



MINDFIELD®
eSense
SKIN RESPONSE

MANUAL

User manual | Biofeedback-training | eSense-App | Electrodes

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Delivery contents

- Mindfield® eSense Skin Response Sensor
- 2 Velcro electrodes (and 2 spare-electrodes)
- eSense app from Mindfield (Apple App Store, Google Play or Amazon App-Store)
- Detailed instruction for efficient biofeedback training



Delivery Contents eSense Skin Response

Skin response in general

Skin response, also known as galvanic skin response (GSR), electrodermal response (EDR) or skin conductance (SC) is a measurement method based on bio-electrical properties of the skin. The skin conductance depends on the activity of the sweat glands of the skin and reacts to the smallest changes, which we can't detect as wet hands yet. The eSense Skin Response applies a very small, safe and unnoticeable electrical voltage, which results in an electrical current to the skin. Through the changes of this small current, we can measure the activity of the perspiration glands of the skin far below the threshold of self-perception. The higher the activity of the sweat glands, the more the skin gets wet and the better the current is conducted. As a result, the Skin Conductance rises.

The Skin Response measures the Skin Conductance in Micro Siemens or μ Siemens. Skin conductance is measured in μ Siemens or symbolized as μ S (where μ denotes a millionth and Siemens is the unit of conductance). "Skin resistance" is also a common term, simply denoting the inverse of conductance ($1S = 1/\Omega$).

The activity of the perspiration glands is determined by the autonomic nervous system, which contains two major subunits: the parasympathetic nervous system and the sympathetic nervous system. The perspiration glands of the skin are solely controlled by the sympathetic nervous system, making them a good indicator for inner strain and stress. The sympathetic nervous system reacts to stress stimuli by activating all the "emergency functions" of the body, bringing it to a state of heightened responsiveness: Pulse and blood pressure rise along with the glucose level in the blood and general alertness. With these changes comes the effect of "wet hands" on which our measurement relies.

We all know a time in our lives when we got wet hands. Think of the speech you gave in front of an audience, or a job interview. If in those situations you were excited, can you remember the cold, sweaty hands?

A scientific theory for this effect assumes that our ancestors needed wet hands to have a firmer grip on things; for example, in an escape or pursuit through difficult terrain. When the threatening situation is over, the parasympathetic nervous system becomes dominant: Pulse, blood pressure and glucose level fall again. The body enters a rest state to allow recuperation. The hands become dry again.

The increased activity of the perspiration glands through a (stress) stimulus is easily visible through the associated increase in skin conductance. The stimulus can be mental or emotional strain, or taking a sudden, deep breath, or a startling action like someone unexpectedly clapping hands or the loud drop of an item onto the floor. Just try it with the eSense - you will easily see the effects!

Skin response and biofeedback training

Stress and its vegetative symptoms can be greatly reduced through biofeedback training, where you intentionally work on **lowering** your skin response.

Skin response is a universal tool for biofeedback training. It is widely used in the therapy of anxiety, panic disorders and specific phobias. Further fields of use are high blood pressure, tinnitus and sleep disorders. If you suffer from a serious disorder or medical condition, always consult a professional physician or therapist, and do not attempt to treat yourself. The eSense Skin Response is not a medical device and may only be used for stress reduction training.

The Skin Response is a precise device. It can measure the smallest changes which would be impossible to recognize yourself. Have a look at the following example of a measurement to see how insightful the results are:



Example measurement curve eSense Skin Response with several, clearly visible peaks because of stressors. The peaks are recognized and colored by the app.

Measurements are done by placing two electrodes on two fingertips of the same hand. The dark-colored lower side of the electrode should be in good skin contact. Other positions for the electrodes and other electrode-types are possible as well.

The goal of the feedback training is twofold: A reduction of the permanent, basic level of stress and a reduction of the immediate stress response to a particular stimulus. A

biofeedback training consists of four training stages. Schedule for the first training about 60 to 90 minutes of free time in which you can conduct the training undisturbed and flexibly.

It must also be differentiated between different types of stress. There is “bad stress,” distress, and there is “good stress,” eustress. You need to ask yourself if you are stressed because you feel overwhelmed and are angry about something or because you are upset. Or are you “stressed” because you are full of drive and are excited? In both cases, the eSense Skin Response shows elevated values. However, in the first case, this is to be judged negatively. In the second case, you can simply enjoy and use the active or euphoric state.

Skin Conductance Response (SCR)

The Skin Conductance contains two components: the tonic, static “**level**” and the phasic, fluctuating “**reactions**”, and these components are usually designated as Skin Conductance Responses (SCR).

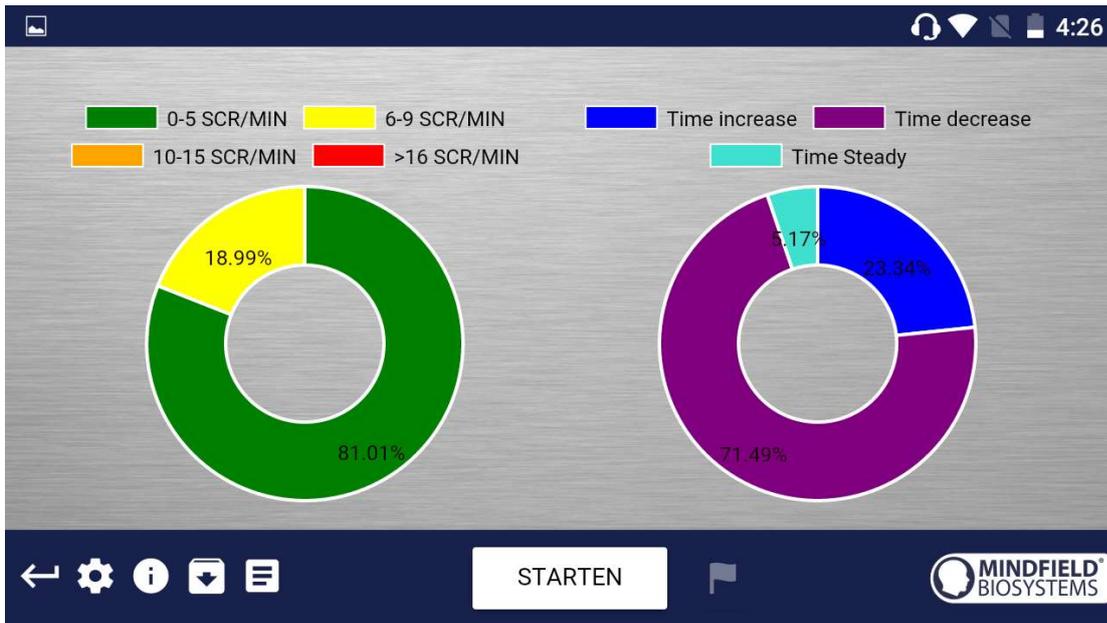
While the “level” is represented well in the average of the measured values, the eSense Skin Response also measures the amount of Skin Conductance Response (SCR) per minute. In general, a higher number of SCR per minute is an indicator for higher stress. Value from experience which is in alignment with scientific literature¹ suggests that a “relaxed” frame is between 0 and 5 SRC per minute. From 6-9 SRC/min starts an animated state. From 10 or even from 16 SRC/min, a level of stress or even high stress can be assumed.

The SCR are great for comparing biofeedback-sessions to each other. If your goal for training is a reduction of stress, then the amount of SRC/min should decrease over several sessions. In the archive of the app, you can compare the different sessions to each other.

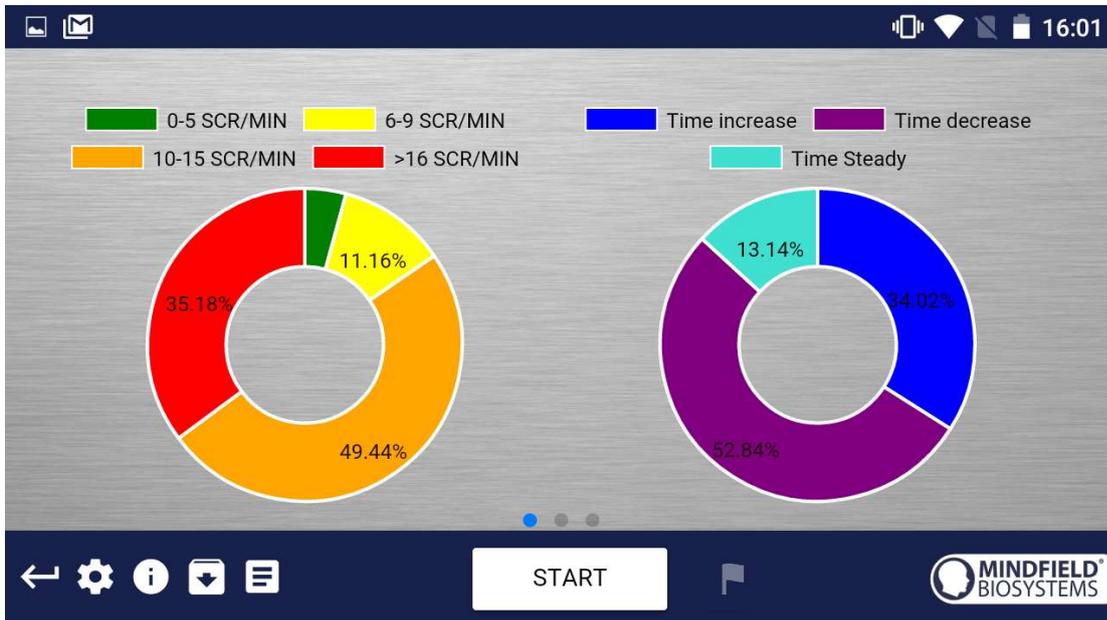
The average value in μS of a session is an indicator for the “level,” hence how high your basis level of tension or relaxation is. You should also try to lower this while you are doing stress reduction training. The average value also takes the SCR into consideration and is falsified with many SRC/min. You should, therefore, use as quiet a frame as possible without any SCR to determine your own “stress level” in μS .

We have colored the SRC/min in the eSense app. Low SRC are green or yellow and high SRC/min are orange or red. While making a measurement, the recognized SRC are colored within the curve. Two examples from our app:

¹ Boucsein, W. B. (2011). *Electrodermal Activity* (2. Aufl.). Berlin, Deutschland: Springer.



Example of a measurement in a relaxed state with little SRC/min (green and yellow)

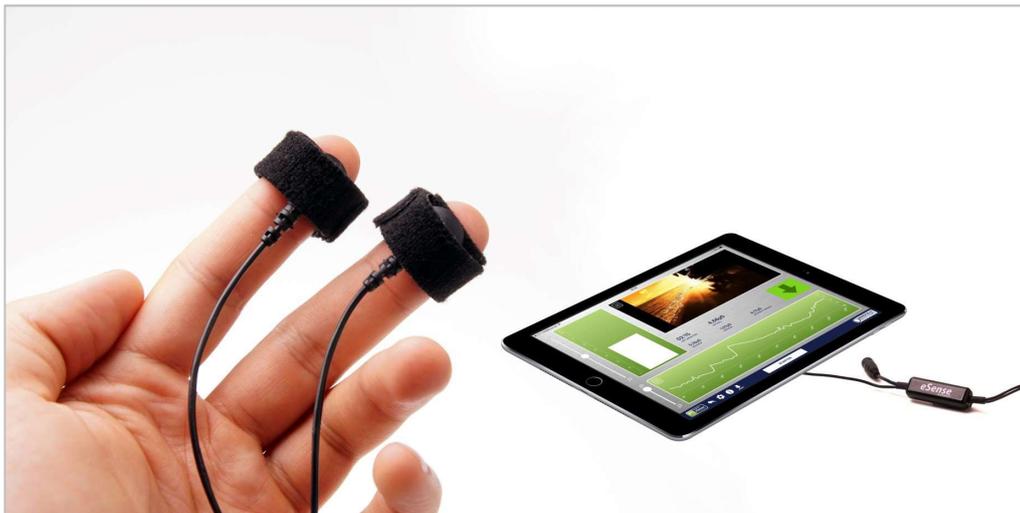


Example of a measurement in a stressed state with more SRC/min (orange and red)

In the right diagram, there is also the time in which the values rise, fall or have been steady. With rising stress, the curve rises more often and longer than it keeps steady or falls. This is also an ideal parameter to analyze and to compare biofeedback sessions.

Process of a training

1. To create the conditions needed for successful training, find a quiet, comfortable room with appropriate temperature; don't have a phone with you during the training; remove sources of distraction from the room; use convenient seating; and wear comfortable clothing. You should avoid all conditions that can make you sweat out of purely physical reasons, like intense physical activity before training or intense sunlight and heat. This could falsify your measured values. To obtain comparable results, you should try to keep your initial and ambient conditions constant through the series of training sessions.
2. Wrap the two electrodes around the upper or middle phalanges of your index and middle finger of the same hand. The dark lower side of the electrodes shall be in good skin contact. Using the non-dominant hand is advisable (e.g. the left hand for right handed people) because the skin tends to be a little less callused there. Attach the cables and wrap the tape another time around their clips to ensure a firm contact.



eSense Skin Response in use with a tablet

3. You should neither tape the electrodes too firmly where you would block blood circulation, nor too weakly so as to let them slip and move around. Put your hand down onto a comfortable support where it can rest.
4. Start the application and have a first glance of the values. If they are below $1\mu\text{S}$, the electrical contact through the clip is bad, or your skin is dry and maybe callused. Check the contact clips, or change your hand or the position of the electrodes if necessary. If the conductance is permanently bad, we have listed

several tips in the FAQ for the eSense Skin Response to improve the conductance. **Usually gel electrodes are necessary.** Don't continue with the training if the values are below $1\mu\text{S}$ and solve the cause first.

5. In comparison with other biofeedback techniques, you will need fewer sessions for a reliable success. 6-10 sessions should be sufficient. To keep focused throughout the entire session, you should limit each session's length to about 30 minutes. If you start feeling tired while training, you should shorten your sessions and practice more often instead.
6. For the interpretation of the measurement, we distinguish between "tonic" and "phasal" effects. The tonic component is the longer-term average of skin conductance and its development during one session. Values for the tonic level can vary between 1 to $15\mu\text{S}$, depending on the individual and the situation.

In contrast, rapid changes (in the app, fluctuations are called SCR [Skin Conductance Responses]) of skin conductance, often caused by a sudden stimulus but also appearing spontaneously, are the phasal component of the skin response. The stimulus can appear spontaneous or as a reaction to a stimulus. The cause of a phasal effect can be internal (thoughts, memories, and emotions), or external (images, sounds, and events).

7. In a state of heightened excitation, both the general tonic level and the rate of spontaneous fluctuations is increased. With low excitation and rest comes a lower tonic level and fewer spontaneous fluctuations.



Example for a situation with rising stress



Example of a phase with relaxation

First stage (observe and experiment; determine your initial status)

1. Record your baseline state for ten minutes at rest without influencing the measurement. Relax as best as you can and do NOT watch the measured values for the whole ten minutes, as it would compromise a true baseline measurement.
2. Have a look at the complete curve and its average tonic level after the first ten minutes. Does it rise or fall in certain phases, or is the general level constant throughout the measurement? How would you judge your ability to relax during the exercise? Maybe you can already find dependencies between the objective measurement and your subjective feelings of relaxation or excitation. If you find no connection, don't worry; you will find a connection during the sessions to come. Keep notes on the general level of the curve and the approximate number of fluctuations per minute to know your initial training status. Both of those values are shown above the graph.



Example of a measurement curve (after 5 minutes duration the background is colored)

3. After completing the ten-minute baseline, you will be shown a survey first. Answer the questions and take notes if necessary. Then you'll see the pie charts that show you the fluctuations per minute (in the best case, everything is green) and how often the readings have risen, stayed the same, and dropped. There's more on this topic later.

4. This is your initial training state. Of course, the day also plays a role here: it should make a difference whether you measure after a stressful working day (or even at work) or at the end of a relaxing weekend. **Use the corresponding function of the app to export this baseline as a CSV file. You can do this by calling the measurement in the archive. This will allow you to access your baseline later (in addition to the archive) by other ways (such as Excel).**
5. One more note: If the readings continue to increase for no apparent reason, the electrodes may be too tight and may simply be the cause of sweating underneath. This moisture should be noticeable.

Second stage (targeted Biofeedback training with the skin response)

1. The second stage consists of multiple sessions. These sessions should always follow the following scheme. You shall now exercise conscious relaxation with the feedback signal.
2. Start the measurement and watch the values for a while. Then try to bring them down through active, conscious intervention. There are many ways to do this, such as breathing in a controlled and calm pattern, using techniques of muscle relaxation or autosuggestion. The exact way is up to you, your knowledge on relaxation and your will to experiment. Also observe small changes in the measured values. A part of the training focuses on the general reduction of the tonic skin conductance level, while a second part focuses on the reduction of the fluctuations.
3. Both the intensity of a stimulus and its subjective significance will influence the amplitude of the consecutive skin response. The stimulus can be internal in nature (thoughts, memories and emotions), or external (images, sounds and events). Inevitably, it will happen to you that you feel less able to relax; for example, because of negative thoughts. If you notice a rising skin response as a result, try to bring it down again. Taking a deep breath brings up the skin response as well, so try to bring it down again.
4. In the second training phase, the aim is to lower the general level of skin conductance and reduce the increase as a result of a stimulus as quickly as possible. They train to reduce their general tension and be able to switch off flexibly after stressful situations. In the app, you should decrease the average of your sessions and the number of fluctuations (SCR / min and total SCR).

Third stage (deliberate provocation, relaxation and stress coping)

1. We will now actively use stress stimuli (stressors) to improve your ability to deal with them. Skin conductance biofeedback is particularly suitable for the use of targeted provocation methods because it shows a timely and sensitive response to a stimulus, and because this response is also proportional to the strength and significance of the stimulus.
2. Start the measurement and watch your readings for a while. Then try to relax. The training starts with a rest period of a few minutes.
3. Now a selective stressor should be applied. This can be a certain thought, sound or image with a negative connotation. Almost every person knows certain things or situations that distress themselves. For example, if you have trouble speaking out loud before a larger group of people, try to imagine the situation and hold a speech before them. Under the influence of such a stressor, you are likely to see a surge in skin response. Try to relax to bring it down again and reduce the spontaneous fluctuations.
4. Alternate phases of relaxation and stress stimuli during the session. After three or four rounds, you should finish the session with a relaxation phase. Also, don't overstrain yourself. Perform multiple sessions over a longer period of time until you have the impression that your stress response is significantly reduced, or you recover quicker after a stressful situation.

Fourth stage (transfer; relaxation without feedback)

1. Now you can check if you can achieve improved relaxation with lower skin response levels and less fluctuations, even without feedback. Record a ten-minute baseline WITHOUT watching the measurement while relaxing as best as you can. Afterwards, compare it to the baseline measurement from the first stage. Your overall level of skin conductance should have dropped, and/or the spontaneous fluctuations should have reduced. Your daily condition can affect the measurement a lot, so repeat the record of the baseline later again if you feel you had an unusual day.
2. As a more challenging transfer exercise, exert stress stimuli on yourself as you did in the third stage, but this time WITHOUT looking at your values. Try to maintain your relaxed state and check afterwards if you succeeded. Have you been able to keep your skin conductance comparatively low and limit the amount of fluctuations, even without the immediate feedback by looking at the

values? If you're able to do this, and your baseline has also dropped in comparison to the first stage, you have successfully completed the stress reduction training. When you encounter stress situations in everyday life, recall the training situation, and use your new skills to stay relaxed. Skill comes with practice!

3. Our eSense app offers not only the free training but also procedures. These are ready-made training programs that you can customize according to your wishes. For the best comparability of training sessions, these should always be performed under identical conditions (same time of day, electrode position and type) and of approximately identical duration. The procedures are a great help. For more information, see the relevant section of this manual.

Functions of the Mindfield eSense App

The eSense comes with the eSense app which you can load for free in the Google Play Store (Android), Apple App Store (iOS) or Amazon App Store.

It offers a wealth of features for effective biofeedback training in a modern design. Essential functions are: the display of measured values as a bar graph, an oscilloscope, feedback via video, music, sound, vibration, and smart bulbs (Magic Blue and Philips Hue). You receive a comprehensive evaluation after each measurement and can compare measurements with each other in the archive and export them as CSV files.

The app is available in English, German, Spanish, French, Italian, Portuguese, Ukrainian, Russian, Turkish, Dutch, Japanese and Chinese. The language is chosen automatically according to the set language of the smartphone or tablet.

Download Links

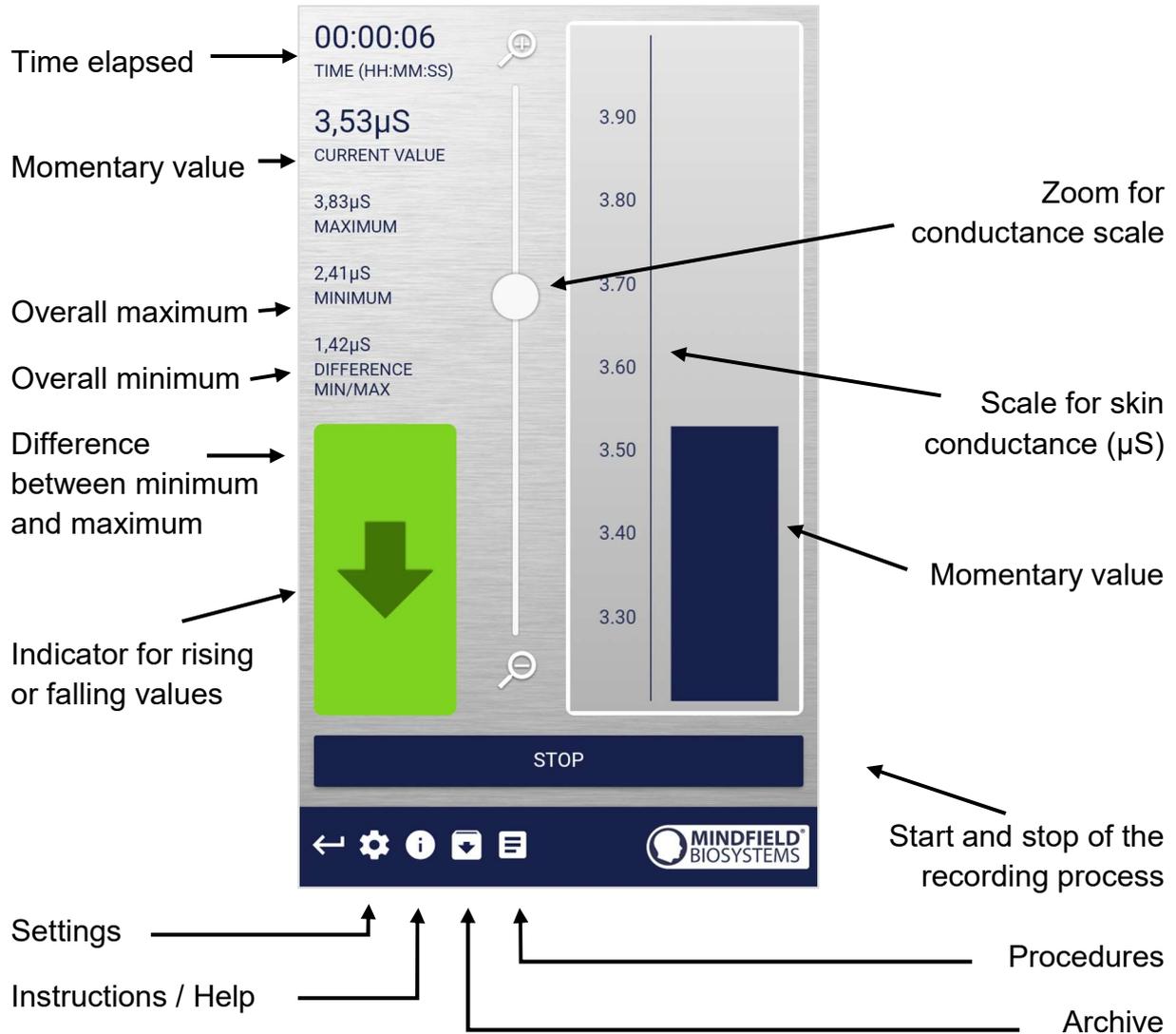


iOS: <https://itunes.apple.com/us/app/mindfield-esense/id1141032160?mt=8>

Android: <https://play.google.com/store/apps/details?id=com.mindfield.boisystem.esense>

Amazon: <https://www.amazon.com/dp/B073VPZ97R>

General view



Absolute decrease of measured values Current SRC pro Minute
 Absolute increase of measured values % of SRC of session

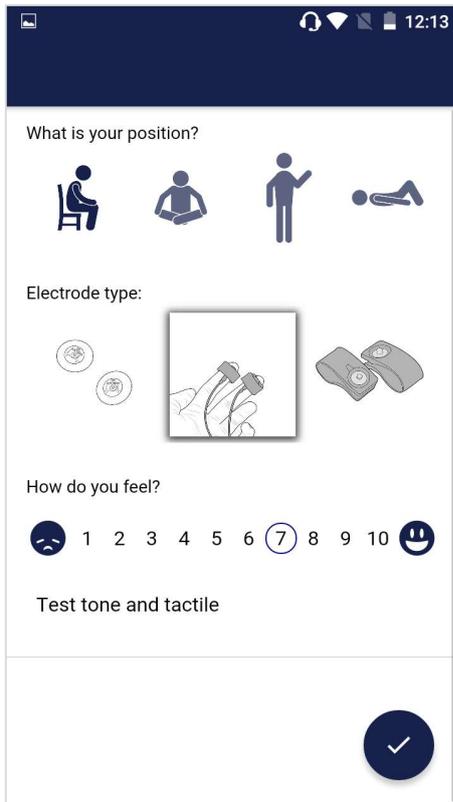


→
 ← Set marker

Swipe the screen to the left or right to change between this main screen and the video view. After the measurement, you can also switch to the pie charts.

Survey (optional)

If you have toggled this option on in the settings, a survey will appear after each measurement. This enables you to archive reproducible measurements and to document changes in your measurements (for instance, if you change the electrodes type or if you start to use the eSense while you are lying down instead of sitting).



What is your position?

Choose between sitting, legged/yoga sitting, standing or laid.

Electrode type

The first image represents the gel electrodes, the second image represents the Velcro electrodes, and the third image represents the EDA finger clips.

How do you feel?

Here you set your mood after the session. This enables you to save your mood in connection with the measurements for the long term.

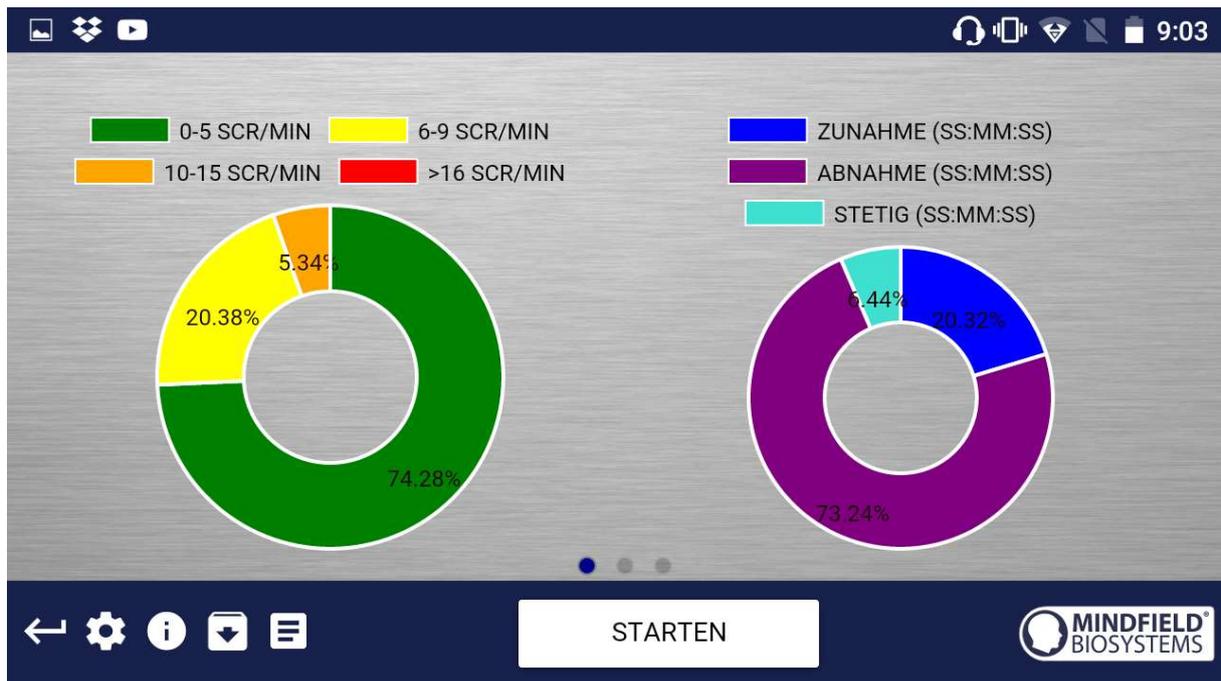
Note (here “Test tone and tactile”)

Here you can simply note a free text to the measurement. We suggest noting down special circumstances so that you can classify measurements with a lot of stress or relaxation even much later in time.

Pie charts (after a measurement)

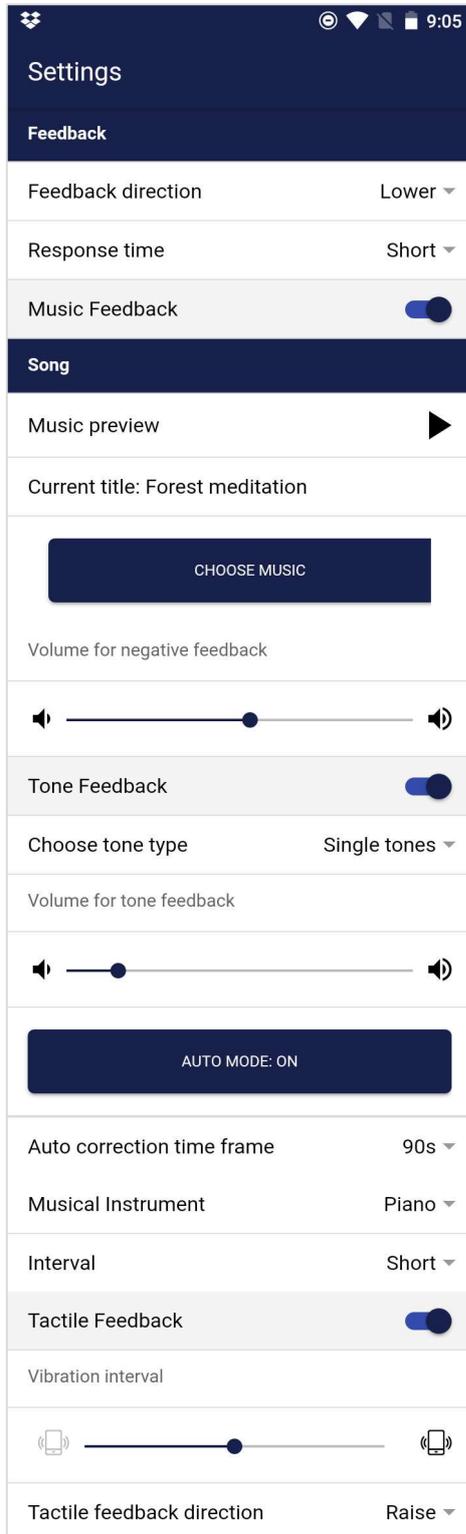
After the measurement (and optional survey), in the landscape mode, a survey appears with two pie charts: one shows your SCR while your measurement and another shows the time proportions of rising, falling or steady values (see screenshot).

Here you can also swipe the screen to the left or right to change between the pie chart and the graph of your measurement.



Both pie charts after a measurement

Settings (Overview)



Feedback Direction

Decide if rising (“raise”) or falling (“lower”) values should count as success for the feedback. The default-setting is short, which makes the feedback change fast to changes in the values. For longer measurements, we recommend middle or long, then the reaction time is a bit delayed and the eSense doesn’t react to the smallest change of the values anymore.

Response time

Adjust how sensitive and quick the feedback will react to a changing direction (rising or falling) of the values.

Music Feedback

Volume for negative Feedback: When values move in the wrong direction, the sound becomes quieter.

Music Preview

Tab the play button to listen to the chosen song.

Choose music

You can choose default or your own music.

Volume for negative feedback

Set the volume for the music.

Tone Feedback

You can always hear sounds from other apps in the background.

Choose tone type

You can choose between a single or continuous tone.

Auto Mode

If this is activated, the range of values in which the tones are changing are adjusted automatically. The minimum- and maximum-value of the set correction frame is used automatically for the lower and upper border for the following interval.

Auto correction time frame

(just visible if the auto mode is activated)

You can set the time frame in which the auto mode adjusts itself.

Musical instrument

You can choose from several pre-installed instruments.

Interval

Set an interval for the tone feedback.

Tactile Feedback

Your device will vibrate as feedback.

Tactile Feedback Direction

Decide if rising (“raise”) or falling (“lower”) values should count as success for the feedback.

Smart bulb feedback	<input checked="" type="checkbox"/>
Choose a bulb	Philips Hue ▾
Hue is not configured yet, please tap on the button below to configure Hue:	
<input type="button" value="CHANGE HUE SETTINGS"/>	
Hue brightness level	
	
Range for white bulbs (see Smartbulb FAQ)	
	
<input type="button" value="AUTO MODE: ON"/>	
Auto correction time frame	90s ▾
Lower range color	
Upper range color	
Video	
	
Video	Burning Wood ▾
General	
Session name:	Messung
Time length X-Axis	90s ▾
Decimal separator	Comma ▾
Sample Rate (CSV Export)	1Hz ▾
Survey after recording	<input checked="" type="checkbox"/>
SCR Feedback	<input checked="" type="checkbox"/>

Smart bulb feedback

The smart bulb will change its color, depending on what the values are.

Choose a bulb

You can choose between the Philips Hue and the Magic Blue.

Change Hue Settings

Adjust the settings for the Hue Bridge and Bulb.

Hue brightness level

Adjust the brightness level of the smart bulb.

Value range from-to

(not visible if the auto mode is activated)

Adjust the value range in which the bulb feedback is active. We suggest setting the range wide in the beginning and making it smaller over time if necessary. Alternatively, you can also choose the auto mode.

Auto Mode

When toggled on, the value range in which the light changes is set automatically. The minimum- and maximum-value of the set correction frame is used automatically for the lower and upper border for the following interval.

Auto correction time frame

(just visible if the auto mode is activated)

You can set the time frame in which the auto mode adjusts itself.

Video

Select: In the Dropdown Menu, you can choose also "Custom". You can choose your own videos from the hard drive of your device.

Session name

Set the shown name of the measurements in the archive.

Time length X-Axis

You can set the time frame which is shown on the graph while measuring.

Decimal separator

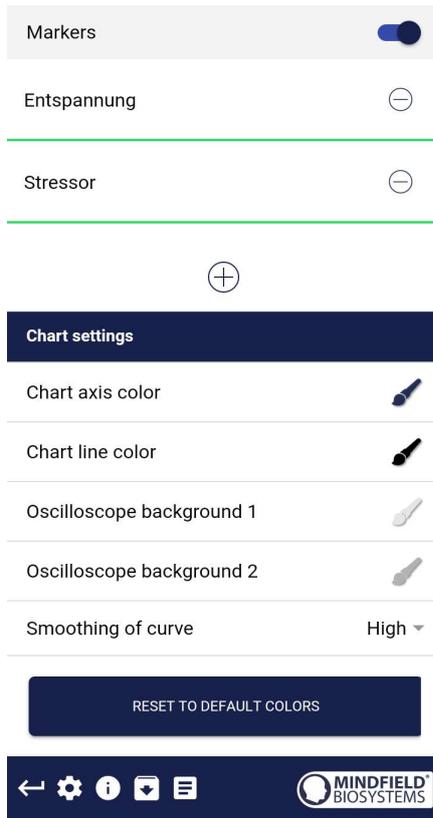
You can choose between point or comma.

Sample Rate (CSV Export)

This determines how many values per second are recorded. More values (a higher value of Hz) creates more detailed data, but also increases the size of the download file.

Survey after recording

Here you can toggle the survey (position, electrode type, mood, note) on or off after each measurement.



SRC Feedback

Activate the coloring for the graph in the oscilloscope while your measurement (green, yellow, orange and red) according to your SRC.

Markers

If toggled on, you can add markers by tapping the “+” button. Those are the markers you can then choose while a measurement (see “set markers” in the general view in the landscape mode above).

Chart settings

You can change the colors of the chart and oscilloscope in the general view.

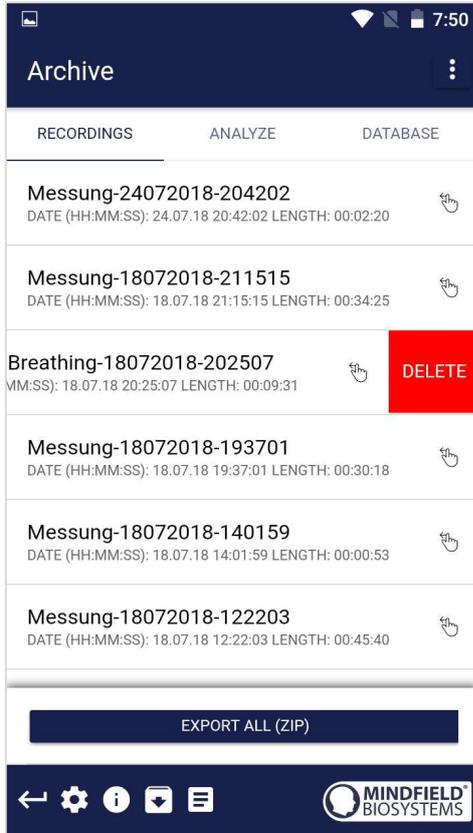
Smoothing of curve

The peaks of the curve are smoothed out if set to High or Middle. The curve is not altered when set to None.

Reset to default colors

You can at any time go back to the default colors of the chart in the general view.

Archive (overview)



The app also contains an archive, in which you can save your measurements and export them as well. You can watch those in detail again, compare them to each other and export them individual or all together (as ZIP file).

Recordings

You can see the measurements listed here. You can see an individual measurement by tapping on it.

To select certain measurements and compare them in the Analyze tab, tap on the 3 points in the upper right corner and choose "Select".

If you want to delete a measurement from this list, you can swipe it to the left (shown from the third measurement).

In the lower area, you see the button to export all measurements as compressed ZIP-data.



Analyze

Here all measurements are listed according to the following factors:

Time, Average of Session μ S, Minimum μ S, Maximum μ S, Difference Min/Max μ S, Time Increase, Time Decrease, Total SCR, % of SCR of Session.

With this, you can recognize trends over time and over several measurements (if, for example, your % of SCR of Session decreases by regular training, you can see this here at a glance).

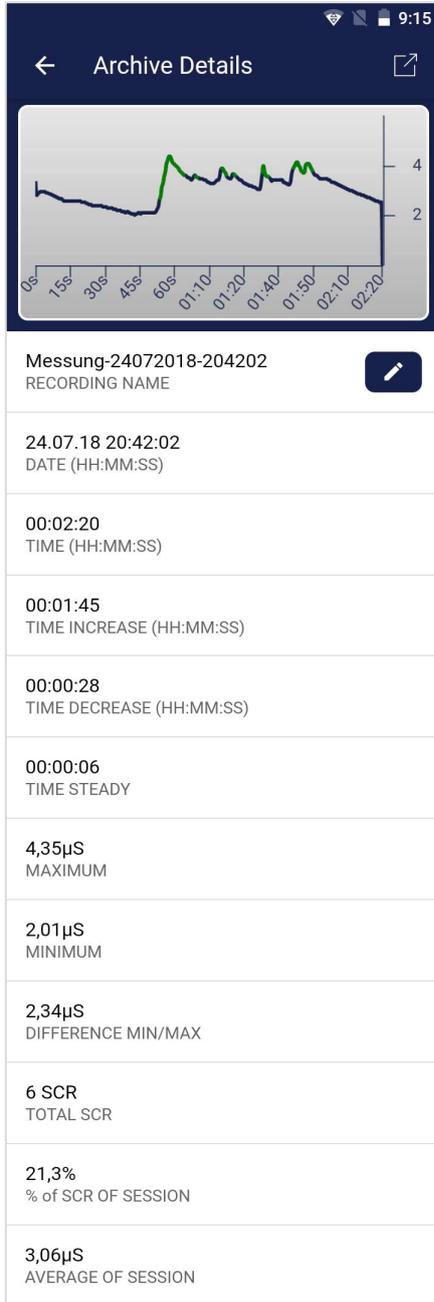


Database

You can import and export all measurements as a database (.sql-file). The database is saved locally on the device and can be imported at a later point; for example, in the case of a fresh installation of the app. We will add another option of an online backup of the database with an update of the eSense app in the future.

This option is just available under Android right now and will be also available for iOS in the future.

Archiv (individual view)



Export data

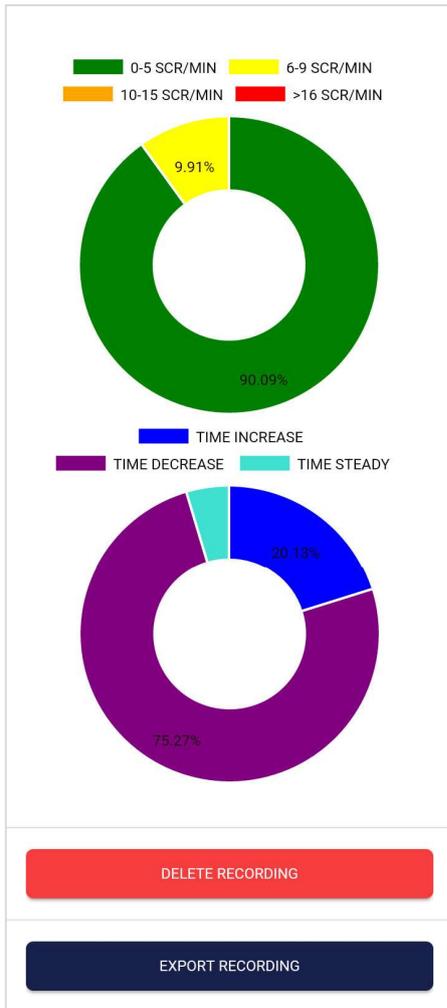
If you click on the export symbol on the top right, you can export the measurements as a .csv-file with all common apps (for instance, send over the Messenger, WhatsApp, email, etc.) or simply save them on your device or in your cloud.

The data are exported as a.csv-file (comma separated values). This format can be opened with Microsoft Excel or Open Office Calc (for free).

If you like to work with Google, Google Sheets can be an alternative to Excel for you. You can open your exported .csv-files, visualize and access them via the cloud easily from several devices. Google Sheets has almost the same functions and interface as Excel.

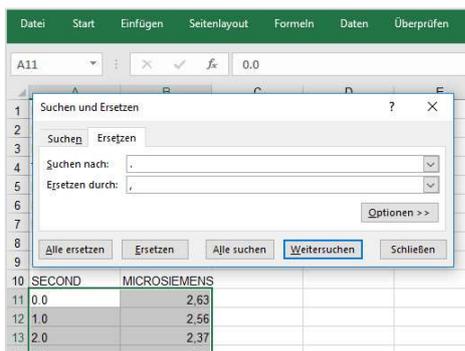
Notice: We have also created a detailed guide for the CSV export and the processing of your data in a separate guide. This can be found under the following link:

<http://mindfield.de/esense-csv-guide>



SRC

You can see the SRC of the measurement here as well. Both pie charts are the same as those that you see right after the measurement. You can find more information in the chapter about Skin Conductance Response (SCR) in this manual.

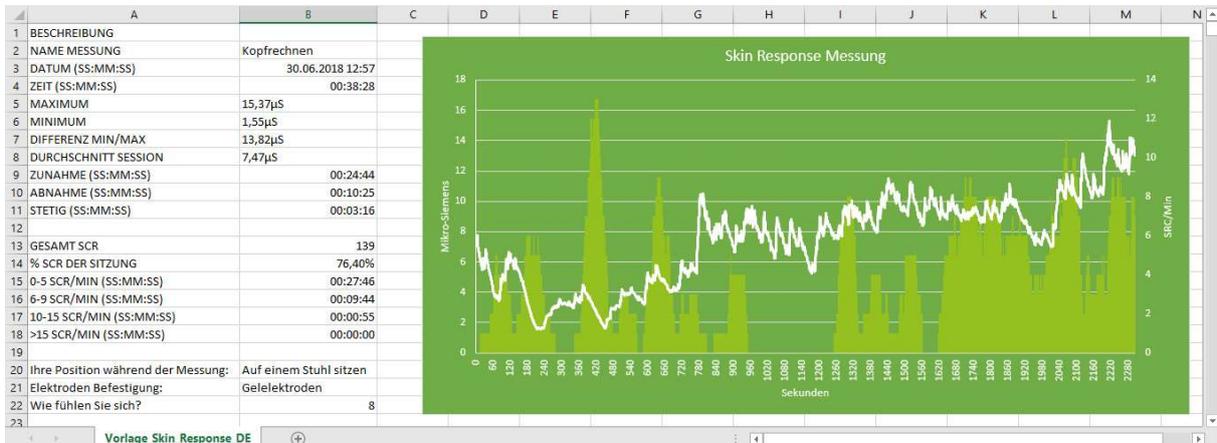


In Excel™ or Google Sheets™

Notice: If you open the .csv-file with Excel™ (or Google Sheets™) and your values make no sense, then there is usually a different set language in the eSense App and Excel™ and Sheets™.

Notice: We have also created a detailed guide for the CSV export and the processing of your data in a separate guide. This can be found under the following link:

<http://mindfield.de/esense-csv-guide>

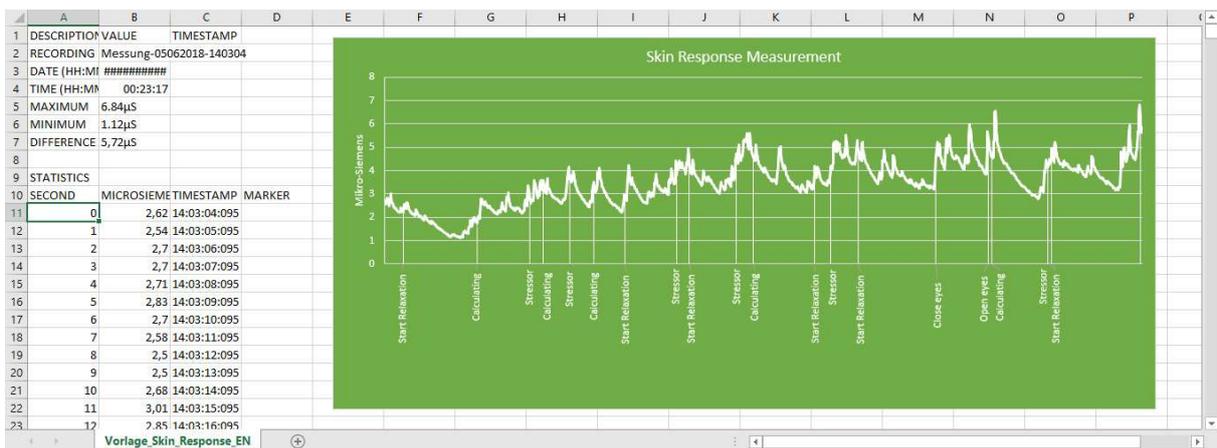


Exported data in Excel with SRC/min in the background (green bars)

Marker feature

You can also set markers while you make measurements. For example, if you have a regular biofeedback exercise which involves breathing calmly at a specific point, you can set a marker in that moment when you breathe calmly. Later in the exported data, you can see the moment where you had breathed calmly. The marker feature comes in handy when you are making longer measurements with several actions.

The markers can be displayed well in Excel:



Exported measurement in Excel with markers

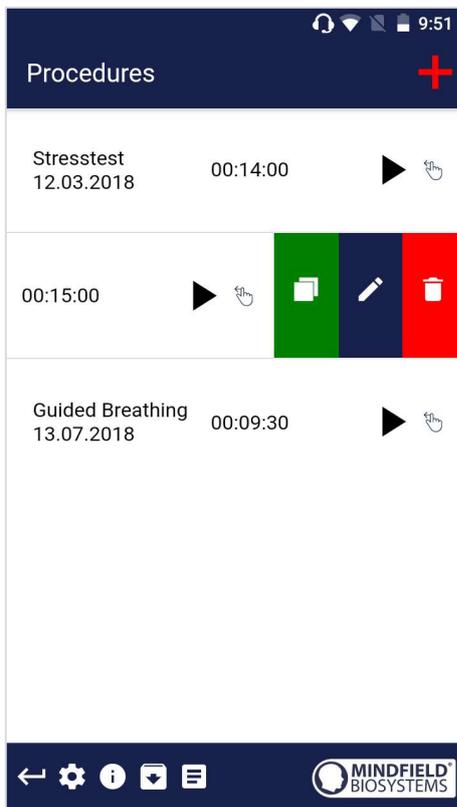
Procedures

A procedure consists of several assembled modules. With this new feature, you can build the perfect individual relaxation guide, do a stress test, use it for pre-defined biofeedback training or use it for research.

There are many possibilities. During a procedure, your skin response or temperature (depending on the eSense sensor you have) will be recorded, and after the recording is made, you can see your results for each module and in total.

We suggest you test the demo-procedures which are included in the app. Those will give you a guided overview of the different modules and functions of the procedures.

Procedures Settings



Edit or delete procedure

To edit a procedure, simply swipe it to the left in the overview.

You can then tap the blue pen-symbol to edit the module.

If you want to copy the procedure, tap on the green copy-symbol.

By touching the red trash symbol, you can delete the module.

Procedure editor

Procedure editor +

Procedure name

Relaxation

Created at: 12.03.2018

Export settings

Decimal separator Point ▾

Sample Rate (CSV Export) 1Hz ▾

Start time (00:00:00)

Text 90

▾

▴

Fixation cross 120

▾

▴

Text 30

End time (00:15:00)

Add module to procedure +

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Procedure name

Here you can name your procedure with a suitable name (in this example, it is simply “test”).

Decimal separator

You can choose between a point or comma.

Sample Rate (CSV Export)

This determines how many values are recorded per second. More values (a higher value of Hz) creates more detailed data, but also increases the size of the download file.

Procedure editor with modules

You can change the order of the single modules using the arrows.

To edit a single module, simply swipe it to the left.

The color of the modules in this overview is determined by your settings in the module editor.

Add Module to procedure

Start to add modules to your procedure by pushing the “+” sign!

Add new module

Add new module
✓

Procedure general settings	
Procedure name	Test
Created at:	25.03.2018
Module type	Image file ▾
Module duration	120s.
	
Module color	
Image module settings	
	
Feedback image	Meditation - 1 ▾

←
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Module Type

You can choose between a text, a video, an audio file, a fixation cross, an arrow or a bar graph.

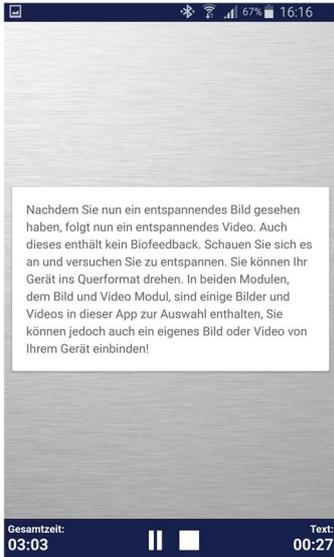
Module duration

Set how long the module shall last. Simply swipe the slider to the left or right.

Module color

Determine the color of the module in the procedure editor.

Overview of the modules



Text module

This module shows a text which you can edit.



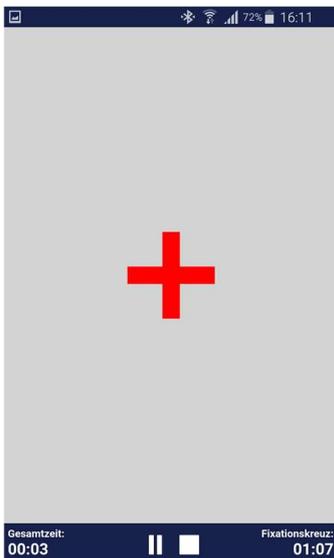
Picture module

The picture module shows either a standard picture from the app or a picture from your gallery.



Video module

In the video module, you can choose either the standard video from the app or use your own video.



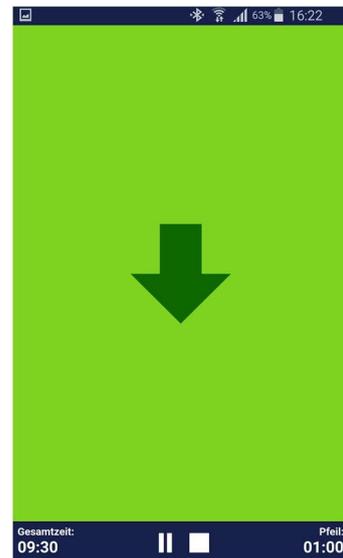
Fixation cross module

The cross changes its color depending on the conductance and provides direct biofeedback.



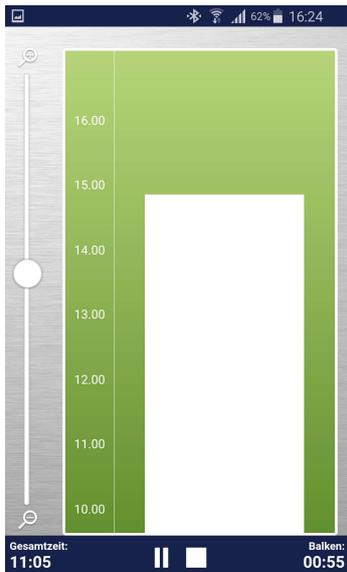
Audio module

The audio module is playing a relaxing song. You can choose your own music.



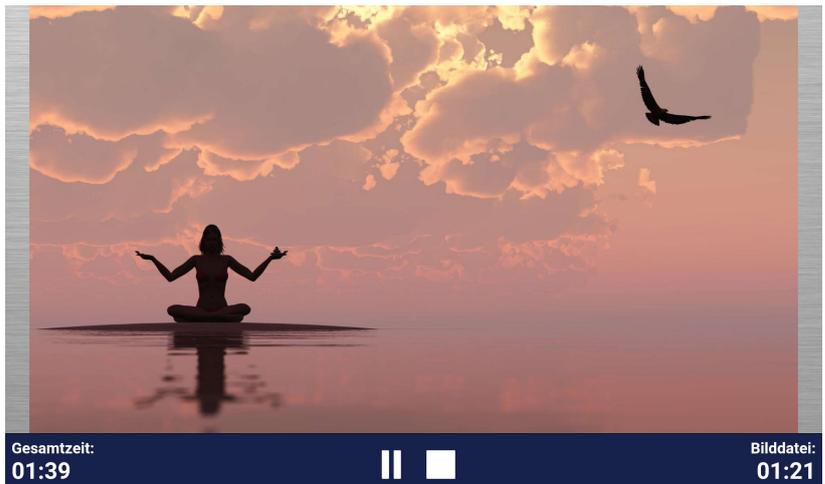
Arrow module

The arrow changes depending on relaxation and gives you direct biofeedback.



Bar graph module

The bar graph shows you your current value and gives you direct biofeedback.



Picture module in landscape format

The procedures can be displayed also in landscape format.



Procedure in archive

Supported devices Android

In general, Android smartphones and tablets from Android 4.4 can be used with the eSense without complications.

Your Android device requires a 3.5mm jack (headphone jack) for external microphones. Most devices have a headphone jack built into them by default.

We suggest you use the affordable [Amazon Fire 7](#) tablet with the eSense.

Supported devices iOS

The following iOS devices can be used with the eSense:

Apple® iPhone® from 4S

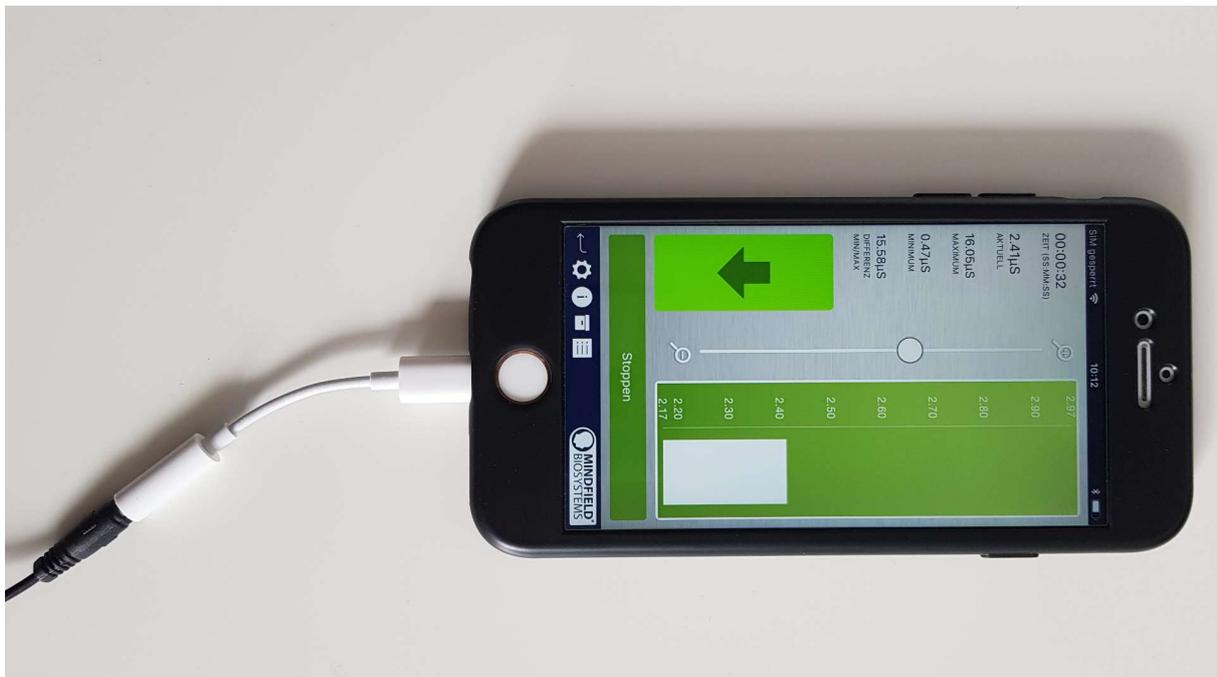
Apple® iPad® from 2nd Generation

Apple® iPad® Pro

Apple® iPod touch® from 5th Generation

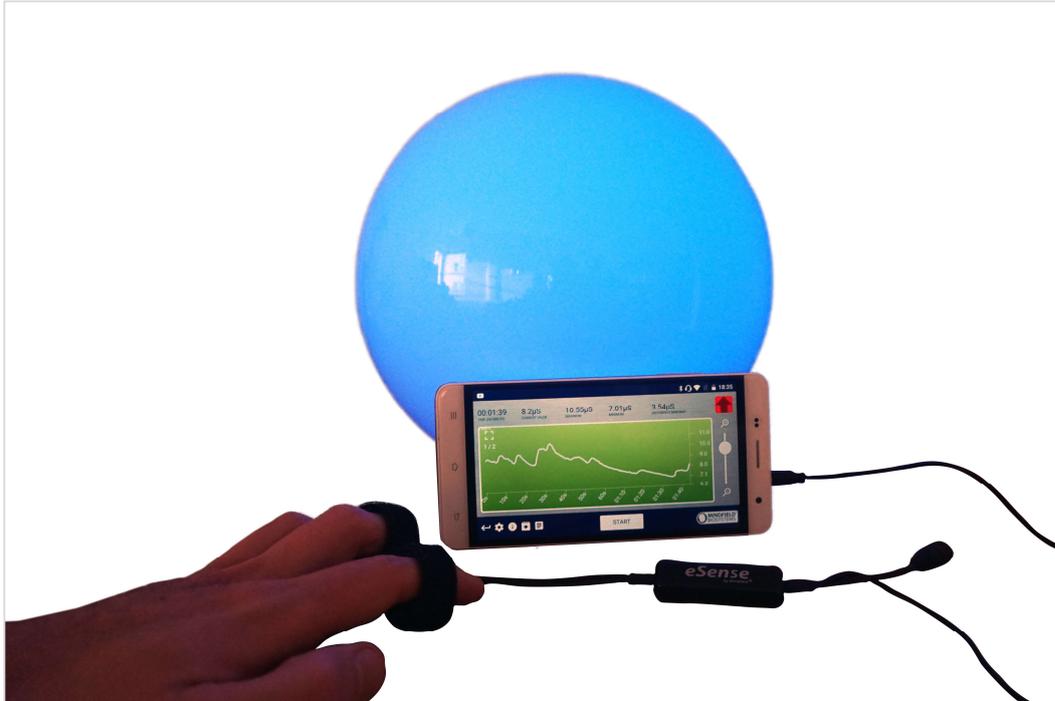
Apple® iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus and iPhone X (in combination with the included Lightning to 3.5 mm Headphone Jack Adapter)

Additional note for users who have iOS 7 or higher: The eSense works through the microphone port. If you have iOS 7 or higher, you have to give the eSense app permission to use the microphone port, otherwise it will not work. You will be asked for permission asked during installation, so please answer the request by clicking “Yes” or “Allow”. After installation, you can make this setting manually: Allow the eSense app to use the microphone port in the system settings of your iOS device: Settings -> Privacy -> Microphone.



Lightning to 3.5 mm Headphone Jack Adapter

New: Smart Bulb (optional)



eSense Skin response in use with the Magic Blue smart bulb

The eSense app can support biofeedback via smart bulbs. Smart bulbs can change their colors and brightness and can be controlled via Bluetooth. In combination with the eSense app, smart bulbs indicate your level of stress or relaxation through their lights.

Currently, the eSense app supports the Magic Blue and Phillips Hue smart bulbs. Both are smart bulbs which can be controlled via Bluetooth. The color as well as the brightness can be adjusted. From within the eSense App, you can connect to the Magic Blue or the Phillips Hue and use it in your biofeedback session.

We have a separate FAQ for the smart bulbs here:

<https://www.mindfield.de/en/category/11-esense.html?download=151>

Magic Blue

You can buy the Magic Bulb at our shop at <https://mindfield-shop.com/en/magic-blue-led-esense.html> or Gearbest at https://www.gearbest.com/smart-light-bulb/pp_230349.html

Phillips Hue

You should be able to find the Phillips Hue in every well-sorted electronic store. You can also order it online. A list of the on- and offline-merchants can be also found on the page of the Phillips Hue: <https://www2.meethue.com/en-us>

We suggest you use one of the starter kits from Phillips, with the eSense. This also contains a colored bulb ('Color Ambience'):

<https://www.amazon.com/dp/B06Y3QXSGX>

To have the best experience, we recommend the Hue Color ambience because with the colors, the feedback can be enhanced more than with only white colors.

Functions of the previous eSense Skin Response App

General View

Start and stop of the recording process

Stop

Indicator for rising or falling values

Time 00:00:28 ← Time elapsed

Current Value 61.59µS ← Momentary value

Minimum 0.44µS ← Overall minimum

Maximum 298.73µS ← Overall maximum

Difference Min,Max 298.29µS ← Difference between minimum and maximum

Average 60s 9.73µS ← Last 60 second's average value

Help ⓘ Instructions and help

Moveable training thresholds for the color gradient (green to red)

Scale for skin conductance (µS)

Momentary value

Same values like in vertical format

Time 00:00:46 Minimum 0.44µS Difference Min,Max 298.29µS

Current Value 0.46µS Maximum 298.73µS Average 60s 10.47µS

Stop

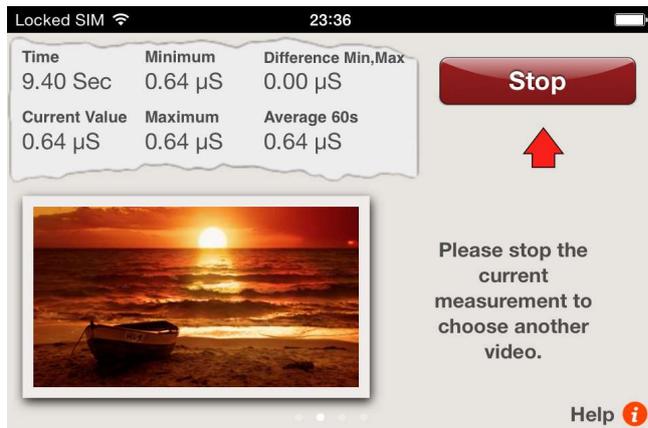
Indicator for rising or falling values

Start and stop of the recording

Time scale in seconds

Moveable training thresholds for the color gradient

Set up of animation

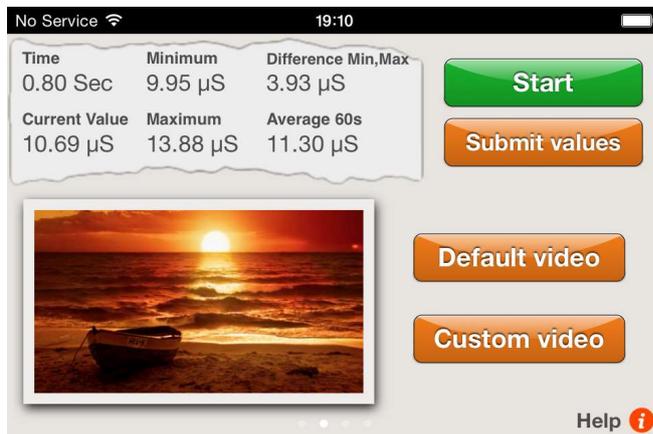


Sweep your finger over the display to change between the horizontal format and the animation.

Double tap on the animation to maximize it.

Move two fingers together ("pinch") to shrink the animation to its original size.

Falling skin conductance keeps the animation going, while rising values stops it.



You want to bring your skin conductance down, so keep the animation going!

Tap on "Custom video" to choose your own video, and tap on "Default video" to return to the standard video.

When using iOS, your custom video must be in the "Camera Roll".

Here's how you add a video to it:

1. Send the video to yourself in an e-mail.
2. Open the e-mail in the Mail app.
3. Download the video.
4. Click and hold the video, and then select "Save to Camera Roll."
5. Now you can select the video from within the eSense app.

A list of supported video formats for iOS can be found here:

<http://www.apple.com/de/iphone/specs.html>

When using Android, your video must be in the "Gallery."

Here's how you add a video:

1. Send the video to yourself in an e-mail.
2. Open the e-mail in the Mail app.
3. The video will be shown as an attachment. Click the dots on the right edge of the attachment and select "save."
4. The video is now in the Gallery and can be loaded by eSense.

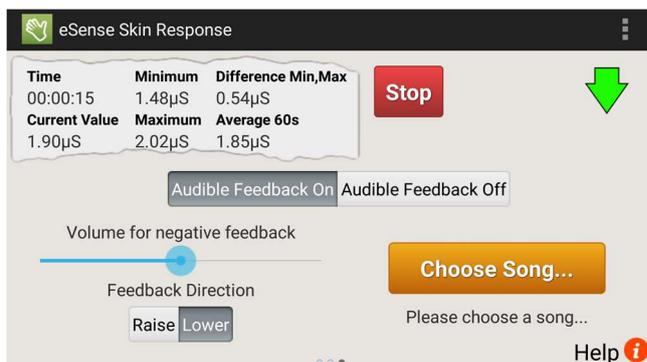
As an alternative, you can use Dropbox:

1. Move the video into your Dropbox.
2. Select the video from the Dropbox and export it onto the SD card in the "Movies" folder (in the Gallery).

A list of supported video formats for Android can be found here:

<http://developer.android.com/guide/appendix/media-formats.html>

Configuration of auditory feedback



Audible Feedback on/off

You can always hear sounds from other Apps in the background.

Volume for negative Feedback

When values move in the wrong direction, the sound become quieter:

0% = mute

100% = undiminished volume

Feedback Direction

Decide if rising ("raise") or falling ("lower") values should count as success for the feedback.

Choose Song

Please choose any Audio file.



Feedback Response Time

Adjust how sensitive and quick the feedback will react to a changing direction (rising or falling) of the values.

Export and forward of measured values



After stopping a recording, you can transfer the measured values via e-mail (in iOS, you need an email account for this function).

Five values per second are saved to a CSV file, where every line is a value; so, five lines correspond to one second of measurement.

Click on “Submit values” to send a CSV (comma separated value) file to your email.

The file can be processed in Microsoft Excel™ or Open Office.

Important note regarding iOS

The previous eSense iOS app is not supported by iOS 11 anymore. Please use the eSense app instead under iOS 11.

Electrode types

Velcro electrodes



Easy to use

Reusable

Cheap

Worse conductivity

You can order Velcro electrodes here:

<https://mindfield-shop.com/accessories/electrodes/eda-velcro-electrodes-for-measurement-of-skin-conductance-8-pieces.html>

Finger clips (without gel)



Easy to use

Reusable

Comfortable

Worse conductivity

You can order the Finger clips here:

<https://mindfield-shop.com/gsr-finger-clips-without-gel-2-pieces.html>

Gel electrodes (disposable)



Easy to use

Good quality of signal

Useable just once

Our prior recommendation

You can order the gel electrodes here:

<https://mindfield-shop.com/emg-ecg-eda-single-use-electrodes-for-adults-with-comfortable-breathable-fabric-pre-geled-50-pieces.html>



EDA gel electrodes (reusable)



Best quality of signal

Complex application

Additional gel necessary

For professional use

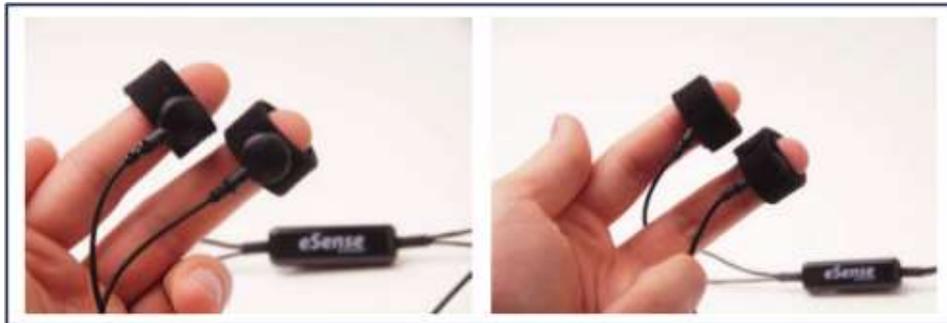
You can order the EDA gel electrodes here:

<https://mindfield-shop.com/eda-gel-electrodes-reusable-3-pieces-incl-99-adhesive-rings.html>

Possible electrode positions

General information for the skin preparation (independent from the electrode type): Skin preparation or skin cleansing is usually not necessary and also not recommended. It is enough to wash the hands, although the soap dries the skin and lowers the measured values. The same applies to the skin cleansing with alcohol. Greasy skin or skin that has just come into contact with hand cream should be freed of oily residues by being washed with lukewarm water and alcohol (70%) if necessary.

Velcro electrodes



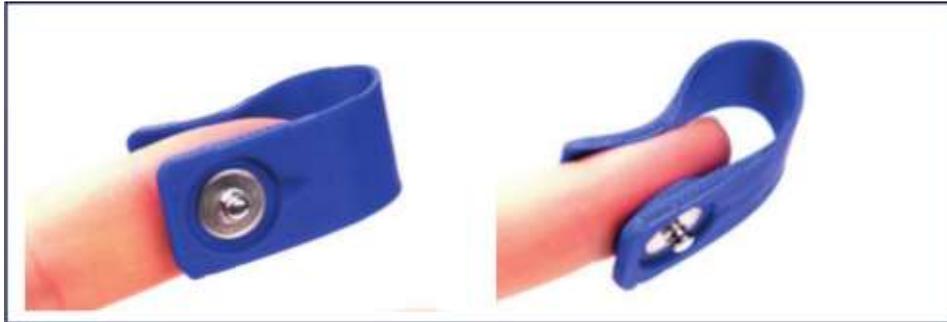
Wrap the Velcro electrodes around the upper and middle phalanx of the index and middle finger. Make sure the silver electrodes touch the surface of your skin directly. Then connect the press button wires with the electrodes. You can wrap the Velcro around the press button ends once again to stabilize the wires, as shown in the right image.

Gel electrodes



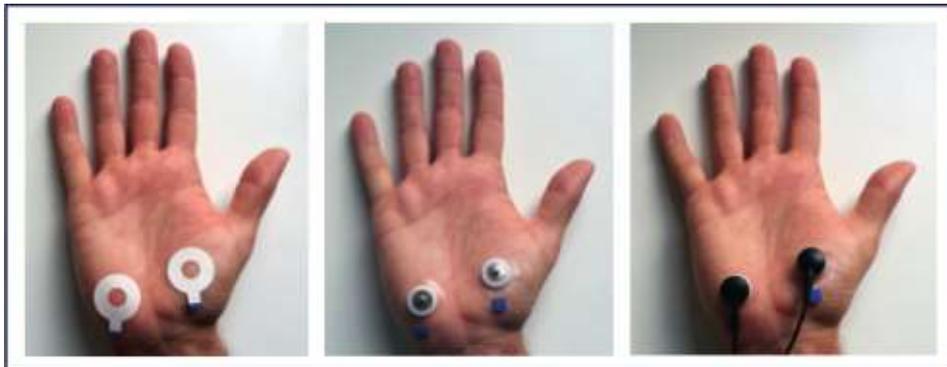
We recommend the single-use gel electrodes. There are three different possibilities of the areas of conduction, as shown in the images. All positions are equivalent. Simply connect the electrodes wire through the press button connectors with the electrodes.

Finger clips



These EDA finger clips are simply put on the fingertips of the index and middle finger. Then the press button wire of the eSense connects with the electrodes (here, the wire should run forward towards the notch inside the clips).

EDA gel electrodes



Due to the required adhesive surface of the skin, it is recommended that you choose the thenar and hypothenar muscles as positions for the electrodes. First, the adhesive rings will be attached. Then the electrodes will be neatly filled with the electrodes' gel until they are full and put onto the adhesive rings after the outer protective foil is removed. Finally, the press button wires will be connected.

Extending the cord of the eSense

If you wish to use a longer cord between the eSense and your smartphone or tablet, you can extend the original cord of the eSense with a common, 4-pin, 3.5mm jack headset extension cord. We have tested three cords that have worked well:

2m cord: <http://amzn.to/2kJwqBM>

0.5m cord: <http://amzn.to/2kKEONs>

110cm cord: <http://amzn.to/2jJg1LZ>

All three suggested cords cost between £6-8 and are available from Amazon. Alternatively, you should be able to use other 4-pin cords as well.

EC Declaration of Conformity for the Mindfield eSense

in accordance with the following directive(s):

The Electromagnetic Compatibility Directive (EMC) (2004/108/EG)
RoHS - Restriction of (the use of certain) hazardous substances (2011/65/EU)
WEEE Waste Electrical and Electronic Equipment (2002/96/EG & 2008/34/EG)

The manufacturer

Mindfield Biosystems Ltd.
Hindenburgiring 4
D-48599 Gronau
Germany

WEEE-Reg.-Nr. DE 24465971

hereby declares that the following product:

“Mindfield® eSense Skin Response”

complies with all applicable essential requirements of the directives.

It is in conformity with the applicable requirements of the following documents:

DIN EN 60950-1 Information technology equipment – Safety – Part 1: General requirements (2011-01)

DIN EN 55022 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (2008-05)

DIN EN 55024 Information technology equipment - Immunity characteristics - Limits and methods of measurement (2011-09)

Place: Gronau

Date: 19th of August 2017

N. Rockensüß



Niko Rockensüß, Managing Director



According to legal requirements, the Mindfield eSense has to be recycled as electrical waste.

WEEE-Reg.-Nr. DE 24465971

