

# **4-Channel Thermometer**

**800023**

SPER  
SCIENTIFIC

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Environmental Measurement Instruments

## **4-Channel Thermometer - 800023**

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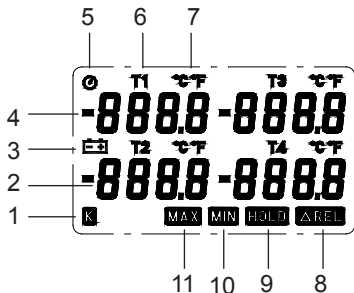
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## **INTRODUCTION**

This instrument is a four channel digital thermometer for use with any K-type thermocouple as temperature sensor. Temperature indication follows National Bureau of Standards and IEC584 temperature/voltage table for K-type thermocouples. It uses RS232 interface to perform bi-directional communication with PC.

## SYMBOL DEFINITION AND BUTTON LOCATION



1. Thermocouple Type Indication.
2. It indicates the value below is T1-T2 sensor.
3. The Battery is not sufficient for proper operation.
4. This indicates that the minus temperature is sensed.
5. This indicates auto power off is enabled.
6. It indicates the value below is T1, T2, T3, T4 Temperature sensor.
7. Centigrade and Fahrenheit indication.
8. The reading is now under relative mode.
9. This indicates that the display data is being held.
10. The Minimum value is now being displayed.
11. The Maximum value is now being displayed.



## BUTTON LOCATION:

- |  |   |
|--|---|
| 1. K type temperature sensor<br>T1 to T4 input connector | 8. Offset calibration screw (on side)       |
| 2. LCD display   | 9. Digital output connector (on side)       |
| 3. ON/OFF & Backlight button                             | 10. MAX MIN function control button         |
| 4. Hold button   | 11. °C, °F control button                   |
| 5. Relative button                                       | 12. AC power adapter connector<br>(on back) |
| 6. Tripod connector (on back)                            | 13. Battery cabinet cover (on back)         |
| 7. T1-T2 button  |   |

## OPERATION INSTRUCTIONS

### 1. Power-Up & Turn ON/OFF backlight

The POWER key turns the Thermometer ON or OFF and backlight ON & OFF.

Press it once to turn on the Thermometer.

Press it again for moment to turn ON or OFF backlight.

Press and hold this button 3 second to turn OFF the power.

### 2 Connection the Thermocouples

For measurement, plug the thermocouple into the input connectors.

### 3. Selecting the Temperature Scale

When the meter was powered on, the user may change it to Fahrenheit (°F) by pressing °C/°F button and vice versa to Celsius.

### 4. Data-Hold Operation

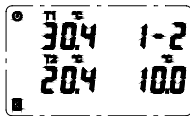
The user may hold the present reading and keep it on the display by pressing the **HOLD** button. When the held data is no longer needed, one may release the data-hold operation by pressing **HOLD** button again.

When the meter is under Data Hold operation, the **ΔREL**, **MAX MIN**, **T1-T2** and **°C/°F** button are disabled. (when you press **ΔREL**, **°C/°F**, **T1-T2** and **MAX MIN** button in HOLD mode, there will be two continuous beeps)

## 5. T1-T2 Operation:

When this button is pushed, **1 – 2** will be shown on the upper right hand side LCD display to indicate that the tester is under T1 minus T2 mode.

The temperature difference is shown on the right hand side display as shown in Fig.



## 6. Relative Operation:

When pressing the **ΔREL** button, the meter will memorize the present reading and the difference between the new reading and the memorized data will be shown on the display. Press the **ΔREL** button again to exit the Relative operation. When the meter is under relative operation, °C/°F button is disabled. (When you press °C/°F button in relative mode, there will be two continuous beep)

## 7. MAX/MIN Operation:

When pressing the **MAX MIN** button the meter will enter the MAX/MIN mode. Under this mode the maximum value, minimum value is kept in the memory simultaneously and updated with every new sample of data.

When the MAX symbol is display, the Maximum is shown on the display.

Press **MAX MIN** again, then the MIN symbol is on the display and also the minimum reading.

Press **MAX MIN** again, MAX, and MIN will blink together. This means that all these data is updated in the memory and the reading is the present temperature.

One may press **MAX MIN** to circulate the display mode among these options.

When the meter is under MAX MIN operation and °C/°F, ΔREL button are disabled.(when you press °C/°F, ΔREL button in MAX MIN mode, there will be two continuous beep)

To exit the MAX/MIN mode, one may press and hold **MAX MIN** for two seconds.

### 8. Auto Power Off:

By default, when the meter is powered on, it is under auto power off mode. The meter will power itself off after 30 minutes if no key operation and no RS232 communication combination at power on can disable auto power off.

One may press and hold **HOLD** button and then power on the meter and there will be two successive beeps to indicate that auto power off is disabled and the POWER button will not show up.

### 9. Low Battery Condition

When the battery voltage is under proper operation requirement, the battery symbol will show on the LCD and the battery need to be replaced with new one.

### 10. Calibration Point:

Input	Adjust VR	Tolerance
0°C	VR1	± 0.1°C
190°C	VR2	± 0.1°C
1000°C	VR3	± 1°C
1900°F	VR4	± 1°F



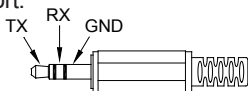
## 11. Digital Output:

The Digital Output is a 9600 bps N 81 serial interface.

The RX is a 5V normal high input port.

The TX is a 5V normal high output port.

## SPECIFICATIONS:



## Numerical Display:

4 digital Liquid Crystal Display per channel.

## Measurement Range:

-200°C ~ 1370°C    -328°F ~ 2498°F

## Resolution:

-200°C ~ 200°C 0.1°C; 200°C ~ 1370°C 1°C

-200°F ~ 200°F 0.1°F; else 1°F

Input Protection at Thermocouple Input: 60V DC,  
or 24 Vrms AC

## Environmental:

- Operating Temperature and Humidity: 0°C ~ 50°C (32°F ~ 122°F); 0 ~ 80% RH
- Storage Temperature and Humidity: -10°C ~ 60°C (14°F ~ 140°F); 0 ~ 80% RH
- Altitude up to 2000 meters.

**Accuracy: at ( 23 ± 5°C )**

<b>Range</b>	<b>Accuracy</b>
-200°C ~ 200°C	±(0.2% reading + 1°C)
200°C ~ 400°C	±(0.5% reading + 1°C)
400°C ~ 1370°C	±(0.2% reading + 1°C)
-328°F ~ -200°F	±(0.5% reading + 2°F)
-200°F ~ 200°F	±(0.2% reading + 2°F)
200°F ~ 2498°F	±(0.3% reading + 2°F)

**Temperature Coefficient:**

For ambient temperatures from 0°C ~ 18°C and 28°C ~ 50°C, for each °C ambient below 18°C or above 28°C add the following tolerance into the accuracy spec.

0.01% of reading + 0.03°C (0.01% of reading + 0.06°F)

**Note...**

The basic accuracy Specification does not include the error of the probe. Please refer to the probe accuracy specification for additional details.

**Electromagnetic Compatibility:**

Total accuracy = specified accuracy  $\pm 2^{\circ}\text{C}$  ( $3.6^{\circ}\text{F}$ )

**Sample Rate:** 3 seconds per period

**Dimension:**  $7\frac{1}{4}'' \times 2\frac{1}{2}'' \times 1\frac{1}{4}''$  ( $184 \times 64 \times 32$  mm)

**Weight:** 8.4 oz (238 g) 0090

**Power requirement:** 9 Volt Battery

**Battery Life:** Approx. 100 hrs with alkaline battery

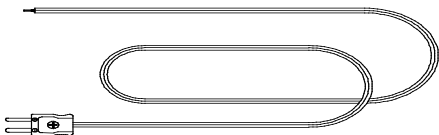
**AC Adapter:** 9V DC  $\pm 15\%$  100 mA

**Plug Diameter:** 3.5 mm  $\times$  1.35 mm

**Option:** AC Adapter, Software, RS-232 Cable

**Appendix: Thermocouple probe specification**

Range	Tolerances	Description
-50°C ~ 200°C -58°C ~ 392°C	$\pm 2.2\%$ or $\pm 0.75\%$ ( $\pm 3.6^{\circ}\text{F}$ or $\pm 0.75\%$ )	with Teflon tape insulation Maximum insulating temperature: 260°C



## **WARRANTY**

Sper Scientific warrants this product against defects in materials and workmanship for a period of **five (5) years** from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover probes, batteries, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will void the warranty.

To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.  
8281 E. Evans Rd., Suite 103  
Scottsdale, AZ 85260

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at [www.sperwarranty.com](http://www.sperwarranty.com) within 10 days of purchase.

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