



Seismofit®

Instructions for use

## **Disclaimer**

The information in the instructions for use is addressing an international market for health service and is based on text, illustrations and symbols. The Instruction for Use gives no specific references to religion, ethnicity, gender or policy.

Any such relation must be considered as an interpretation that VentriJect® cannot be responsible for. The information is only intended for achieving a secure and exact use of the Seismofit®.

## **Copyright**

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## **Changes**

The Instruction for Use may be updated without warning. The user may find the Instruction for Use for any version of the Seismofit® at the VentriJect® website from where it may be downloaded.

The illustrations may deviate from the actual equipment which reflects the constant work for improving the product.

## **Brand name**

VentriJect® and Seismofit® are registered tradename owned by the company.

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## **Introduction**

### **Instructions for Use (IFU)**

This instruction for use is intended as a reference guide for safe and correct use of Seismofit®.

The IFU contains both general and specific instructions for use including seismocardiographic recording, maintenance and information on specific components.

To ensure optimal use of the Seismofit® it is important to read the IFU carefully and understand the use of the product before starting.

### **Seismofit® and the environment.**

Seismofit® is designed and sized to minimize the impact on the environment.

The sensor is small with wireless communication, the adhesive patch similarly of minimal size and the outer packaging is made from cardboard that may be discarded as ordinary paper waste.

Seismofit® contains microelectronic components and must not be discarded as ordinary waste but be delivered for recycling.

### **Product description**

Seismofit® is an equipment for recording of vibrations of the chest of a person.

Seismofit® records the vibrations arising from the heart on the person's chest and transmits the recording to the VentriJect App.

The Seismofit® System consists of two parts: a Seismofit® Sensor and the Seismofit® Patch and is operated with the VentriJect App. The

patch is for adhering the sensor to the chest when positioned at sternum.

The Seismofit® Sensor is shown at the picture below.



## **Intended use**

The intended use of Seismofit® is to determine a VO<sub>2</sub>max score equivalent based on seismocardiography to assess patient health and vitality status in adults above 18 years.

## **Use of the recording**

The recording will be transmitted to a smartphone for further examination.

The smartphone will communicate with an external server that will analyze the recording and calculate an equivalent to the CRF-score (estimated VO<sub>2</sub>max) which currently will be displayed in the App.

## **Risks**

By use of Seismofit® a VO<sub>2</sub>max-score equivalent will be created. If using this for strategies concerning health issues it should

be done together with a professional i.e. medical doctors, physiologists, therapists or technicians.

Using the Seismofit® outside of its intended use or not following the guidelines for correct recording, described in this document, can result in estimations of unintended higher or lower VO<sub>2</sub>max score for the subject.

The Seismofit® will not be able to cause any hazards. The battery is low power, the Bluetooth® connection is low power and any emission will be much weaker than emissions from a smartphone. The patch is based on skin friendly and non-sensitizing adhesive.

## **Intended user profile**

Seismofit® is intended for use with health care professionals like medical doctors, nurses, technicians and therapists after

having read the IFU or being instructed in the system but not limited hereto.

### **Intended test persons**

Seismofit® is intended to be used for adult persons of both genders above 18 years of age and without electronic implants.

### **Use conditions**

Seismofit® is intended used in medical clinics or equivalent at room temperatures, atmospheric pressure range of 700hPa to 1060hPa.

Do not sterilize, autoclave or wash the Seismofit®.

Do not record in noisy environment where vibrations could be expected or with strong electromagnetic fields or radio frequency from machines or equipment.








*Warning:* Use of the Seismofit® adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, the Seismofit® and the other equipment should be observed to verify that they are operating normally

*Warning:* Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Seismofit®, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

Remove hair before recording if disturbing for the fixation.

Only use tissue moistened with water or ethanol wiper for cleaning.

## **Symbols**

<b>Symbol</b>	<b>Explanation</b>
	Product code
	Series number
	Warning and precautions <i>Notice the description below</i>
	Guidance for help in the Instruction for Use
	Label for compliance with relevant EU-directives.
LOT	Batch code
	Producer
	The Seismofit® Sensor must at discarding be delivered for recycling according to national law. (Directive 2012/19/EU, (WEEE))

## **Definitions:**

The Instruction for Use contains symbols and user information that are important and must be read carefully before the recoding is started.

Symbols and warnings will also be found on the packaging for the Seismofit® Sensor and the Seismofit® Patches.

## **Symbols of products and in the Instructions for Use.**

Warnings: describe situations where the CRFscore may be disturbed unintended.

Precautions: describe situations where surroundings, functionality of Seismofit® Sensor may be interfered.

## **Warnings**

Deviation of procedures from the IFU or use of the Seismofit® outside the intended field of use may result in errors and misinterpretations for the patient.



Never use the Seismofit® on patients with implanted electronic equipment like pacemakers or equivalent.

Do not use Seismofit® on very hairy skin, scars after surgery or anormal body shapes that lead to poor fixation of the product as this may lead to wrong scores.

Do not use the Seismofit® Sensor without the original Seismofit® Patch as this may lead to misleading scores.

Do not apply liquids (water, oils, solvents, surfactants or the like) to the Seismofit® Sensor as it may cause functional errors.

Do not use the device if the outer plastic shell is damaged or broken, exposing the internal components of the device.

Do not modify the device in any way.

### **Precautions**

Avoid dropping or violent handling of the Seismofit® Sensor as this may cause damage to the microelectronic part including the accelerometer and Bluetooth® transmission.

Apply correct cleansing of the Seismofit® Sensor.

Store and apply the Seismofit® Sensor and Patch according to claims in the Instruction for Use in respect to temperature and humidity.

### **Seismofit® Sensor**

The Seismofit® Sensor records the vibrations of the chest originating from the heart and recorded at the sternum. The recorded signal will be transmitted to a smartphone. The

sensor has direct physical contact to the skin via an adhesive patch.

The test person must lie on the back (supine position) and the sternum (lower third of chest bony prominence) is localized. The Seismofit® Sensor must be used together with the Seismofit® Patch for firm contact to the chest ensuring best recording. If a patch is placed wrongly a new shall be used. The patch is for single use only.

### **First recording**

A prerequisite for the first recording is installing the VentriJect App on your iPhone according to purchase instructions.

Before starting the first recording the battery drawer shall be opened and the battery co-packed with the Seismofit® Sensor shall be placed in the drawer which currently is

closed. Now the sensor is active (photo: open drawer).

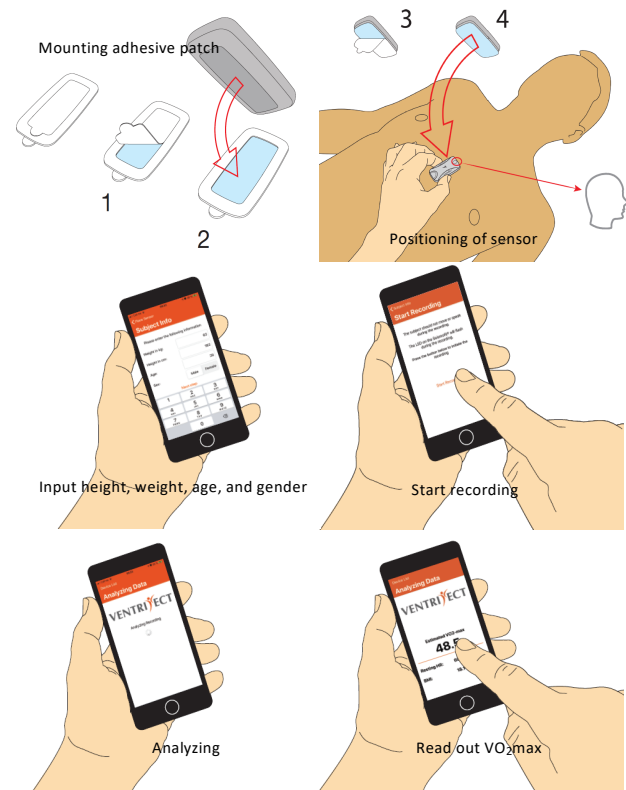


## Start Recording

The overall investigation time will be a few minutes. The following guide describes the major steps when using the Seismofit® Sensor and companioning App to perform a recording.

The steps are

- 1) Mounting the adhesive patch
- 2) Position of the sensor at the sternum with head drawing against the head of the test person
- 3) Input weight, height, age and sex
- 4) Start of recording
- 5) Analyzing step
- 6) Read out of result



## LED signals

After positioning at the chest, the sensor is activated from the App. The active recording may be followed by the flashing of the light according to the table.

LED indicator	Sensor status
No light	The sensor is not connected to the phone.
Identification flash (identified device)	5 flashes – pause – 5 flashes
Recording initiated	Constant flashing
Recording finished and data ready on device	2 flashes pause - flashes

## Seismofit® Patch

The Seismofit® Patch is supplied in boxes containing 20 pieces. The patches are disposable and can be discarded together with ordinary plastic or laminated packaging.

The patch has a liner with adhesive on both sides as core with silicone release papers on top. In use the patch shall first have removed the small release paper (no print) and be applied to the sensor bottom surface. Next the first part followed of second part of the second release paper is removed and the combined sensor and patch is applied on the skin of the lower third part of the chest with the correct orientation against the head of the test person.

## Preparing a test person

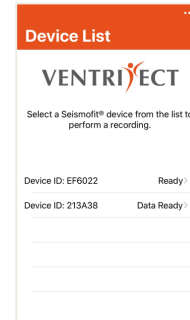
To ensure a high quality of the recorded signal presence of hair must be removed from the skin at the sternum if it is considered to interfere with the intimate contact between sensor and skin.

Ordinary electric razor machine is recommended.

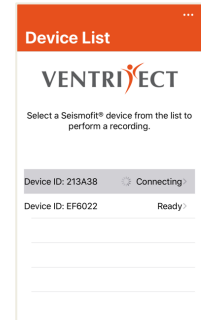
A patch shall never be applied to broken skin.

## Performing a recording

After opening the App following steps are presented



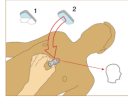
Screen 1



Screen 2

Screen 1-2 select and choose the Seismofit® Sensor by its ID

Device List
Device
Device ID: 213A38  
The LED on the Seismofit® is now flashing.  
The last recording from this Seismofit® has not yet been analyzed  
If you want to analyze the recording press the "Analyze last recording" button below. You will be prompted to enter subject information before the signal will be downloaded and analyzed.  
If you want to delete the last recording press the "Perform new recording" button below.  
Analyze last recording  
Perform new recording

Device List
Place Sensor
Device ID: 213A38  
The LED on the Seismofit® is now flashing.  
Before starting the recording, please make sure that the Patch with the Seismofit® is firmly attached to the skin of the subjects.  
The subject should be in relaxed supine position during the recording.  

Next step

Device List
Place Sensor
Subject Info
Please enter the following information  
Weight in kg: 62  
Height in cm: 182  
Age: 29  
Sex: Male Female  
Next step  
1 2 3  
4 5 6  
7 8 9  
0

Screen 3

Screen 4

Screen 5

Screen 3-5 Approving device (in case more devices are contactable), positioning at chest and entering of information.

Screen 3 allows for analysis of a recording stored on the device. This is only pertinent if the App has been disconnected from the Seismofit® Sensor during a previously ongoing recording.

Subject Info
Start Recording
The subject should not move or speak during the recording.  
The LED on the Seismofit® will flash during the recording.  
Press the button below to initiate the recording  
Start Recording

Start Recording
The subject should not move or speak during the recording.  
The LED on the Seismofit® will flash during the recording.  
Press the button below to initiate the recording  
Time remaining: 31  
Abort Recording

Data Transfer
Data is now being transferred from the Seismofit® to the phone.  
When this process is done, the screen will update automatically  
Transferring data

Screen 6

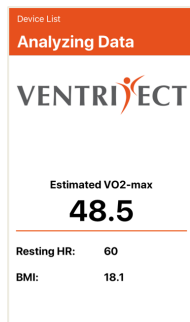
Screen 7

Screen 8

Screen 6-8 Initiation of recording and transferring of the data from the Seismofit® Sensor to the smartphone.



Screen 9



Screen 10

Screen 9-10 Analyzing and showing final  
VO<sub>2</sub>max

### After the recording

Remove and discard the Seismofit® Patch and cleanse the Seismofit® Sensor with a 70% ethanol cleaning tissue.

Never use running tap water for cleansing of Seismofit® Sensor.

If the Seismofit® Sensor by accident becomes wet let it dry for 24 hours at ambient temperature in low to medium humidity air. Never use an electric oven or hairdryer.

### Lost Connection to Seismofit®

In the case of lost connection to the Seismofit®, that does not automatically reconnect to the app. Please close the App completely on the smart phone and open it again.

## **Maintenance**

Seismofit® Sensor does not hold any parts that requires service.

If expired the battery must be changed.

## **Discarding**

### **Patch**

The Seismofit® Patch may be discarded as ordinary trash.

### **Sensor**

When the Seismofit® Sensor is worn out the discarding must be by the recycling station according to national regulative.

Seismofit® and the distributors of Seismofit® Sensor and Patches respect the EU Directive 2012/19/EU regarding discarding of electronic equipment (WEEE).

## **Seismofit® Sensor requirements**

### **Functionality:**

Temperature 10-40°C.

Relative humidity 20-80% without condensate



**Storage**

Temperature 10-40°C.

Relative humidity 20-80% without condensate

**Recording conditions**

Pulse < 90 bpm

**Power supply**

Battery 3V like Maxell 2032

**Seismofit® smartphone requirements**

Apple iOS 13.3 or newer.

**Warranty**

The Seismofit® Sensor is covered by warranty of a one-year use from day of purchase.

The Seismofit® Patch has an expiration period of 2 years from manufacturing date.

The warranty is not valid in case of misuse or if Seismofit® Sensor house parts have been taken apart.

The warranty does not cover interpretation of results outside indicated use.

## **Approvals**

IEC 60601	Compliance to IEC 60601-1
CE-mark	Compliance to Medical Device Directive 93/42/EEC
EMC-emission	Compliance to the requirements in EMC emission Class B devices in EN 60601-1-2
EMC-immunity	Compliance to immunity requirements of EN60601-1-2:

## **Acronyms & Definitions in text**

<b> Akronyms</b>	<b>Definitions</b>
Seismocardiography	Recording and interpretations of vibrations originating from the beating heart
Seismofit® System	Sensor, and Patch.
Seismofit®	Sensor that records vibrations from the heart
Seismofit® Patch	Adhesive patch for fixation of sensor to the skin at the chest
VO <sub>2</sub> max-score / Seismofit® Score	Cardio respiratory fitness score – a measure of health
Recording	Obtaining a seismogram from the heart

## **EMC Information**

### **Electromagnetic Emission**

Technology: Wireless Bluetooth Low Energy (BLE)

Modulation type: Gaussian frequency shift keying (GFSK) modulation

Frequency area: 2400 -2480 MHz

Radiated effect maximum: 2.5 mW (Class 2 transmitter)

The radio equipment can be used without safety distance to the user.

The Seismofit® can be used in electromagnetic environments as described in the table below:

<b>Emission Test</b>
RF Emission CISPR 11
<b>Compliance</b>
Group 1 Class B
<b>Guidance</b>
Device uses Radio Frequency energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.

<b>Immunity Test</b>
Electrostatic Discharge (IEC 61000-4-2)
<b>Compliance</b>

Contact Discharge: $\pm 8$ kV Air Discharge: $\pm 2$ kV, $\pm 4$ kV, $\pm 8$ kV, $\pm 15$ kV
<b>Guidance</b>
Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.

<b>Immunity Test</b>
Radiated RF EM field (IEC 61000-4-3)
<b>Compliance</b>
80-2700 MHz; 1kHz AM 80 %; 3 V/m
<b>Guidance</b>
Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.  Recommended separation distance $d = 1.2\sqrt{P}$ for 80 MHz to 800 MHz $d = 2.3\sqrt{P}$ for 800 MHz to 2,7 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).

<b>Immunity Test</b>
Proximity fields from RF wireless communications equipment (IEC 61000-4-3)
<b>Compliance</b>

- 385 MHz; Pulse Modulation: 18 Hz; 27 V/m
- 450 MHz, FM  $\pm$  5 Hz deviation: 1 kHz sine; 28 V/m
- 710, 745, 780 MHz; Pulse Modulation: 217 Hz; 9 V/m
- 810, 870, 930 MHz; Pulse Modulation: 18 Hz; 28 V/m
- 1720, 1845, 1970 MHz; Pulse Modulation: 217 Hz; 28 V/m
- 2450 MHz; Pulse Modulation: 217 Hz; 28 V/m;
- 5240, 5500, 5785 MHz; Pulse Modulation: 217 Hz; 9 V/m

#### **Guidance**

Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance 30 cm.

#### **Immunity Test**

Rated power frequency magnetic fields (IEC 61000-4-8)

#### **Compliance**

30 A/m, 50 Hz: 217 Hz; 9 V/m

#### **Guidance**

Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.