



## USER GUIDE



Version 1.2



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# About this guide

The user guide describes the functions and characteristics of the Callibri sensor/device in detail. Safe operation of the device requires familiarity with the contents of this guide.

## Symbols and abbreviations used in this guide

This user guide employs the following symbols:



**Warning** – situations which can cause harm to you or those around you.



**Attention** – situations that may result in damage to the device or other equipment.



**Note** – recommendations or additional information.

*OS – operating system*

*PC – personal computer/laptop*

## Safety information

The following precautions are necessary to avoid potential harm to the user or damage to the device.



- *Do not use a damaged charger or USB cable, and do not use with loose or damaged electrical sockets.*
- *Do not use excessive force when inserting the USB cable into the device, as this can damage the USB connector.*
- *Avoid kinking any of cables that are plugged into the USB connector, as this can cause the cables to break.*
- *Do not allow moisture or gel to enter the USB connector, as this can lead to clogged or oxidized electrode contacts and damage the device. Such malfunctions are not covered by warranty.*
- *Do not use the device during thunderstorms, which increase the risk of electrical shock.*
- *Do not place the device inside or on top of heating sources (such as microwaves, stovetops or radiators). When severely overheated the device may explode.*
- *The disposable electrodes should only be used on healthy, undamaged skin.*

## Additional warnings for electrostimulation usage



- *Do not use disposable surface electrodes that have dried out! This can cause burns on the user's skin!*
- *Do not perform stimulation in close proximity to metallic objects (belts, clasps, jewelry, etc.)!*
- *Do not plug the charger into the device while it is mounted on the user's body!*

### ***The device should not be used in the following circumstances:***

- *Electrical current intolerance on the part of the user.*
- *Damage to the user's skin (cuts, abrasions, ulcers).*
- *User has a pacemaker, neurostimulator or any other electronic implant.*
- *User has a heart condition, and has not consulted a doctor before using Callibri.*
- *Serious circulation problems in the lower extremities.*
- *Use only with caution if the user experiences epileptic seizures. Use only with a doctor's permission!*

### ***It is forbidden to:***

- *Use the device near the head. Data do not exist concerning the effects of stimulation on the brain.*
- *Use the device to stimulate the throat. Possible*

*effects include severe muscle spasms and airway obstruction.*

- *Undergo stimulation of the upper thorax, which may interfere with the rhythm of the heart.*

***It is not recommended to:***

- *Undergo stimulation for extended periods (longer than 30 minutes).*
- *Use the device while pregnant.*
- ! • *Do not attempt modification or repair of the device. In case of malfunction, contact the manufacturer.*
- *Extreme heat and cold may damage the device, as well as reduce battery life and power output.*
- *Do not apply excessive force to the USB connector on the Callibri device.*
- *The device is intended for use in designated healthcare facilities. For further instructions on utilization, consult your local authorities.*

# Device information

## Purpose of the device

The Callibri device is designed for use with Life/Health Tracking software on mobile and desktop computers. The device has two purposes:

- *electrophysiological*;
- *electrostimulative*.

*Electrophysiological operation* of the device allows the recording of electromyography, electrocardiography, electroencephalography and rheopulmonography (respiratory movement) signals.

*Electrostimulative operation* provides electrostimulation of muscles.

Both operations employ triaxial MEMS (gyroscope and accelerometer) which enable the device to orient itself in space.

The device has its own software development kit (SDK). The SDK is intended for software developers on Android, iOS, MacOS, Windows and Linux operating systems.

These development tools facilitate easy creation of Callibri-based apps for the following purposes:

- **For electrophysiology:**
  - development of 'smart clothing';
  - heart rhythm monitoring;
  - monitoring personal exercise and training;
  - medical applications (neurology, physical therapy, gynecology, urology, etc.).



- **For electrostimulation:**
  - EMS training in fitness;
  - restoring muscle tone to weakened muscles;
  - pain reduction.

## General information about Callibri

The Callibri sensor connects to an external device (desktop computer, tablet or mobile phone) with the help of Bluetooth Low Energy (BLE) wireless technology. The quality and stability of this connection depends in large part upon the operating environment and proper procedure by the user.

To ensure a stable connection between Callibri and the external device, follow these recommendations:

- Do not cover Callibri or the external device with your body or other objects; preserve direct line of sight between devices. This requirement is due to the fact that Bluetooth Low Energy uses a 2.4 HZ radio frequency. At this frequency, radio waves have difficulty passing through obstacles.
- For use with desktop computers, use a high quality BLE adapter (recommended model Asus USB-BT400, product not included). It is also recommended to bring the BLE adapter into close proximity with Callibri using a USB extension cable (product not included).
- While Callibri is in use, disconnect all other Bluetooth devices – especially multimedia (headsets, etc.) devices – to avoid reducing the bandwidth available to Callibri. The fewer devices connected via Bluetooth, the greater Callibri's

ability to accurately transfer wireless data.

- Try to minimize the distance between Callibri and the external device. The maximum connection range is highly dependent on external factors, such as the degree of interference from radio emitters working on the same frequency as BLE (2.4 GHz). Observe the effective range, beyond which stable connection becomes impossible.
- Try to minimize the number of devices which are emitting radio waves on the same frequency as BLE (2.4 GHz) are present in the same room as Callibri, while also limiting the presence of powerful radio emitters in general. It is recommended to disable the WiFi functionality on devices device to which Callibri is connected, as well as the local WiFi network.
- Try to avoid placing Callibri in close proximity to metallic objects. Metal is impermeable to radio waves, and can cause distortions in BLE transmitting channels.

## Technical characteristics

Technical characteristics for electrophysiological use

Connection between Callibri and external device	BLE version 4.0 or later
Voltage range	from 0 V to 0.2 V
Recorded signals	EKG, EMG, EEG, angle, velocity, acceleration
Detection of sensor's orientation in space	yes
Input–Referred Noise (measured with the inputs shorted together)	no more than 12 $\mu$ Vpp
Duration of uninterrupted use	at least 6 hours

## Technical characteristics for electrostimulative use

Connection between Callibri and external device	BLE version 4.0 or later
Recorded signals	angle, velocity, acceleration
Current amplitude of stimulative impulse	from 1 to 100 mA in increments of 1 mA
Frequency of stimulative impulses	from 1 GHz to 200 GHz in increments of 1 GHz
Duration of stimulative impulse	from 60 to 460 $\mu$ s in increments of 20 $\mu$ s
Duration of uninterrupted use	at least 6 hours

## Technical characteristics: power supply

Input parameters: 100–240 VAC, 50/60 Hz, 0.1–0.5 A (or in accordance with your region).

Output parameters: 5V, DC (direct current) 1–2 A.

## Markings

Labels and markings on the Callibri device contain the following information:

- name of device;
- name or trademark of manufacturer;
- serial number;
- graphics and warning symbols.

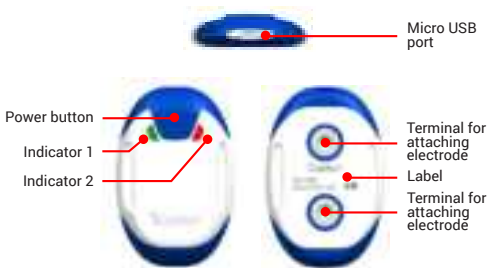
Labels and marking on the packaging contain the following information:

- name or trademark of manufacturer;
- name of device;
- graphics and warning symbols.

# Device operation

## External appearance of Callibri

LED indicators for electrophysiological use:



- LED indicators not illuminated – Callibri is turned off.



- Left indicator glows green – Callibri is powered on.



- Right indicator glows red – battery charge is less than 5%.



- Right indicator blinks red – battery charge is less than 1%.

## LED indicators for electrostimulative use:



- LED indicators not illuminated – Callibri is turned off.



- Left indicator glows green – Callibri is powered on and in standby mode/ pausing to trigger electrical impulses.



- Right indicator glows red – Stimulation in progress.



- Right indicator blinks red – battery charge is less than 1%.

## LED indicators when charging battery:



- LED indicators not illuminated – Callibri is turned off.



- Left indicator blinks green – battery is charging.



- Left and right indicators glow green and red – battery is fully charged.

## Charging the battery

Before using Callibri, the battery must be charged.



- Only use chargers that meet all the technical characteristics listed in this guide. The use of improper chargers may cause the battery to explode, or otherwise cause damage to the device.



### Additional power supply requirements for electrostimulative use



- Charging Callibri through a USB connector in a desktop computer is not recommended!
- In stimulation mode, a USB connector on a desktop computer must not be used to charge Callibri!

### Caring for the device



- All parts of the device can be carefully wiped clean with a moist toilette. Callibri's attachment band should be periodically washed with soap and warm water.



- Do not expose the internal components of the device to moisture!



# Manufacturer`s warranty

Warrantied period of operation – 12 months.

Warrantied period of storage – 6 months from date of production.

In the event that repair or correction of defects is necessary during the warrantied period, the warranty is extended by the amount of time for which the device is not available for use due to the defect or malfunction. If the device is replaced in its entirety, the warranty period is renewed from the date of the replacement.

Warranty repair of the device is carried out at the cost of the seller/manufacturer. After expiration of the warranty, the cost of repairs is borne by the purchaser of the device.

If a warrantied device ceases to function due to improper operation, then the cost of repairs is borne by the purchaser.

# Troubleshooting

Before contacting technical support, acquaint yourself with the recommendations in the «General Information about Callibri» section (page 9), or attempt the following troubleshooting procedures:

## ***Device does not turn on***

*Callibri does not power on because the battery is fully depleted.*

*Connect the charger to the device.*

## FCC Warning

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The device has been evaluated to meet general RF exposure requirement.

The device can be used in portable exposure condition without restriction

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