



Precision Thermometer microK

- Accuracy ± 0.1 ppm
- Zero drift for PRTs
- PRT, thermocouple and thermistor sensing
- <2 second measurement time
- Keep-warm currents
- 0-10mA sensor current
- Touch screen

The new microK family of precision thermometers set new world standards for accuracy and stability. Designed for a wide range of high accuracy industrial and scientific calibration applications, the instrument uses a completely new measurement technique to achieve accuracies better than 0.1 parts per million (ppm) - equivalent to 0.0001°C - when used with a standard platinum resistance thermometer (SPRT).

When used with a 0°C cold junction reference unit, or by measuring the junction temperature with a PRT on another channel the instrument is capable of low uncertainty precision thermocouple measurements, with a voltage uncertainty of just $0.25\mu\text{V}$, equivalent to 0.01°C with a Platinum / Gold Thermocouple at 1000°C .

The microK range consists of four instruments offering a choice of measurement uncertainty from 0.1 to 0.8ppm, equivalent to 0.1mK to 0.8mK over the whole range of an SPRT with an $R_0 > 2.5\Omega$.

The instruments in the microK range offer performance characteristics and features which are simply not available elsewhere. Comparable instruments available internationally do not achieve the same accuracy or stability (zero drift characteristics with SPRT measurements are not obtainable in any other instrument), other instruments do not support the same variety of sensors, and offer considerably less operational features. The microK family uses solid state construction with no potentiometers or relays which ensures long term reliability and low cost of ownership, a feature of growing international importance.

Stable: The inherently stable 'substitution technique' used in the microK means that it achieves zero drift for resistance measurements and only 3ppm/year for voltage measurements so you can be confident in your measurements between calibrations.

Versatile: This is the only instrument of its type that works with PRTs, thermocouples and thermistors, so you only need to purchase one product for your thermometry application rather than two or more instruments.

Easy to Use: The microK includes a comprehensive range of features, including direct reading in temperature for all sensor types, data logging, easy export of data to Excel™ and graphing facilities. Despite its sophistication



microK 100
Unequaled combination of accuracy, stability and versatility.

the microK is very easy to use. The built in 6.4" full VGA colour touch screen, powered by the Window CE operating system provides a familiar and powerful operator interface so you can get on with making measurements rather than learning how to control the instrument.

Best Practice Ready: Best practice guidelines recommend the use of two reference thermometers for calibrations. That is why we have included three channels in the microK, enabling you to achieve best practice without having to buy additional and costly multiplexers.

Cable Pod™ Connector System: The connectors accept 4mm plugs, spades or bare wires. The $3/4$ " separation is compatible with standard 4mm to BNC adaptors, so you can use thermometers with any normal termination type. The Cable Pod™ connector system uses gold-plated, tellurium-copper to give the lowest possible thermal EMF and the best measurement uncertainty. The connectors have a clamping arrangement that does not rotate as the terminal is screwed down, thereby protecting the wire from mechanical damage.

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.

Keep-Warm Current: 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.

The microK Family

microK 400 and 800

These models were first introduced in 2006 and set a new standard for temperature measuring instruments. With innovative features and performance of 0.4 and 0.8ppm these are the instruments of choice for secondary laboratories. All the microK family have three input channels. PRT, Thermistor and Thermocouple Support, Touch Screen, Zero Drift, Data Logging and reliable solid state construction

microK 100 and 200

Retaining the features and innovation of the original microK these models introduced in 2009 incorporate a measurement engine with improved linearity and advanced Parallel Analogue Processing giving Primary Laboratory performance of better than 0.1ppm and 0.2ppm. A further innovation is the ability to automatically compute and display the zero current resistance with no manual correction, another microK first.

microKanner

The microKanner replicates the input system of the microK for all 10 of its input channels. Measurements made with a microKanner are therefore to the same uncertainty as the microK itself. A microK system can be expanded to a maximum of 92 channels without losing measurement performance.

The use of plug-and-play technology means that the extra channels appear automatically on the microK when you connect it to a microKanner. The new channels are configured in exactly same way as any of the microK's existing inputs, through the microK's touch screen or via the PC Interface.

Parallel Analogue Processing - microK 100 or microK 200

When working at 0.1ppm uncertainty the noise of the instrument is an important performance parameter. In developing the microK 100 and 200 a new technology, that of parallel analogue

processing has been used to lower the noise to a level which could previously only be achieved by the best of AC bridges. To learn more visit the Isotech website.



microK 400 with microKanner

microK Universal Specifications

Accuracy - Thermocouples	Voltage uncertainty: Range 0-20mV 250nV Equivalent to 0.01°C for Gold Platinum thermocouples at 1000 °C	Interfaces	RS232 (9600 baud) USB (1.1) - host
Measurement Time	<2 seconds per channel	Display	163mm / 6.4" VGA (640 x 480) Colour TFT LCD
Temperature Conversions	PRTs: ITS-90, Callendar-van Dusen Thermocouples: IEC584-1 1995 (B, E, J, K, N, R, S, T), L and gold-platinum Thermistors: Steinhart-Hart	Channels	3
Cable Length	Limited to 10Ω per core or 10nF shunt capacitance (equivalent to 100m of RG58 coaxial cable)	Cold Junction Mode	External and Remote with PRT
Input Connectors	Cable Pod™ connector accepting: 4mm plugs, spades or bare wires Contact material: gold plated tellurium copper	Expandable	Add up to 90 expansion channels
		Probes Supported	PRT's, Thermistors & Thermocouples
		Units	Ratio, V, Ω, °C, °F, K
		Switching Technology	Solid state
		Keep Warm Current	Adjustable 0-10mA

microK Specifications (Specifications are subject to change without prior notice)

Parameter	microK 100	microK 200	microK 400	microK 800
Accuracy PPM (Whole range)	0.1	0.2	0.4	0.8
Accuracy (at 0.01C) (mk)	0.025	0.05	0.1	0.2
Accuracy (SPRT Ro ≥ 25Ω) ^[1] (mk)	0.1	0.2	0.4	0.8
Accuracy (SPRT Ro ≥ 0.25Ω) ^[1] (mk)	0.25	0.5	1	2
Sensor Current	0-10mA in 3 ranges: 0 - 0.1mA ±0.4% of value, ±70nA, resolution 28nA 0.1 - 1mA ±0.4% of value, ±0.7µA, resolution 280nA 1 - 10mA ±0.4% of value, ±7µA, resolution 2.8µA			
Resolution (mK)	0.001	0.001	0.01	0.01
Stability (ppm/yr)	0 ^[2]	0 ^[2]	0 ^[2]	0 ^[2]
TC (resistance ratio) ^[3] (ppm/°C)	0 ^[2]	0 ^[2]	0 ^[2]	0 ^[2]
Resistance Range (kΩ)	0 - 100	0 - 100	0 - 500	0 - 500
Internal Resistance Standards (Ω)	25, 100, 400	25, 100, 400	1, 10, 25, 100, 400	1, 10, 25, 100, 400
Internal Standard Resistor Stability	TCR <0.05ppm/°C Annual Stability <2ppm/year		1Ω <10ppm/°C <25ppm/year 10Ω <0.6ppm/°C <5ppm/year 25,100,400 <0.3ppm/°C <5ppm/year	
Keep Warm Current	0-10mA ±0.4% of value, ±7µA, resolution 2.8µA			
Operating Conditions	15-30°C / 50-85°F, 10-90% RH (for full spec) 0-50°C / 32-120°F, 0-99% RH (operational)			
Supply	88-264V (RMS), 47-63Hz (Universal)			
Power	25W maximum, 1.5A (RMS) maximum		20W maximum, 1.5A (RMS) maximum	
Size W x D x H (mm)	520mm x 166mm x 300mm / 20.5" x 6.6" x 11.9"			
Weight (kg)	13.3	13.3	12.4	12.4

Notes: 1. Over whole range of SPRT, -200°C to 962°C.

2. The microK 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.

3. Using external reference resistors.