Edu-Logger Galvanic Skin Response
Logger Sensor Guide
900-227

Edu-Logger galvanic skin response logger sensor 900-227

The Edu-Logger GSR sensor can be used for any science experiment or activity which utilizes the natural galvanic skin response (skin conductance) in the fields of biology, physiology, psychology, etc.

Galvanic skin response, or skin conductance, is a measure of the changes in the skin's conductivity due to a stimulus, whether it is a picture, smell, sound, touch, etc. Sweat glands are controlled by the sympathetic nervous system which release small amounts of sweat when a stimulus is sensed. This is how the GSR sensor can relate psycho-activity to sweat gland activity.

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

Hundreds of possible experimental subjects that can be done with the 900-227 sensors are: physiological and psychological relationships and responses to stimuli, human biology demonstrations, lie detection, and many more.

The GSR sensor uses the following units of measure:
- Micro Siemens (µS): A unit measuring electrical conductance.
- Arbitrary analog units (Arb): An arbitrary unit to demonstrate waves, frequencies, and periods.

Connecting to the GSR sensor:

The GSR sensor needs to form a strong connection to the skin in order to work properly. For better results, the skin should be clean and wet. Attached are two probes with Velcro finger connectors.   While conducting experiments, remain as still as possible for the best results.

1. Clean the bases of two fingers on the same hand with alcohol and wet them a little with water.
2. Wrap the Velcro connectors around the two bases of the fingers, securing as tightly as possible without causing discomfort.
3. For best results, ensure the flat metal piece on each Velcro connector is located on the underside of each finger.
4. Attach both the white and the black snap connectors (located on the end of the wire) to the Velcro finger connector by snapping to the exposed metal nub.
   Note: It does not matter which connector attaches to which finger.
5. You are now properly connected to the GSR sensor.

Quick start procedure:

PC or Mac Computer

Materials needed:

- 900-227 GSR Sensor
- 900-213 USB Module
- USB to mini USB cable (included with the 900-215 module)

Your GSR sensor needs to be connected to a 900-215 module. The 900-215 module then connects to a computer via a USB to mini-USB cable. Please note that you cannot plug the GSR sensor directly into a 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 GSR sensor to the 900-215 module (they directly plug together). Please note there is no calibration required for this sensor.
4. Open the Edu-Logger software.
5. Once a GSR sensor logo appears on the left side of the screen the probe has been automatically identified and you can begin experimentation.
6. If the GSR sensor is not automatically identified then click the "Search for sensors" icon to find the sensor.
7. Click on the "On-line experiment" button; this will open a graph below.
8. Click on the "Module setup" button located on the GSR 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 GSR 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:

- 900-227 GSR Sensor
- 900-268 WiFi module
- 900-215 Battery

Your GSR 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 GSR 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 GSR sensor. The icon will display real time data.

14. Click on the "Module setup" button located on the GSR sensor icon in the module window to change the GSR 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:

- 900-227 GSR Sensor
- 900-272 Graphic Display Module
- 900-215 Battery

Procedure:

1. Connect the GSR 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:

- 900-227 GSR Sensor
- 900-215 Battery

Materials needed to configure your offline experiment:

- 900-215 Module or 900-268 module or 900-272 Module
- USB to mini USB cable (included with the 900-215 module).

Procedure:

1. Connect the GSR 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 GSR 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 900-227 GSR sensor)

Restoring sensor's factory default settings:

Procedure:

1. Connect the 900-215 to a PC, Mac, tablet, or smart device.
2. Connect the GSR sensor to a 900-215 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 either" or "On-line experiment" (whichever you are using).
7. Click "Clear experiment results".
8. Resume from step 4.

Included with sensor:

- Edu-Logger 900-227 GSR sensor guide (this document).
- GSR probes attached by durable rubber-coated wires.
- Two white Velcro finger connectors.

Sensor specifications		
	μS	Arbitrary analog units
Range and operation modes	0 to 10	0 to 65279
ADC resolution	16 bit	
Resolution	0.01	1
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.
- GSR probes connected to the sensor body by durable rubber-coated wires.
  Note: Edu-Logger products are intended for educational use.

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 (^{o}C, ^{o}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 GSR sensor uses an internal very high impedance differential operational amplifier to convert micro changes in the skins resistance and conductivity into measurable voltage. This voltage is sampled by the sensor controller.

When a stimulus is sensed, the sympathetic nervous system reacts causing many physiological changes including releasing miniscule amounts of sweat from sweat glands. These small changes of the skin's moisture change the skin and tissue conductance, which is measured by the sensor.

10

Maintenance and storage:

- Never submerge the Edu-Logger plastic body in any liquid.
- Do not allow liquid into either the GSR sensor or probes.
- Wash hands prior to use for best results.
- After use, gently wipe away any foreign material from the GSR 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 proves 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