



**Edu-Logger Infrared
Temperature Logger Sensor
Guide
900-245**



Edu-Logger infrared temperature logger sensor 900-245

The Edu-Logger infrared temperature sensor can be used for any science experiment or activity which requires accurate temperature measurements such as in the fields of physics, chemistry, biology, environmental science, etc.

The sensor comes pre-calibrated so you can start experimentation right out of the box using this guide.

Using the infrared temperature sensor over the standard temperature sensor and surface temperature sensor has several advantages:

- Can safely take measurements of hazardous materials from a distance.
- Has no probe which can react with chemicals.
- Greater flexibility of use.
- Very precise measuring zone means you can reliably measure the temperature of a specific point instead of a larger area.
- Great for outdoor experiments.

Hundreds of possible experimental subjects that can be done with the 900-245 sensors are: exothermic and endothermic chemical reactions, metabolism, heat and energy transfer, human temperature changes, effects of heat on enzyme function, weather studies, material thermal conductance properties, and many more.

The infrared temperature sensor uses the following units of measure:

- Celsius: The SI (International System of Units) unit of temperature.
- Fahrenheit: The temperature measurement unit of the English System commonly used in the United States.

Infrared light:

Infrared light (radiation) is emitted from moving molecules inside of bodies with a temperature above absolute zero (0 K). This phenomenon is called “black body radiation”. When the temperature of an object increases the molecules inside move much more rapidly and more infrared radiation is released.

How the infrared temperature sensor works:

On the top of the Edu-Logger infrared temperature sensor is a metallic lens which focuses infrared light from an object onto an internal detector called a thermopile. The thermopile acts as a heat-sink as it collects infrared radiation. An electrical current runs through the thermopile and as more heat is absorbed more resistance is produced. The resistance is measured and easily converted into a temperature reading.

How to use the infrared temperature sensor:

For instructions on connecting the sensor to computers, tablets, smartphones, or the Edu-Logger Viewer please review the following sections.

After you have connected your Edu-Logger infrared sensor to the smart device of your choosing:

1. Locate the metallic lens on the top of the infrared sensor. (This is where infrared radiation is detected).
2. Direct the metallic lens towards the target you want to measure, it can be either a solid or liquid.
3. The sensor works over very long distances, however detecting small objects from far away can be tricky so you may need to measure from a closer distance.

Quick start procedure:

PC or Mac Computer

Materials needed:

- 900-245 Infrared Temperature Sensor
- 900-213 USB Module
- USB to mini USB cable (included with the 900-213 module)

Your infrared temperature sensor needs to be connected to a 900-213 module. The 900-213 module then connects to a computer via a USB to mini-USB cable. Please note that you cannot plug the infrared temperature sensor directly into the computer.

Resident PC software and browser based application can be downloaded for free at www.edulab.com as well as a full software user guide.

Note: Make sure not to download and install both types of software they will conflict on the computer.

Procedure:

1. Install the Edu-Logger software
2. Connect the 900-213 module to the PC or Mac
3. Connect the infrared temperature sensor to the 900-213 module (they directly plug together). Please note there is no calibration required for this sensor.

4. Open the Edu-Logger software.
5. Once the infrared temperature sensor logo appears on the left side of the screen the probe has been automatically identified and you can begin experimentation.
6. If the infrared temperature sensor is not automatically identified then click the “Search for sensors” icon to find the sensor.
7. Select the “On-line experiment” button; this will open a graph below.
8. Click on the “Module setup” button located on the infrared temperature sensor icon in the module window to change the sensor settings if need be.
9. Click on the "experiment set up" button to change the experiment settings if need be (experiment duration for example).
10. The infrared temperature sensor will give a live reading in the box to the left of the screen while plugged in.
11. To run an experiment and collect data click “Run experiment”.
12. To end data collection early, click “Stop experiment”.

Tablet, smart phone device

Materials needed:

- 900-245 Infrared Temperature Sensor
- 900-268 WiFi module
- 900-215 Battery

Your infrared temperature sensor needs to be connected to a 900-268 module. The 900-268 module will create a closed Edu-Logger WiFi network which will stream the Edu-Logger data to a device of your choosing. Once your device is wirelessly connected to the Edu-Logger network you can run experiments and collect data through a browser of your choosing.

Procedure:

1. Connect the infrared temperature sensor directly to the left side 900-268 (no wires required).
2. Connect a 900-215 module to the right side of the 900-268 module.
3. Although not required, we recommend plugging the 900-215 to an outlet using a USB to mini USB charger (such as a typical cell phone charger). The 900-268 module will run for 15-75 minutes (depending on the sensor) without being plugged in.
4. The 900-268 can be powered directly using a mini to USB cord and plugging it into your computer or a wall charger. Please note this function is only available on 900-268 units with the USB icon on the cover.
5. For further 900-268 instructions or the 900-268 quick start guide please visit: www.edulab.com
6. The 900-268 indicator lights will flash; take no action until the LED to the far left turns blue; this can take up to one minute.
7. Take your tablet or smart phone, go to the WiFi settings and select the Edu-Logger network which matches the 900-268 Module ID found on the back of the 900-268 device. (Edu-LoggerXXXX for example).
8. Give your device about 20 seconds to connect to the 900-268.
9. Once the device is connected, go to your browser and type the website **wifi201.com** into the URL bar, then wait for 30-60 seconds.
10. You will see a “Control mode” icon in the browser, click on this icon.
11. The browser will then load a new screen and begin to auto detect the sensor(s); this can take a minute. (You can stop the search when the sensor is found.)

12. If the browser does not auto detect the sensor(s), select “Search for sensors”.
13. Once the sensor is found you will see an icon on the left side of the screen for the infrared temperature sensor. The icon will display real time data.
14. Click on the “Module setup” button located on the infrared temperature sensor icon in the module window to change the infrared temperature probe settings if need be.
15. Click on the experiment set up button to change the experiment settings if need be (Experiment duration for example).
16. To run an experiment and collect data, select “On-Line” experiment, then select "Run".
17. If you have a newer generation 900-268 (with the USB icon on the cover) this can be used as a 900-213, meaning you can tether the probes directly to the computer using the 900-268. To engage operation in this fashion, press 3 times on the panel key. Repeating this operation will return the unit to WiFi mode.

Operation with Edu-Logger viewer

Materials needed:

- 900-245 Infrared Temperature Sensor
- 900-272 Viewing Module
- 900-215 Battery

Procedure:

1. Connect the infrared temperature sensor to the left side of the viewer.
2. Connect the 900-215 module to the right side of the viewer.
3. The 900-272 will auto detect the sensor and you will see it appear on the left side of the screen.
4. Once the sensor appears it will be monitoring data in real time.

5. To run an experiment and collect data click the run button (little green person).

Off-line experiments

(Off-line experiments are for when you do not have a sensor connected directly to a computer, tablet, smartphone, or Edu-Logger viewer).

Materials needed:

- 900-245 Infrared Temperature Sensor
- 900-215 Battery

Materials needed to configure your offline experiment:

- 900-213 Module or 900-268 module or 900-272 Module
- USB to mini USB cable (included with the 900-213 module).

Procedure:

1. Connect the infrared temperature sensor directly to the left side of a charged 900-215 module.
2. When ready to collect data press the “Start/Stop” button on the infrared temperature sensor, a red light will turn on for the duration of the experiment.
3. To change the experiment settings first connect to your chosen device (PC, Mac, tablet, smart device) and select the “Module setup” button. (For more information on how to change the experiment settings view quick start procedure section for your chosen device in this document.)
4. After the experiment has concluded (when the “Start/Stop” button is pressed again or the data collection period ends) connect the sensor to your chosen device. (full instructions in each device’s quick start procedure section)
5. Open Edu-Logger software.

6. Click the “Off-line experiment” button.
7. Click the “Load data from sensors” button.
8. Select which experimental data to upload. (5 experimental runs can be stored at one time on the 900-245 infrared temperature sensor)

Restoring sensor’s factory default settings:

Procedure:

1. Connect the 900-213 to a PC, Mac, tablet, or smart device.
2. Connect the infrared temperature sensor to a 900-213 module (they directly plug together). Please note there is no calibration required for this sensor.
3. Open the Edu-Logger software.
4. Click the “Tools” icon.
5. Click the “Restore sensor’s factory defaults” on the menu.
6. If prompted to clear the graph, click either the “Off-line experiment” or “On-line experiment” (whichever you are using).
7. Click “Clear experiment results”.
8. Resume from step 4.

Included with sensor:

- Edu-Logger 900-245 Infrared Temperature Sensor Guide (this document).

Sensor specifications		
	Celsius	Fahrenheit
Range and operation modes	-30 to 382°C	-22 to 719°F
ADC resolution	13 bit	
Resolution	0.1°C	0.1°F

Max sample rate (S/sec)	100
------------------------------------	-----

Sensor features:

- Fully digital data.
- Rugged plastic ergonomic case.
- Push button switch for Start/Stop experiments in off line mode.
- LED indicator of experiment status (blinks while collecting data).
- Pre-calibrated sensing equipment.
- Internal thermopile detector to gather infrared light.

Note: Edu-Logger products are intended for educational use.

Videos and experiment examples:

- Videos, literature and other probes can be found at www.edulab.com

Technical background:

The philosophy behind Edu-Logger's plug and play technology is based on each sensor's ability to store its own data due to an internal flash memory chip and micro-controller in each plastic Edu-Logger body. This technology allows the sensor to collect and then store the digital data in the correct scientific units (°C, °F, Lux, %, ppm, for example).

The sensor is pre-calibrated at the factory. The built-in software in the logger can be upgraded at any time using software.

The Edu-Logger infrared sensor works on the phenomenon known as "black body radiation". As

molecules are heated up, they move much more rapidly and in turn put off more infrared radiation.

Inside the infrared sensor is a detector called a thermopile, which collects infrared light directed from the external lens. As the thermopile heats up an electrical current which flows through it encounters more resistance which scales with temperature changes. The resistance can easily be measured and then calculated back into a temperature value.

Maintenance and storage:

- Never submerge the Edu-Logger plastic body in any liquid.
- Do not allow liquid into the infrared temperature sensor's body.
- After use, gently wipe away any foreign material from the infrared temperature sensor.
- Store in a box at room temperature out of direct sunlight.

Warranty:

We promise to deliver our sensor free of defects in materials and workmanship for a period of 3 years from the date of purchase. Our warranty does not cover damage of the product caused by improper use, abuse, or incorrect storage. Sensors with a shelf life such as ion selective probes have a warranty of 1 year. Should you need to act upon the warranty please contact your distributor. Your sensor will be repaired or replaced.

Thank you for using Edu-Logger!

W: www.edulab.com

E: info@edulab.com

V10012013