MICROK

3-channel expandable precision thermometer for PRTs, thermocouples and thermistors – Primary laboratory

The MicroK family of precision thermometers use 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).

Description

The MicroK family of precision thermometers uses a completely new measurement technique to achieve accuracies better than 0.02 ppm.

With four models to suit all levels of temperature metrology from National Measurement Institutes to those wanting a solution 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

First introduced in 2006 the MicroK has proven use at the world’s leading NMIs and many commercial laboratories. After years of experience and success we now introduce new models with even better performance and new features. All microK models now include IEEE-488 General Purpose Interface Bus as well as RS232 and USB. The microK 70 and microK 125 also feature an Ethernet port and can be monitored and controlled across a LAN.

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 µV, equivalent to 0.01°C with a Platinum / Gold Thermocouple at 1000°C.

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.

Highly stable

The inherently stable “substitution technique” used in the MicroK means that it achieves zero drift for resistance measurements and only 3 ppm/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 SPRTs, 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 the MicroK is very easy to use. The built-in full 6.4” full VGA colour touch screen, powered by the Windows 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. This is why we have included three channels in the MicroK, enabling you to achieve best practice without having to buy additional and costly multiplexers.

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.

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 0.8 ppm, these are the instruments of choice for secondary laboratories.

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 0.1 and 0.2 ppm. A further innovation is the ability to automatically compute and display the zero current resistance with no manual correction.

MicrosKanner

The MicrosKanner replicates the input system of the MicroK for all of its 10 input channels. Measurements made with a MicrosKanner 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 MicrosKanner. 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.

Key features:

- High accuracy: ±0.1 ppm according to models
- PRTs, thermistors and thermocouples
- Zero drift for PRTs
- Measurement time: < 2 s
- Keep-warm currents
- Expandable to 92 channels

Specifications

Parameter	MicroK 70	MicroK 125	MicroK 250	MicroK 500
Accuracy whole range (SPRT Ro ≥ 2.5 Ω) (1)	0.07 ppm	0.125 ppm	0.25 ppm	0.5 ppm
Accuracy ratio 0.95 to 1.05 (2) Equivalent temperature accuracy (2)	0.017 ppm 0.017 mK	0.03 ppm 0.03 mK	0.06 ppm 0.06 mK	0.125 ppm 0.125 mK
Resolution	0.001 mK	0.001 mK	0.01 mK	0.01 mK
Resolution voltage	10 nV	10 nV	10 nV	10 nV
Stability	0 ppm/year (3)	0 ppm/year (3)	0 ppm/year (3)	0 ppm/year (3)
Tc (resistance ratio) (4)	0 ppm/°C (3)	0 ppm/°C (3)	0 ppm/°C (3)	0 ppm/°C (3)
Resistance range	0-100 kΩ	0-100 kΩ	0-500 kΩ	0-500 kΩ
Voltage range (thermocouples)	± 125 mV	± 125 mV	± 125 mV	± 125 mV
Internal resistance standards	25, 100, 400 Ω	25, 100, 400 Ω	1, 10, 25, 100, 400 Ω	1, 10, 25, 100, 400 Ω
Internal standard resistor stability	TCR < 0.05 ppm/°C Annual stability: < 2 ppm/year		1, 10 Ω: 25,100,400 Ω:	

(1) Over whole range of SPRT, -200°C to 962°C. For Ro=0.25 Ω increased by a factor of 2.5
(2) E.g.: 25 Ω SPRT with 25 Ω standard resistor at Water Triple Point or with direct comparison of similar SPRTs.
(3) 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.
(4) Using external reference resistors.

Further features

Accuracy in thermocouples	Voltage uncertainty: 250 nV Range: 0-20 mV Equivalent to 0.01°C for Gold Platinum thermocouples at 1000°C
Measurement time (per channel)	Resistance: < 2 s (1 s using the RS232 or GPIB interface) Voltage: < 1 s (0.5 s using the RS232 or GPIB interface)
Cold junction mode	External and remote with PRT

MicrosKanner	Expands MicroK with up to 90 expandable channels
Sensor current	0-10 mA in 3 ranges: **Range 1:** 0-0.1 mA Accuracy: ±0.4% RDG + ±70 nA Resolution: 28 nA **Range 2:** 0.1-1 mA Accuracy: ±0.4% RDG + ±0.7 µA Resolution: 280 nA **Range 3:** 1-10 mA Accuracy: ±0.4% RDG + ±7 µA Resolution: 2.8 µA
Keep-warm current	0-10 mA, adjustable for each channel Accuracy: ±0.4% RDG + ±7 µA Resolution: 2.8 µA

General specifications

Size	520 x 166 x 300 mm
Weight	MicroK 70 / 125: 13.3 kg MicroK 250 / 500: 12.4 kg
Display	Colour TFT LCD 640 x 480, 6.4” VGA Display unit: °C, °F, K, Ω, mV
Power supply	88 / 264 VAC, 47/63 Hz MicroK 70 / 125: 25 W maximum, 1.5 A (RMS) maximum MicroK 250 / 500: 20 W maximum, 1.5 A (RMS) maximum
Communication ports	All models: RS 232, GPIB, USB MicroK 70 / 125: Ethernet
Storage capacity	2 Gb > 4 years measurements stored with date and time on internal memory

Environmental specifications

Reference range	+15 to +30°C (RH: 10 to 80% w/o condensing
Operating reference range	0 to +40°C (RH: 0 to 95% w/o condensing)

Models and accessories

Instruments:

864A/MicroK 70 3-channel expandable reference thermometer for PRTs, thermocouples and thermistors, accuracy 0.07 ppm

Delivered in standard with:

- User manual
- UKAS certificate by simulation

864A/MicroK 125 3-channel expandable reference thermometer for PRTs, thermocouples and thermistors, accuracy 0.125 ppm

Delivered in standard with:

- User manual
- UKAS certificate by simulation

910A/MicroK 250 3-channel expandable reference thermometer for PRTs, thermocouples and thermistors, accuracy 0.250 ppm

Delivered in standard with:

- User manual
- UKAS certificate by simulation

910A/MicroK 500 3-channel expandable reference thermometer for PRTs, thermocouples and thermistors, accuracy 0.5 ppm

Delivered in standard with:

- User manual
- UKAS certificate by simulation

External channel expander:

913 MicrosKanner, 10 channel expander, driven by RS or directly from the MicroK

Delivered in standard with:

- Connection cable for MicroK

Packing information:

Size	520 x 166 x 300 mm
Weight	MicroK 70 / 125: 13.3 kg

MicroK 250 / 500: 12.4 kg