

Quick Guide Ambu® Manikin Management Module

Manage and create ECG signals

The training devices Ambu® Man Defib und Ambu® Man Advanced offer the functionality of ECG simulation. For this purpose, the devices already contain various predefined ECG signals. Via the interface of the Ambu® Manikin Management Module you can adjust the physiological parameters of these ECG signals and more.

Furthermore, you have the possibility to create a new ECG signal with the help of a template in CSV-format.

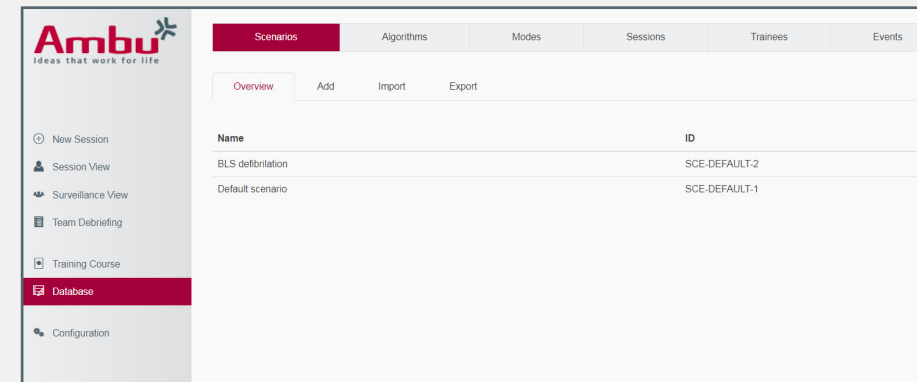
How to do this in detail, you will find out in the following sections.

1. Access "Controlled session"

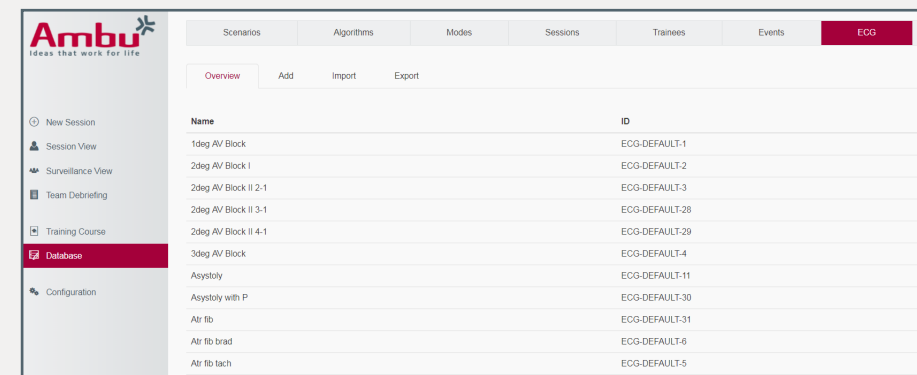


Start the training device and connect your end device to the training device. Enter **http://Ambu.login** or **192.168.1.1** into the address bar of your browser and select "Controlled session".

2. Manage ECG signals



On the left side, click on the menu item "Database".



Now click in the database on the "ECG" tab. Here you will find an overview of all saved sounds on the training device. If you click on one of the ECG signals, you get to the "Edit" tab.

Continuation: Manage ECG signals

In this view you have the possibility to change the name and physiological parameters of the selected ECG signal. In addition, you can see already a preview of the ECG signal.

The physiological parameters are given in the following units:

Parameter	Unit
Systolic blood pressure	mmHg
Diastolic blood pressure	mmHg
SpO ₂	%
etCO ₂	mmHg
Breathing	1/min
Heart rate	1/min

For saving  or deleting  the ECG signal use the two buttons below.

3. Create a new ECG signal

With the help of a template in CSV-format you can create your own ECG signal. You can download the template directly from the training device. To do this, go to the tab "Import" under "ECG" and click on "Download CSV template". Now you can save the CSV-file on your computer and edit it with a suitable spreadsheet program.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Name	?										
2	RR systolic	?										
3	RR diastolic	?										
4	SpO ₂	?										
5	etCO ₂	?										
6	Breathing	?										
7	Heart frequency	?										
8	Defibrillation display	?										
9	Frequency	?										
10	Pulse	(?)	(?)	(?)								
11												
12	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
13	?	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
14	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
15	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
16	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
17	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)
18	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)	(?)

Note: All fields with "?" are mandatory and all fields with "(?)" optional. If a mandatory field is not filled in, the file cannot be re-imported to the training device. The field "Defibrillation display" is an exception and can be left blank.

Continuation: Create a new ECG signal

In the upper part of the template are the fields for the name of the ECG signal and the physiological parameters. The units are shown in square brackets on the right. In addition, you can define the frequency of the signal in Hertz and the pulse. The frequency determines the temporal resolution of the signal and is set to 100 Hz by default.

In the lower part of the template the actual ECG signal is created. The columns represent the single leads of a 12-lead ECG and are labeled accordingly in the top line. The rows show the course of the signal over time. Any number of rows can be added until the desired signal length is reached.

Each row represents a certain point of time in the signal. The time interval depends on the entered signal frequency. At the standard frequency of 100 Hz corresponds each row to a time of 0.01 seconds.

$$1 \div 100 \text{ Hz} = 0.01 \text{ s}$$

In this way, the amplitude values entered in the cells can be uniquely assigned to a point in time. Furthermore, it is possible to calculate how many rows are required for the individual ECG sections.

Example:

For example, if a P-wave lasts 0.1 seconds, it extends over 10 rows in the template at a frequency of 100 Hz:

$$0.1 \text{ s} \div 0.01 \text{ s} = 10 \text{ rows}$$

If the frequency is changed, the ECG signal must also be adjusted accordingly, as otherwise the positions of the amplitude values do not correspond to the temporal resolution of the signal.

In the cells, the amplitude values are entered according to the respective lead (column) and the respective time (row). The amplitude values can be taken from real ECG signals, for example. Since these values are given in mV, they must first be converted from mV to a number of data points for display on the training device. Each data point corresponds to **0.011 mV**. The calculated value is then entered in the row corresponding to the time of the respective amplitude value.

Example:

The R-peak of an ECG signal has an amplitude value of **0.7 mV**. Calculated this corresponds to a value of **63** data points:

$$0.7 \text{ mV} \div 0.011 \text{ mV} \approx 63$$

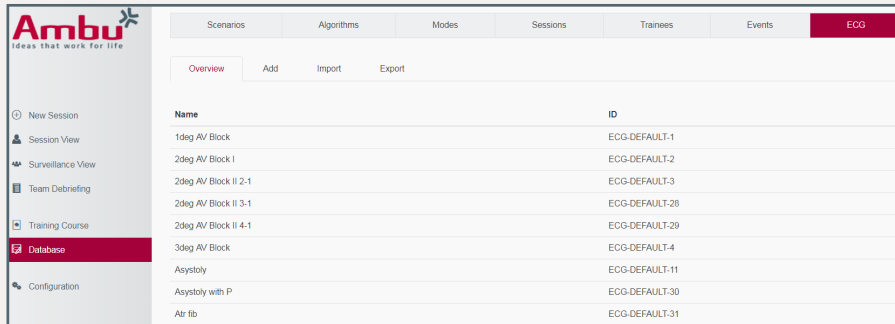
Calculate all values of the signal in this way and enter them in the correct row, so that the signal is displayed correctly.

Note:

For defibrillation, the signal should be at least 30 seconds long (equivalent to 3000 rows at a frequency of 100 Hz), otherwise the defibrillator may not recognize the signal as a defibrillatable signal.

When you have entered all data in the template, save the file.

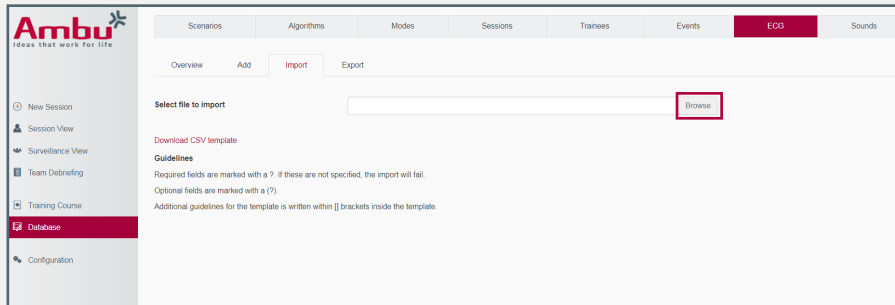
4. Import the new ECG signal



The screenshot shows the Ambu software interface. The top navigation bar includes tabs for Scenarios, Algorithms, Modes, Sessions, Trainees, Events, and ECG (highlighted in red). Below this, there are sub-tabs for Overview, Add, Import, and Export. The main content area displays a table with two columns: Name and ID. The table lists various ECG signal types and their corresponding IDs.

Name	ID
1deg AV Block	ECG-DEFAULT-1
2deg AV Block I	ECG-DEFAULT-2
2deg AV Block II 2-1	ECG-DEFAULT-3
2deg AV Block II 3-1	ECG-DEFAULT-28
2deg AV Block II 4-1	ECG-DEFAULT-29
3deg AV Block	ECG-DEFAULT-4
Asystoly	ECG-DEFAULT-11
Asystoly with P	ECG-DEFAULT-30
Atr fibr	ECG-DEFAULT-31

To load the file back onto the training device, proceed as follows:
Connect to the training device as described in section 1.
Then click on "Database" and select the "ECG" tab.



The screenshot shows the Ambu software interface with the ECG tab selected. The sub-tab "Import" is active. A "Select file to import" field is visible with a "Browse" button next to it. Below the field, there are instructions for downloading a CSV template and guidelines for import.

Select file to import [Browse](#)

[Download CSV template](#)

Guidelines
Required fields are marked with a ? . If these are not specified, the import will fail.
Optional fields are marked with a (?)
Additional guidelines for the template is written within [] brackets inside the template

Click here on the tab "Import". In this view you can now upload the new ECG signal as CSV-file.
Click on the "Browse" button and select the CSV-file you want to upload.
Afterwards, a message appears whether the import was succesful.
The new ECG signal can then be found in the "Overview" tab and can be selected in the session view.