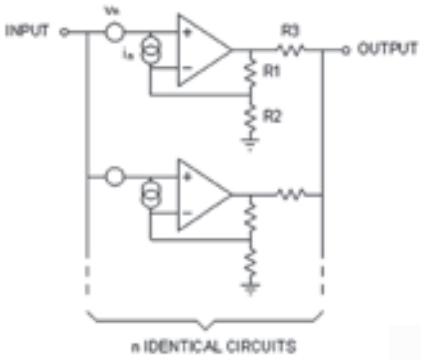
This noise reduction technique can only be used with an AC resistance bridge (it cannot be used in switched DC bridges or DC current-comparator bridges) and this is one of the reasons that AC resistance



< LOCKABLE CHANNELS

The microK²'s enhanced display capabilities allow channels to be pinned at the top of the screen for continuous visibility, ensuring key data from internal or scanner channels remains in focus. Additionally, two channels can be viewed graphically at the same time. This feature is perfect for comparing measurements in real-time, whether from internal channels or an external scanner.

bridges have historically been seen as the instrument of choice for primary standards temperature metrology.



Noise Reduction by Parallel Analogue Processing

In developing the microK, a new technique of Parallel Analogue Processing was devised to reduce the voltage noise to a level that was only previously achievable using the best AC resistance bridges.

Each amplifier contributes linearly to the desired output signal. However, the noise from each amplifier contributes as the RMS (root of the mean squares), which is less than the linear summation of the signals. In a similar way to the noise impedance matching technique used in AC resistance bridges, the microK design is able to reduce voltage noise at the expense of current noise by using a number of amplifiers connected in parallel (increasing *n*).

Elimination of Thermal EMF

Like an AC Bridge, the microK eliminates the effect of thermal EMFs (EMFs generated as the result of dissimilar metals and temperature gradients) by taking two measurements and reversing the current between them.

The process of current reversal and averaging, together with true 4-wire resistance measurement has the effect of eliminating thermal EMF and of ensuring an intrinsically stable zero with time and temperature.

Line Frequency Rejection

As the microK range of instruments uses digital filters these provide 100% or complete rejection of 50Hz and 60Hz. Other instruments may use analogue filters which provide finite rejection but the digital filters used in microK's provide complete rejection.

PARALLEL ANALOGUE PROCESSING >
In developing the microK a new technique of Parallel Analogue Processing is used to reduce the voltage noise to a level that was only previously achievable using the best AC resistance bridges.

microsKanner: Channel Expander

The microsKanner can be used with any member of the microK family to add further channels, up to a maximum of 90 expansion channels.

Easy to Use: The use of plug-and-play technology means that the extra channels appear automatically on your microK bridge when connected to a microsKanner. You can configure the new input channels in exactly the same way as any of the microK's existing inputs (through the microK's touch screen or a PC, via an RS232, Ethernet or IEEE-488 connection). You just plug in a microsKanner and immediately gain the benefit of the additional channels, making this the easiest channel expansion system of its type.

Accurate: The microsKanner replicates the input system of the microK bridge for all 10 of its input channels. Measurements made with a microsKanner are therefore to the same accuracy as the microK bridge it is connected to. By adding further scanners the microK system can be expanded to 92 channels without losing measurement performance.

Versatile: Like the microK bridge, the microsKanner works with PRTs, thermocouples and thermistors giving you unparalleled flexibility.

Keep-Warm Currents: The microsKanner has 10 individually programmable keep-warm current sources to maintain the power in PRTs when they are not being measured, eliminating uncertainty caused by power coefficients.

Low Thermal EMF Binding posts: The connectors accept 4mm plugs, spades or bare wires. The standard ¾" separation is compatible with standard 4mm to BNC adaptors, so you can use thermometers with any standard termination type. The binding posts connector system uses gold-plated, tellurium-copper to give the lowest possible thermal EMF and the best measurement uncertainty.

Reliable: Like the microK, the microsKanner uses the latest semiconductor technology for channel selection and signal routing. This completely solid-state design therefore provides the highest possible reliability.

Model	microsKanner
Channels	10
Keep-Warm Currents	0-14.2mA ±0.4% of value, ±7μA, resolution 2.5μA
Input connectors	Low Thermal EMF Binding posts accepting: 4mm plugs, spades or bare wires
Contact material	Gold plated tellurium copper
Interface	RS232 (9600 baud)
Operating conditions	15-30°C / 50-85°F, 10-90% RH (for full specification) 0-50°C / 32-120°C, 0-99% RH (operational)
Power	88-264V (RMS), 47-63Hz (Universal) 10W maximum, 1.2A (RMS) maximum
Size	520mm x 166mm x 300mm / 20.5" x 6.6" x 11.9" (W x D x H)
Weight	12.6kg / 28lb

< UNWAVERING RELIABILITY

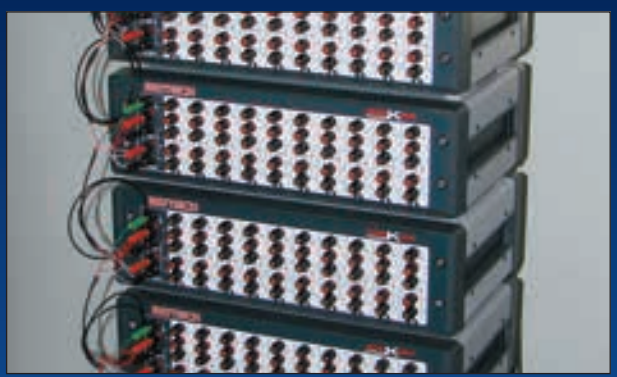
The microK features a 100% solid-state design with no moving parts, using the latest semiconductor devices and high density silicon integration technology (FPGA) for enhanced reliability and lower servicing costs. Automated optical inspection (AOI) ensures quality before calibration in Isotech's ISO 17025 accredited Primary Laboratory. If you've seen inside other instruments in this class, you may have been concerned about long-term reliability and servicing costs; the microK sets a new standard.

microsKanner

- **Performance** - zero uncertainty contribution
- **Flexibility** - supports all sensor types (PRTs, thermocouples & thermistors)
- **Keep-warm currents for PRTs** - individually programmable
- **Ease of use** - plug-and-play… new channels added by the microsKanner just appear in the existing operator interface on the microK
- **Input channels** - up to 90 expansion channels
- **Reliability** - completely solid-state (no relays)

NEW

The microK² features an extra channel for SPRTs, reference resistors, or the microsKanner channel expander. Benefit from added flexibility with the ability to use up to four SPRTs or reference resistors, and add microsKanners for up to 90 additional channels. This improvement enhances accurate calibrations and intercomparisons by allowing extra connections to monitor SPRTs and reference resistors.



Introducing the microK² ELITE Package

Unmatched Performance and Assurance

We are proud to offer the microK² ELITE package, a premium offering that combines enhanced performance with an exclusive set of benefits designed to provide you with the highest level of confidence and support.

Performance Guarantee - <30 ppb Accuracy

The microK² ELITE package includes a microK² instrument with superior performance, achieving ratio accuracy of <30 ppb across the entire range (0 to unity). This exceptional level of precision is guaranteed, with each unit calibrated using our Automatic Ratio Bridge Calibrator (RBC-A)

Exclusive Benefits - Extended Warranty and Free Recalibration

As part of the microK² ELITE package, you'll recieve an extended three-year warranty, ensuring long-term reliability and peace of mind. Additionally, we offer free ratio accuracy recalibration in years two and three you only cover the shipping costs.

A Commitment Like No Other

No other company matches our commitment to precision and reliability. We are the only provider offering guaranteed performance validated by the advanced RBC-A (Automatic Ratio Bridge Calibrator), developed by renowned metrologist Rod White. Backed by a three-year guarantee, the microK² ELITE package represents the pinnacle of performance, delivering assurance and protecting your investment for the long term.

microK² Specifications *(Specifications are subject to change without prior notice)*

Parameter	microK² ELITE	microK² 60
Accuracy Whole Range *[1]*	30ppb	60ppb
Equivalent Temperature Accuracy Whole Range *[1]*	30 µK	60 µK
Equivalent Temperature Accuracy Water Triple Point *[2]*	7.5 µK	15 µK

Common Specifications

Weight	13.2kg
Resolution, Temperature	0.001 mK 0.000001°C
Input Channels NEW	Four - three front and one rear
Ratio Range	Unlimited
Ratio Accuracy Stability *[3]*	Zero Drift
Ratio Accuracy Temperature Coefficient *[4]*	Zero
Resistance Range	0 - 500 kΩ
Keep Warm Current	Each Channel Individually Programmable
Voltage Range (Thermocouple)	125 mV
Voltage Accuracy 0 - 20 mV	0.15 µV Equivalent to 0.006°C for a Platinum / Gold thermocouple at 1000°C
Resolution Voltage	10 nV
Cold Junction Mode	External and Remote with PRT
Sensor Current NEW	Each Channel Adjustable 0 - 14.2 mA
Cable Length	Limited to 10Ω per core and 10nF shunt capacitance (equivalent to 100m of RG58 coaxial cable)
Temperature Conversions NEW	PRTs: ITS-90, Callendar-van Dusen. Thermocouples: IEC 60584-1 Ed. 3.0 2013 (B, E, J, K, N, R, S, T), L, Pt/Pd and Au/Pt, Thermistors: Steinhart-Hart, Polynomial
Internal Resistance Standards	25, 100, 400Ω
Optional Internal Values	1, 10, 10KΩ, Custom
Internal Standard Resistor Stability	TCR < 0.5 ppm/°C and stability < 2 ppm/year
Input Connectors	Upgraded: Gold Plated 4mm binding posts for plugs, spades, or bare wires, material tellurium-copper alloy for low thermal EMF
Interfaces	Ethernet 3 x USB Host, 2 x RS232, IEEE
Store Calibration Coefficients	Unlimited
Datalogger	32 GB Storage
Expandable NEW	Add up to 90 expansion channels
Switching Technology	Solid State
Units	Ratio, V, Ω, °C, °F, K
Display	10.1-inch high-resolution touchscreen with anti glare treatment
Operating Conditions	Full Specification: 15 - 30°C 10 - 80% RH Operational: 0 - 40°C 0 - 95% RH
Power	85 - 264 Vac 50/60 Hz 20 watts maximum
Dimensions	539mm x 200mm x 300mm (19" Rck Mountable)

[1] Over whole range of SPRT, -200°C to 962°C. For Ro=0.25Ω increased by a factor of 2.5
[2] E.g. With 25.5Ω SPRT and 25Ω Reference Resistor or Direct Comparison of SPRTs with Ro > 2.5Ω
[3] The microK2 uses a "substitution technique" in which the Device-Under-Test and the Reference are successively switched into the same position in the measuring circuit. This means that the stability of resistance ratio measurements is immeasurably small.
[4] Using External reference resistors

Resistance Bridge Calibrator (RBC)

***Manual** and **Automatic** Models*

Isotech have a unique solution to measure the performance of resistance bridges - the RBC. It is used to verify the performance of all microK models. Developed by D. R. White at the Measurement Standard Laboratory of New Zealand, the RBC allows bridge performance to be fully evaluated. Isotech has an exclusive license from MSL to manufacture and supply the RBC.

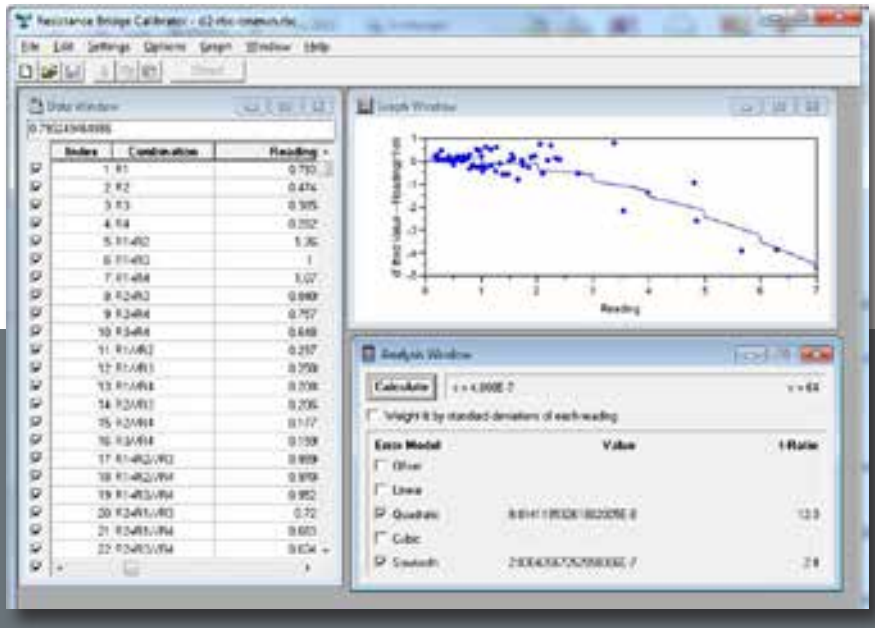
Confidence

RBC testing of microK establishes both confidence and evidence of the microK's performance. When NMIs have used the RBC to evaluate other bridges many have been found to be out of specification or have 'small but significant' faults.

The RBC can generate 70 ratios (including complements) combining reciprocal and linearity checks. Neither the exact values or frequency dependence of the base resistors need to be known.

The result is a system that can evaluate both AC and DC bridges with an accuracy to 10ppb at 100 Ohms.

The supplied software produces full reports



For further information, see our website:

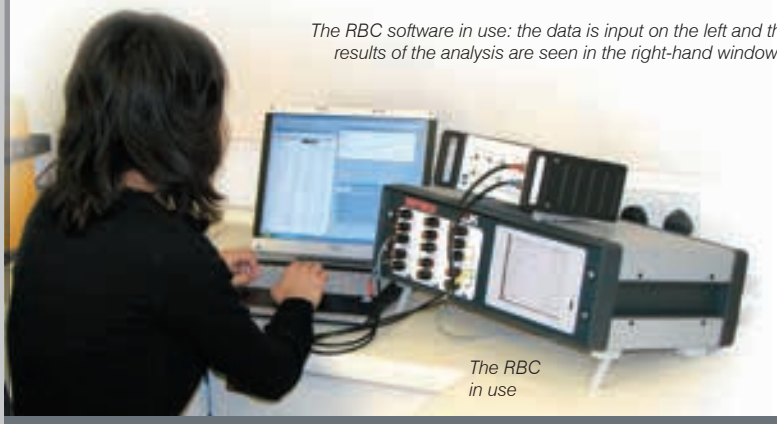
http://www.isotech.co.uk/rbc

The RBC has allowed both Isotech and leading NMIs to validate microK performance, it has given metrologists evidence of actual performance and contributed to the outstanding success of the microK bridge.

Automatic vs Manual

The manual model is operated from switches and the data manually entered into the software for analysis and reporting.

The new automatic model is operated from a PC via a USB connection. There are drivers for the Isotech microK, milliK and AC and DC bridges from other manufactures that allow for fully automatic and unattended calibration of commonly used thermometry bridges. The software design allows for new drivers to be created as DLLs and we expect to support a growing number of bridges, check the website for full details The RBC 100A / 400A benefits not only from automatic operation but with changes to the internal circuitry to increase the accuracy and they can be immersed in oil to allow temperature control.



The RBC software in use: the data is input on the left and the results of the analysis are seen in the right-hand windows.

The RBC in use

Can you trust your bridge?

In the paper "A Method for Calibrating Resistance Thermometry Bridges" D. R. White evaluated 38 Bridges. He found significant faults with 15% of those tested, but "like the walking wounded" they continued to provide a plausible reading.

The RBC allows easy verification and calibration of your bridge ensuring measurements are accurate and traceable, use it to Restore Bridge Confidence.

MANUAL Specifications

Accuracy:	<0.1ppm at 100Ω (For DC and AC to 400 Hz)	
Temperature Coefficient:	< ±0.3 ppm/ °C.	
Maximum Sensing current:	RBC100M: RBC400M:	10mA 5mA
Resistance range:	RBC100M: RBC400M:	16Ω to 127Ω 43Ω to 346Ω
Power supply:	None - the RBC is completely passive	
Connections:	Four-terminal coaxial using separate BNC for the current and voltage leads	
Case Dimensions:	Width 215mm Height 105mm Depth 200mm (2U height by half rack width)	
Weight:	2.5 kg	

AUTOMATIC Specifications

Accuracy:	<0.01ppm at 100Ω (For DC and AC to 400 Hz. When RBC is temperature controlled)	
Temperature Coefficient:	< ±0.3 ppm/ °C	
Maximum Sensing current:	RBC100A: RBC400A:	5mA 3mA
Resistance range:	RBC100A: RBC400A:	16Ω to 127Ω 43Ω to 346Ω
Power supply:	5V, via the USB cable. Idle current typically less than 5mA, switching currents less than 200mA.	
Connections:	Signal: Five-terminal guarded dc, spade lugs. Digital control: USB.	
Case Dimensions:	Diameter 88mm Height 140mm Identical to Tinsley type standard resistors.	
Weight:	1.25 kg	

Software

Tabular and graphical representation of data
Least-squares fit to determine model of bridge error
Tabular summary of data and results
Print calibration report

Compatible with Microsoft Windows XP to Windows 10 platforms