

DATASHEET

microK2

Isotech

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-200 to 1800°C

Precision Thermometer

NEW microK²

- **Accuracy and Stability:** Superior resistance ratio accuracy and zero drift to ensure long-term stability
- **Trusted by NMIs:** Widely recognised by leading NMIs with independent reports validating its exceptional performance
- **Second Generation:** Improved performance with new features and a 10.1-inch high-resolution touchscreen for clear visualisation of measurements and data.

The microK² builds on the success of the original microK models that were quickly adopted by the world's leading National Metrology Institutes and commercial laboratories. Retaining Isotech's innovative technology and operating mode to achieve accuracies as low as 7.5µK, microK² remains first choice to measure with SPRTs and supports all standard thermometer types including Standard Thermocouples, Industrial PRTs and Thermistors.

NEW: The microK² introduces several new features designed to enhance usability, accuracy, and versatility. A notable addition is the new fourth channel, which accepts SPRTs, reference resistors, or the channel expander, offering greater flexibility in measurement systems. The touchscreen has been upgraded to a 10.1-inch high-resolution display with improved capacitive touch technology, ensuring a more responsive and intuitive user interface, input terminals are now more robust and easier to use. Enhanced connectivity options now include Ethernet, two RS232 serial ports, three USB ports and a IEEE 488 Port with new software features.

Performance by Design - Inherently Drift-Free

The microK was developed with a clear design philosophy: to ensure genuine, long-term performance without relying on "tweak pots," software adjustments, or self-calibration. This innovative approach has resulted in a resistance ratio accuracy that is uniquely drift-free, ensuring unparalleled accuracy and stability.

As a ratio bridge, the microK leverages a substitution



Unequalled combination of accuracy, stability and versatility.

topology that inherently eliminates drift. With no need for compensation circuits, software offsets, or routine calibration, the microK maintains its performance without requiring adjustments or service interventions, delivering consistent, reliable measurements year after year, thereby reducing operating costs.

Since its introduction in 2006, the microK has been rigorously studied and validated by temperature metrologists worldwide, confirming its superior performance and reliability.

For an in-depth understanding of the microK's technology and performance, visit our website. You'll find a range of technical papers, including those presented at conferences, academic studies, and more general articles, all providing solid evidence of the microK's exceptional capabilities,

www.isotech.co.uk/evidence.

Accuracy

Model	Ratio Accuracy	Equivalent Temperature Accuracy at Water Triple Point [2]
microK ² ELITE	30 ppb	7.5 µK
microK ² 60	60 ppb	15 µK
microK ² 150	150 ppb	38 µK
microK ² 300	300 ppb	75 µK

Key Features

■ Resistance Thermometry

- 0.1Ω, 0.25Ω, 1Ω, 10W, 25.5Ω, 100Ω SPRTs
- Industrial PRTs
- Thermistors
- Rhodium-Iron (Resistance only)

■ Voltage Measurement

- Laboratory Standards: Platinum / Rhodium, Gold / Platinum and Base Metal, Accuracy to 0.15µV

■ Accurate

- World-Leading Accuracy for Primary & Secondary Laboratories

■ Stable

- ZERO drift in ratio measurement

■ Four Input Channels

- Best Practice Ready
- Expandable to 93
- Allows for future-proof scalability, accommodating growing laboratory needs

■ Ease of Use

- Upgraded Touch Screen Operation, Store all Standard Thermometer and Standard Resistors Internally
- Log to internal memory or USB Memory Drive

■ Trusted

- Documented Performance with Acceptance by the World's Leading NMIs

■ microK²

- New & Improved Performance, Upgraded with New Features

microK Benefits

NEW

■ Unmatched Accuracy

Documented ratio accuracy as low as 0.03 ppm

■ Extra Channel

Features a new fourth channel on the rear panel for increased flexibility

■ Extensive Connectivity

Includes Ethernet, RS232, USB & IEEE 488 (GPIB)

■ Trusted by Experts

Chosen by leading National Metrology Institutes worldwide

■ Versatility

Suitable for all temperature metrology applications & budgets

■ Intuitive Operation

Faster, larger touchscreen interface for easy navigation provides a clear and responsive interface, even in bright environments, making it easier to read and navigate

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 0.15 μV , equivalent to 0.006°C for a Platinum / Gold thermocouple at 1000°C.

ADC

The microK achieves unrivalled linearity and low noise through innovative techniques that include parallel analogue amplifiers, solid-state switching, advanced guarding and a zero-drift substitution topology. Its novel sigma-delta ADC employs a multi-bit, pulse-width modulation (PWM) DAC under NPL's "Technology Applied" scheme to achieve <0.03 ppm accuracy and low quantisation noise.



National Physical Laboratory

Technology Applied

Extensive Testing and Validation

The microK² performance, rigorously tested by NMIs and leading research organisations, confirms its reliability and precision. Visit our website for a full brochure along with technical articles and papers highlighting the microK² unmatched capabilities.



Cryogenic Measurements

The microK supports Rhodium-Iron thermometers (RhFe or RIRTs) and SPRTs for measurements down to 4K in ratio and resistance modes (resistance only).

Keep Warm Currents

The keep warm current for each channel, whether on the microK or via the microKanner channel expander, is automatically set to the last applied sense current. This feature not only simplifies the use of the microK but also ensures that measurements remain immune to power coefficient effects.

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. Automatically computes and displays resistance with no manual correction needed, simplifying the process and reducing potential errors. Now available on all microK² models.

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.

Parallel Analogue Processing Technology

All microK models deliver exceptional precision and stability, setting the standard for temperature measurement in calibration and research laboratories. The microK² 150 and microK² 300 already achieve outstanding performance through Isotech's advanced design and long-term stability. In the microK² 60 and flagship microK ELITE, this is taken even further with Isotech's unique *Parallel Analogue Processing Technology*. By combining multiple amplifiers that work together to minimise voltage noise, these models achieve world-leading performance for research and primary laboratories.



microK² with microKanner

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

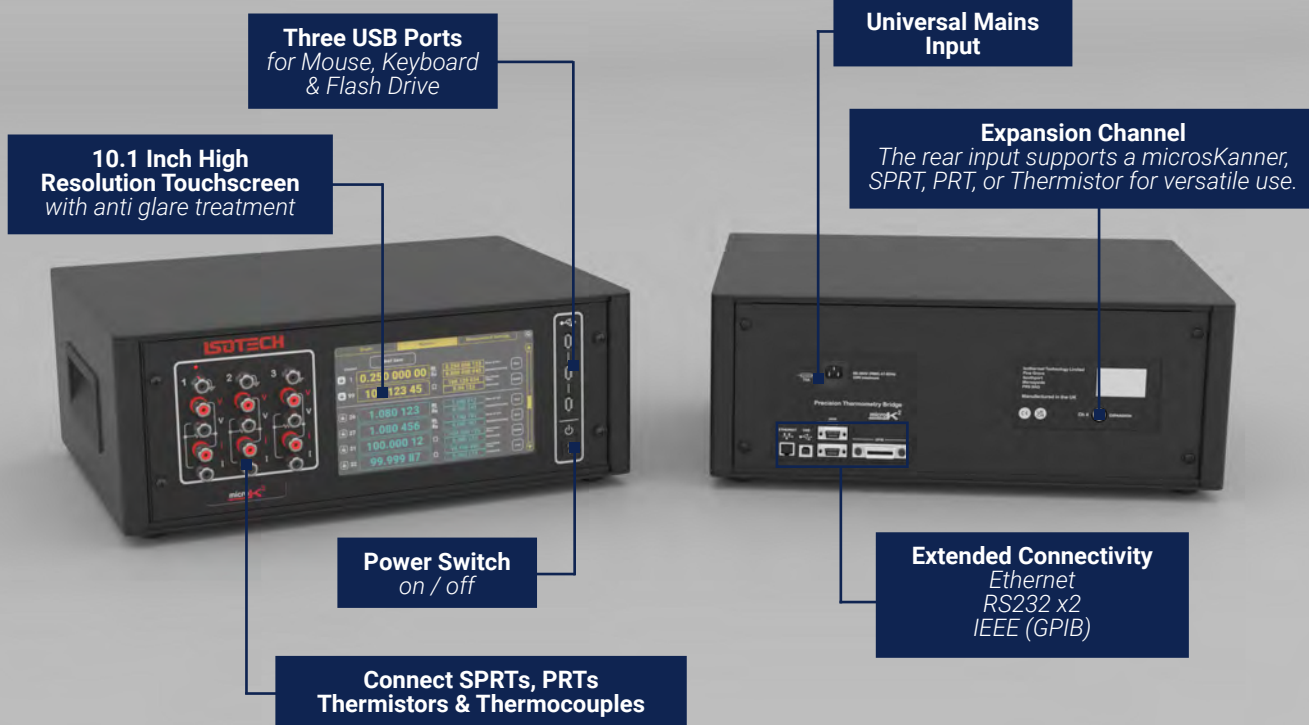
The microK² ELITE package includes a microK² instrument with superior performance, achieving ratio accuracy of <30 ppb across the entire range (0 to unity). This exceptional level of precision is guaranteed, with each unit calibrated using our Automatic Ratio Bridge Calibrator (RBC-A)

Exclusive Benefits - Extended Warranty and Free Recalibration

As part of the microK² ELITE package, you'll receive 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	microK ² ELITE	microK ² 60	microK ² 150	microK ² 300
Accuracy Whole Range [1]	30 ppb	60 ppb	150 ppb	300 ppb
Equivalent Temperature Accuracy Whole Range [1]	30 μ K	60 μ K	150 μ K	300 μ K
Equivalent Temperature Accuracy Water Triple Point [2]	7.5 μ K	15 μ K	38 μ K	75 μ K
Noise Reduction Technology	Parallel Analogue Processing - World-leading Performance		Advanced Low-Noise Design	

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 k Ω
Keep Warm Current	Each Channel Individually Programmable
Voltage Range (Thermocouple)	125 mV
Voltage Accuracy 0 - 20 mV	0.15 μ V 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 10 Ω 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, 400 Ω
Optional Internal Values	1, 10, 10K Ω , 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" Rack Mountable)

[1] Over whole range of SPRT, -200°C to 962°C. For $R_0=0.25\Omega$ increased by a factor of 2.5

[2] E.g. With 25.5 Ω SPRT and 25 Ω Reference Resistor or Direct Comparison of SPRTs with $R_0 > 2.5\Omega$

[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