EDA ELECTRODERMAL ACTIVITY AMPLIFIER FOR MRI - EDA100C-MRI

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NEW! MRI Smart Amplifiers!

The MRI smart amplifiers incorporate advanced signal processing circuitry which removes spurious MRI artifact from the source physiological data. Signal processors are able to distinguish between physiological signal and MRI artifact as manifested by gradient switching during MRI sequences, such as Shim or EPI.

Because MRI-related transient artifact is removed at the source, the MRI version amplifier can be sampled at the same rate as during normal (non-MRI) physiological recording. There is no longer any requirement to over-sample the amplifier output to capture every nuance of MRI artifact to train secondary computer-based processing steps to remove such artifact.

In every aspect, data recording is easier and the final results are cleaner when using the MRI version amplifiers to record physiological data in the fMRI or MRI.

Features:
1) Less sensitivity to electrode and transducer lead placement
2) Improved gain selectability
3) No missing spectra in physiological signal frequency band
4) No requirement for acquisition oversampling
5) Minimizes computer-based real-time or post-processing signal processing
6) Clean data available as real-time analog output

The EDA100C-MRI measures both the skin conductance level (SCL) and skin conductance response (SCR) as they vary with sweat gland (eccrine) activity due to stress, arousal or emotional excitement. The EDA100C-MRI uses a constant voltage (0.5 V) technique to measure skin conductance. The controls allow selection of absolute (SCL+SCR) or relative (SCR) skin conductance measurements. MRI version amplifiers are compatible with MRI cable/filter sets.

Acq*Knowledge* includes a fully automated electrodermal response scoring tool that locates skin conductance responses, visually identifies them in the record and measures them. It also automates event related potentials (ERP) analysis by locating the onset of the stimuli and identifying a valid SCR. See the Applications > Psychophysiology Area for further information.

Each EDA100C-MRI amplifier requires one set of the following electrode combinations:

- 2 x LEAD108B 15 cm or LEAD108C 30 cm MRI-compatible Leads (recommended)
- 2 x EL508 or EL509 disposable radio-translucent Electrodes (recommended)

or

- 1 x TSD203 Ag-AgCl Skin Resistance Transducer
- 1 x GEL101 Electrodermal Gel

or

- 2 x EL258 Ag-AgCl Lead Electrodes
- 1 x ADD208 Adhesive Disks

- 1 GEL101 Electrodermal Gel

IMPORTANT! See **Safety Guidelines** for recording biopotential measurements in the MRI environment.

Usage Recommendations

When using the EL508 wait 5 minutes (minumum) before starting to record data.
When using GEL101 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 TSD203 electrode cavity with GEL101.
3. Attach the TSD203 electrode to the subject.
4. Wait 5 minutes (minimum) before starting to record data.

Calibration

To set up Acq*Knowledge* to record skin conductance directly, perform the following:

Lower frequency response at DC

In the scaling window, set the input voltages so they map to the DC conductance ranges indicated by the sensitivity setting. For example, if the EDA100C-MRI is set to a Gain of 5 μmho/V, then 0V will map to 0 μmhos or infinite resistance and 1V will map to 5μmho or 200kohm.

Lower frequency response at 0.05 Hz

In the scaling window, set the input voltages so they map to the 0.05Hz conductance ranges indicated by the sensitivity setting. For example if the EDA100C-MRI is set to a Gain of 5 μmho/V, then 0V will map to X μmhos and 1 V will map to (X+5) μmhos, where X is the mean conductance being recorded.

To verify the Gain setting of the EDA100C-MRI:

1. Calibrate Acq*Knowledge* as detailed above for lower frequency response at DC.
2. Place the lower frequency response to DC.
3. Set the Gain switch on the EDA100C-MRI to 5 μmho/V.
4. Perform measurement with electrodes disconnected.
    - Acq*Knowledge* should produce a reading of 0 μmho.
5. Insulate a 100 kohm resistor and place it from electrode pad to electrode pad (resistor must be insulated from fingers.
6. Perform measurement with electrode-resistor setup.
    - Acq*Knowledge* should produce a reading of 10 μmho.

Applications

- Psychophysiology

SPECIFICATIONS | RECOMMENDED ITEMS | KNOWLEDGE BASE | RESOURCES

Gain:	20, 10, 5, 2 μsiemens/volt (i.e. μmhos/volt)
Low Pass Filter:	1 Hz, 10 Hz
High Pass Filter:	DC, 0.05 Hz, 0.5 Hz
Sensitivity:	0.7 nano-siemens (with MP System)
Constant Voltage Excitation:	Vex = 0.5 VDC
Output Range:	±10 V full range (analog); 0-10 V nominal range
INPUT SIGNAL RANGE	

Gain	Range (μmho)
20	0-200
10	0-100
5	0-50
2	0-20

Note: Normal human range is 1-50 μmho.

Unit Note—BIOPAC software calculates SCL/SCR in μmho, the traditional unit of conductance. Micromho (μmho) is interchangeable with the alternative microsiemen (μS). To use Ohm, the traditional measure of *resistance*, convert as 1 μmho equals 1,000,000 ohm.