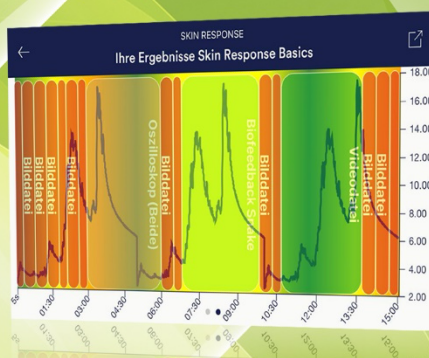




# MANUAL

Version 5.6.1 | 08.02.2022



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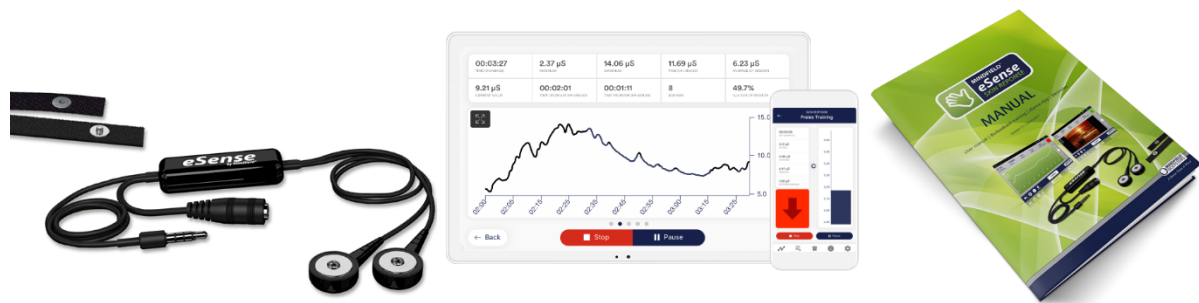
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## Delivery contents

### Delivery contents eSense Skin Response:

- 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)



### Delivery Contents eSense Skin Response Bundle:

- 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)
- **2 + 4 Velcro-Electrodes**
- **50 pieces GSR single-use electrodes with gel**
- **GSR Finger Clips without gel, 2 pieces**

## News

In addition to the usual bug fixes and small improvements, we have once again improved the design and navigation with the new version 5.1.0 of the eSense app. This means that the app runs even faster and smoother **now**.

Another new feature is the extended **view** of the archive with which you can track and evaluate your measurements over a longer **period** even better.

We have also optimized the cloud view. This means that the cloud functions can be used even more effectively.

However, you still have the option of using the app as usual with all previous functions without creating an account.

## 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  $\mu$ Siemens. Skin conductance is measured in  $\mu$ Siemens or symbolized as  $\mu$ S (where  $\mu$  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.

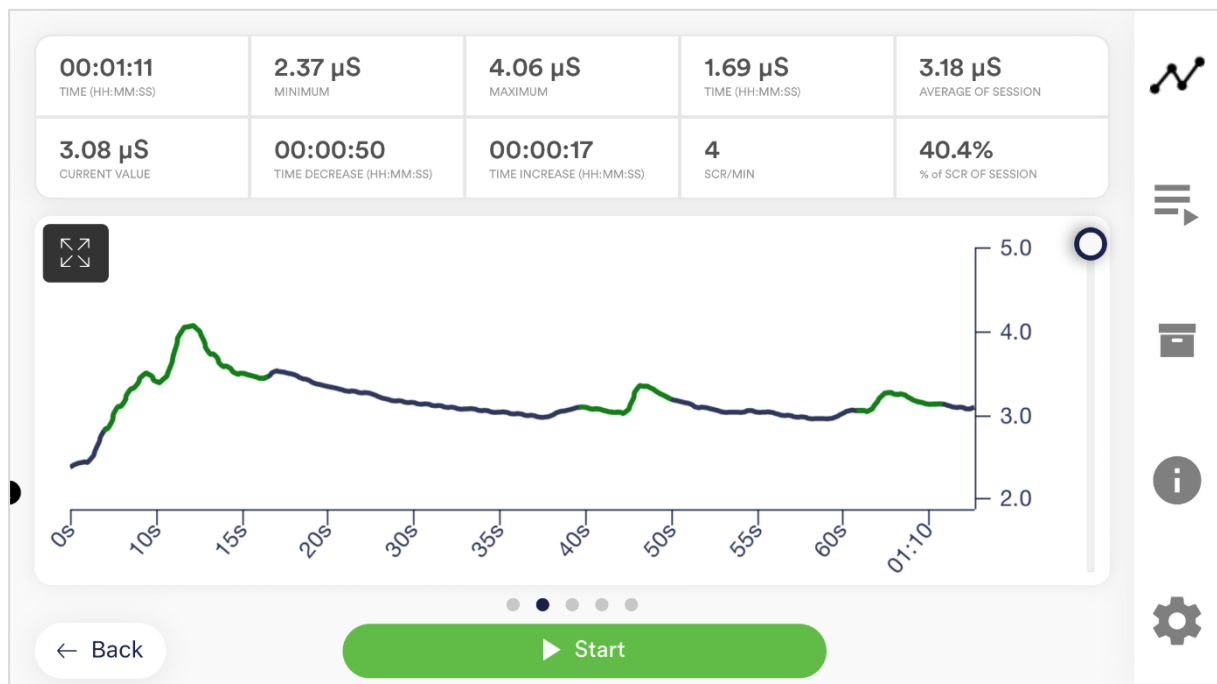
The increased activity of the perspiration glands through a (stress) stimulus is easily visible through the associated increase in skin conductance. The stimulus can be mental or emotional strain, or taking a sudden, deep breath, or a startling action like someone unexpectedly clapping hands or the loud 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 literature<sup>1</sup> 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.

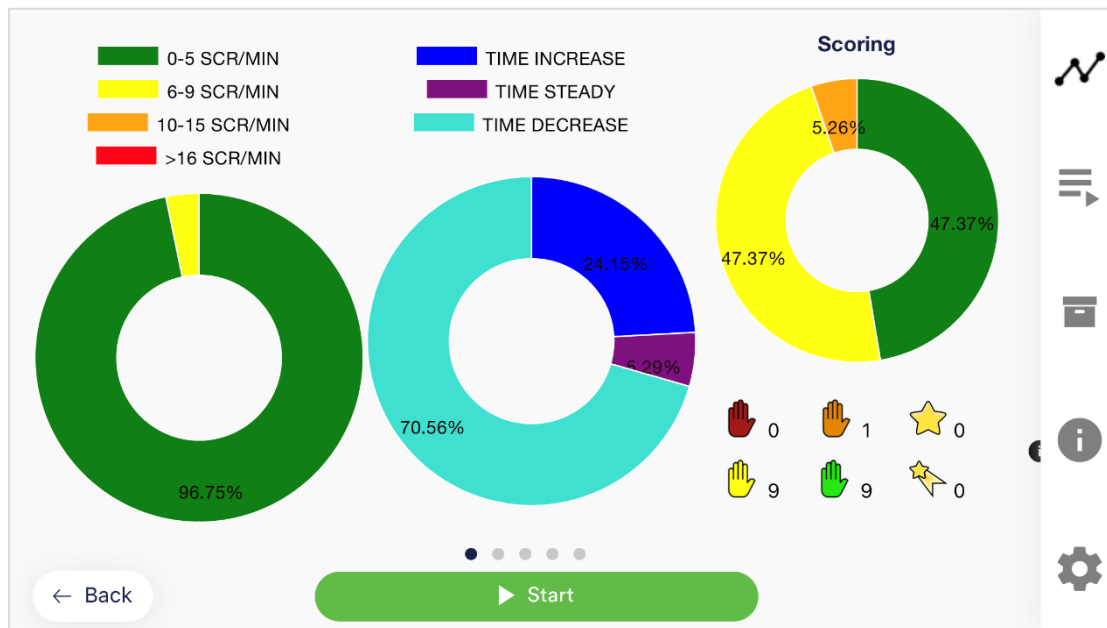
The average value in  $\mu\text{S}$  of a session is an indicator for the “level,” hence how high your basis level of tension or relaxation is. You should also try to lower this while you are doing stress reduction training. The average value also takes the SCR into consideration and is falsified with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

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:

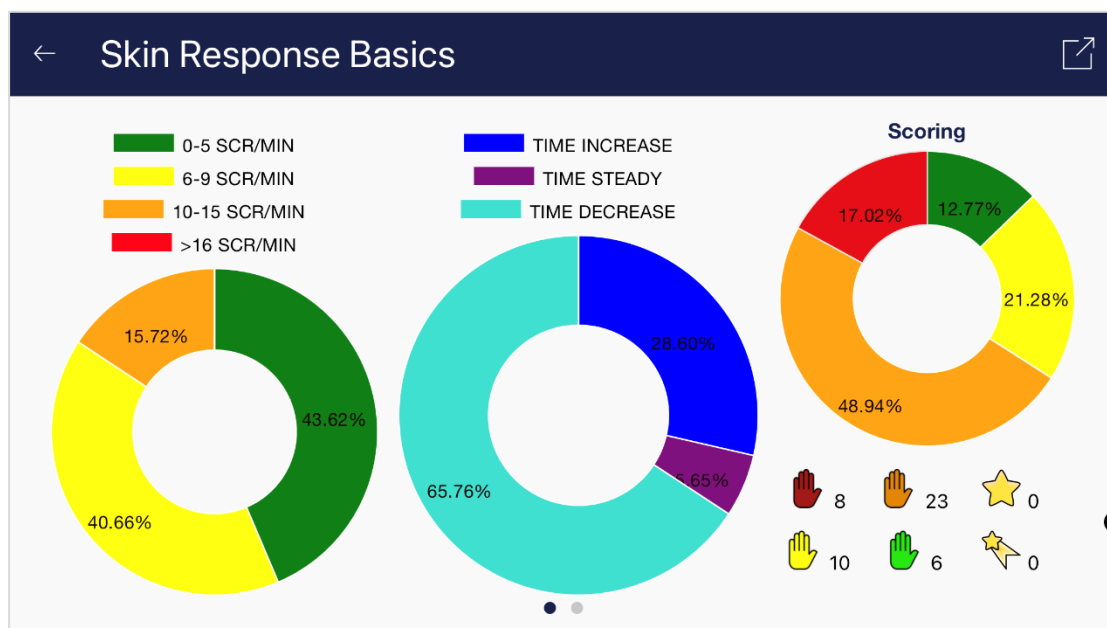
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<sup>1</sup> Boucsein, W. B. (2011). Electrodermal Activity (2. Aufl.). Berlin, Deutschland: Springer.





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

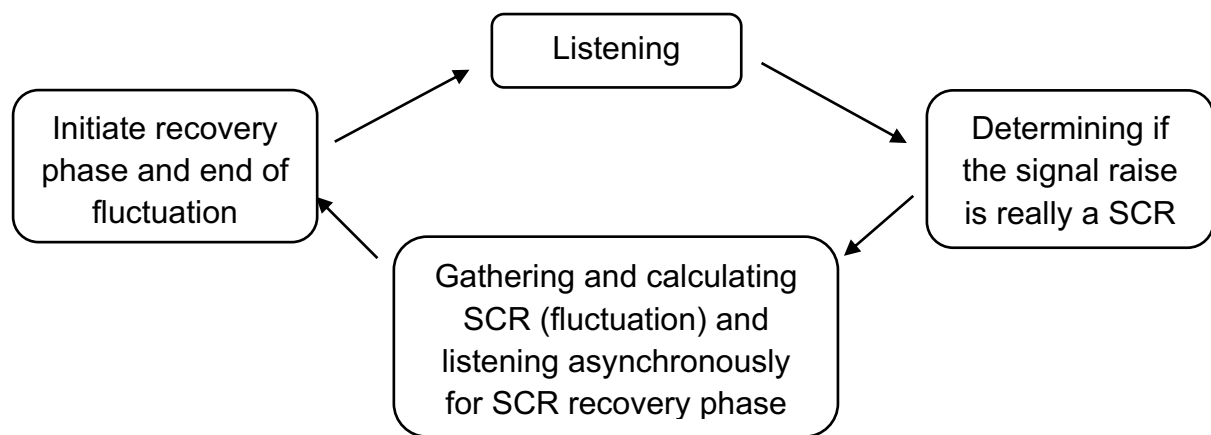


**Example of a measurement in a stressed state with more SRC/min (yellow and orange)**

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.

The whole process of detecting and calculating the SCR is a cycle of four steps:

1. Listening state
2. Determining if the signal raise is really a SCR
3. Gathering and calculating SCR and listening asynchronously for SCR recovery phase
4. Initiate recovery phase and end of fluctuation



We have more detailed information about the SRC in our FAQ:  
<https://www.mindfield.de/dwnld.php/?download=161>

## Preparation and start of the app

Create the conditions needed for a successful training:

- find a quiet room (mobile phone etc. switched off)
- appropriate temperature of 20-22° C (68-72° F)
- convenient seating
- 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.

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.

## Fixation of the Velcro-electrodes

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.

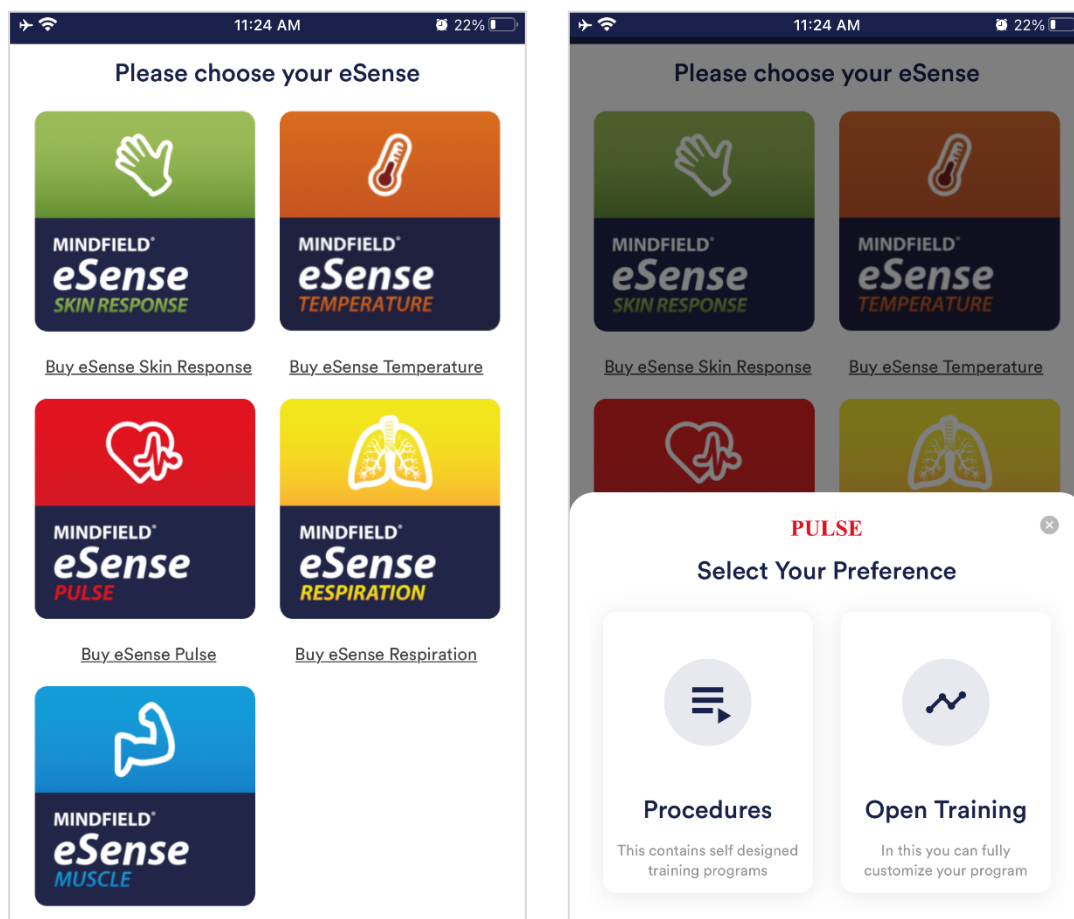


eSense Skin Response in use with a tablet

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.

Another note: If your **values are below 1 $\mu$ 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 $\mu$ S and solve the cause first.

The next step is to start the app. At the beginning you can choose between a free training and a procedure. We recommend that you start with a procedure. We present you both below.



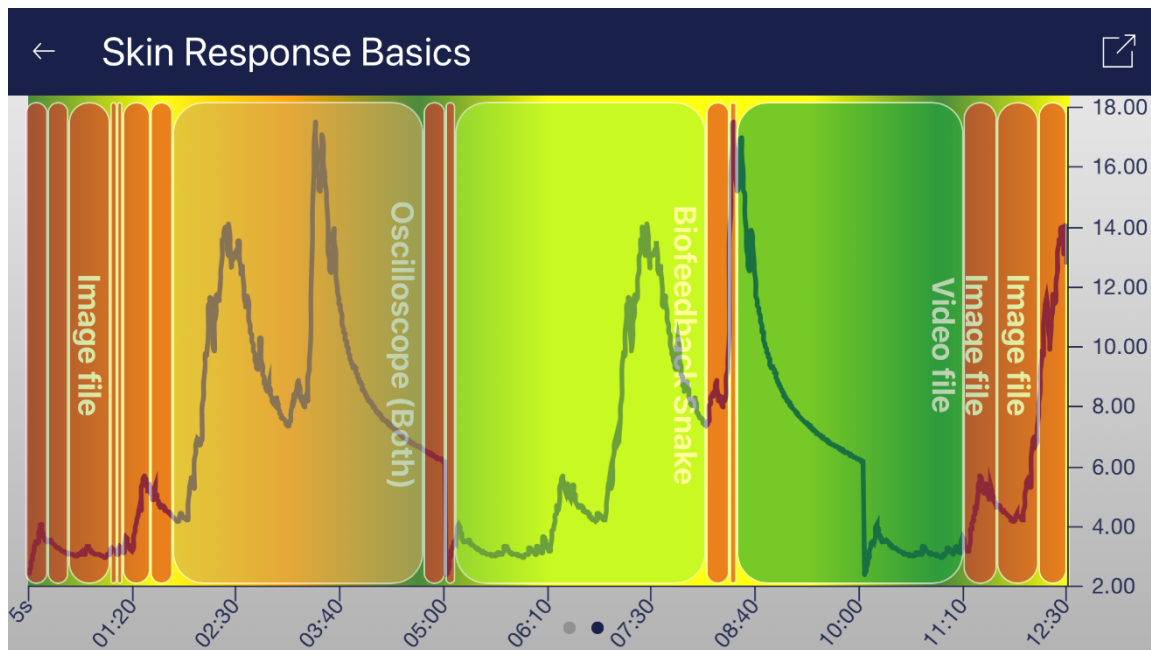
**Choose between procedure or open training after starting the app**



## 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.



### Overview after a procedure

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.

The included procedures are also protected by a password in order that those can't be edited or deleted by accident. You can any time create a copy of those procedures without a password and change it as you wish.

We also explain in detail how you can create and edit your own procedures in the chapter procedures settings.

## Open Training

As a second option you can also conduct an open training. This is compared to the procedures a bit more complex. We therefore explain a typical open training session which consists of 4 training phases.

## Preparation and start

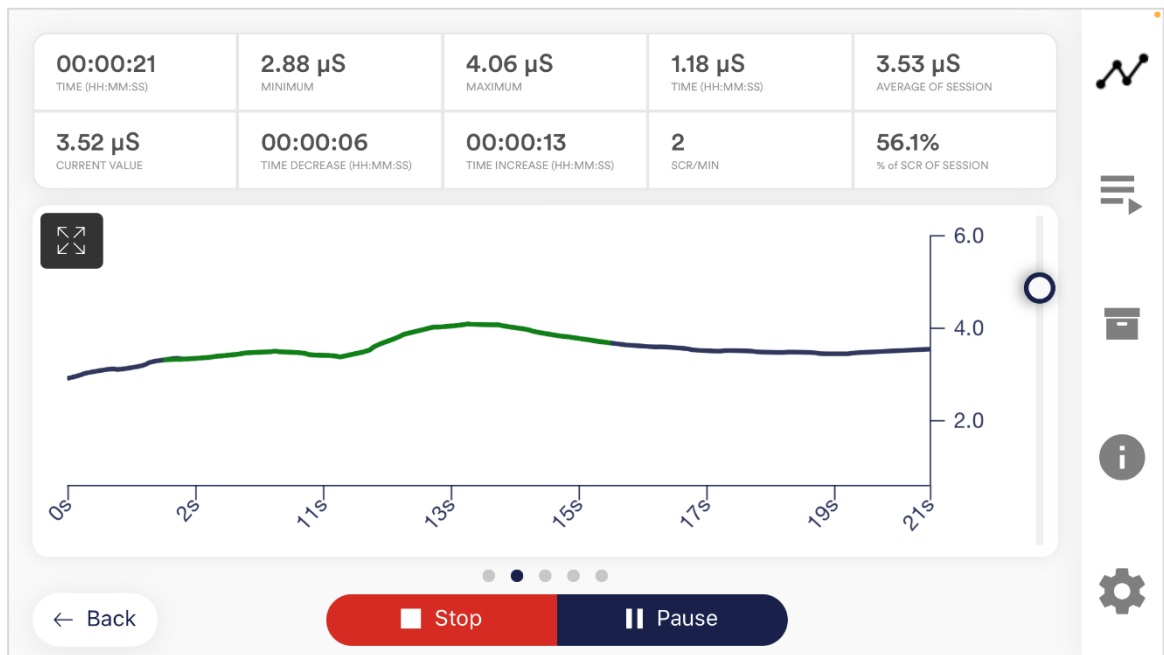
1. Follow the first steps of preparation from the previous chapter and choose an open training in the selection screen after starting the app
2. Tap on Start and have a first look at the measured values
3. For the interpretation of the measurement, we distinguish between “tonic” and “phasic” effects. 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 phasic 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).

4. In a state of heightened excitement, both the general tonic level and the rate of spontaneous fluctuations is increased. With low excitement 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 excitement. 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) or Apple App Store (iOS).

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>

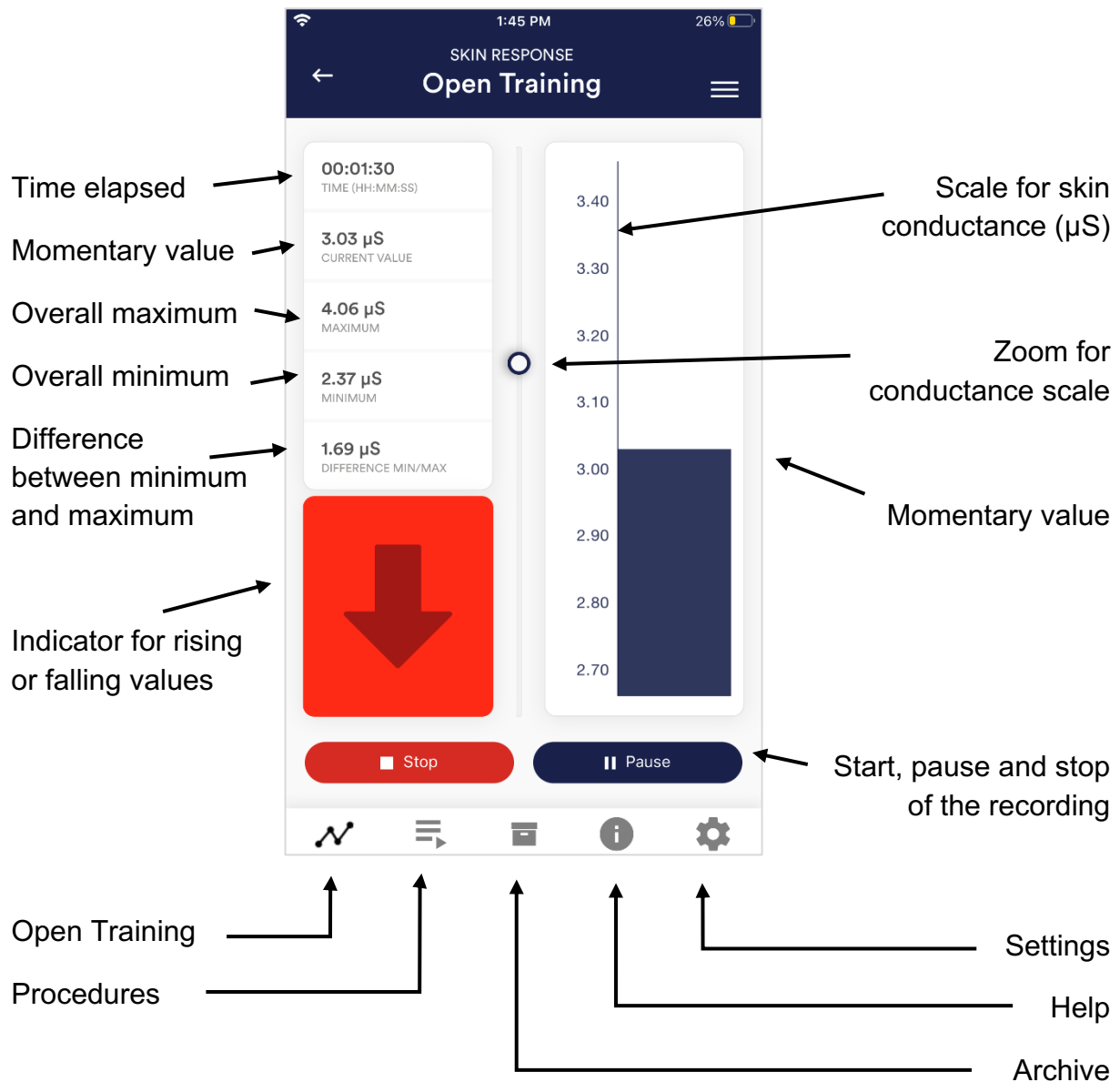
Android: <https://play.google.com/store/apps/details?id=com.mindfield.boisystem.esense>

### General notes

- If the text on your Android device is sometimes cut off the reason can be a larger font in the system settings (especially for Huawei). In the Android settings, there is usually a way to adjust the font size and display size. It's best to set this to "standard" or "default", otherwise it can cause problems with app.
- For data files which you can load as own media into the eSense App, the general limitations by Android and iOS apply. We have successfully tested the following:
  - o Images: PNG and JPG (GIF can be loaded but isn't animated)
  - o Audio: MP3, WMA and WAV (Android) and MP3, WAV and AAC (iOS)
  - o Videos: MOV, MP4 and 3GP (Android) and MOV, MP4 and M4V (iOS)
  - o If your audios or images are in other formats you simply can convert the files on your computer. Just use a free tool like Free Audio Converter ([https://www.freemake.com/free\\_audio\\_converter/](https://www.freemake.com/free_audio_converter/)) or Free Video Converter ([https://www.freemake.com/free\\_video\\_converter/](https://www.freemake.com/free_video_converter/))

- An additional tip: You can also directly download videos from YouTube and bring them in the correct format (MP4) with tools like <https://notube.net/en>

## General view & Open Training





Absolute decrease of measured values

Current SRC pro Minute

Absolute increase of measured values

% of SRC of session

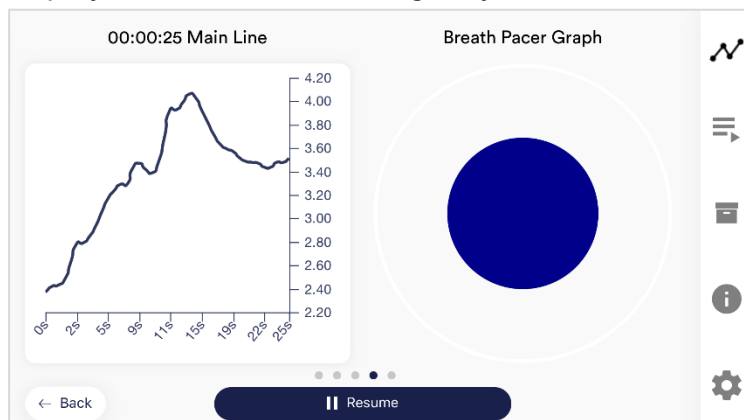


Set marker

Swipe the screen to the left or right to change between this main screen and the other views. After the measurement, you can also swipe to the pie charts.

## Breath Pacer (optional)

If you have toggled this option on in the settings, you can have the Breath Pacer displayed. In the settings you can choose between line or sphere.



Breath Pacer as sphere

You can configure the breath pacer in the settings. There you can freely choose inhalation time, hold, exhalation and hold in 0.1s increments.

## Biofeedback Snake

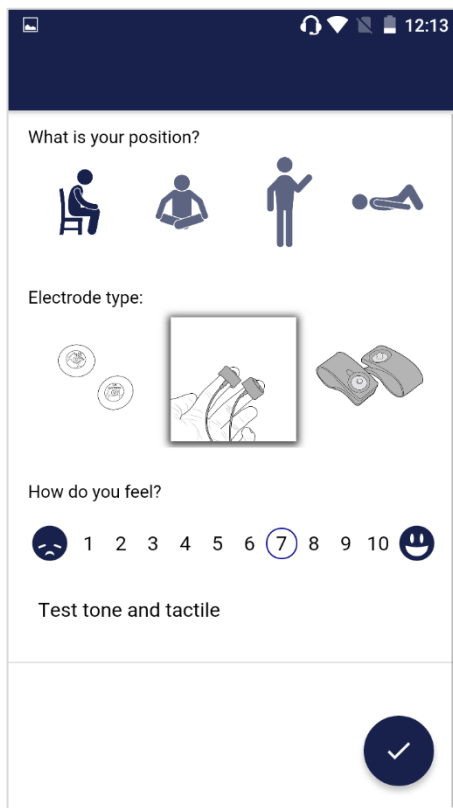


### Biofeedback Snake for the Skin Response

You can also display the Biofeedback snake as an additional option. At the top left are appearing symbols which vary in color depending on the current measured value. The symbols are either green (further positive direction), yellow (slight negative direction), orange (strong negative direction) or red (very strong negative direction). After 10 green symbols you will also be rewarded with a star and after 50 green symbols even with a shooting star. If the snake goes over the entire screen you will see the last 5 minutes. The SCR events (Skin Conductance Responses) also contribute to the calculation of the color of the hands.

## 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.

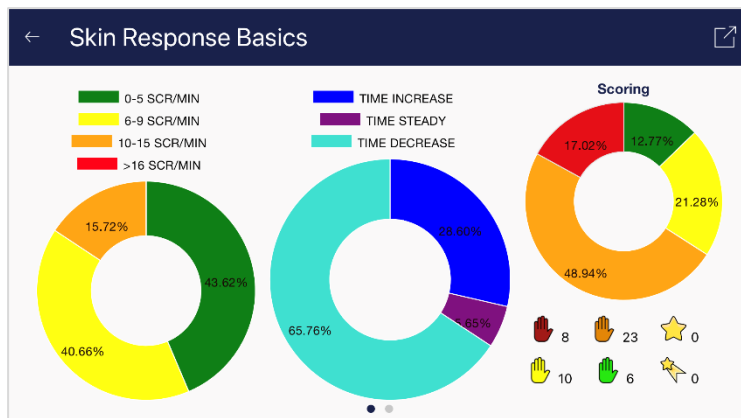
### Note (here “Test tone and tactile”)

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)

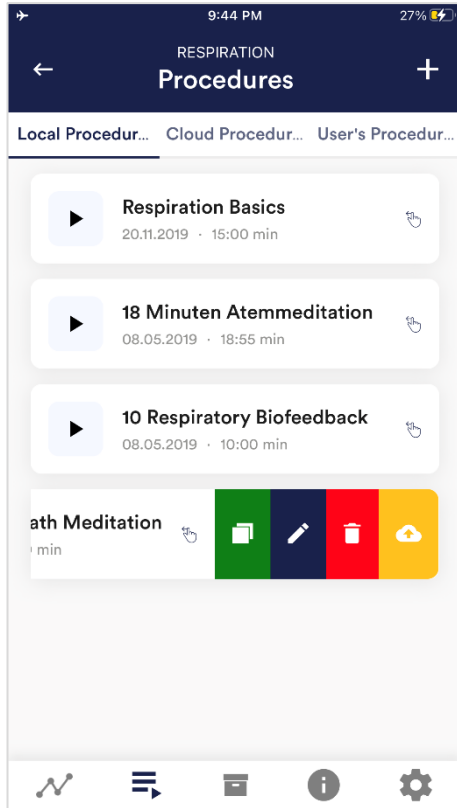
After the measurement (and optional survey), in the landscape mode, a survey appears with two pie charts: one shows your SCR while your measurement and another shows the time proportions of rising, falling or steady values (see screenshot).

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

## Procedures



### Edit or delete procedure

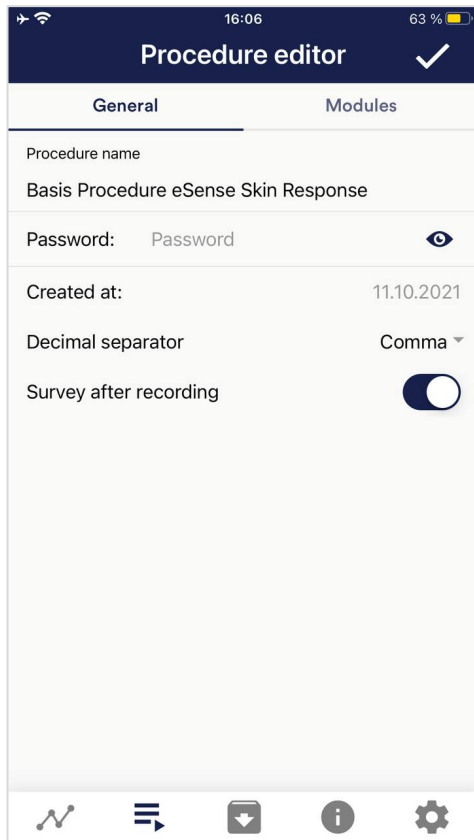
To edit a procedure, simply swipe it to the left in the overview.

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



The screenshot shows the 'Procedure editor' app interface. At the top, there's a status bar with signal, time (16:06), and battery (63%). Below is a dark blue header with 'Procedure editor' and a checkmark icon. Two tabs, 'General' and 'Modules', are visible. The 'General' tab is active, showing fields for 'Procedure name' (Basis Procedure eSense Skin Response), 'Password' (Password), 'Created at' (11.10.2021), 'Decimal separator' (Comma), and 'Survey after recording' (toggle switch). At the bottom, there's a navigation bar with five icons: a line graph, a list, a download arrow, an information 'i' icon, and a settings gear.

### Procedure name

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

### Decimal separator

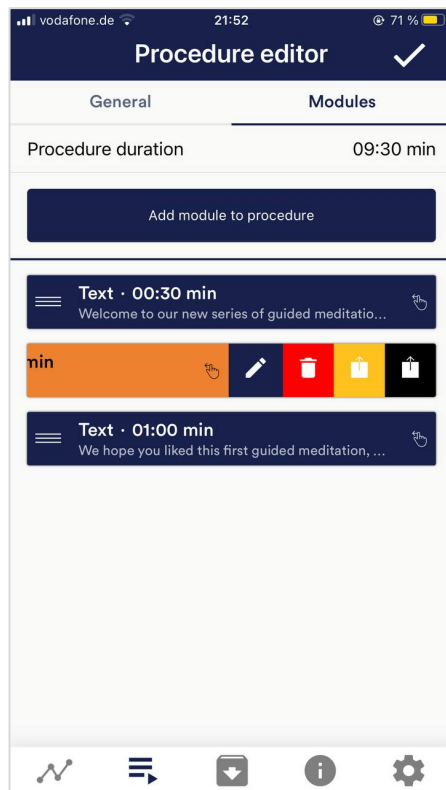
You can choose between point or comma as separator of values in CSV export of procedures.

### Survey after recording

Here you can activate/deactivate the survey (position, mood, notes) after each measurement.



## Add new module



In the procedure editor, select the "Modules" tab.

### Add module to procedure

Click on this button to add another module.

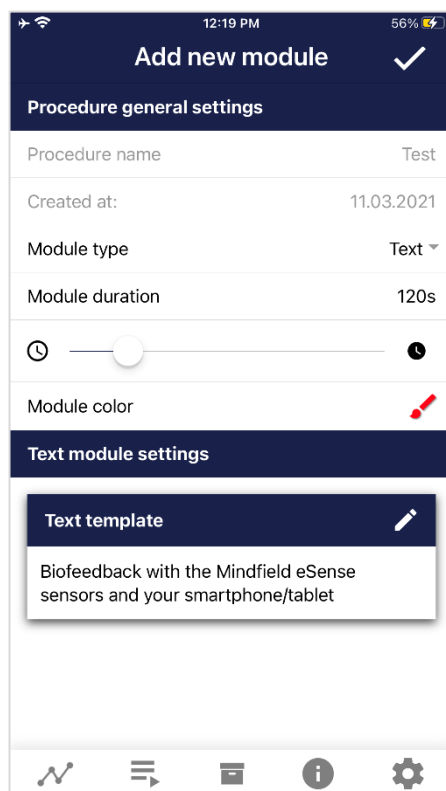
### Edit module

Slide the module to the left and tap on the blue pencil symbol to edit.

To delete a module, tap the red trash can icon.

To duplicate a module within the procedure, click on the yellow sharing symbol.

To duplicate a module to another procedure, click on the black sharing icon and select the procedure from the following popup.



### Module Type

You can choose between a text, a fixation cross, an image, a video, an audio file, an arrow, a bar graph, a smart bulb, an oscilloscope, a breath pacer or the biofeedback snake.

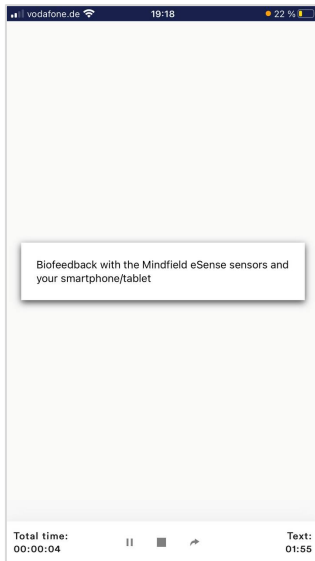
### Module duration

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

### Module color

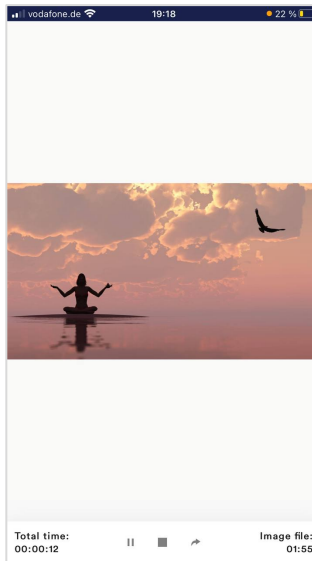
Determine the color of the module in the procedure editor.

## Overview of the modules



### Text module

This module shows a text which you can edit.



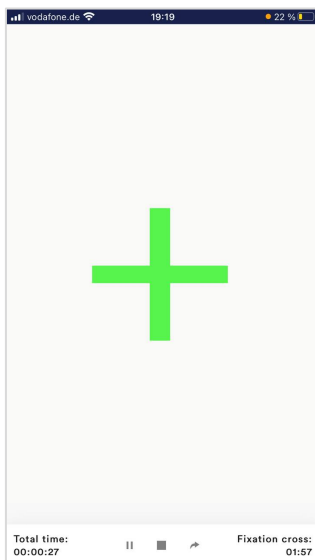
### Picture module

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



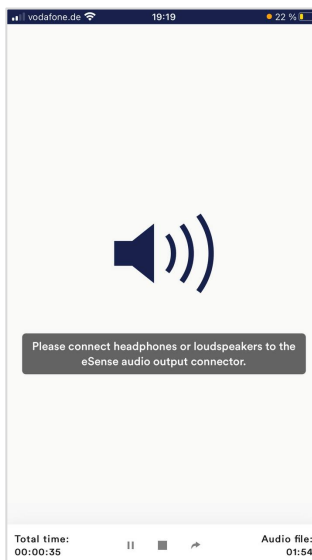
### Video module

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



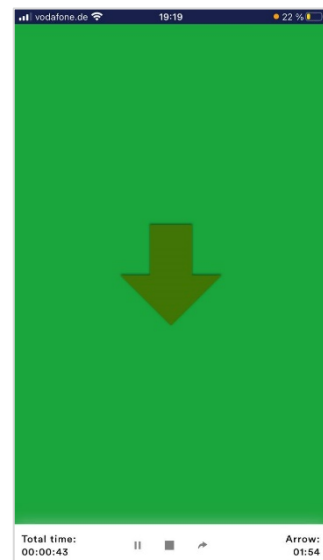
### Fixation cross module

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



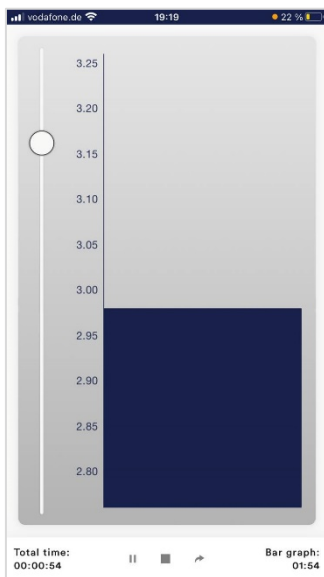
### Audio module

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



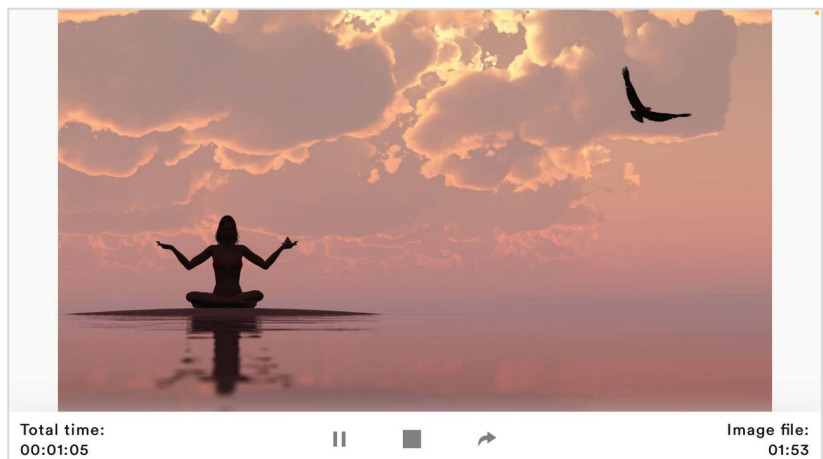
### Arrow module

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.



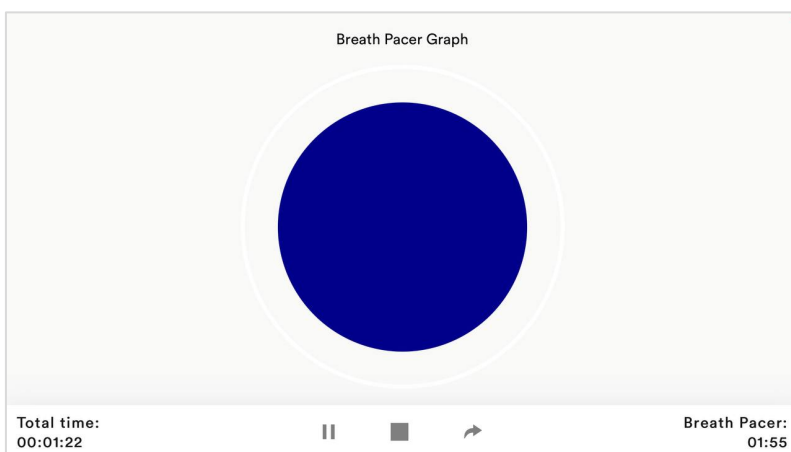
### Picture module in landscape format

The procedures can be displayed also in landscape format.



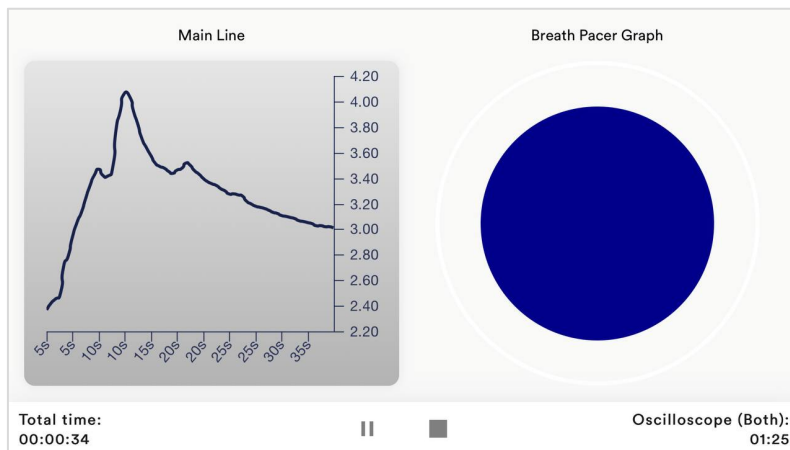
### Breath Pacer module in landscape format

The procedures can be displayed also in landscape format.



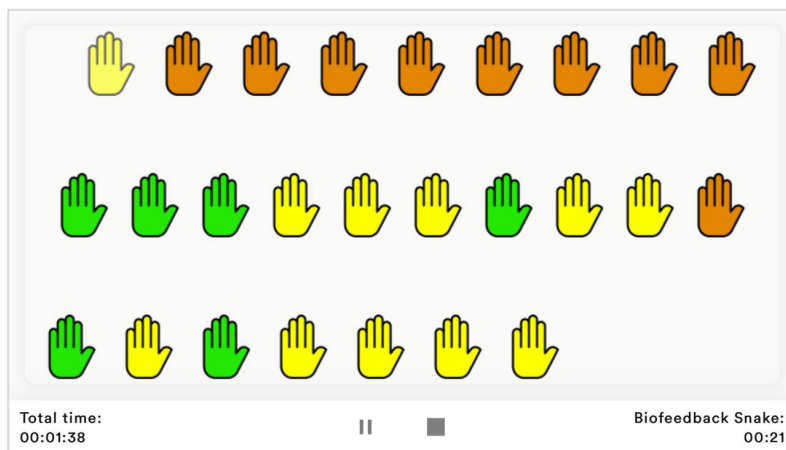
### Oscilloscope Type Breath curve (Sphere)

The circle leads the breathing rhythm. When the blue circle contracts, breathe out. When he expands, inhale. You can also set holding phases between inhaling and exhaling.



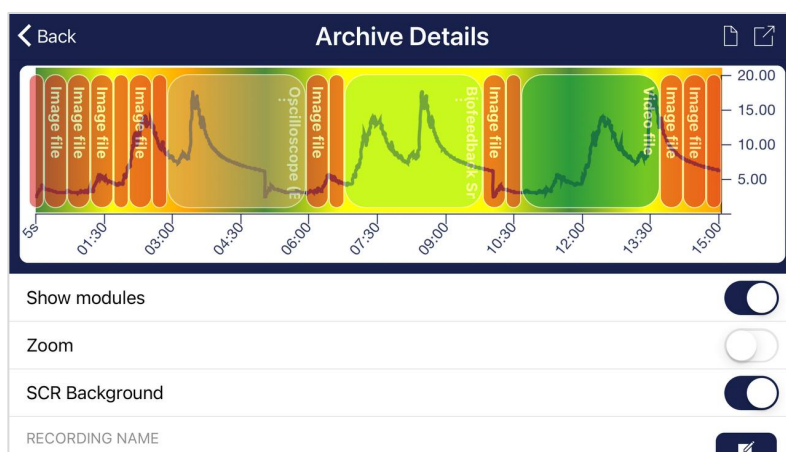
### Oscilloscope Type Both

This is a combination of the graph to the left and the breathing aid to the right \. You can see the measured values while following the breathing aid.



### Biofeedback Snake

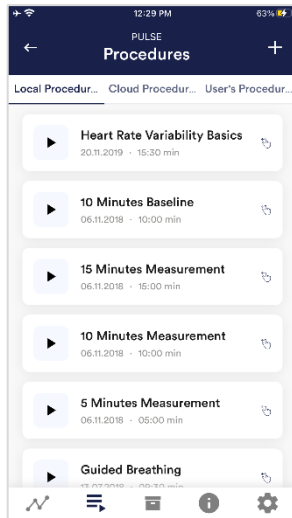
The Biofeedback Snake is also available as module.



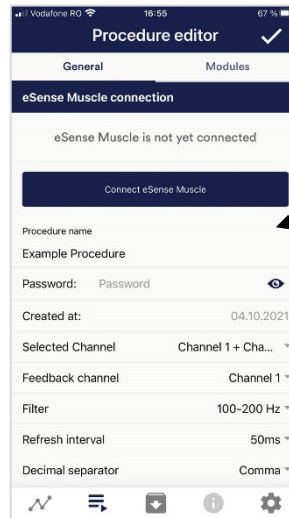
### Procedure in the archive

The colored background represents the SRC per minute (green = relaxed state / little SCR, yellow = excited state / medium SCR)

## Creation of a procedure

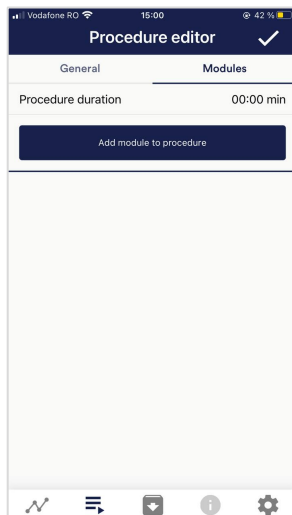


1) Tap on the plus icon to create a new procedure.

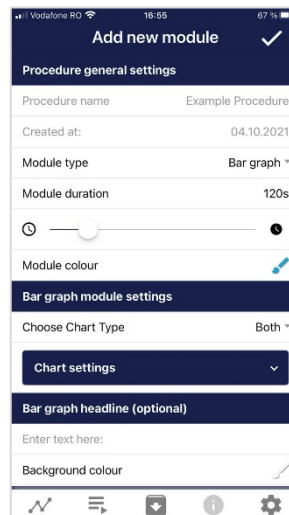


2) Give the procedure a name (here "Example Procedure").

You can simply accept all other default settings for this example.

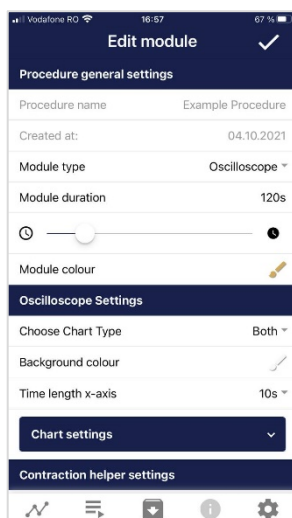


3) Select the upper tab "Module" and tap on the button "Add module".



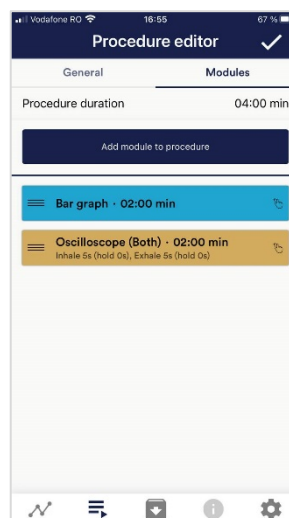
4) Select a bar graph module and tap the check mark.

Here, too, you can accept the default settings.



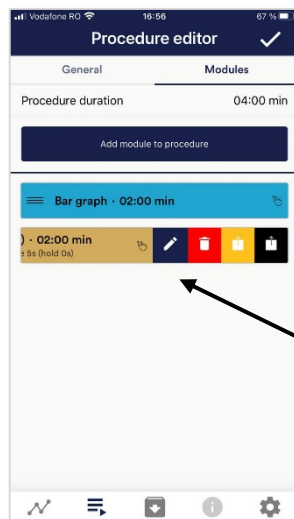
5) Then add an Oscilloscope and breath pacer module

Here, too, you can accept the default settings.



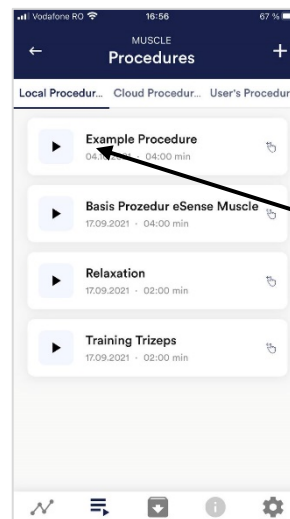
6) Your procedure should now look like this.





7) If you want to change something at a later date on one of the modules, you can swipe the corresponding module to the left and tap on the blue pencil symbol.

Otherwise you can now tap the tick at the top right.



8) Start the procedure by tapping the play button.

Have fun!

## Meditations

You can also choose one of our guided meditations as a procedure. The breathing meditation is already included in the eSense app. We will also offer more meditations shortly as new free cloud procedures for users with account.

The meditations thus offer you an easy way to train your awareness and attention and, at the same time, receive biofeedback.

## Own media (photos, videos and audios)

You can use your own pictures in the picture module, your own videos in the video module or your own music or melodies in the audio module in the procedures.

Android usually enables this without any further problems. As long as you allow the eSense app to access your files on your device, you can upload them to the eSense app.

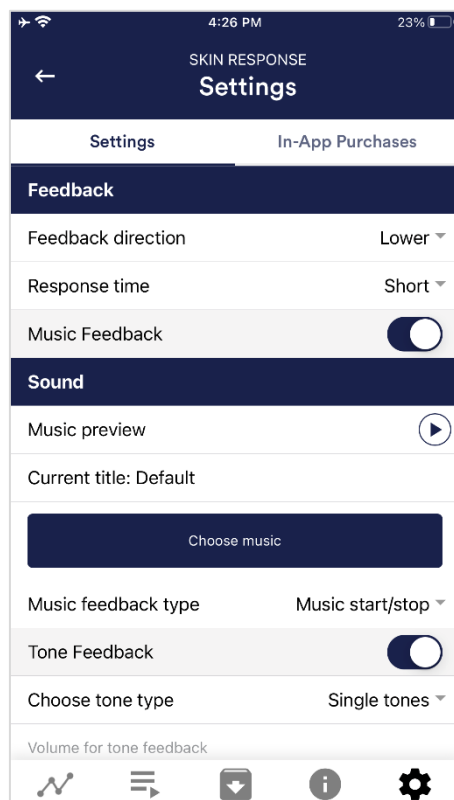
iOS is a bit more restrictive. As usual, you can use your pictures from your device in the iCloud for pictures and videos.

For audio files you need iTunes (or an alternative such as "CopyTrans Manager"). This is where your music or melody must be. You can find your music in iTunes (or CopyTrans Manager) under the tab "My Sound" and insert it into your procedures.

We have a detailed video at [https://www.youtube.com/watch?v=A\\_CRbmBeBBc](https://www.youtube.com/watch?v=A_CRbmBeBBc) where we show all the steps.

On **iOS**, the **power saving mode** must also be deactivated, otherwise the videos in the procedures cannot be played.

## Settings (Overview)



### Feedback Direction

Select the direction in which you want the feedback to react to. It can respond either to an increase or decrease in the measured values.

### Response time

The default setting is "Short", which allows feedback to respond quickly to changes in readings. For longer measurements we recommend "Medium" or "Long", then the reaction time will be slightly delayed and the eSense will no longer react to every small change of the measured values.

### Music Feedback

If the value moves in the unwanted direction (e.g. lower values), the music will become quieter or change its speed depending on the type of feedback you choose.

### Music Preview

Tab the play button to listen to the selected song.

### Choose music

You can choose default or your own music.

### Music feedback type

You can optionally choose between music start/stop, volume feedback or playback rate feedback. Note: For iOS are the Restricted options.

### Tone Feedback

In the background, you can hear sounds from other apps.

### Choose tone type

You can choose between single or continuous tones.

### Auto Mode

When this is activated, the range in which the sound changes is automatically adjusted. The minimum and maximum values of the set time window are automatically used for the lower and upper limits of the following interval.

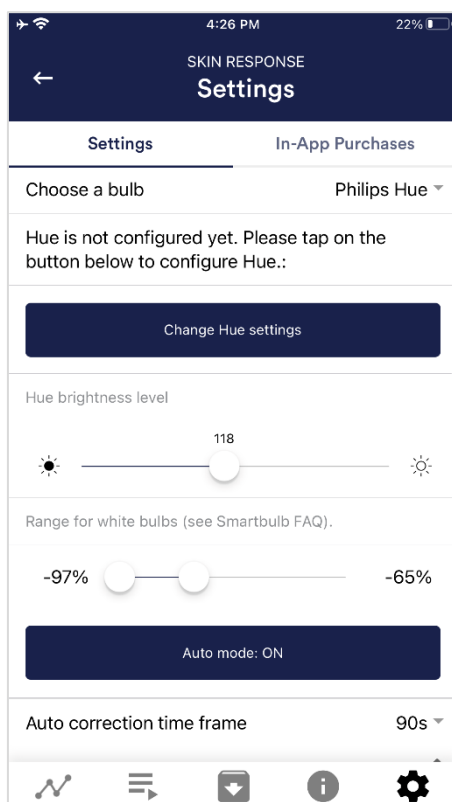
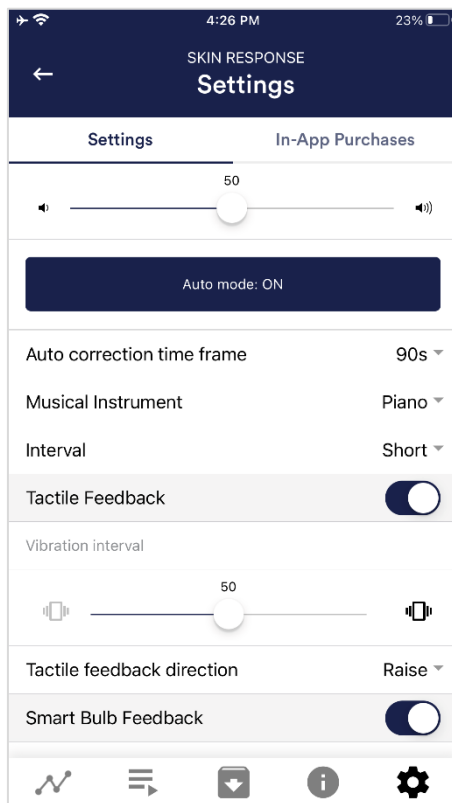
**Value range from-to (Not visible when auto mode is enabled)** You can set the area in which the feedback is active. We recommend selecting the range wide at the beginning and to set it smaller over time if necessary. Alternatively, you can use the automatic mode.

### Auto correction time frame (Only visible when auto mode is enabled)

You can specify the time window in which the automatic mode adjusts itself each time.

### Musical instrument

You can choose from various preset instruments.



### Interval

Set an interval for the tone feedback.

### Tactile Feedback

Your device will vibrate to provide feedback. Only smartphones support this feature, tablets do not have a vibration motor.

### Tactile feedback direction

Decide whether decreasing ("Decrease") or increasing ("Increase") tactile feedback values should be considered a success.

### Smart bulb feedback

The light bulb changes its color depending on the values.

### Choose a bulb

Choose between Magic Blue, Magic Blue V2 or Phillips Hue.

### Connection test

With this option, the bulb changes color if the connection is successful.

### Breath Pacer

If activated, a breathing aid is displayed during the measurement.

### Breath pacer type

You can choose between line and sphere.

### Enable audio tone

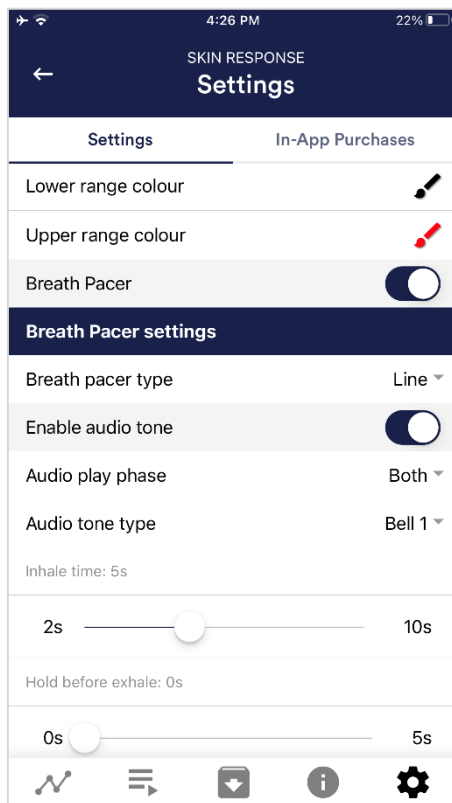
Tones can also be added as auditory breathing aids.

### Inhale time / exhale time

Select the seconds for each inhalation breath and exhalation breath to display the breathing aid.

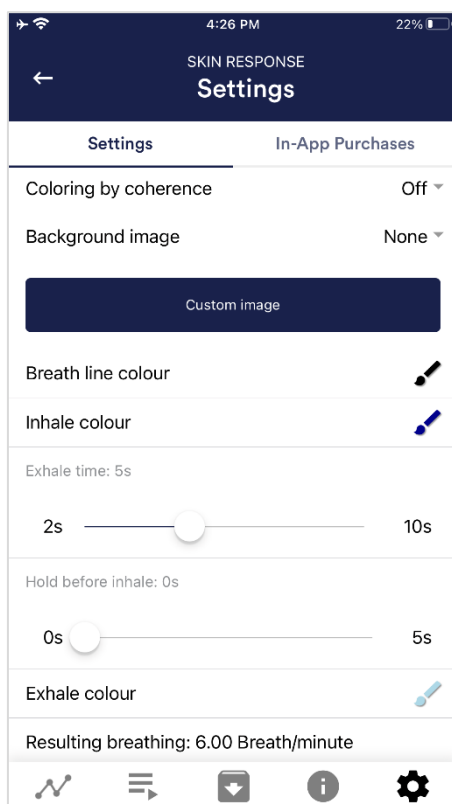
### Hold before inhale / exhale

Select the seconds between inhalation and exhalation breaths



#### Inhale color / exhale color

Select the color for each inhalation and exhalation stroke of the bar or ball.

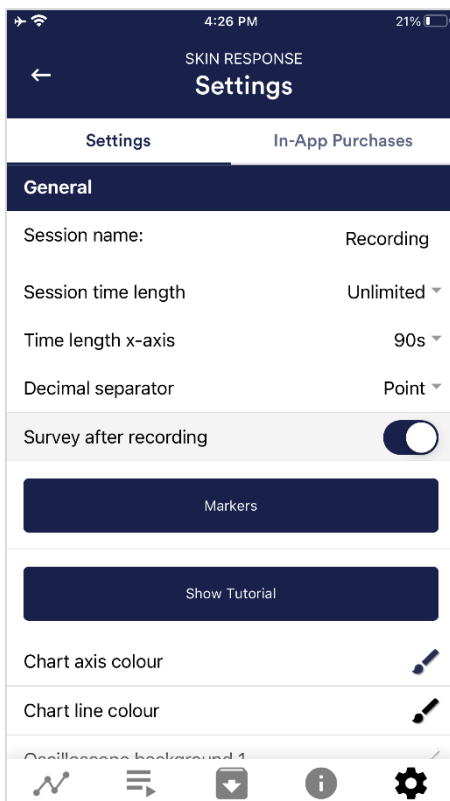
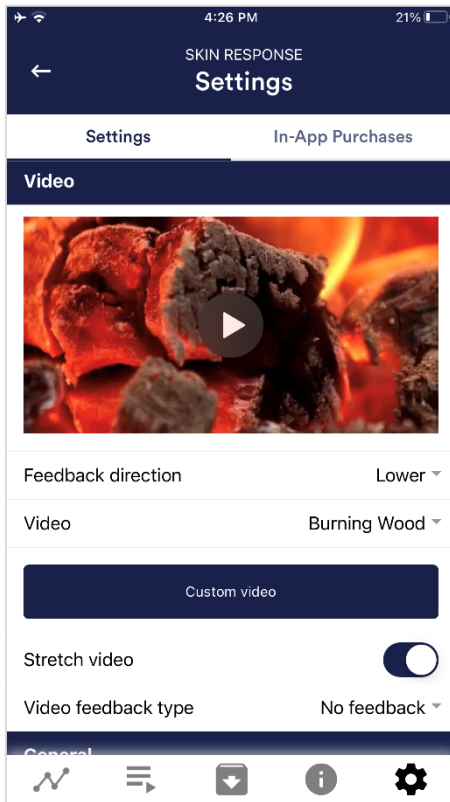


#### Video

Choice: In the dropdown menu, you can select from included videos and "Select your own video". You can select your own videos from your device.

#### Video Feedback Type

Effects can be applied to the video as feedback. You can choose between Start/Stop, Sharpness, Brightness and Saturation. In addition, the automatic or manual mode for selecting the upper and lower limits is then available for sharpness, brightness, and saturation. In between is then interpolated. "No feedback" is also possible, then the video is simply played.



### Session name

Enter the name of your session which will be displayed in the archive here.

### Session time length

You can automatically time-limit normal measurements. They stop automatically after the set time.

### Time length X-Axis

You can set the time displayed on the X-axis of the oscilloscope. We recommend 90 seconds.

### Decimal separator

You can choose between comma or dot.

### Survey after recording

Here you can activate/deactivate the survey (position, electrode type, mood, notes) after each measurement.

### Markers

You can define markers by tapping the button. These are the markers you can set during a measurement. (See also 'Set Marker' in Landscape mode of the general view above).

### Show tutorial

You can watch the tutorial again at any time from the first start of the app.

### Chart settings

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

### Chart axis color

You can change the color of the chart axis in the main view.

### Chart line color

You can change the color of the chart line in the main view.

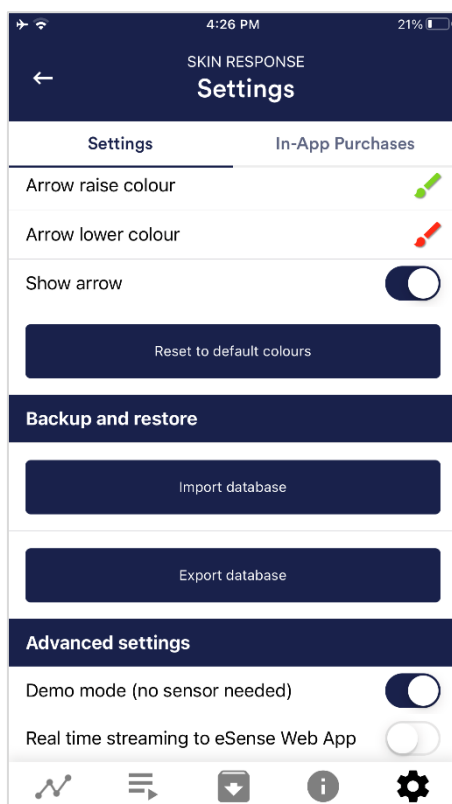
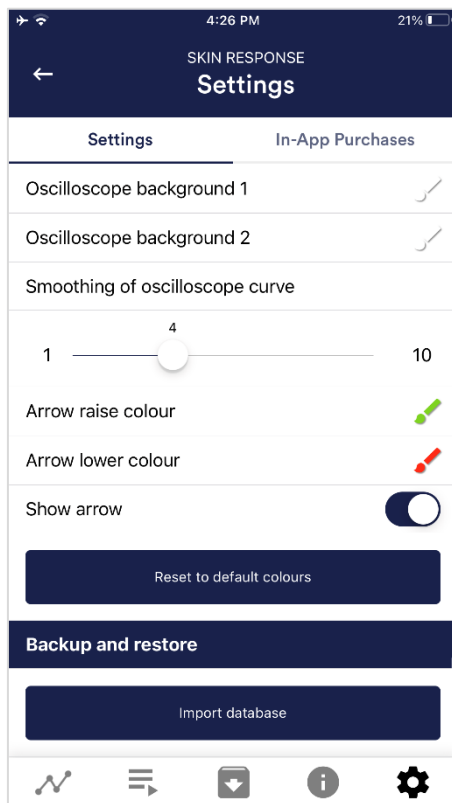
### Oscilloscope background 1&2

You can change the background color of the oscilloscope in the main view.

### Smoothing of oscilloscope curve

You can adjust the smoothing of the curve in the oscilloscope between 1 (hardly) and 10 (very strong).





### Arrow raise / lower color

You can change the color of the arrow in the main view.

### Show arrow

You can also disable the arrow in the main view.

### Reset to standard colors

You can restore the default colors for the graph at any time.

### Backup & Restore

You can export and import your procedures and measurements. More about this in our FAQ

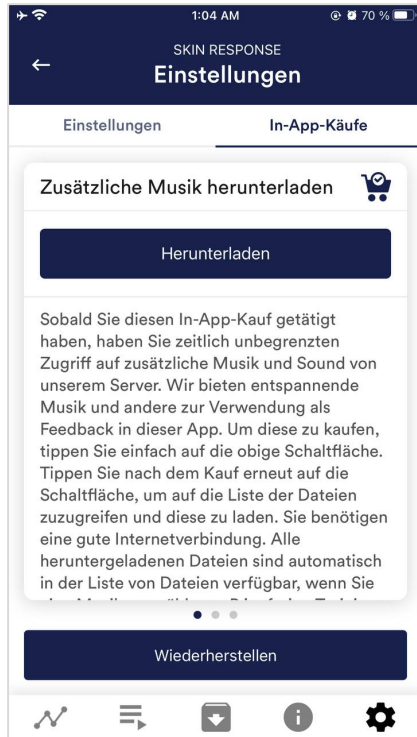
### Demo Mode

A saved measurement is played back automatically. A real sensor is not needed.

### Real time streaming to eSense Web App

This allows you to stream the data live to the eSense Web App. More information in the Account and Cloud section.

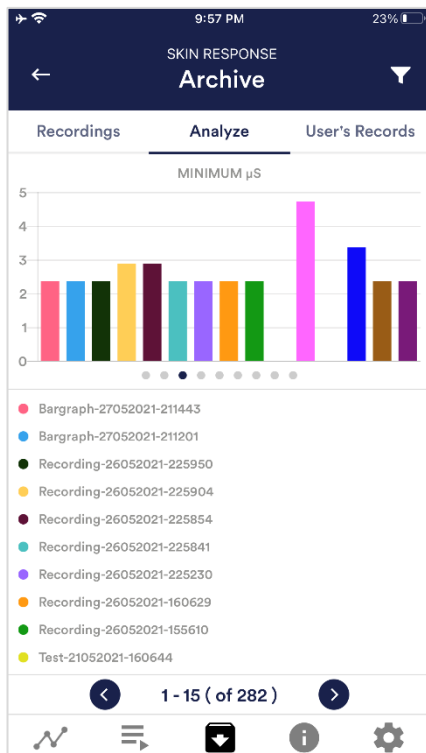
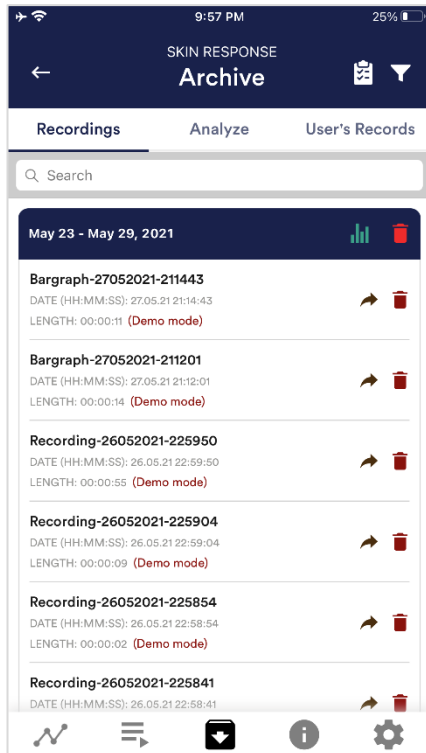
## In App Purchases



## In-App Purchases

Additional to the option to use your own music or videos in the eSense App you can also purchase additional music or videos. We regularly extend the offer.

## 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

Here you can see your measurements listed. You can view a single measurement by tapping on it.

If you click on the clipboard symbol at the top right, you can mark one, several or all measurements. You can then export, analyze or delete the exported measurement (s).

On the filter symbol you can choose whether you want to sort the measurements by name, date, length in ascending or descending order.

If you want to delete a single measurement from this list, you can also tap on the trash can symbol to the right of the measurement.

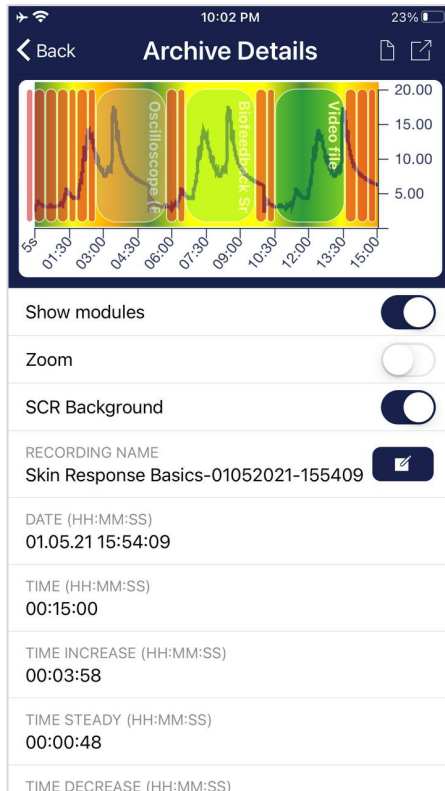
### Analyze

Here all measurements are listed according to the following factors:

Time, Average of Session  $\mu S$ , Minimum  $\mu S$ , Maximum  $\mu S$ , Difference Min/Max  $\mu S$ , 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 immediately).

## Archiv (individual view)



## Export data

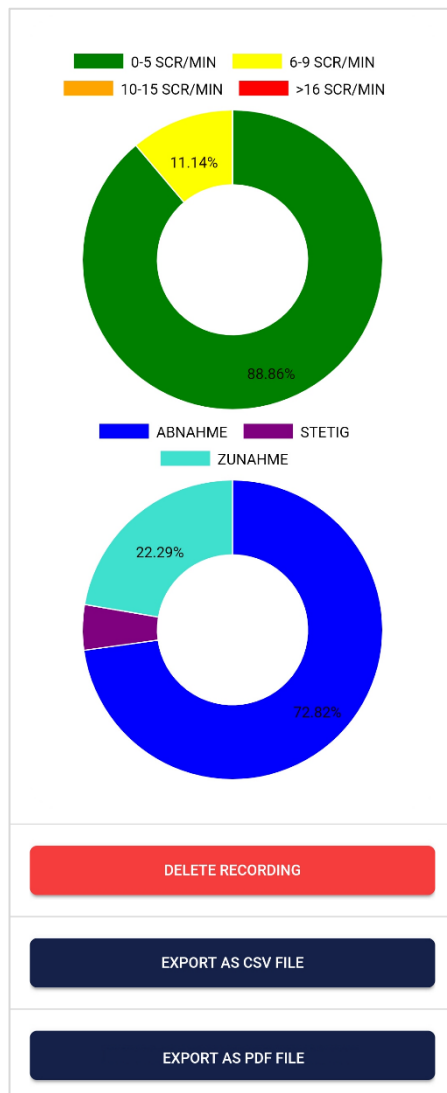
If you click on the export symbol on the top right, you can export the measurements as a .csv-file with all common apps (for instance, send over the Messenger, WhatsApp, email, etc.) or simply save them on your device or in your cloud.

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:

[www.mindfield.de/esense-csv-guide](http://www.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.

## Parts of increase/decrease/steady

In the pie chart you can see the parts in which the measured values were increasing, decreasing or steady.

## Export as PDF File

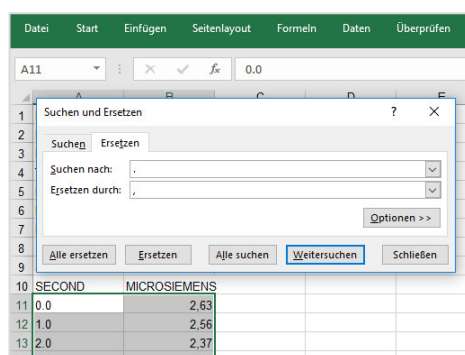
You can export the measurement also as PDF alternatively. Note: This takes a moment

## 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™.

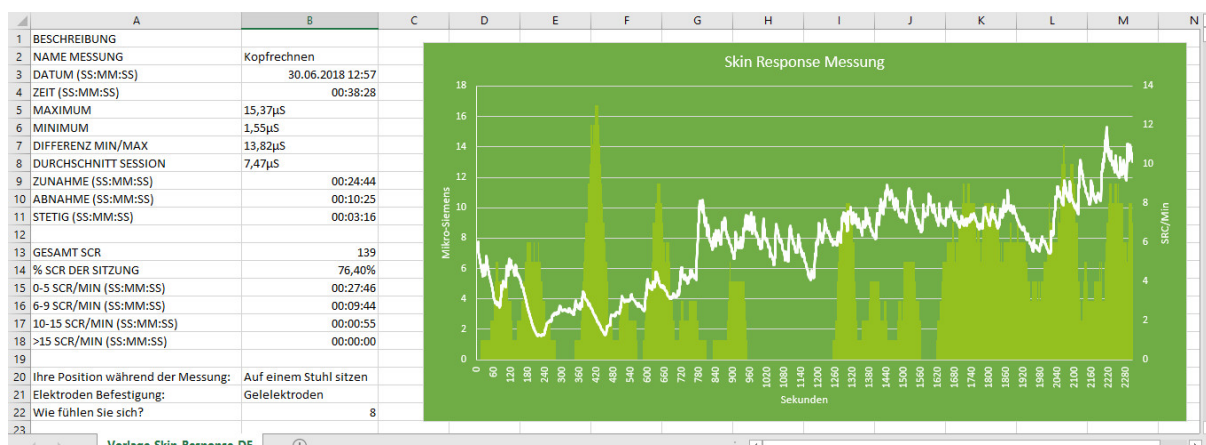
**Notice:** We have also created a detailed guide for the CSV export and the processing of your data in a separate guide. This can be found under the following link:

[www.mindfield.de/esense-csv-guide](http://www.mindfield.de/esense-csv-guide)



SECOND	MICROSIEMENS
0.0	2.63
1.0	2.56
2.0	2.37



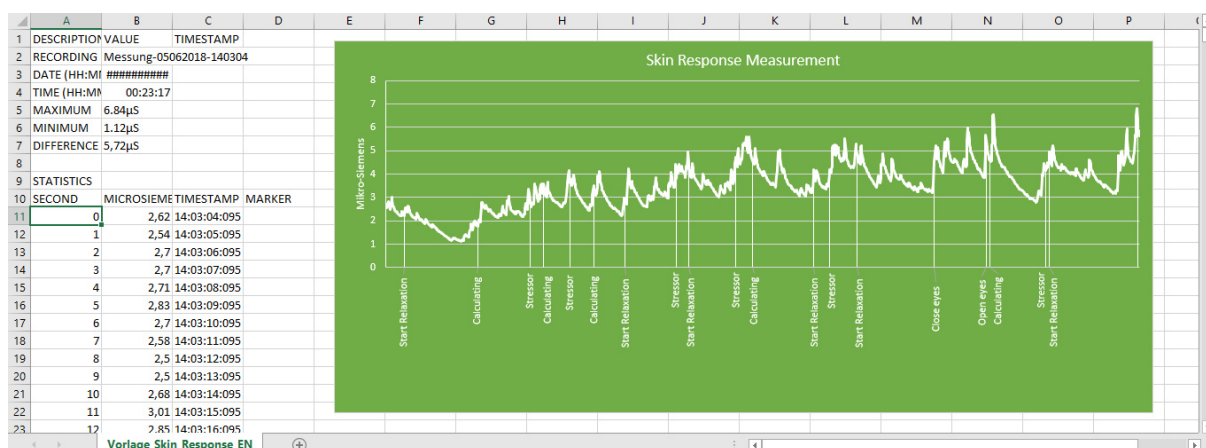


Exported data in Excel with SRC/min in the background (green bars)

## 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

## Account and Cloud

You can register your own, free account for the eSense app and book plans. You can also benefit from free, regularly added procedures without booking a plan. Thus, we recommend using the app with an account. With the plans you can mainly use the cloud and its functions and get also access to the eSense web app.

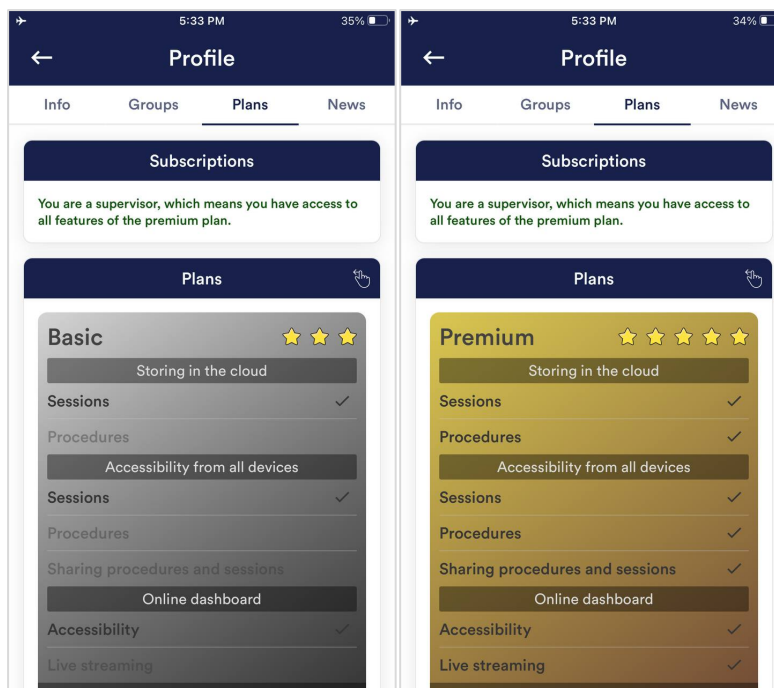
With the Basic plan, you can save your measurements locally and online in the cloud and thus access your measurements from all devices and from anywhere. You also get access to the eSense web app.

The Premium Plan includes all functions of the Basis Plan. In addition to your measurements, you can also save your custom procedures online in the cloud and thus access your procedures from all devices. (Attention: Technical limitations from Apple unfortunately do not allow the upload (and thus the synchronization) of audio files. The synchronization of picture and video files is possible, however).

You can also share your measurements with other users as Premium plan user. You also have the option to live stream your data to the eSense Web App in real time.

These plans can be used, among other things, to design a trainer's client's workflow. An overview of the account and the cloud in our separate PDF: <https://mindfield.de/dwnld.php?download=191>.

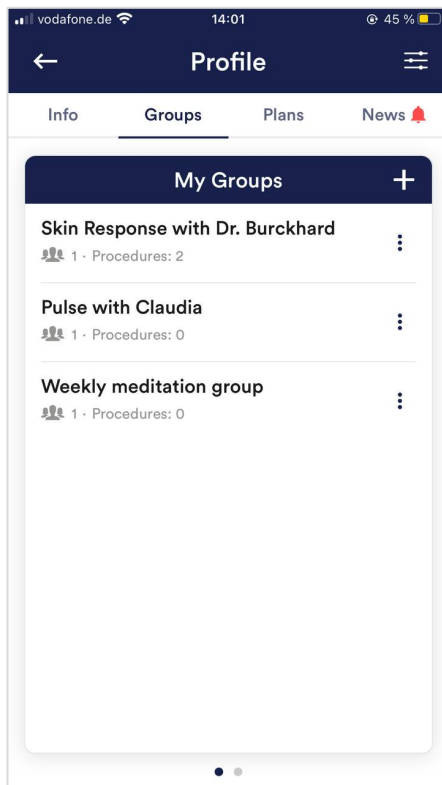
You can book the plans in our app in the profile tab:



## Plans in Profile Tab

## Groups

The accounts enable you to create your own groups or to join other groups. This allows you to share your recordings with your friends. Or you can work with a trainer as a client since you can share your recordings with the trainer.



### Create a group

Tap on the plus symbol to create a group.

### Edit a group

Tap on the 3 dots next to the group name. You can then (if authorized) view and remove the members of the group or add new members. You can also change the title of the group or delete the group.

## eSense Web App

In addition to the app, we have also developed an eSense web app that mirrors and supplements the app. You can use this with the account and plans mentioned above.

You can analyze your recorded data (with the basic plan) or even transfer your data to a PC in real time (live streaming with the premium plan).

The main advantage of this is that you can see the graph even better with a large screen and enlarge individual areas and have more advanced analyze features.



### eSense Web App with a live measurement with the eSense Pulse

With the eSense Web App, you can also view measurements from several and different eSense simultaneously and in real time, which allows a professional trainer client to design the workflow.

You can find the web app at [www.esense.live](http://www.esense.live). There you can login with the same account (username and password) as for the eSense app. You can find more information about the eSense Web App and its possibilities in our separate PDF for streaming data (<https://mindfield.de/dwnld.php/?download=187>) and our YouTube videos ([https://www.youtube.com/channel/UCNFYv0kkoKQvGL-SGGbh\\_cw/](https://www.youtube.com/channel/UCNFYv0kkoKQvGL-SGGbh_cw/)).

## Supported devices Android

- All Android Smartphones and Tablets from Android 7.0 (Nougat)  
**Your Android device requires a 3,5mm jack (headphone jack) for external microphones!** For Android devices without a headphone jack, you can use an adapter with a DAC chip. We recommend this adapter on Amazon:  
<https://amzn.to/2SnAUA1>
- If you plan on purchasing a device for using the eSense, we suggest a Nokia 2.4 (<https://amzn.to/3oIUjyn>), a Nokia G20 (<https://amzn.to/35JPDvS>), a Motorola Moto E7i Power (<https://amzn.to/3GyOh3X>) or a Xiaomi Redmi 9a (<https://amzn.to/32WHvao>) as an inexpensive entry-level device.

## Supported devices iOS

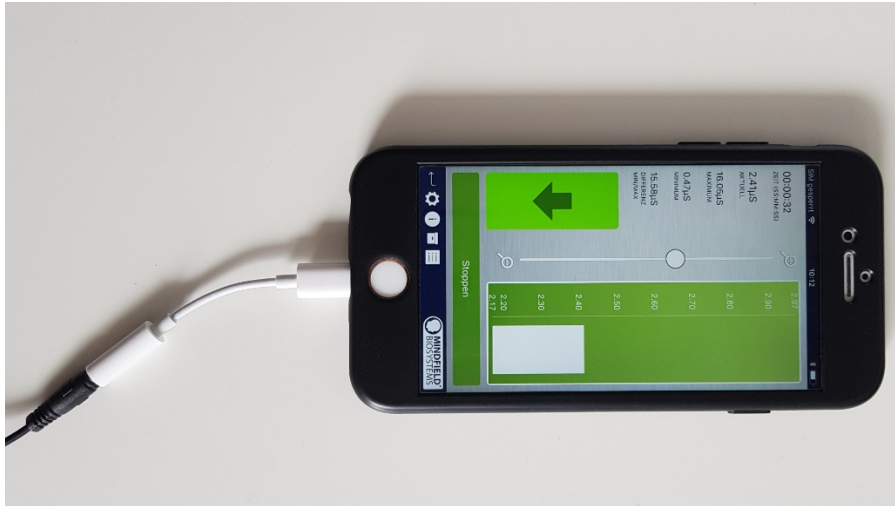
- **All iOS devices from version 12.5 or higher, which are (in part):**
- Apple® iPhone® 5S, iPhone® 6 / 6S, iPhone® SE / SE 2, iPhone® 7/7 +, iPhone® 8/8 +, iPhone® X, iPhone® XR, iPhone® XS, iPhone® 11/11 Pro, iPhone® 12/12 Pro
- Apple® iPad® from 5th generation (iPad Air) or newer, including all iPad Mini from 2nd generation
- Apple® iPad® Pro from 1st generation or newer
- Apple® iPod Touch® from 6th generation or newer
- **Note:** Some newer iOS devices without the classic 3.5mm headphone jack and with the newer Lightning / USB-C connector also work perfectly with the eSense. You either need an original Apple USB-C (<https://amzn.to/2OQYssu>) or original Apple Lightning (<https://amzn.to/2SJVG37>) to 3.5 mm connection adapter (not included in the scope of delivery of the eSense). Alternatively, you also can use any other adapter with a DAC chip. We recommend this adapter on Amazon: <https://amzn.to/2SnAUA1>

**Additional note Siri:** Please note that Siri can NOT be activated while you do a measurement with the eSense app (this applies to all eSense sensors). Otherwise a running measurement can be disturbed and your values be wrong therefore. You have to deactivate Siri YOURSELF (our app can't do this due to the settings of Apple).

In order to deactivate Siri go Settings -> (General ->) Siri and deactivate Siri (the exact steps can vary depending on the version of iOS).

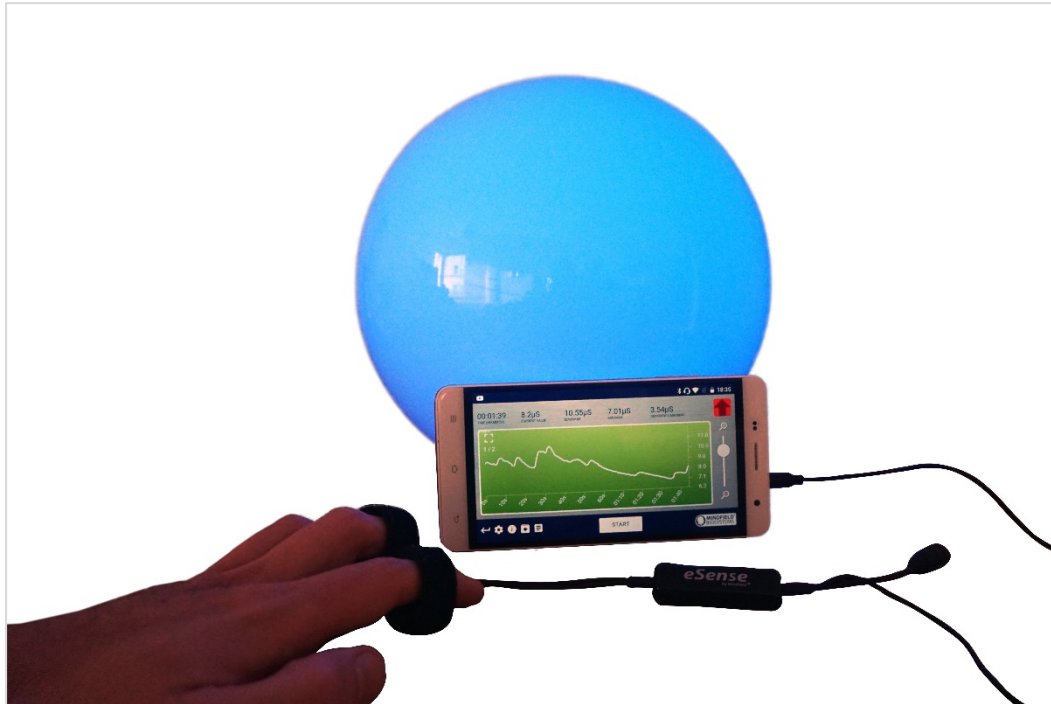


**Additional note for users who have iOS 7 or higher:** The eSense works through the microphone port. If you have iOS 7 or higher, you have to give the eSense app permission to use the microphone port, otherwise it will not work. You will be asked for permission asked during installation, so please answer 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**

## 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 more information about the smart bulbs in our FAQ:

<https://www.mindfield.de/dwnld.php?download=161>

## Magic Blue

You can buy the Magic Bulb at our shop at [www.mindfield-shop.com/en/product/magic-blue-v2/](http://www.mindfield-shop.com/en/product/magic-blue-v2/).

## Philips 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.

## Electrode types

### Velcro electrodes



- ✓ Easy to use
- ✓ Reusable
- ✓ Cheap
- Worse conductivity

You can order Velcro electrodes here:

[www.mindfield-shop.com/en/product/eda-velcro-electrodes-for-measurement-of-skin-conductance-8-pieces/](http://www.mindfield-shop.com/en/product/eda-velcro-electrodes-for-measurement-of-skin-conductance-8-pieces/)

### Finger clips (without gel)



- ✓ Easy to use
- ✓ Reusable
- ✓ Comfortable
- Worse conductivity

You can order the Finger clips here:

[www.mindfield-shop.com/en/product/gsr-finger-clips-without-gel-2-pieces/](http://www.mindfield-shop.com/en/product/gsr-finger-clips-without-gel-2-pieces/)

## Gel electrodes (disposable)



- ✓ Easy to use
- ✓ Best quality of signal
- Useable just once

### Our prior recommendation

You can order the gel electrodes here:

[www.mindfield-shop.com/en/product/emg-ecg-eda-single-use-electrodes-for-adults-with-comfortable-breathable-fabric-pre-geled-50-pieces/](http://www.mindfield-shop.com/en/product/emg-ecg-eda-single-use-electrodes-for-adults-with-comfortable-breathable-fabric-pre-geled-50-pieces/)



## EDA gel electrodes (reusable)



- ✓ Best quality of signal
- ✓ Complex application
- Additional gel necessary

### For professional use

You can order the EDA gel electrodes here:

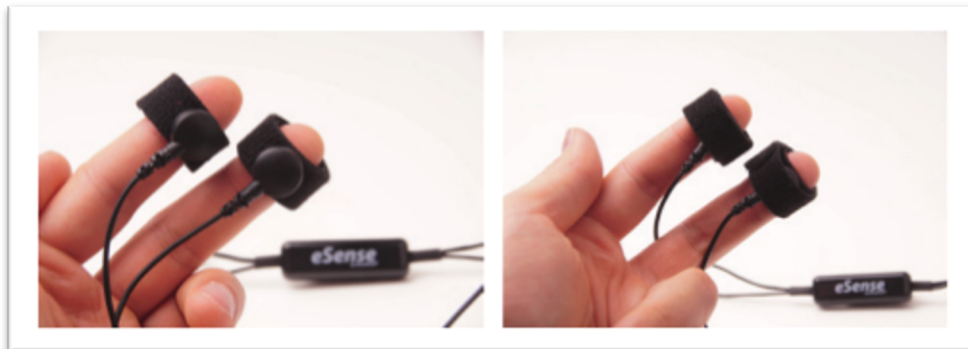
[www.mindfield-shop.com/en/product/eda-gel-electrodes-reusable-3-pieces-incl-99-adhesive-rings/](http://www.mindfield-shop.com/en/product/eda-gel-electrodes-reusable-3-pieces-incl-99-adhesive-rings/)



## Possible electrode positions

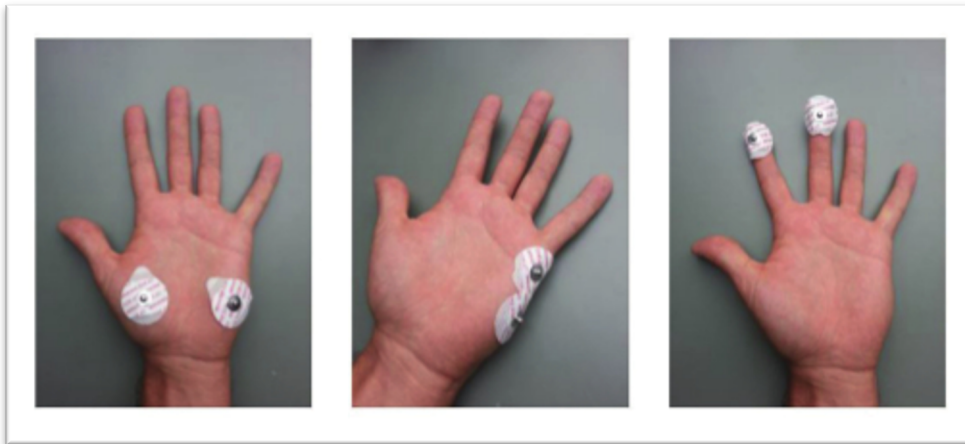
General information for the skin preparation (independent from the electrode type): Skin preparation or skin cleansing is usually not necessary and also not recommended. It is enough to wash the hands, although the soap dries the skin and lowers the measured values. The same applies to the skin cleansing 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



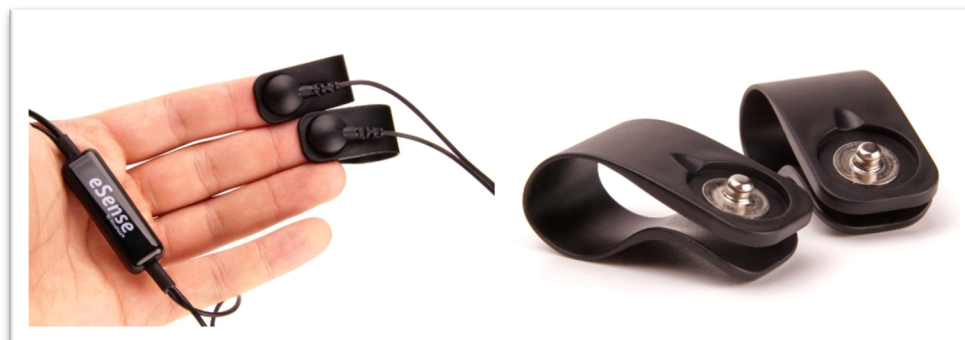
Wrap the Velcro electrodes around the upper and middle phalanx of the index and middle finger. Make sure the silver electrodes touch the surface of your skin directly. Then connect the press button wires with the electrodes. You can wrap the Velcro around the press button ends once again to stabilize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

## Gel electrodes



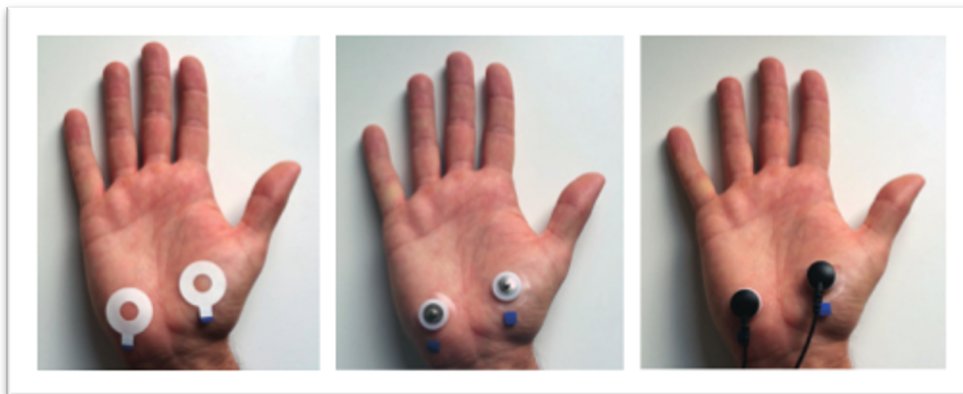
We recommend the single-use gel electrodes. There are three different possibilities of the areas of conduction, as shown in the images. All positions are equivalent. Simply connect the electrodes wire through the press button connectors with the electrodes.

## 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.

## Technical Data

Measurement using direct voltage with a voltage source of 0.61V DC and a source resistance of 61.5 kOhm.

The maximum DC patient auxiliary current according to EN-60601 medical device standard is thus within the limit value of 10uA DC.

**Sampling frequency:** 5 Hz (5 measured values per second)

The measured values are saved for exporting the data and can be exported as a CVS file in the app.

**Resolution of the measured values:** 18 bit, rounded to 2 decimal places, i.e. 0.01uS in data export without rounding.

**Measuring range:** 10 kilo-ohms to 1 mega-ohm corresponding to 100uS .. 1uS. Possible deviation of + - 5% over the entire measuring range on average.

## 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.  
Hindenburgring 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**

  
 **MINDFIELD®**  
BIOSYSTEMS  
www.mindfield.de  
A Better State of Mind

Niko Rockensüß, Managing Director



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

WEEE-Reg.-Nr. DE 24465971



## Privacy policy

The eSense App does not collect any personal data, such as name, gender, date of birth, etc..

Each recording of measurement data is done under a general prefix such as "measurement", supplemented by with the eSense sensor used, the current date and time of the measurement. The recorded measurement data cannot therefore be assigned to any person.

The prefix of a recording, e.g. "measurement", can be changed by the user in the settings and used for the assignment to a person. Users can decide whether to change this prefix to their name, for example. Then each measurement and also each CSV file exported from it contains the name of the user in the file name.

### Access rights within the eSense App

1. Microphone input: Access to the microphone input is required to receive measurement data from the eSense sensor at all.  
This access is mandatory.
2. Access to media library: Access to photos, music, and videos is only required if you want to use your own photos, music, and/or videos in the eSense App. The eSense app should be used as feedback. It is also possible to use only the by the app supplied media.
3. Access to the location: The access to the location (activation of GPS) is only required for the Bluetooth connection to the Magic Blue bulb (optionally available) or the eSense Pulse. This is mandatory under Android and lies outside the possibilities of the publisher of the eSense App. No standard data is collected, the standard function is not used.
4. Access to Bluetooth: If the eSense app is used with the Magic Blue smart bulb to provide biofeedback by modifying the color and brightness of the light bulb, it needs to be connected via Bluetooth within the app. To do this, the Bluetooth function is used. For the eSense Pulse Sensor, Bluetooth is also required as it transmits the data via Bluetooth.

## Transmission of anonymous usage data and crash reports

In order to improve the technical stability of the eSense App and the detection of code errors, we use the Sentry service. Sentry serves these purposes alone and does not evaluate any data for advertising purposes. The transmission takes place anonymously and only with an existing internet connection.

### Processed data

Usage data, metadata (device ID, device data, IP address).

Special protective measures: IP masking, immediate deletion.

External Functional Software Disclosure: Functional Software Inc., Sentry, 132 Hawthorne Street, San Francisco, California 94107, USA.

Privacy Policy: <https://sentry.io/privacy/>.

Processing in third countries: USA

Warranty for processing in third countries: Privacy Shield,  
<https://www.privacyshield.gov/participant?id=a2zt0000000TNDzAAO&status=Active>.

Deletion of the data: Information on the device or time of error is collected anonymously and is not used for personal purposes and then deleted.

### Medical information

The Mindfield eSense sensors are not medical devices and may therefore only be used to reduce stress.

If you suffer from an illness, do not carry out any treatment on your own and always consult a therapist.

