

SS3LA ELECTRODERMAL ACTIVITY (EDA) TRANSDUCER WITH REUSABLE ELECTRODES



The SS3LA transducer connects to a single MP3X/45 input channel to record electrodermal activity (changes in skin conductance) or, with modified setup, skin resistance*. The SS3LA operates by applying a fixed voltage (0.5 Volts DC) across the two electrodes and then detects the minute current flowing between the electrodes. Because the voltage (V) is fixed, from Ohms Law, the conductance (G) will be proportional to the current (I): $G = I/V = I/0.5 \text{ V}$. Circuitry in the SS3LA then converts the detected current to a voltage so it can be measured by the MP device. The software performs the necessary scaling and units conversion. Two reusable Ag-AgCl electrodes are mounted in individual, ergonomically designed, polyurethane housings for improved contact, attachable to the fingers by a Velcro strap. The electrodes have a 6 mm contact area with a 1.6 mm cavity to accommodate isotonic electrode gel (GEL101 or equivalent). The non-polarizable electrodes are shielded to minimize noise interference and improve recordings.

- See the SS57L EDA Lead for a disposable electrode option

USAGE RECOMMENDATIONS

Presets - BSL *PRO* (and AcqKnowledge software for MP36R) includes the following EDA presets:

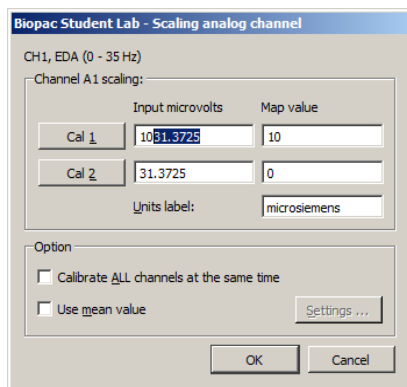
- Electrodermal Activity (EDA), 0-35 Hz; **requires calibration**—see details below
- Electrodermal Activity (EDA) Change; no calibration required (BSL *PRO* 4.0.3 and earlier only)

To navigate to the presets in the software, choose **MP > Set Up Data Acquisition** (BSL 4.1) or **Set Up Channels** (BSL 4.0.3 or earlier) > **Channels** > and select the desired EDA preset from the **Preset** pop-up menu.

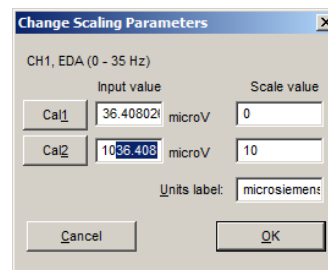
Single-point Calibration for (EDA) 0-35 Hz Preset

The following single-point calibration will yield very good results and is easy to perform:

1. Disconnect the electrodes.
2. Click “Setup” > “Scaling” button in the software’s EDA preset dialog.
3. Click the **Cal 2** button.
4. Add the new **Cal 2** value to the default **Cal 1** value (example below left, $1000 + 31.3725 = 1031.3725$). If the new **Cal 2** value is negative, then subtract that value from **Cal 1**.



BSL 4.x and AcqKnowledge 4.x EDA Scaling Dialog



Note that **Cal 1** and **Cal 2** values are reversed in software versions BSL 3.7.x and earlier.

BSL 3.7.x EDA Scaling Dialog

Two-point Calibration for (EDA) 0-35 Hz Preset

Two-point calibration offers the advantage of greater accuracy, but is a more complex procedure. To perform:

1. Prepare two 1% calibration resistors: 100 kilohm (10 microsiemens) and 1 megaohm (1 microsiemen). Insulate the resistor using clear tape such that when held, the fingers will not directly contact the resistor leads.
2. Place the 1 megaohm resistor such that one resistor lead contacts one electrode pad and the other resistor lead contacts the opposite electrode pad.
3. Click “Setup” > “Scaling” button in the software’s EDA preset setup dialog.

4. In the Scaling dialog box, set the **Cal 1 Scale value** to “1” and click **Cal 1**.
5. Repeat Step 2 using the 100 kilohm resistor.
6. In the Scaling dialog box, set the **Cal 2 Scale value** to “10” and click **Cal 2**.

If the file is now saved as a template (*.gtl), the calibration values will be maintained as long as the transducer is matched to the software each time it is used.

Verify - check the accuracy of the SS3LA:

1. Click **Start** to begin a recording.
2. Place an insulated 100 kilohm resistor (10 microsiemens) across the electrode pads (resistor must be insulated from fingers).
3. Click **Stop**.
4. Check the EDA value when the resistor was placed across the electrodes using measurements.
 - The software should produce a reading of 10 microsiemens (μsiemens).

Setup - There must be good electrical connections between the skin and the electrodes for EDA to work properly.

Gel - When using GEL101 isotonic gel it is important that the gel has a chance to be absorbed and make good contact before recording begins. Accordingly:

1. Apply GEL101 to the skin at the point of electrode contact and rub it in.
2. Fill the SS3LA electrode cavity with GEL101.
3. Attach the SS3LA electrode to the subject.
4. Wait 5 minutes (minimum) before starting to record data.

***Measuring skin resistance** - Use an Expression calculation channel to take reciprocal of conductance, and then apply proper scaling.

Tip



To detect a good signal, subjects should have a little sweat on their hands (not a lot, but enough so that their hands are not completely smooth or cold). If subjects wash their hands just prior to the recording or if they have been sitting in a cold room, then they must do something to activate the sweat glands before beginning calibration or recording. If subjects begin with colder hands, the scale will be diminished and the signal will be easily saturated once they “warm up” during the lesson.

CLEANING THE SS3LA TRANSDUCER

- The GEL should be immediately cleaned off the electrodes after each use. Dried gel will act as insulator preventing electrical contact with the skin, and the Ag-AgCl electrode disk could degrade quickly with time because of the porous electrode surface.
- To clean the electrodes, wet a cotton swab or toothbrush with water and remove the electrode gel. Always dry the electrodes after cleaning.
- If needed, use Hydrogen Peroxide solution (2-3%) to brighten electrode surface (optional) or to sterilize the electrode. Do not place the electrode in solution, but rather use a cotton swab or toothbrush. Dry the electrodes after cleaning.
- If a dark residue remains after the above cleaning methods are used, then a cleaner with pumice (such as Ajax) can be used on the wetted cotton swab or toothbrush.
- **Warning!** Use of a Waterpik® or similar jet will drastically shorten the life of these electrodes and is not recommended.

SS3LA SPECIFICATIONS

Electrode Type: Ag/AgCl, shielded

Excitation: 0.5 V DC

Range: 0.1-100 μsiemens (normal human range is 1-20 μsiemens)

Surface Area: 6 mm contact area

Gel Cavity Area 1.66 mm

Dimensions: 16 mm (long) × 17 mm (wide) × 8 mm (high)

Weight: 4.5 grams

Cable Length: 2 meters

Connector Type: 9 Pin DIN

Sterilizable: Yes (contact BIOPAC)