

# Temperature TC-K (0 °C - 1200 °C)

**DT025**



The Temperature TC-K (0 °C - 1200 °C) sensor can be connected to the Nova5000, MultiLogPRO or TriLink data loggers.

This Temperature sensor is a Thermocouple Type K (TC-K) sensor with a range of 0 °C to 1200 °C. The sensor is extremely accurate, and has a maximum error of 2% over the entire range.

The TC-K sensor is mainly used for high temperature measurements, monitoring chemical processes that occur in high temperatures, or simply monitoring ovens. The high accuracy and reliability of this sensor makes it an excellent tool for industry as well as for educational requirements.

The TC-K sensor is composed of the Fourier System sensor case and a 20 cm thermocouple wire.

## Typical Experiments

- Exploring a candle flame
- Measuring the temperature of exterior walls and roofs of buildings
- Investigating the thermal insulation of the building envelope

## How it Works

A thermocouple consists of two long wires made of different metals connected at one end while at the other end they are close to each other but without making contact. When the connected end of the thermocouple is placed in a higher temperature than the unconnected end, voltage is produced between the wires. The sensor is actually equipped with another temperature sensor, designed to correct the bias that is caused by the room temperature. Finally, the voltage received after correcting this



offset is amplified and adjusted to a range of 0 - 5 V, accepted by the data logger. The proper result is then recorded and stored in the data logger's memory.

### Sensor Specification

<b>Range for Nova5000:</b>	0 °C - 1200 °C 32 °F - 2192 °F 273.15 K - 1473.15 K
<b>Range for MultiLogPRO and TriLink:</b>	0 °C - 1200 °C 32 °F - 2192 °F
<b>Accuracy:</b>	±2 % over entire range
<b>Resolution (12-bit):</b>	0.3 °C 0.55 °F
<b>Default Sample Rate:</b>	10 samples per second
<b>Feature:</b>	Equipped with an offset calibration screw
<b>Recommended Sensor Usage:</b>	Resistant to mild chemical solutions  Do not place the sensor's cable in liquid
<b>Features:</b>	Equipped with a gain calibration screw

### Calibration

The Temperature TC-K (0 °C - 1200 °C) sensor is shipped fully calibrated. For experiments that require very accurate calibration, the sensor is equipped with an offset calibration screw, located at the back of the adaptor. Place the Temperature sensor in a reference sample (e.g. ice and water in 0 °C) and start recording. Insert a flat screwdriver to the calibration hole and slowly turn the calibration screw until the reference value is reached.

### Using the Temperature Sensor with the Nova5000 and MultiLab Software

1. Launch the MultiLab CE software.
2. Connect the Temperature sensor to the Nova5000's sensor input (starting from I/O-1). The sensor is automatically recognized by the MultiLab software.
3. Click **Setup** on the main toolbar and program the data logger's sample rate and number of samples. Click **Run** on the main toolbar to start the measurement.



### *Selecting Units*

By default MultiLab displays the data in °C. To change the display to °F or K:


1. Click **Logger** on the main MultiLab toolbar and then click **Preferences**.
2. Choose the desired unit in the **Temperature unit** menu and then click **OK**.

### **Using the Temperature Sensor with the MultiLogPRO or TriLink and MultiLab Software**

1. Launch the MultiLab software.
2. Connect the Temperature sensor to the data logger's sensor input (starting from I/O-1). The sensor is automatically recognized by the MultiLab software.
3. Click **Setup** on the main toolbar and program the data logger's sample rate and number of samples. Click **Run** on the main toolbar to start the measurement.

### *Selecting Units*

By default MultiLab displays the data in °C. To change the display to °F:

1. Click **Setup** on the main toolbar.
2. Click **Properties**  next to the Temperature sensor input.
3. Select the checkbox next to the desired temperature unit and click **OK**.

### **An Example of using the Temperature Sensor**

#### *Exploring a Candle Flame*

A flame does not show the same temperature at every zone within the flame. The characterization of such a flame is possible with a thermocouple (a highly sensitive, fast responding temperature sensor ranging from 0 °C to well over 1000 °C).

The following graph shows the temperature in three different zones of the candle flame.

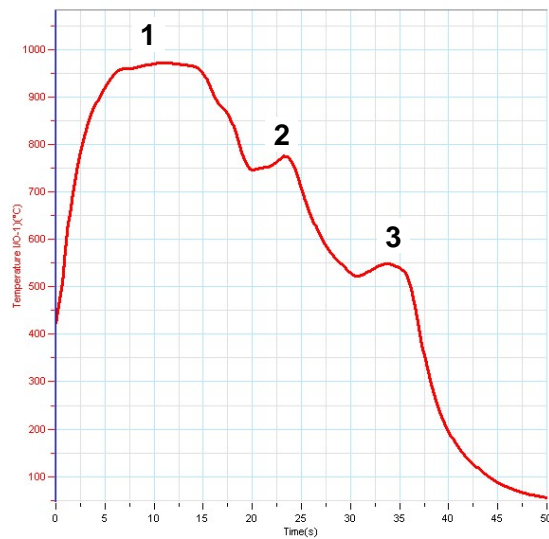


Figure 1: The temperature in three different zones of the candle flame

## Technical Support

Please contact Fourier technical support as follows:

Web: [http://www.fourier-sys.com/support\\_support.html](http://www.fourier-sys.com/support_support.html)

Email: [support@fourier-sys.com](mailto:support@fourier-sys.com)

Consult the FAQs before contacting technical support:

[http://www.fourier-sys.com/support\\_faq.html](http://www.fourier-sys.com/support_faq.html)

## Copyright and Warranty

All standard Fourier Systems sensors carry a one-year warranty, which states that for a period of twelve months after the date of delivery to you, it will be substantially free from significant defects in materials and workmanship.

This Warranty does not cover breakage of the product caused by misuse or abuse.

This Warranty does not cover Fourier Systems consumables such as electrodes, batteries, EKG stickers, cuvettes and storage solutions or buffers.