

# 1523/1524 Reference Thermometers

Measure, graph and record three sensor types with one tool

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

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 1523/1524 Reference Thermometers from Fluke Calibration measure, graph, and record PRTs, thermocouples, and thermistors. These thermometer readouts deliver high accuracy, wide measurement range, logging, and trending, all in a handheld tool you can take anywhere.

The 1523/1524 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 1523/1524 uses current reversal, a technique used in high-end instruments that eliminates thermal EMFs, for precision temperature measurements. Specifications are guaranteed from  $-10\text{ }^{\circ}\text{C}$  to  $60\text{ }^{\circ}\text{C}$  ambient. Special precision resistors and a highly stable reference voltage source keep 1523/1524 accuracy virtually insensitive to environmental temperature.

Like all Fluke handheld tools, the 1523/1524 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.



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

**Monitor trends in the lab or in the field**

See trends graphically on the 1523/1524 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.

Document on demand 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.

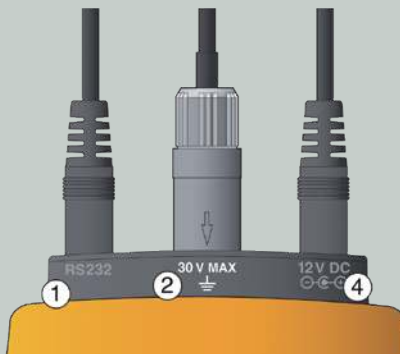
RS-232-to-USB adapters are available for those who prefer USB connectors. Battery power lasts at least 20 hours on three AA batteries, or use the dc power adapter for extended periods of measurement. Power saving features can be enabled or disabled for longer battery life or greater convenience.

**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.

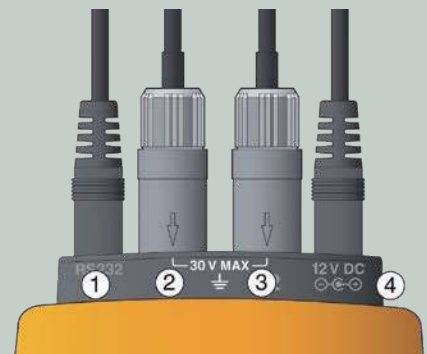
Probes may be locked by password to specific channels and readouts for security or for system calibration traceability. Plug any thermocouple with mini-thermocouple jacks into an optional universal thermocouple adapter for convenient measurement. Each thermocouple adapter or standard connector supports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

**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)
- 4 External power adapter connection, for continuous use without changing batteries. Alternatively, 3 AA batteries will last more than 20 hours in the field.

**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 Thermometer is a versatile single-channel thermometer that measures, graphs, and records three sensor types with one tool. Support for PRTs/RTDs, thermocouples, and thermistors provide flexibility to choose the right probe for the job.

The 1524 Reference Thermometer helps you do twice the work in half the time. Two channels, 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° thermocouples: 0.01°	
Logging	25 readings with statistics	25 readings with statistics 15,000 time and date stamped
Sample interval (normal)	1 second	1 second (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), ± 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) 200 Ω to 50 kΩ ± (0.01 % + 0.5 Ω) 50 kΩ to 500 kΩ ± (0.03 %)	
Temperature coefficient, voltage: -10 °C to 13 °C, +33 °C to 60 °C (14 °F to 55.4 °F, 91.4 °F to 140 °F)	± (0.001 %/°C + 1 mV/°C)	
Temperature coefficient, resistance: -10 °C to 13 °C, +33 °C to 60 °C (14 °F to 55.4 °F, 91.4 °F to 140 °F)	0.0008 %/°C + 0.0004 Ω (0 Ω to 400 Ω) 0.002 %/°C + 0.1 Ω (0 Ω to 50 kΩ) 0.06 %/°C + 0.1 Ω (50 kΩ to 500 kΩ)	
Excitation current, resistance	1 mA (0 Ω to 400 Ω) 10 µA (0 Ω to 50 kΩ) 2 µA (50 kΩ to 500 kΩ)	

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

## Calibration

Equivalent temperature accuracies for selected sensors derived from primary specifications (Ω, mV)

### Temperature, thermocouples

Type	Range	Measure accuracies
K	-200 °C to 0 °C (-328 °F to 32 °F)	± 0.61 °C (± 1.10 °F)
	0 °C to 1370 °C (32 °F to 2498 °F)	± 0.24 °C (± 0.43 °F)
R	-20 °C to 0 °C (4 °F to 32 °F)	± 1.09 °C (± 1.96 °F)
	0 °C to 500 °C (32 °F to 932 °F)	± 0.97 °C (± 1.71 °F)
	500 °C to 1750 °C (932 °F to 3182 °F)	± 0.49 °C (± 0.88 °F)
S	-20 °C to 0 °C (4 °F to 32 °F)	± 1.05 °C (± 1.89 °F)
	0 °C to 500 °C (32 °F to 932 °F)	± 0.95 °C (± 1.71 °F)
	500 °C to 1750 °C (932 °F to 3182 °F)	± 0.56 °C (± 1.01 °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 (±°C)

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

## Ordering Information

- 1523<sup>1</sup>** Reference Thermometer, Handheld, 1 Channel
- 1524<sup>1</sup>** Reference Thermometer, Handheld, 2 Channel, Data Logger
- 1523-P1** 1523 Bundled with 5616 PRT<sup>2</sup> [-200 °C to 420 °C (-328 °F to 788 °F) 100 ohm, 6.35 mm x 305 mm (1/4 in x 12 in)], Universal TC INFO-CON Connector, TPAK, and Case
- 1523-P2** 1523 Bundled with 5628 PRT<sup>3</sup> [-200 °C to 660 °C (-328 °F to 1220 °F), 25 ohm, 6.35 mm x 305 mm (1/4 in x 12 in)], Universal TC INFO-CON Connector, TPAK, and Case
- 1523-P3** 1523 Bundled with 5627A PRT<sup>3</sup> [-200 °C to 420 °C (-328 °F to 788 °F), 100 ohm, 6.35 mm x 305 mm (1/4 in x 12 in)], Universal TC INFO-CON Connector, TPAK, and Case
- 1523-P4** 1523 Bundled with 5615 PRT<sup>3</sup> [-200 °C to 420 °C (-328 °C to 788 °C), 100 ohm, 6.35 mm x 305 mm (1/4 in x 12 in)], Universal TC INFO-CON Connector, TPAK, and Case
- 1524-P1** 1524 Bundled, with 5616 PRT<sup>2</sup>, Universal TC INFO-CON Connector, TPAK, and Case
- 1524-P2** 1524 Bundled with 5628 PRT<sup>3</sup>, Universal TC INFO-CON Connector, TPAK, and Case
- 1524-P3** 1524 Bundled with 5627A PRT<sup>3</sup>, Universal TC INFO-CON Connector, TPAK, and Case
- 1524-P4** 1524 Bundled with 5615 PRT<sup>3</sup>, Universal TC INFO-CON Connector, TPAK, and Case

<sup>1</sup>Requires an optional probe

<sup>2</sup>5616 PRT includes a NIST traceable calibration and is not RoHS (Restriction of Hazardous Substances) compliant

<sup>3</sup>5628, 5627A, and 5615 PRTs include a 17025 accredited calibration and are RoHS compliant

## Calibration options

- 1523-CAL** 1523 Accredited Calibration
- 1524-CAL** 1524 Accredited Calibration
- 1929-2** System Verification, PRT with Readout, Accredited
- 1929-5** System Verification, Thermistor with Readout, Accredited
- 1930** System Calibration, PRT with Readout, Accredited
- 1935** System Calibration, Thermistor with Readout, Accredited
- 1925-A** Accredited Thermistor Calibration, 0 °C to 100 °C (23 °F to 212 °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 Meter Hanging Kit**



**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 included
- 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), 17025 accredited calibration included
- 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)
- 9935-S** Software, LogWare II, Single User
- 1523-CASE** Case, 1523/1524 Readout and Probe Carrying
- TPAK** 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
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**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>

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Printed in U.S.A. 10/2018 3383390C D-EN-N

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