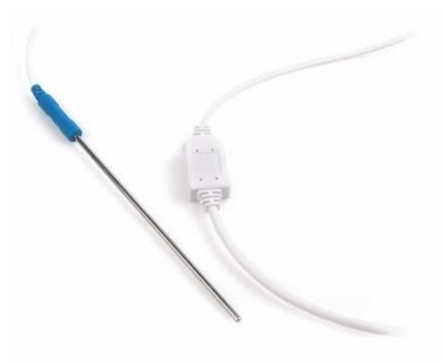# PT -100 TEMPERATURE Sensor

-200 to 400ºC

Product Number: ENTMP027

Overview

One of the qualities of platinum is that its electrical resistance increases linearly with the temperature. The PT-100 Temperature sensor uses this quality to produce highly accurate readings in a wide temperature range (-200 ºC to 400 ºC). It is ideal for temperature measurements in chemical solutions and for experiments where great stability, accuracy and repeatability are critical.

The sensor is ideal for use in Chemistry and Physics.
The PT-100 Temperature sensor can be connected to all types of einstein™ data loggers.

www.einsteinworld.com

Typical experiments

Chemistry

- Measuring the Temperature of Liquid Gases
- Determining the boiling point of different materials
- Creating heating curves

How it works

This sensor measures temperature based on the electrical resistance of the platinum core. Its name derives from the fact that at 0 ºC the platinum's resistance is 100 Ohms. This resistance changes linearly as the temperature changes - at 100 ºC the resistance is 138.4 Ohms. The sensor uses a small electric current of 1.7 mA to measure this resistance which is then amplified to a range of 0-5 Volts and then calculated by the data logger as a Temperature measurement.

Sensor specification

Range:	- 200 ºC to 400 ºC
	- 328 ºF to 752 ºF
	73.15 K to 673.15 K
Accuracy:	±2 % over entire range
Resolution (12-bit):	0.15 ºC
Recommended Sampling Rate:	10 samples per second Response Time
(for 90% change in reading):	40-60 seconds in air

Note: The Temperature sensor was designed only for educational purposes and shouldn't be used for industrial, medical, or research applications.
Note: For use in mild chemical solutions only

Calibration

The Temperature PT-100 sensor is shipped fully calibrated.

Data logging and analysis

Android

1. Take your einstein™ Tablet OR pair your einstein™ LabMate with your Android or iOS tablet via Bluetooth
2. Insert the sensor cable into one of the sensor ports
3. Launch MiLABEx and then tap on LAB start an Experiment
4. MiLABEX will automatically detect the sensor

www.einsteinworld.com

5. Tap on Sensors to make sure the icon next to the sensor is checked and enabled for logging
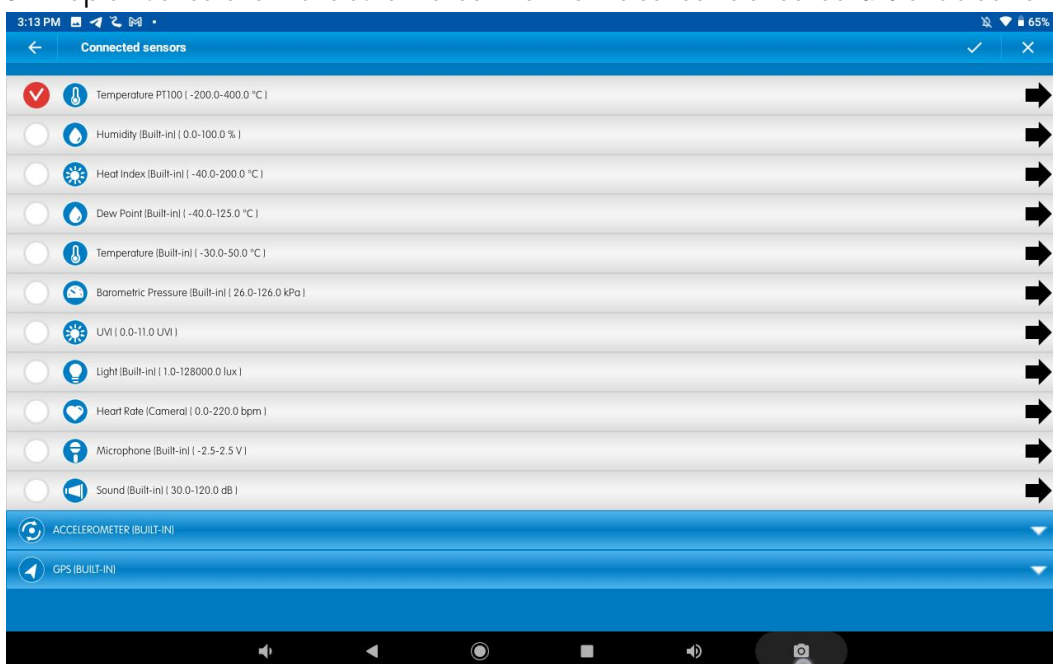

6. You are ready to Start an Experiment

Desktop

1. Pair your einstein™ LabMate with your PC, MAC, or Linux machine via Bluetooth, or connect it via the USB cable (found in the einstein™ LabMate box).
2. Insert the sensor cable into one of the sensor ports
3. Launch MiLABEx and then click on LAB start an Experiment
4. MiLABEx will automatically detect the sensor and show it in the Current Setup Summary window
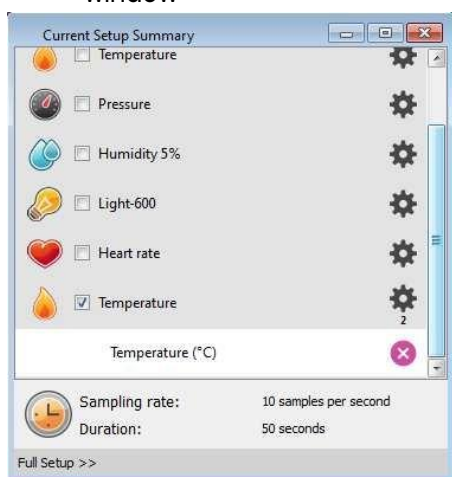
5. Click Full Setup, located at the bottom of the Current Setup Summary window to program the data logger's sample rate, number of samples, units of measurement, and other options
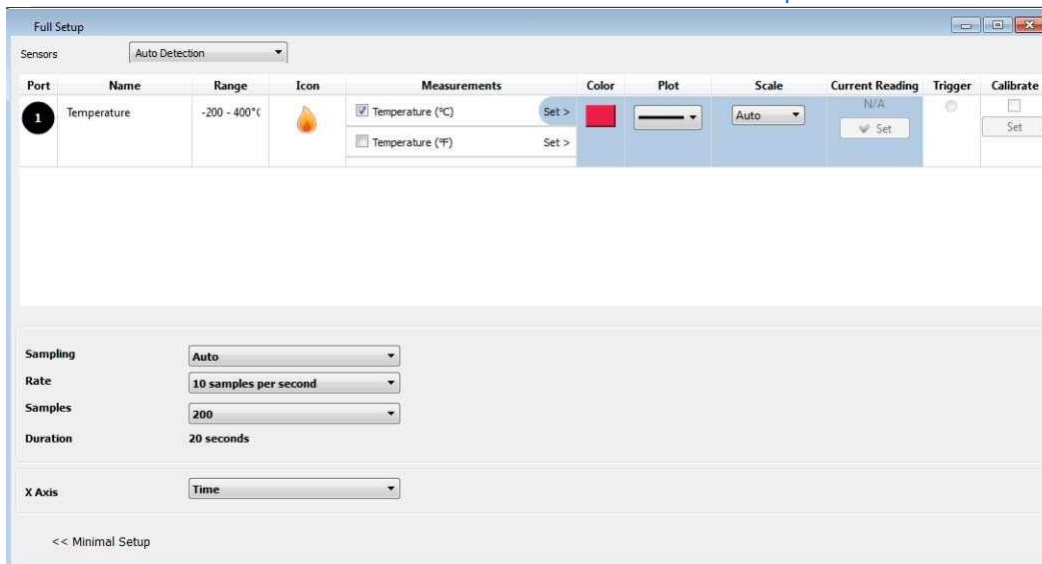
6. Click the Run button on the main toolbar of the Launcher View to start logging

An example of using the Temperature Sensor

Measure the cooling rate of a glass of hot water.

1. Insert the sensor into a glass of hot water
2. Go to Full Setup and define Sampling as 1 sample per second and the number of Samples as 2000 samples
3. Click the Run button on the main toolbar of the Launcher View to start logging
4. Figure 1 shows a sample graph from this experiment
5. You may repeat the experiment with different sizes and shapes of glasses and see the impact
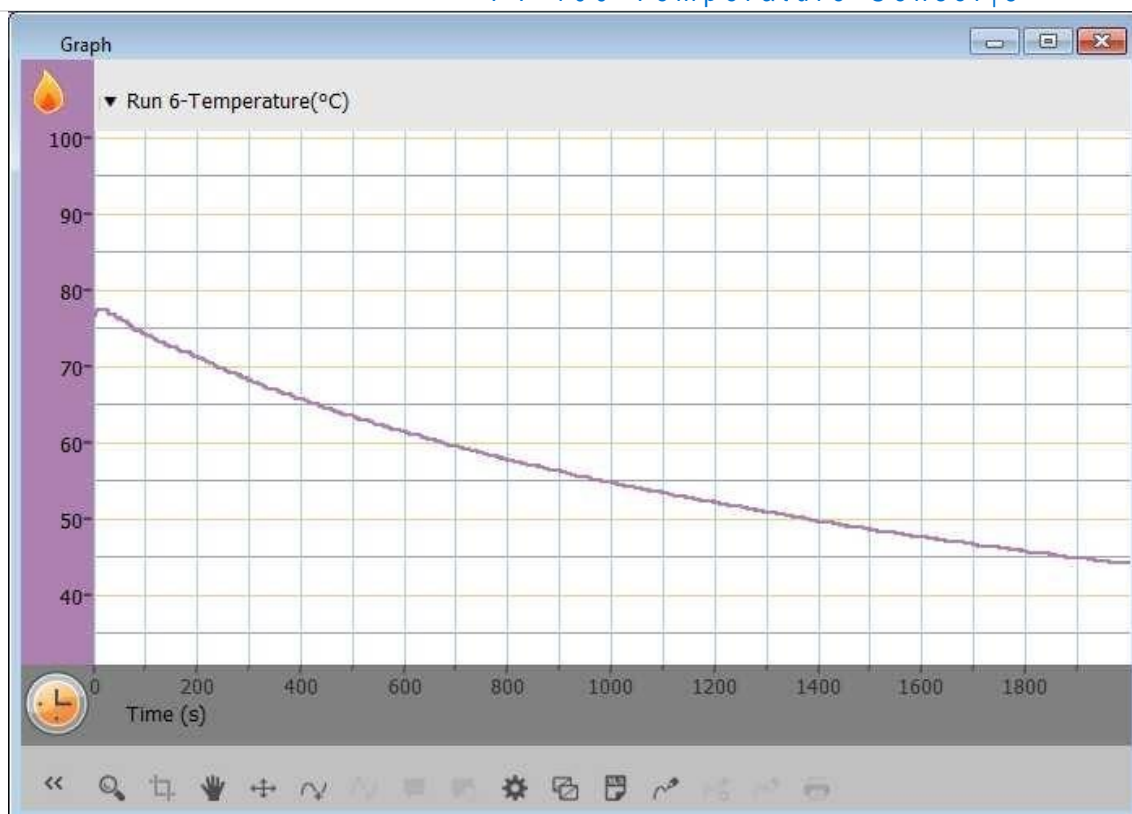
(Figure 1)

Troubleshooting

If the sensor isn't automatically recognized by MiLAB, please contact Fourier Education's technical support.

Technical support

For technical support, you can contact the Fourier Education's technical support team at: Web: www.einsteinworld.com/support
Email: support@fourieredu.com

Copyright and Warranty

All standard Fourier Systems sensors carry a one (1) 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.

service names are registered trademarks or trademarks of Fourier Systems. All other registered trademarks or trademarks belong to their respective companies.

ALBERT EINSTEIN and EINSTEIN are either trademarks or registered trademarks of The Hebrew University of Jerusalem. Represented exclusively by Green Light. Official licensed merchandise. Website: einstein.biz