

Instructions for displaying eSense measured values in Microsoft Excel™ and Google Sheets™

eSense App Version 3.2.6 | 12/02/2019

General information

The exported files are always CSV files. CSV stands for "Comma separated values". This means that a comma separates the values in the file (,).

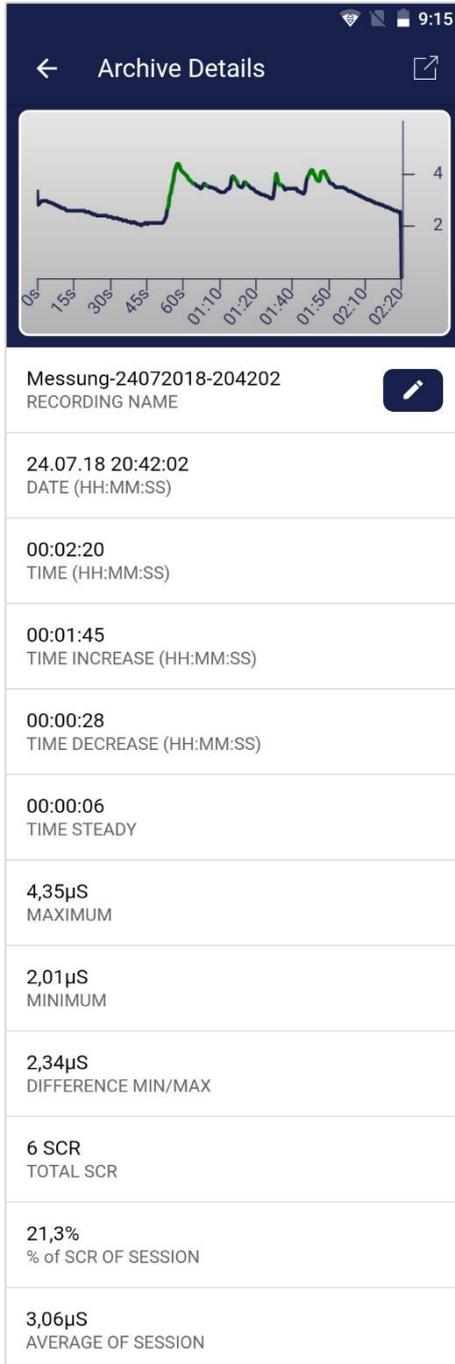
These CSV files can be opened and edited with programs such as Microsoft Excel™ and Google Sheets™. It is also possible to import and edit the CSV files with programming languages or frameworks such as SPSS™, Matlab™, R™, Python™, Numpy™ and Tensorflow™. This guide applies to Microsoft Excel™ and Google Sheets™.

Your settings at Excel™ and Google Sheets™ are decisive. The eSense app adapts the measured values to the language used. In English, the numbers are usually separated by a dot. Therefore, 1.5 in the English version becomes 1,5 in the German version. Because of different languages in the eSense app and Excel™ or Sheets™, you may open the CSV file with Excel™ or Google Sheets™ and notice that the numbers don't make sense.

In principle, therefore, the following applies: If you use Excel™ or Sheets™ in German, you should also use the eSense app in German. If you use Excel™ or Sheets™ in English, you should also use the eSense app in English. This saves you the first 2 steps (replacing decimal separators and splitting values into columns), and you can start with step 3 (applying skin conductance against time).

The examples shown in this manual are mostly referring to the eSense Skin Response. In general, you can edit the data from the eSense Temperature or the eSense Pulse in the same way.

Exporting measured values from the Mindfield eSense app



The app includes an archive where you can see, compare and export your recordings.

Export data

By clicking on the **export icon in the upper right**, you can export the recordings in .csv format with all common apps (e.g. send via Messenger™, WhatsApp™, email etc.) or simply on your phone or in your cloud (e.g. Google Drive™ or Dropbox™).

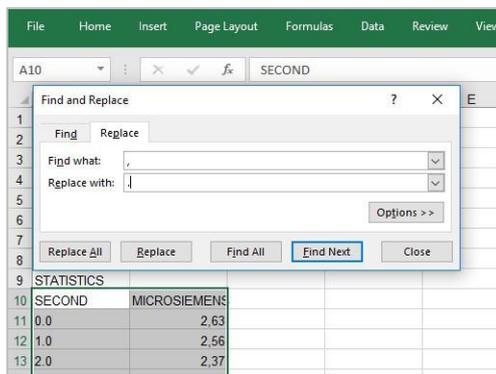
The data is exported as a .csv file (comma-separated values). You can open this file format with Microsoft Excel™ or Open Office Calc™ (free alternative to Excel).

If you like working with Google, Google Sheets™ (Google Tabellen™ in German) can also be an alternative to Excel for you. You can also open and visualize your exported .csv files and easily access them from multiple devices via the cloud. Google Spreadsheets has almost the same functions as Excel and a very similar operation.

Microsoft Excel™

1. Replace decimal separator (only necessary if you have different language settings in Excel™ and in the eSense app)

- 1.1. Press Ctrl and H (search and replace).
- 1.2. Replace all commas "," with semicolons ";" (replace the column separator).
- 1.3. Replace all commas "," with periods "." (replace decimal separator).



Replacing decimal separator

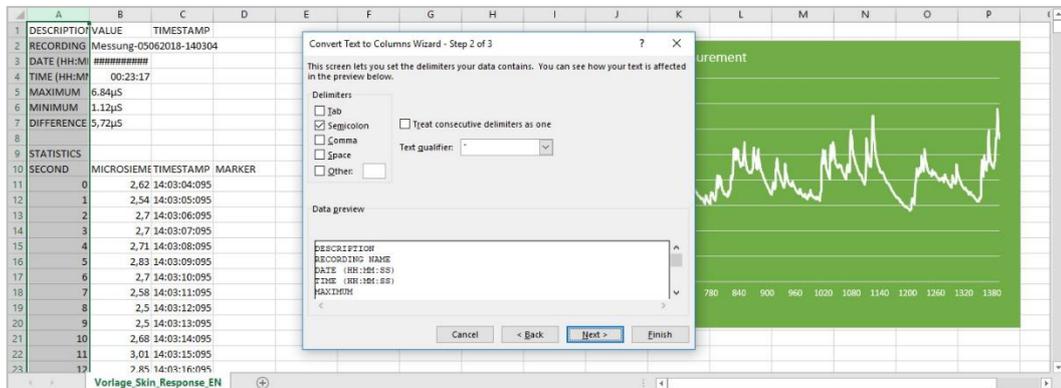
- 1.4. Alternatively, you can change the decimal separator used by Excel™ by default: Click File---Options--Advanced. Deactivate the item "Take over separator from operating system" and select dot as decimal separator and comma as thousand separator.

2. Split values into columns (only necessary if you have different language settings in Excel™ and in the eSense app)

The values for time and measured value are still in the first column, separated by commas or semicolons. You must divide them into two columns.

- 2.1. Select the entire first column A.
- 2.2. Click on the "Text to columns" function in the "Data" menu.
- 2.3. Select file type "Delimited" and click on next.
- 2.4. Choose the separator comma (,) or semicolon (;), depending on which character separates the values.

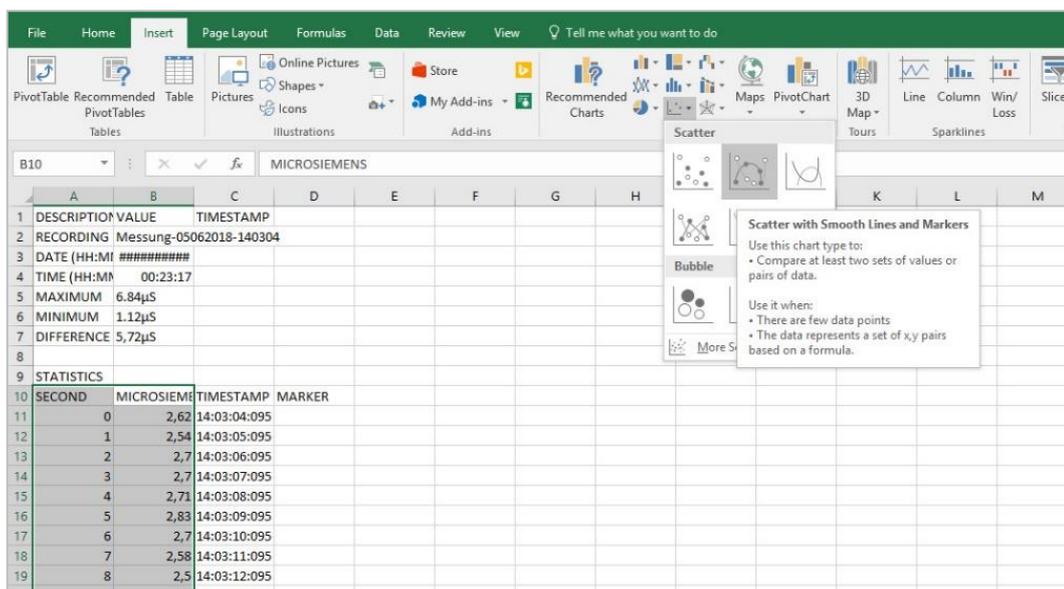
2.5. Click on "Next", Column data format "General", and "Finish".



Splitting values into columns

3. Draw skin conductance against time

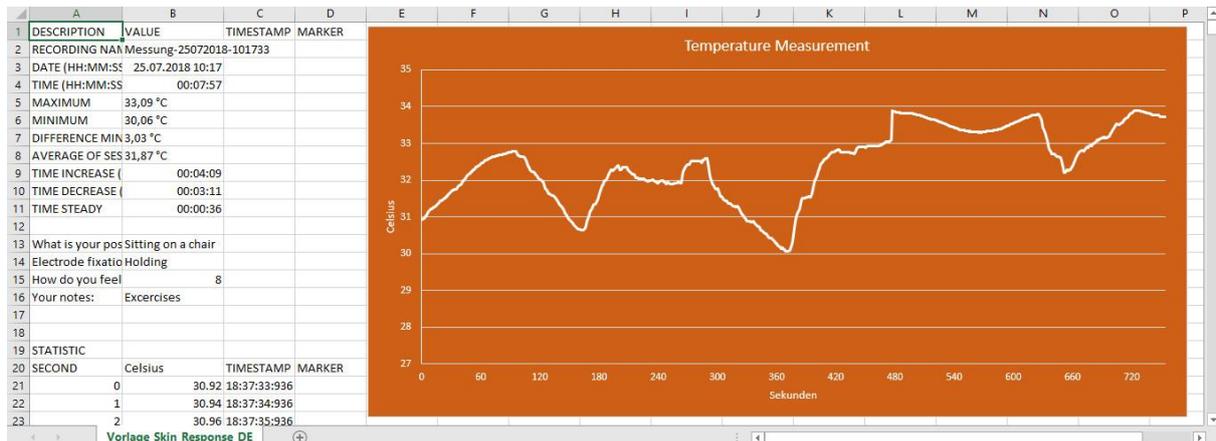
- 3.1. Mark both columns (Seconds and Micro Siemens/Celsius/Fahrenheit) completely (Tip: with the mouse, click into the column where "MicroSiemens", "Celsius" or "Fahrenheit" is written. Press the CTRL and Shift keys simultaneously, then hold those keys down and press the left and down arrow keys. With this abbreviation, you can quickly select both columns, even for thousands of measured values).
- 3.2. Select the diagram type "Scatter" in the "Insert" menu and then the diagram type "Scatter with smooth lines and marker". You get a diagram with the time in seconds in the horizontal axis. Alternatively, you can also select "Line".
- 3.3. **Note:** If you are using the latest version of Excel™, you can also try "Recommended graphs". Often Excel™ already recognizes the graph automatically.



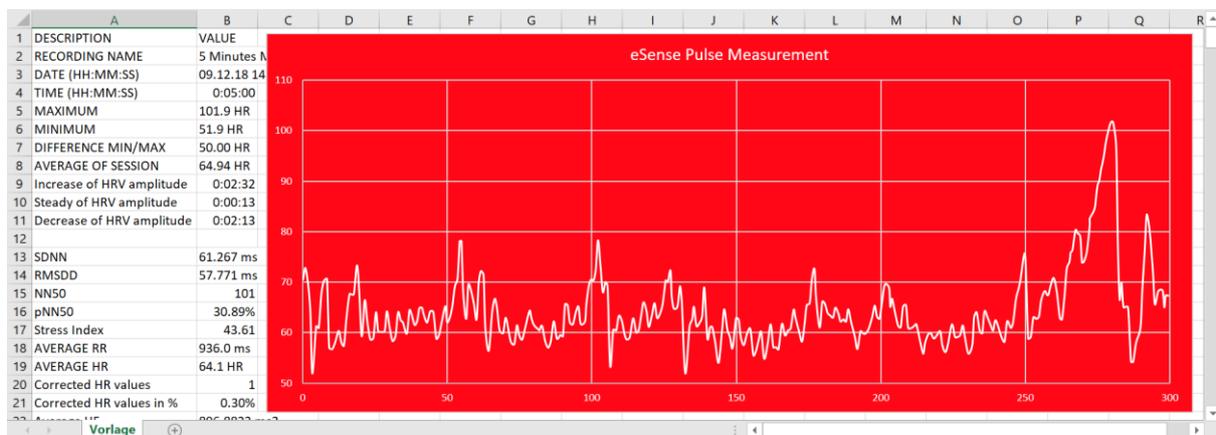
Create graph (Scatter with Smooth Lines and Markers)



The finished diagram (Type Line) from a measurement with the eSense Skin Response



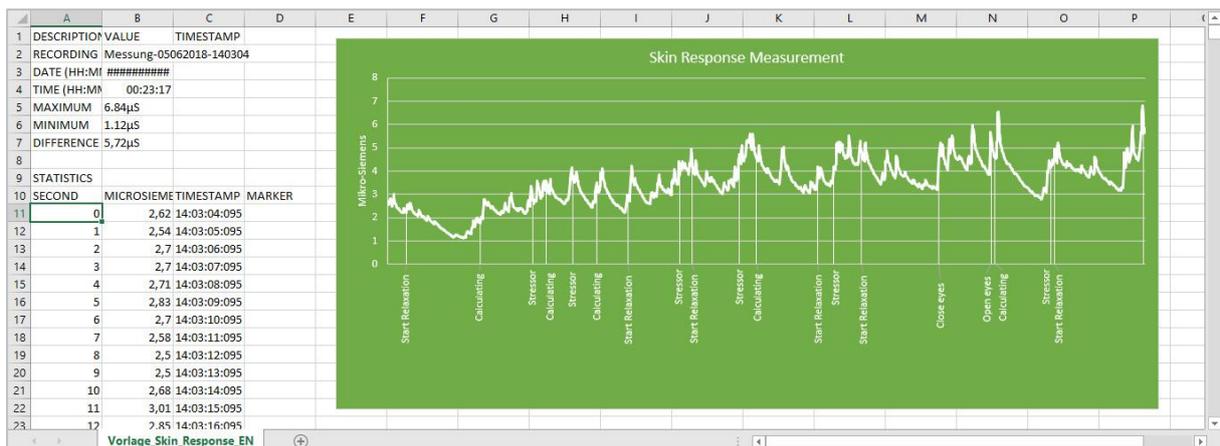
The finished diagram (Type Line) from a measurement with the eSense Temperature



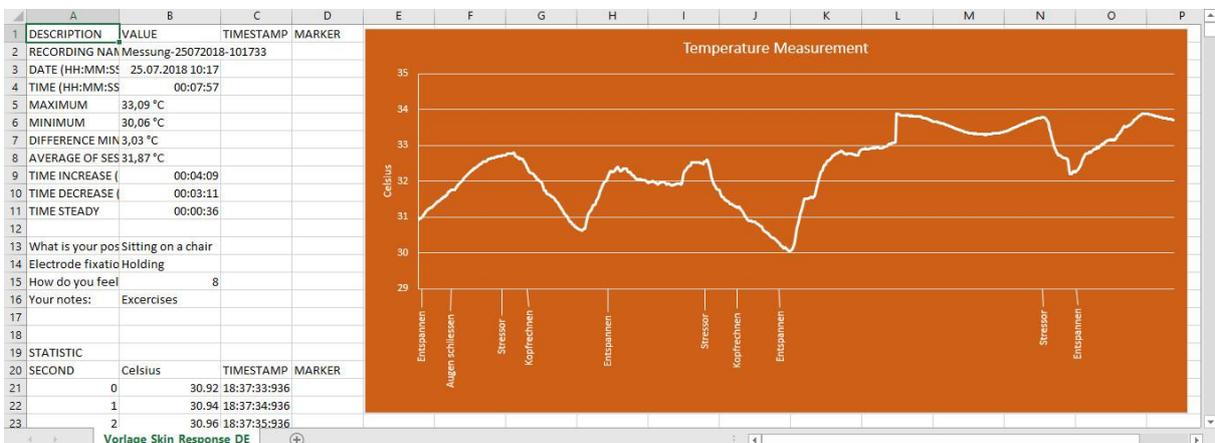
The finished diagram (Type Line) from a measurement with the eSense Pulse

4. Draw skin conductance against markers

- 4.1. First create the diagram from the previous step 3 (Draw skin conductance against time).
- 4.2. In the menu under "Diagram tools" -> "Design", select "Select data". A new mask will appear.
- 4.3. Under "Legend entries (rows)", select "Add".
- 4.4. Enter a series name (for example "markings") and select your markings for the row values (in column D).
- 4.5. Select from the menu "Add chart element" -> "Data labels" -> "More data label options".
- 4.6. A menu will open on the right. There you can select "Label options" -> "Value from cells" (and deactivate "Value" if necessary). Another mask opens, and you have to mark your marks from column D again.
- 4.7. If you also want the lines to the positions in the graphs, you must select "Add chart element" -> "Drop Lines".
- 4.8. You can now adjust colors or fonts.



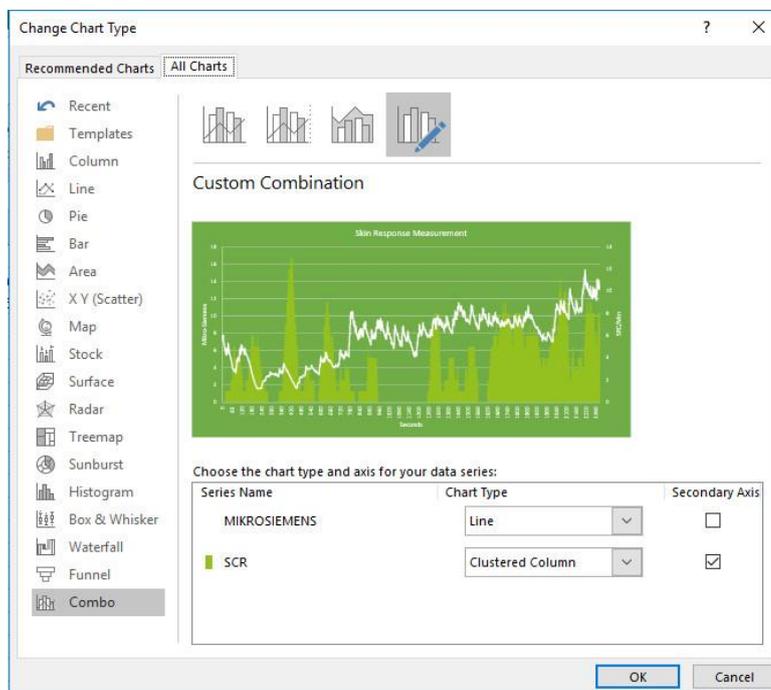
The finished diagram with markers from a measurement with the eSense Skin Response



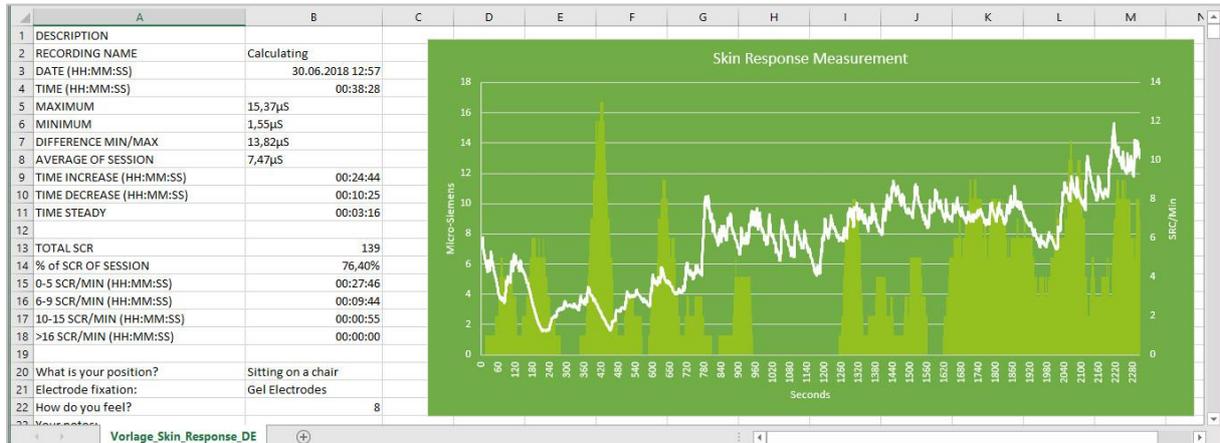
The finished diagram with markers from a measurement with the eSense Temperature

5. Draw skin conductance against SCR (just for the eSense Skin Response)

- 5.1. First create the diagram from the previous step 3 (Draw skin conductance against time).
- 5.2. In the menu under "Diagram tools" -> "Design", select "Select data". A new mask will appear.
- 5.3. Under "Legend entries (rows)", select "Add".
- 5.4. Enter a series name (for example "SCR") and select your markings for the row values (in column F).
- 5.5. In the menu at "Chart tools" -> "Design", choose "Change Chart type". A new mask will appear. In the tab "All charts" -> "Combo" -> "Custom Combination", choose the SCR "Clustered Column" in the dropdown menu and make sure that the tick at "Secondary axis" is set (see also following screenshot).



Add SCR series as Clustered Column



The finished diagram with SCR

Google Drive (Google Sheets™ / Tabellen™)

As in Excel™, complications with the separators can also occur here. The exported files are always CSV files. CSV stands for "Comma separated values". This means that a comma separates the values in the file (,).

Google often tries to format the data automatically. Then it can happen, among other things, that the measured values are interpreted as dates. To prevent this, you should first make sure that you select "Format" -> "Number" -> "Number".

1. Replace decimal separator (only necessary if you have different language settings in Google Sheets™ and in the eSense app)

- 1.1. Press Ctrl and H (search and replace).
- 1.2. Replace all commas "," with semicolons ";" (replace the column separator).
- 1.3. Replace all commas "," with periods "." (replace decimal separator).

	A	B	C	D	E	F	G	H	I
10	SECOND	MICROSIEMENS	TIMESTAMP	MARKER					
11	0.0	1.48	13:11:45:588						
12	1.0	1.50	13:11:46:588						
13	2.0	1.73	13:11:47:588						
14	3.0	1.94	13:11:48:588						
15	4.0	1.91	13:11:49:588						
16	5.0	2.17	13:11:50:588						
17	6.0	2.22	13:11:51:588						
18	7.0	02.08	13:11:52:588						
19	8.0	2.00	13:11:53:588						
20	9.0	1.93	13:11:54:588						
21	10.0	1.91	13:11:55:588						
22	11.0	1.88	13:11:56:588						
23	12.0	1.83	13:11:57:588						
24	13.0	1.82	13:11:58:588						
25	14.0	1.80	13:11:59:588						
26	15.0	1.80	13:12:00:588						
27	16.0	1.91	13:12:01:588						

Replacing decimal separator

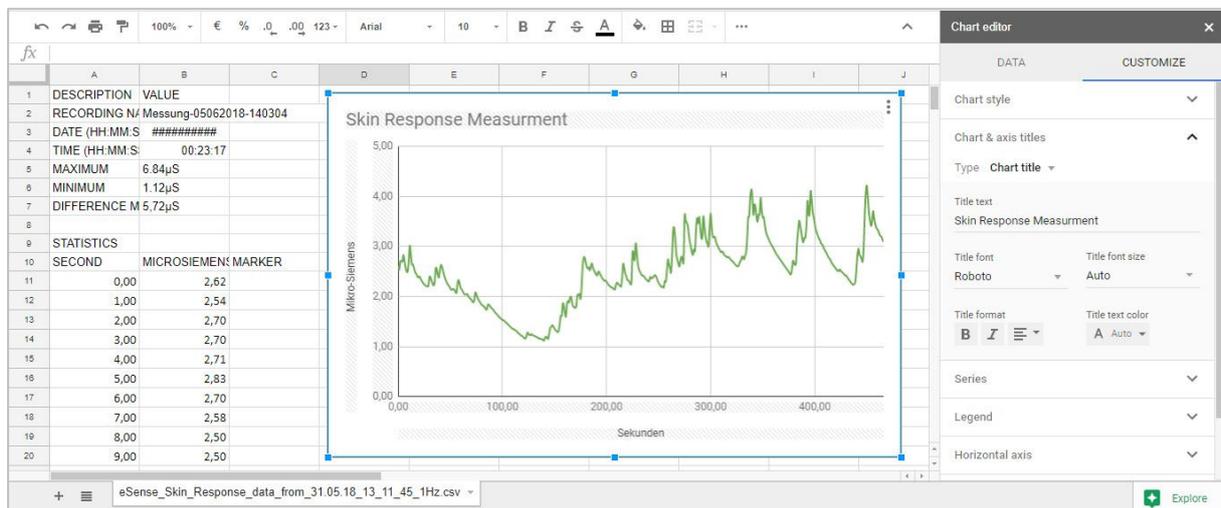
2. Split values into columns (only necessary if you have different language settings in Google Sheets™ and in the eSense app)

Depending on their language settings, the values for time and measured value are both in the first column, separated by commas or semicolons. You must divide them into two columns.

- 2.1. Select the entire first column A.
- 2.2. Click on "Split text into columns" in the "Data" menu.
- 2.3. Select file type "separate" and click on next.
- 2.4. Choose the separator comma (,) or semicolon (;), depending on which character separates the values.

3. Apply skin conductance against time.

- 3.1. Mark both columns (Second and Micro Siemens/Celsius/Fahrenheit) completely (Tip: with the mouse, click into the column where "Measured values" is written. Press the CTRL and Shift keys simultaneously, hold those keys down, and press the left and down arrow keys. With this abbreviation, you can quickly select both columns, even for thousands of measured values).
- 3.2. Select "Insert" -> "Diagram" in the menu. **Note:** Google Sheets™ often tries to automatically create the right chart. Sometimes this works well, sometimes it doesn't. If the diagram does not make sense, simply continue with the next steps.
- 3.3. Click on the diagram. A dialog box should open at the right margin. Select "Smoothed line diagram" as the diagram type. For "X-axis", make sure seconds are selected. For the "series", make sure that your measured values are selected. See the following screenshot.



The finished diagram

4. Enter main conductance against highlights

- 4.1. Delete column C with the time stamp.
- 4.2. Mark the column with your measured values and the column with your markings simultaneously (as shown in the following screenshot).
- 4.3. Select "Insert" -> "Diagram" in the menu. **Note:** Google Sheets™ often tries to automatically create the right chart. Sometimes this works well, sometimes it doesn't. If the diagram does not make sense, simply continue with the next steps.
- 4.4. Click on the diagram. A dialog box should open at the right margin. Select "Smoothed line diagram" as the diagram type. For the "series", make sure that your measured values are selected. Your markings should be selected as "Labelling". See also the following screenshot

