The milliK Precision Thermometer from Isotech sets a new standard for the high accuracy measurement and calibration of Platinum Resistance Thermometers, Thermistors, Thermocouples and Process Instrumentation (4-20mA) over the range -270°C to 1820°C.

In addition to low uncertainty measurements from Reference Standards and Industrial sensors, the milliK can control Isotech temperature sources, sequencing through a programmable list of temperature set points and log data to internal memory or a USB drive.

The milliK has two input channels for sensors and a third channel for current. It can be expanded to become a measuring system with up to 33 channels reading SPRTs, RTDs, Thermistors, or Thermocouples with the option to control calibration baths and log readings accurately.

**Benefitting You**
The milliK sets a new standard for value, versatility and accuracy - < ±5ppm over range for PRTs, ±2µV for Thermocouples and ±1µA for current transmitters, see table.

Supporting a wide range of sensors and functions it replaces individual devices making it a cost effective calibration solution.

A robust design and operation from AC or DC power allows the milliK to be used in the laboratory, test room or out in the field.

The milliK can display in °C, °F, K, Ohms, mV and mA with numeric and graphical display modes. The large back lit display makes configuring the instrument and setting the scrolling strip charts intuitive. The USB port allows for the use of a mouse, keyboard or USB Drive.

**Built on World Leading Technology**
In 2006 Isotech launched the microK range of thermometry bridges which quickly established themselves as the instrument of choice for National Metrology Institutes and Primary Laboratories with innovative features, accuracy and versatility.

In response to industry demands for greater accuracy, the milliK now brings the same design philosophy used in the microK to those outside the Primary Laboratory. Users calibrating industrial sensors in the laboratory, pharmaceutical plants, food and beverage plants, aerospace, power industries and service companies will welcome the milliK as a solution to increase measurement confidence, ensure high accuracy traceable calibration, improve quality as well as ensure safety and lower energy consumption.

**No Compromise Design**
The design team have considered industrial users and applications in order to avoid measurement errors and problems encountered in some instruments from other manufacturers:

- **Eliminates Thermal EMF Errors in PRTS**
  Fast current reversal technology and solid state switching eliminate thermal EMF effects avoiding the errors that occur with fixed DC instruments.

- **Lead Wire Correction**
  PRT lead wire errors are eliminated for up to 30m of four core screened cable. Also supports lead wire wire correction for three wire PRTs.

- **Galvanic Isolation**
  Not only are the two sensor channels galvanically isolated, the 4 - 20mA input is also separately isolated. The benefits of the advance design are no ground loops, improved safety and noise immunity.

**High Resolution**
The display resolution is 0.0001°C (0.1mK) made possible by using a powerful Sigma Delta Analogue to Digital converter to achieve a true measuring resolution of just 28µΩ equivalent to 0.00007°C (0.07mK) for PRT inputs.

**Expandable**
The millisKanner adds eight channels, and each can be configured individually as a SPRT, PRT, Thermistor or Thermocouple input. A maximum of four millisKanners can be added, providing up to 32 channels - all controlled from the milliK touch screen or an RS232 connection.
Reliable
Like the award winning microK range, the milliK is all solid state. There are no mechanical relays, switches or potentiometers which would reduce reliability.

Input Connectors
No compromise design ruled out lower cost problematic connectors and the SPRT / PRT inputs are via the highest quality gold plated push / pull self latching circular connectors overcoming the problems seen elsewhere where thermometers have been designed to a budget.

Outstanding CJC Performance and Flexibility
Again, the no compromise design philosophy led to a specially developed rugged thermocouple connector made from alumina and incorporating a digital temperature sensor for optimal cold junction accuracy.

Three CJC modes allow thermocouple operation with internal automatic compensations, external 0°C reference systems or the milliK can measure the junction with a probe on an unused channel, useful for automated systems.

21st Century Design
Utilising a powerful internal operating system and fast 32 Bit processor the milliK has the power and capacity to overcome the memory limitations of older instruments.

Store Probe Data
There is sufficient memory for an almost unlimited number of standard probes, allowing the storing of calibration data for both resistance thermometers and thermocouples. The digital matching of probe data allows the instrument to show the true temperature. The instrument will warn if a probes calibration time has expired.

Data Logging
Older instruments are limited to a maximum number of logged data points, the milliK is limited only by storage space. The internal memory can store more than six months of data, and with a low cost USB Memory stick the milliK can log continuously for a lifetime.

21st Century Design
Utilising a powerful internal operating system and fast 32 Bit processor the milliK has the power and capacity to overcome the memory limitations of older instruments.

Connectivity and Communications
With USB host, two serial interfaces and Ethernet it is easy to communicate with the milliK whether it is on the bench next to a PC or remotely using a LAN or WAN connection. These interfaces are fitted as standard.

The milliK includes a PC lead and software.

Open Calibration
The milliK is readily calibrated against resistance and voltage standards. There are no internal adjustments and the calibration commands are simply sent via RS232 or from the front panel (password protected). The procedure is open and fully documented unlike some other instruments where there is no choice but to return to the manufacturer.

1 The milliK can connect to Isotech temperature sources
Dry Blocks (Basic & Site only), Liquid Baths and Furnaces
Can cycle the bath through a series of temperatures logging the data - all without a PC.

2 Wide range of sensors
The milliK can use Standard Reference probes and read from industrial sensors being calibrated, including 4 - 20mA transmitters - all to high accuracy.

3 Expandable
The milliK can be expanded to have a maximum of 33 high accuracy channels. The millisKanner has eight expansion channels, with each channel configurable for SPRT, PRT, Thermistor or Thermocouple input type.

4 Logs
The milliK can record time stamped data to internal memory or a USB Memory Drive.

5 Safety
The milliK inputs are galvanically isolated, with the 4 - 20mA input separately isolated avoiding problems with high voltage pick up common when using thermocouples in high temperature furnaces.

6 Designed to eliminate and protect against real world problems
The milliK eliminates thermal EMF errors, compensates for lead wire resistance and warns if a probe is out of calibration.
### Specifications

**Input Channels**
- 3 Channels 1 + 2
- Process Inputs 4 - 20mA
  - Isolated 24VDC Power Supply Included

**Ranges**
- **SPRTs:**
  - 0 - 115Ω
  - 0 - 460Ω
  - ± 115mV
- **PRTs:**
  - 0 - 460Ω
- **Thermocouples:**
  - ± 115mV
  - 4-20mA: 0 - 30mA

**Display Units**
- °C, °F, K, Ω, mV, mA

**Accuracy**
- SPRTs/PRTs: 5ppm Initial, 7ppm Over 1 year
- Thermistors: 50ppm Initial, 150ppm Over 1 year
- Thermocouples: 2µV Initial, 4µV Over 1 year
- 4-20mA: 0.01% Initial, 0.02% Over 1 year

**Temperature Accuracy**
- SPRTs/PRTs (at 0°C): ± 3mK Initial, ±4mK Over 1 year
  - (over full range): ±5mK Initial, ±7mK Over 1 year
- Thermistors: ±50ppm Initial, ±150ppm Over 1 year
- Thermocouples:
  - Ice Point Ref Internal CJC
  - Type B @ 1000°C: ±0.12°C Initial, ±0.14°C Over 1 year
  - ±0.12°C Initial, ±0.14°C Over 1 year
  - Type E @ 600°C: ±0.02°C Initial, ±0.05°C Over 1 year
  - ±0.01°C Initial, ±0.02°C Over 1 year
  - ±0.10°C Initial, ±0.20°C Over 1 year
  - ±0.05°C Initial, ±0.10°C Over 1 year
- Type K @ 600°C: ±0.04°C Initial, ±0.06°C Over 1 year
  - ±0.03°C Initial, ±0.06°C Over 1 year
  - ±0.13°C Initial, ±0.25°C Over 1 year
  - ±0.06°C Initial, ±0.18°C Over 1 year
- Type L @ 600°C: ±0.03°C Initial, ±0.06°C Over 1 year
  - ±0.02°C Initial, ±0.06°C Over 1 year
  - ±0.12°C Initial, ±0.23°C Over 1 year
  - ±0.05°C Initial, ±0.12°C Over 1 year
- Type N @ 600°C: ±0.04°C Initial, ±0.06°C Over 1 year
  - ±0.03°C Initial, ±0.06°C Over 1 year
  - ±0.10°C Initial, ±0.19°C Over 1 year
  - ±0.05°C Initial, ±0.10°C Over 1 year
- Type R @ 1000°C: ±0.09°C Initial, ±0.12°C Over 1 year
  - ±0.08°C Initial, ±0.12°C Over 1 year
  - ±0.14°C Initial, ±0.21°C Over 1 year
  - ±0.09°C Initial, ±0.18°C Over 1 year
- Type S @ 1000°C: ±0.10°C Initial, ±0.14°C Over 1 year
  - ±0.09°C Initial, ±0.14°C Over 1 year
  - ±0.16°C Initial, ±0.24°C Over 1 year
  - ±0.10°C Initial, ±0.20°C Over 1 year
- Type T @ 200°C: ±0.02°C Initial, ±0.03°C Over 1 year
  - ±0.01°C Initial, ±0.03°C Over 1 year
  - ±0.10°C Initial, ±0.18°C Over 1 year
  - ±0.03°C Initial, ±0.05°C Over 1 year
- Au-Pt @ 600°C: ±0.06°C Initial, ±0.08°C Over 1 year
  - ±0.05°C Initial, ±0.08°C Over 1 year
  - ±0.10°C Initial, ±0.15°C Over 1 year
  - ±0.05°C Initial, ±0.10°C Over 1 year

**Resolution**
- Resistance (PRTs): 0.000001Ω
- (Thermistors): 0.001Ω
- Voltage: 0.00001mV
- Current: 0.001mA
- Temperature: 0.0001°

**Temperature Conversions**
- **PRTs:**
  - IEC60751(2008), Callendar-van Dusen, ITS90
  - IEC61394-1 1995
  - Thermocouples:
    - B, E, J, K, N, R, S, T
    - L, Au-Pt
    - Thermistors: Steinhart-Hart, polynomial

**Sensor Currents**
- **SPRTs/PRTs:**
  - 1mA and 1.428mA
- **Thermistors:**
  - 5μA (reversing)

**Keep-Warm Current**
- **SPRTs/PRTs:**
  - 1mA and 1.428mA

### Input Connectors
- **SPRTs/PRTs:** LemoEPG.1B.306.
  - HLN 6-pin gold plated contacts
- **Thermocouples:**
  - Miniature Thermocouple socket (ASTM E 1684-05)
  - 4-20mA: 4mm sockets

### Interfaces
- 10/100MBit Ethernet (RJ45 socket)
- USB (2.0) host
- 2 x RS232 (9-pin D-type plug, 9600 Baud)

### Display
- 89mm / 3.5” QVGA (320 x 240) colour
  - TFT LCD with LED backlight

### Operating Conditions
- Operating:
  - 0-45°C / 32-113°F
  - 0-99% humidity
- Full Specification:
  - 15-30°C / 50-85 °F
  - 10-90% humidity

### Statistics
- In addition to instantaneous display
  - user can select mean of 2 - 100 measurements with standard deviation

### Measurement Time
- PRTs (4-wire): 0.4s
- Thermistors: 0.4s
- Thermocouples (ice point): 0.4s
  - (internal CJC): 0.7s
  - (external CJC): 1.0s

### Cable Length
- Limited to 10Ω per core and 10nF shunt capacitance (equivalent to 100m of typical 4-core screened PTFE cable)

### Logging
- Capacity to store > 180 Days of time stamped measurements to internal memory

### Recommended Probes
- Isotech Semi Standard PRTs
- Isotech Model 909 SPRT

### Power
- 88-264V (RMS), 47-63Hz (universal), 6W maximum or 4 x AA cells

### Dimensions
- 255mm x 255mm x 114mm / 10” x 10” x 4.5” (W x D x H)

### Weight
- 2.25kg / 5lb

### Optional Carring Case
- 931-22-102

**NOTE:** Due to our program of continual development and improvement, we reserve the right to amend or alter characteristics and design without prior notice.