

# 1523/1524 Reference Thermometers

## Measure, graph and record three sensor types with one tool

- High accuracy
- PRTs: up to  $\pm 0.011^\circ\text{C}$
- Thermocouples: up to  $\pm 0.24^\circ\text{C}$
- Precision thermistors:  $\pm 0.002^\circ\text{C}$

### Two models

- 1523: Single channel standard model with memory for 25 readings
- 1524: Two channels; memory for logging 15,000 measurements; real-time clock for time and date stamps

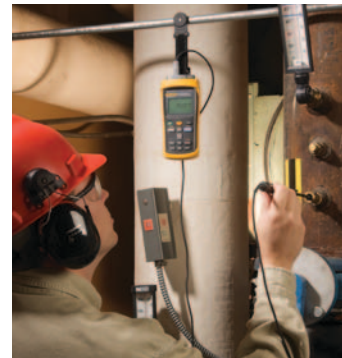


## Technical Data

### Finally, a reference thermometer as versatile as you are

The new 1523/24 Reference Thermometers from Fluke Calibration measure, graph, and record PRTs, thermocouples, and thermistors. These new thermometer readouts deliver high accuracy, wide measurement range, logging, and trending, all in a handheld tool you can take anywhere.

The 1523/24 lets you handle field applications, laboratory measurements, and data logging with ease. And with the dual channel measurement capabilities of the model 1524, you can do twice the work in half the time.



### Make accurate, consistent measurement...anywhere

You need accuracy for compliance, product yields, energy savings, and consistent results. The 1523/24 uses current reversal, a technique used in high-end instruments that eliminates thermal EMFs, for precision temperature measurements. Specifications are guaranteed from  $-10^\circ\text{C}$  to  $60^\circ\text{C}$  ambient. Special precision resistors and a highly stable reference voltage source keep 1523/24 accuracy virtually insensitive to environmental temperature.

Like all Fluke handheld tools, the 1523/24 Reference Thermometers endure rigorous testing in temperature extremes and under harsh conditions of vibration, so you can take it with confidence anywhere you need to go. An optional magnetic hanger allows you to hang the thermometer for easy viewing while freeing your hands to focus on the job.



## Monitor trends in the lab or in the field

See trends graphically on the 1523/24 thermometer's 128x64-backlit LCD display. You can change the graph's resolution at the touch of a button. Now it is easy to see when the temperature is stable (without statistics or long delays) or to monitor processes over time to verify correct operation.

Hold readings on the display at the touch of a button, or document up to 25 readings and associated statistics for easy retrieval. Statistics include the average maximum and minimum values, and the standard deviation. View them through the display or by uploading it to a PC via RS-232 connection and 9940 I/O TookKit software, included free. To monitor and log more data over time, use a PC and optional LogWare II software.

RS-232-to-USB adapters are available for those who prefer USB connectors. Battery power lasts at least 20 hours on three AA batteries, or use the dc power adapter for extended periods of measurement. Power saving features can be enabled or disabled for longer battery life or greater convenience.

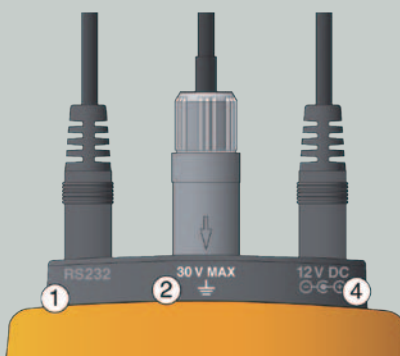
## INFO-CON connectors ensure correct temperature conversion

Inside the INFO-CON, a memory chip keeps calibration information for the attached probe. Simply plugging in the probe uploads the information to the readout. The connector transfers this information to the 1523/24 automatically, ensuring the correct temperature conversion for accurate, hassle-free measurements.

Probes may be locked by password to specific channels and readouts for security or for system calibration traceability. Plug any thermocouple with mini-thermocouple jacks into an optional universal thermocouple adapter for convenient measurement. Each thermocouple adapter or standard connector supports reference junction compensation (RJC) with its own internal precision thermistor.

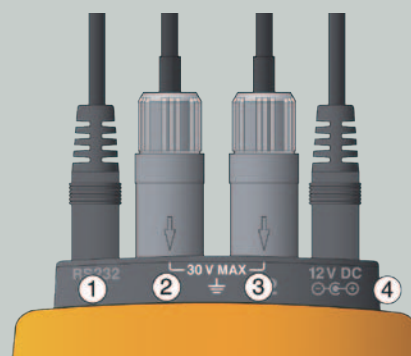
## Two models let you make the best choice for your application

### 1523 single-channel thermometer



- 1 RS-232 serial interface connector. For PC communications, uploading and downloading data from memory and from the probe INFO-CON connectors.
- 2 Sensor connector (PRT, thermocouple, or thermistor)
- 3 External power adapter connection, for continuous use without changing batteries. Alternatively, 3 AA batteries will last more than 20 hours in the field.
- 4 External power adapter connection

### 1524 two-channel thermometer



- 1 RS-232 serial interface connector
- 2 Channel 1 sensor connector (PRT, thermocouple, and thermistor)
- 3 Channel 2 sensor connector (PRT, and thermistor)
- 4 External power adapter connection

The 1523 Reference Thermometers are versatile single-channel thermometers that measure, graph and record three sensor types with one tool. Support for PRTs/RTDs, thermocouples, and thermistors provide flexibility to choose the right probe for the job.

The new 1524 Reference Thermometers help you do twice the work in half the time. Two channels and three sensor types and high-speed measurement make you more productive and make model 1524 the one reference thermometer you need to own. It has all the features of the 1523, and it's a data logger too. A real-time clock and memory for 15,000 time and date stamped measurements mean everything you are going to need is in this package. Log up to three times per second, or once every hour or other options in between. Download the data to a PC for analysis when you need it.

## Specifications

|                                                                                                                    | 1523                                                                                                              | 1524                                                        |
|--------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Input channels                                                                                                     | 1                                                                                                                 | 2                                                           |
| Resolution                                                                                                         | PRTs and thermistors: 0.001°<br>thermocouples: 0.01°                                                              |                                                             |
| Logging                                                                                                            | 25 readings with statistics                                                                                       | 25 readings with statistics<br>15,000 time and date stamped |
| Sample interval (normal)                                                                                           | 1 second                                                                                                          | 1 second<br>(simultaneous measurement)                      |
| Typical sample interval (fast mode)*                                                                               | 0.3 seconds                                                                                                       |                                                             |
| Sensor types                                                                                                       | PRTs, RTDs, thermistors, and thermocouples                                                                        |                                                             |
| Thermocouple types                                                                                                 | C, E, J, K, L, M, N, T, U, B, R, S                                                                                |                                                             |
| Statistics                                                                                                         | Maximum, minimum, average, standard deviation                                                                     |                                                             |
| Trending                                                                                                           | Scale: ± 10 °C (18 °F), ± 1 °C (1.8 °F), ± 0.1°C (0.18 °F),<br>± 0.01°C (0.018 °F), 10 minutes of real-time data  |                                                             |
| Power requirements                                                                                                 | 3 AA alkaline batteries, 12 V dc universal power supply                                                           |                                                             |
| Size (HxWxD)                                                                                                       | 96 mm x 200 mm x 47 mm (3.75 in x 7.9 in x 1.86 in)                                                               |                                                             |
| Weight                                                                                                             | 0.65 kg (1.4 lb)                                                                                                  |                                                             |
| Computer interface                                                                                                 | RS-232, 9940 I/O ToolKit software included                                                                        |                                                             |
| Safety                                                                                                             | EN61010-1:2001, CAN/CSA C22.2 No. 61010.1-04                                                                      |                                                             |
| Environmental conditions for best accuracy: 13 °C to 33 °C (55.4 °F to 91.4 °F)                                    |                                                                                                                   |                                                             |
| Millivolt range and accuracy                                                                                       | -10 mV to 75 mV, ± (0.005 % + 5 µV)                                                                               |                                                             |
| Internal reference junction compensation                                                                           | ± 0.2 °C (± 0.36 °F)                                                                                              |                                                             |
| Resistance range and accuracy                                                                                      | 0 Ω to 400 Ω ± (0.004 % + 0.002 Ω)<br>200 Ω to 50 kΩ ± (0.01 % + 0.5 Ω)<br>50 kΩ to 500 kΩ ± (0.03 %)             |                                                             |
| Temperature coefficient, voltage:<br>-10 °C to 13 °C , +33 °C to 60 °C<br>(14 °F to 55.4 °F, 91.4 °F to 140 °F)    | ± (0.001 %/°C + 1 mV/°C)                                                                                          |                                                             |
| Temperature coefficient, resistance:<br>-10 °C to 13 °C , +33 °C to 60 °C<br>(14 °F to 55.4 °F, 91.4 °F to 140 °F) | 0.0008 %/°C + 0.0004 Ω (0 Ω to 400 Ω)<br>0.002 %/°C + 0.1 Ω (0 Ω to 50 kΩ)<br>0.06 %/°C + 0.1 Ω (50 kΩ to 500 kΩ) |                                                             |
| Excitation current, resistance                                                                                     | 1 mA (0 Ω to 400 Ω)<br>10 µA (0 Ω to 50 kΩ)<br>2 µA (50 kΩ to 500 kΩ)                                             |                                                             |

\*See technical manual for sample interval details by sensor type and number of inputs.

Equivalent temperature accuracies for selected sensors derived from primary specifications ( $\Omega$ , mV)

### Temperature, thermocouples

| Type                                                                                                                                                            | Range                                                                                                  | Measure accuracies                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| K                                                                                                                                                               | $-200^{\circ}\text{C}$ to $0^{\circ}\text{C}$<br>( $-328^{\circ}\text{F}$ to $32^{\circ}\text{F}$ )    | $\pm 0.61^{\circ}\text{C}$<br>( $\pm 1.10^{\circ}\text{F}$ ) |
|                                                                                                                                                                 | $0^{\circ}\text{C}$ to $1370^{\circ}\text{C}$<br>( $32^{\circ}\text{F}$ to $2498^{\circ}\text{F}$ )    | $\pm 0.24^{\circ}\text{C}$<br>( $\pm 0.43^{\circ}\text{F}$ ) |
| R                                                                                                                                                               | $-20^{\circ}\text{C}$ to $0^{\circ}\text{C}$<br>( $4^{\circ}\text{F}$ to $32^{\circ}\text{F}$ )        | $\pm 1.09^{\circ}\text{C}$<br>( $\pm 1.96^{\circ}\text{F}$ ) |
|                                                                                                                                                                 | $0^{\circ}\text{C}$ to $500^{\circ}\text{C}$<br>( $32^{\circ}\text{F}$ to $932^{\circ}\text{F}$ )      | $\pm 0.97^{\circ}\text{C}$<br>( $\pm 1.71^{\circ}\text{F}$ ) |
|                                                                                                                                                                 | $500^{\circ}\text{C}$ to $1750^{\circ}\text{C}$<br>( $932^{\circ}\text{F}$ to $3182^{\circ}\text{F}$ ) | $\pm 0.49^{\circ}\text{C}$<br>( $\pm 0.88^{\circ}\text{F}$ ) |
| S                                                                                                                                                               | $-20^{\circ}\text{C}$ to $0^{\circ}\text{C}$<br>( $4^{\circ}\text{F}$ to $32^{\circ}\text{F}$ )        | $\pm 1.05^{\circ}\text{C}$<br>( $\pm 1.89^{\circ}\text{F}$ ) |
|                                                                                                                                                                 | $0^{\circ}\text{C}$ to $500^{\circ}\text{C}$<br>( $32^{\circ}\text{F}$ to $932^{\circ}\text{F}$ )      | $\pm 0.95^{\circ}\text{C}$<br>( $\pm 1.71^{\circ}\text{F}$ ) |
|                                                                                                                                                                 | $500^{\circ}\text{C}$ to $1750^{\circ}\text{C}$<br>( $932^{\circ}\text{F}$ to $3182^{\circ}\text{F}$ ) | $\pm 0.56^{\circ}\text{C}$<br>( $\pm 1.01^{\circ}\text{F}$ ) |
| Accuracies are based on internal reference junction compensation. Refer to technical manual for greatly improved accuracies using external reference junctions. |                                                                                                        |                                                              |

### Accuracies of selected readout/probe combinations ( $\pm^{\circ}\text{C}$ )

| Temperature                                                   | 5616-12 | 5615-6 | 5627A-12 | 5610-9 |
|---------------------------------------------------------------|---------|--------|----------|--------|
| $-200^{\circ}\text{C}$ ( $-328^{\circ}\text{F}$ )             | 0.014   | 0.025  | 0.027    | n/a    |
| $0^{\circ}\text{C}$ ( $32^{\circ}\text{F}$ )                  | 0.021   | 0.021  | 0.049    | 0.009  |
| $100^{\circ}\text{C}$ ( $212^{\circ}\text{F}$ )               | 0.027   | 0.028  | 0.065    | 0.009  |
| $300^{\circ}\text{C}$ ( $572^{\circ}\text{F}$ )               | 0.040   | 0.043  | 0.103    | n/a    |
| $420^{\circ}\text{C}$ ( $788^{\circ}\text{F}$ )               | 0.050   | n/a    | 0.130    | n/a    |
| Includes readout accuracy, probe calibration, and probe drift |         |        |          |        |

## Ordering Information

|                |                                                                                                                                                                                                                                                            |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1523*</b>   | Reference Thermometer, Handheld, 1 Channel                                                                                                                                                                                                                 |
| <b>1524*</b>   | Reference Thermometer, Handheld, 2 Channel, Data Logger                                                                                                                                                                                                    |
| <b>1523-P1</b> | 1523 Bundled with 5616 PRT [ $-200^{\circ}\text{C}$ to $420^{\circ}\text{C}$ ( $-328^{\circ}\text{F}$ to $788^{\circ}\text{F}$ ), NIST Traceable Calibration, 100 ohm, 6.35 mm x 305 mm (1/4 in x 12 in)], Universal TC INFO-CON Connector, TPAK, and Case |
| <b>1523-P2</b> | 1523 Bundled with 5628 PRT [ $-200^{\circ}\text{C}$ to $660^{\circ}\text{C}$ ( $-328^{\circ}\text{F}$ to $1220^{\circ}\text{F}$ ), Accredited Calibration, 25 ohm, 6.35 mm x 305 mm (1/4 in x 12 in)], Universal TC INFO-CON Connector, TPAK, and Case     |
| <b>1523-P3</b> | 1523 Bundled with 5627A PRT [ $-200^{\circ}\text{C}$ to $420^{\circ}\text{C}$ ( $-328^{\circ}\text{F}$ to $788^{\circ}\text{F}$ ), Accredited Calibration, 100 ohm, 6.35 mm x 305 mm (1/4 in x 12 in)], Universal TC INFO-CON Connector, TPAK, and Case    |
| <b>1524-P1</b> | 1524 Bundled, with 5616 PRT, Universal TC INFO-CON Connector, TPAK, and Case                                                                                                                                                                               |
| <b>1524-P2</b> | 1524 Bundled with 5628 PRT, Universal TC INFO-CON Connector, TPAK, and Case                                                                                                                                                                                |
| <b>1524-P3</b> | 1524 Bundled with 5627A PRT, Universal TC INFO-CON Connector, TPAK, and Case                                                                                                                                                                               |

\*Requires an optional probe

## Calibration options

|                 |                                                                                                                                   |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>1523-CAL</b> | 1523 Accredited Calibration                                                                                                       |
| <b>1524-CAL</b> | 1524 Accredited Calibration                                                                                                       |
| <b>1929-2</b>   | System Verification, PRT with Readout, Accredited                                                                                 |
| <b>1929-5</b>   | System Verification, Thermistor with Readout, Accredited                                                                          |
| <b>1930</b>     | System Calibration, PRT with Readout, Accredited                                                                                  |
| <b>1935</b>     | System Calibration, Thermistor with Readout, Accredited                                                                           |
| <b>1925-A</b>   | Accredited Thermistor Calibration, $0^{\circ}\text{C}$ to $100^{\circ}\text{C}$ ( $23^{\circ}\text{F}$ to $212^{\circ}\text{F}$ ) |

## Recommended accessories

A wide array of accessories is available to help you maximize productivity, but the following are essential for most users.



**Calibrated  
Temperature  
Sensors**



**TPAK  
Magnetic  
Hanger**



**Probe and  
Readout  
Case**



**Universal  
Thermocouple  
Adapter**



**Universal  
RTD Adapter**

## Included accessories

NIST traceable certificate of calibration, users guide, CD-ROM (contains technical manual), 12 V dc universal power supply, RS-232 cable, 9940 I/O ToolKit software

## Optional accessories

- 5610-9-P** Probe, Precision Thermistor, Stainless Steel, 3.18 mm x 228.6 mm (1/8 in x 9 in), 0 °C to 100 °C (32 °F to 212 °F), NIST traceable calibration
- 5615-6-P** Probe, PRT, 100 ohm, 4.76 mm x 152.4 mm (3/16 in x 6 in), -200 °C to 300 °C (-328 °F to 572 °F), Accredited Calibration
- 5609-9BND-P** Probe, PRT, 25 ohm, 6.35 mm x 305 mm (1/4 in x 12 in), 90° bend at 9 inches, -200 °C to 660 °C (-328 °F to 1220 °F), Requires Calibration (i.e. 1924-4-7)
- FLK80P1** 80PK-1, Probe, Thermocouple, Beaded Type K
- FLK80P3** 80PK-3A, Probe, Thermocouple, Surface Measurement Type K
- 9935-S** Software, LogWare II, Single User
- 1523-CASE** Case, 1523/1524 Readout and Probe Carrying
- FLUKETPAK** TPAK, Meter Hanging Kit
- 2373-LPRT** Adapter, Lemo to Mini Grabbers (4-wire)
- 2373-LTC** Adapter, Lemo to Universal TC (TC)
- 2384-P** INFO-CON Connector, PRT (Gray Cap), Spare
- 2384-T** INFO-CON Connector, TC (Blue Cap), Spare

**Fluke Calibration.** *Precision, performance, confidence.™*

|            |    |             |          |      |          |
|------------|----|-------------|----------|------|----------|
| Electrical | RF | Temperature | Pressure | Flow | Software |
|------------|----|-------------|----------|------|----------|

**Fluke Calibration**  
PO Box 9090,  
Everett, WA 98206 U.S.A.

**Fluke Europe B.V.**  
PO Box 1186, 5602 BD  
Eindhoven, The Netherlands

**For more information call:**  
In the U.S.A. (877) 355-3225 or Fax (425) 446-5116  
In Europe/M-East/Africa +31 (0) 40 2675 200 or Fax +31 (0) 40 2675 222  
In Canada (800)-36-FLUKE or Fax (905) 890-6866  
From other countries +1 (425) 446-5500 or Fax +1 (425) 446-5116  
Web access: <http://www.flukecal.com>

©2011-2012 Fluke Calibration. Specifications subject to change without notice.  
Printed in U.S.A. 2/2012 3383390B D-EN-N

**Modification of this document is not permitted without written permission from Fluke Calibration.**