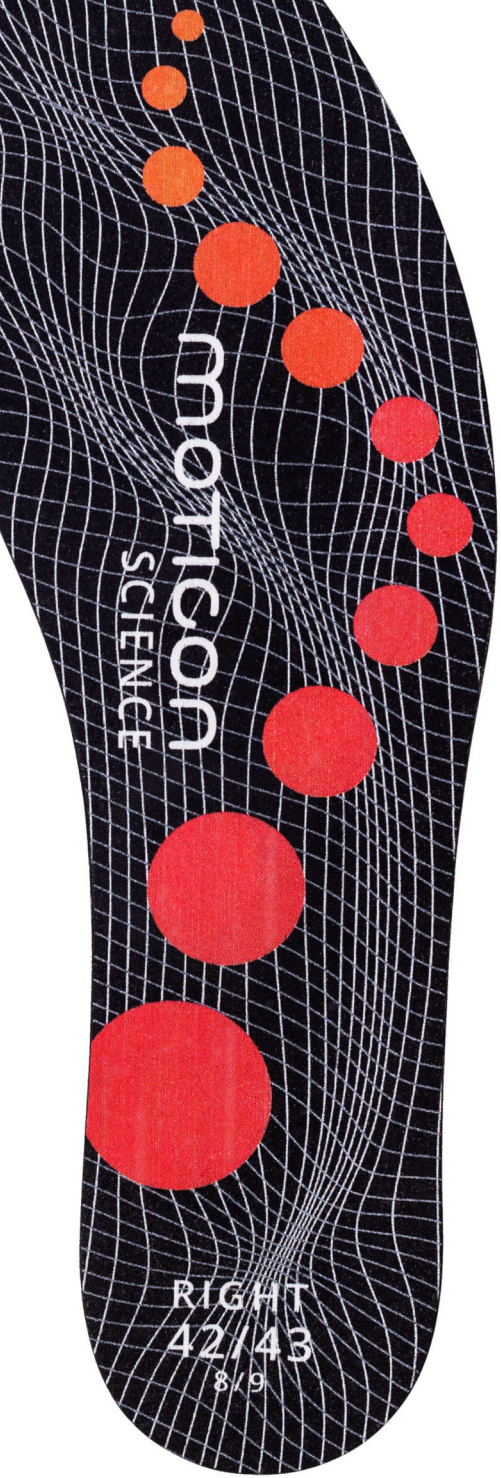

moticon
SCIENCE

Moticon SCIENCE

Instruction Manual

Effective August 1, 2019

PRELIMINARY

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Warning Symbols & Labeling

The following signs and symbols are used in this instruction manual, the SCIENCE Sensor Insole labeling, and the packaging labeling:

Safety critical warning

Safety critical warning, prohibited action

Safety critical warning, mandatory action

Indicates that the insctructions for use must be consulted

Keep away from children

Do not dispose of in your household waste (EU WEEE Directive 2012/19/EU)

SN Device serial number

Temperature range for operation / storage

Humidity range for operation / storage

Handle package with care

On the sensor insoles, the labeling is located in the mid area of the lower surface. On the packaging, handling instructions are given on the outer surface of the packaging.

Overview

Model
Insole3

The Moticon SCIENCE Sensor Insole is a versatile tool for sensing human foot dynamics.

The sensor insole is fully integrated and highly flexible. It incoporates all technological components to execute standalone measurements. No external devices are required for data acquisition.

The following table depicts the basic specifications. For more information, refer to the detailed product specifications on www.moticon.de/support.

Sensors	16 pressure 3 acceleration 3 angular rate per side
Wireless	Bluetooth Low Energy
Power Supply	PD2032 coin cell battery, rechargeable
Sizes	9 double sizes EU 32/33 - 48/49 US 1/2 - 12½/13½
Data Storage	On-board memory & live transmission to smartphone

Intended Use

In the following, the terms "sensor insole" and "product" refers to an individual left / right Moticon SCIENCE Sensor Insole, as well as to a pair of sensor insoles.

Intended Use

Measurements may be incorrect when the product is used outside of the defined intended use.

Professional use only.

Always keep the product and the coin cell batteries away from children to prevent swallowing.

The sensor insole is inteded to be used inside a shoe for measuring the plantar pressure distribution at the sole of foot, and the acceleration in three aces and rotation of the foot in three axes.
This product is not a medical product. It is the responsibility of the user to interpret the measurement data obtained from the product, and no diagnosis or treatment decision may be carried out soley on the basis of the data obtained from the sensor insole.

Contraindications

The following conditions are absolute contraindiciations for using the product:
- open wounds of the foot, irritated or otherwise unhealthy foot skin
- orthopedic or other reasons depending on the health status of the wearer, which do not allow for waring the sensor insole
- severe gait impairments where the sensor insole might increase the risk of fall
- inability of the wearer to wear closed shoes for wearing the sensor insoles

When applying the sensor insole to a wearer for more than one day , the user applying the product to the wearer must ensure that the wearer will not encounter negative orthopedic long-term effects from wearing the product, and must instruct the wearer to report discomfort and pain due to wearing the device, and to stop wearing the sensor insole in such case.

Operation Modes

Standard Modes [1]	Description	Use Case
Preview	Transmits fixed basic sensor data wirelessly	Live showcasing and activity checks in the Moticon SCIENCE Mobile App
Live	Transmits sensor data wirelessly to endpoint (cloud/desktop computer)	Direct data transmission for storage on endpoint
Record	On-board sensor data recording	Standalone data acquisition without smartphone
Transmit	Wireless sensor data transmission from on-board memory to endpoint (cloud/PC)	Transmitting previously recorded sensor data to endpoint for storage on endpoint

Intelligence Modes [1]	Description	Use Case
Smart Recording [2]	Activity triggered recording mode. Recording is only on when users are active. Internal firmware controls start/stop of recording automatically. No phone is required.	For longterm gait monitoring
Smart Sleep	Automatic shut down into power safe mode when sensor insole is not in use. No hardware switches are used.	No user interaction for turning on/off required

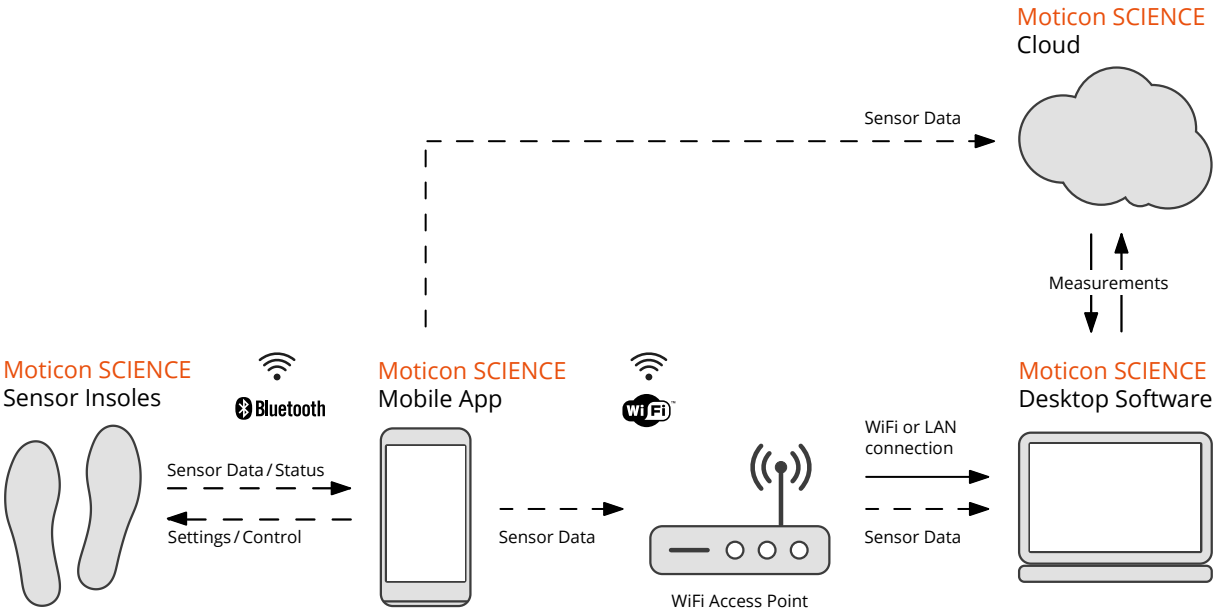
Notes

[1] The operation modes can be selected in the Moticon SCIENCE Mobile App.
[2] Smart Recording is an activity triggered recording mode where internal firmware algorithms control the intermediate pausing and resuming in action. The mobile device (phone/tablet) is only required for starting and stopping, not for the recording itself.
For further details on the operation modes refer to the applications note on www.moticon.de/support.

System Functions

Function	Description
Firmware Update	Firmware of the sensor insoles can be updated wirelessly using the Moticon SCIENCE Mobile App
File Management	The firmware runs a file management system on the on-board memory of the sensor insoles. Measurements can be selected, deleted and transmitted individually using the Moticon SCIENCE Mobile App
System Status	The firmware checks the system status and transmits status information. Status information includes: 1. Restarts 2. Active time 3. Miscelaneous: firmware version, serial number, size, side
Battery Status	The firmware detecs the battery charge status of the inserted coin cell batteries. The charge status is transmitted to the Moticon SCIENCE Mobile App.

Connectivity



Notes

For instructions of use refer to the tutorials on www.moticon.de/support.

Legend

- - - Wireless data transmission.
—— Cable bound data transmission.

Software Setup

Moticon SCIENCE Mobile App

The Moticon SCIENCE Mobile App is available for Android only! For more information, refer to the system requirements on www.moticon.de/support#faq.

You need an active email address linked to a Google account to activate the mobile app.

1. Send the email address linked to your Google account to support@moticon.de. Moticon will register this email address for the closed Moticon SCIENCE user group.
2. In Google Play Store, search for "Moticon SCIENCE" and install the mobile app on your phone or tablet.
3. When you launch the mobile app, grant the following permissions:
   Bluetooth service
   Location service

Moticon SCIENCE Desktop Software

The Moticon SCIENCE Desktop Software is available for Windows 10 (or higher) only! Refer to the system requirements for more information on www.moticon.de/support#faq.

4. Download and install the desktop software on your computer using the access/license credentials indicated on the software deployment document attached to your product shipment.

Network Setup

You need to connect both your phone/tablet and your computer to the same local network. For troubleshooting, go to www.moticon.de/support#sw-setup.

5. Connect your phone/tablet and your computer to the same local network (options: local WiFi, wireless access point, hotspot initiated by computer).
6. Find the IP (IPv4) address of your computer (e.g. '192.168.?.???') in the system network/internet settings.
7. In the Moticon SCIENCE Mobile App, go to the 'Settings' section, enter the IP address of your computer.
8. Press the confirm button and check that the notification indicates a successful network connection.

Safety Instructions

Safety warnings for sensor insole application

The sensor insole is not an orthotic. In case an orthotic is used by the wearer, the attentding doctor must be consulted about wether it can be replaced by the sensor insole.

The sensor insoles must be worn only pairwise (both left and right) on order to avoid asymmetric gait.

Only sensor insoles with appropriate size may be worn. Incorrect sizes (too small, too big, or improper fit) are potentially dangerous, may be damaged during walking, and cause erroneous measurement values. Check the proper fit of the sensor insole after insertion into the shoe.

The sensor insole may only be worn in closed footwear.

The weight of the wearer wearing the sensor insole may not exceed 120 kg.

Immediately stop wearing sensor insoles in case of pain or skin irritation.

The battery compartment must face down towards the floor when insertig the sensor insole into a shoe.

Remove the coin cell battery from both insoles after finishing a measurement, or when the coin cell battery is not used for some time. Store the sensor insole only without coin cell battery.

In case of an internal fault, surface temperature of 41 °C to 43 °C may occur, consituting a possible temperature hazard.

The sensor insole may not be worn with open wounds or ulcers.

The sensor insole must be worn with socks in order to avoid direct skin contact.

See the detailed product information on www.moticon.de/insole3-specs and tutorial videos about correct sensor insole handling on www.moticon.de/support

Safety Instructions

Safety warnings against misuse of sensor insole

Do not attempt to modify the size or shape of a sensor insole. Do not cut the sensor insoles! This is dangerous and will damage the sensors.

Do not bend or twist the sensor insole, to prevent damage of electronics. The sensor insole is designed to be used inside a shoe, atypical bending or torsiioin will destroy it.

Do not sting or prick the sensor insoles. Remove any sharp or spiky objects from footwear when using sensor insoles. Sharp elements cause severe damage. Do not use damaged sensor insoles.

Do not use sensor insoles for measurements outside of closed footwear. Do not wear sensor insoles when driving a car or climbing a ladder.

Do not use the sensor insole in wet conditions, e.g. rain or strong foot sweat.

Safety warnings for coin cell batteries

Always keep the product and the coin cell batteries away from children to prevent swallowing.

Never use batteries other than the coin cell battery type specified by Moticon. They are labeled as follows: **Route JD Inc Li-ion Rechargeable 3.7V**

Do not use the sensor insole in case of a damaged, demolished or shifted battery contact terminal. Do not use the sensor insole with open battery compartment.

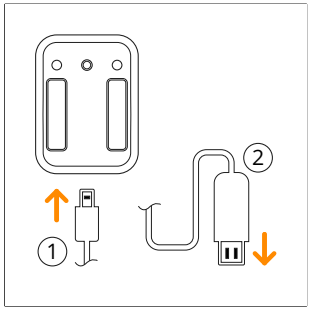
Do not remove the coin cell battery during a measurement. For longer measurements, instruct the wearer to not remove the battery and to not remove the battery lid.

Do not use sharp objects for removing the battery. Only use the tip of the finger.

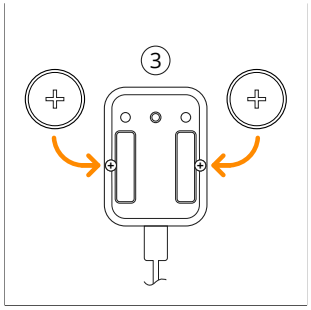
Only insert fully charged batteries into sensor insoles, otherwise the battery level indicator in the Moticon SCIENCE Mobile App will display wrong values.

See the detailed product information on www.moticon.de/accessories and tutorial videos about correct coin cell battery handling on www.moticon.de/support.

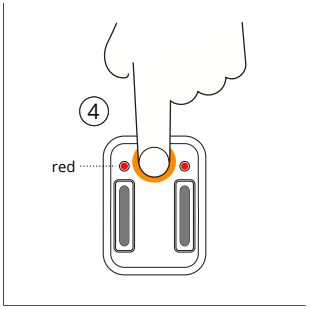
Sensor Insole Setup



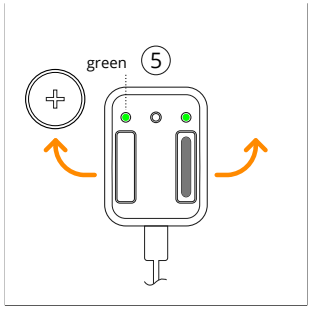
1. Plug micro USB cable side into coin cell charger
2. Plug A-type USB cable side to 5.0V USB source



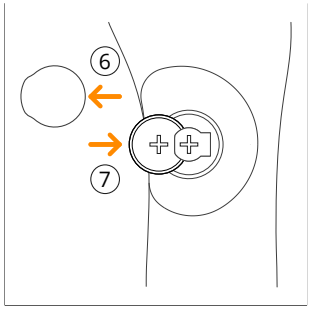
3. Insert coin cell batteries in charging slots, "+" terminal outwards



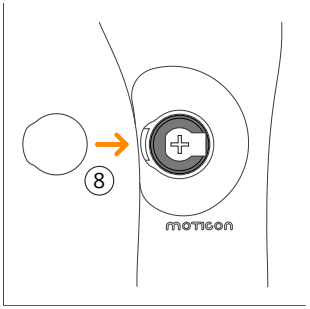
4. Press reset button to start charging, red lights indicate charging



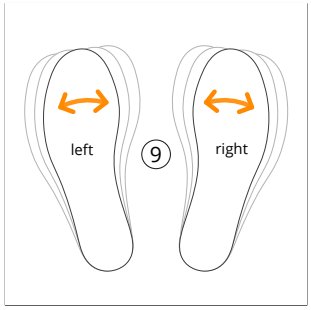
5. Green lights indicate full charge status, remove coin cell batteries from charging slots



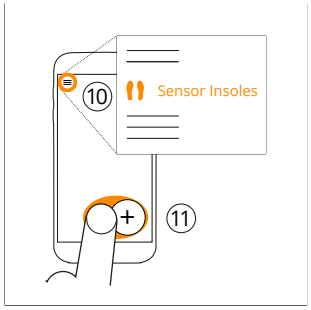
6. Remove battery lid from sensor insole
7. Insert PD2032 coin cell battery



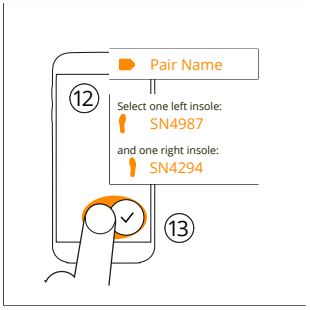
8. Attach battery lid to sensor insole



9. Shake left and right sensor insole 2-3 seconds to activate them (auto turn on/off, no switches)



10. Select "Sensor Insoles" section in mobile app
11. Press "+" to start pairing new sensor insoles



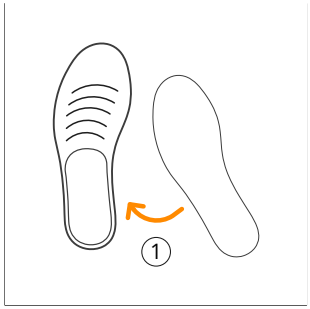
12. Enter name, select left and right sensor insole
13. Press confirm button to save pairing settings

Data Acquisition Procedure

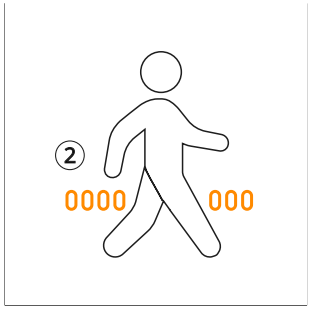
The following workflow describes the basic data acquisition procedure using the on-board memory of the sensor insoles to collect data. Other ways of data collection and a more detailed description of the workflow steps can be found on www.moticon.de/support.

The software setup (P09) and the sensor insole setup (P12) must be completed before starting with the data acquisition procedure.

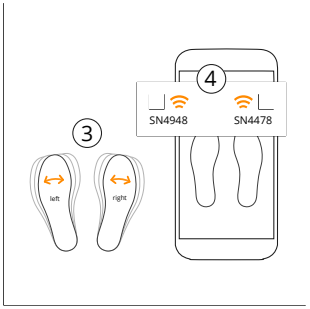
Carefully read all safety instructions (P10-P11) before you begin working with the sensor insoles.



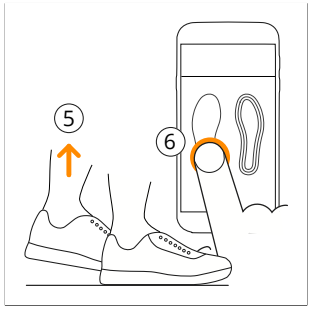
1. Insert sensor insole into the shoe
Caution: read handling instructions!



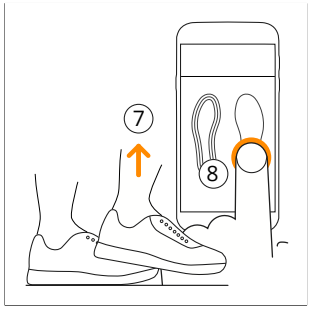
2. Walk 20-30 steps



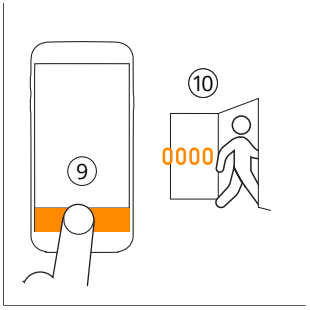
3. For sensor insole interaction shake 2-3 seconds
4. Wait until wireless icons turn white (not flashing)



5. Raise and/or unload left foot
6. Process left zeroing in Intensity widget

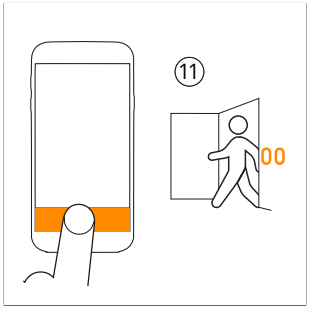


7. Raise and/or unload right foot
8. Process right zeroing in Intensity widget



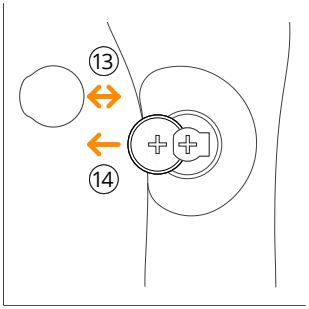
9. Press "START" to start measurement
10. Perform test/motion sequence (w/o phone)

Data Acquisition Procedure

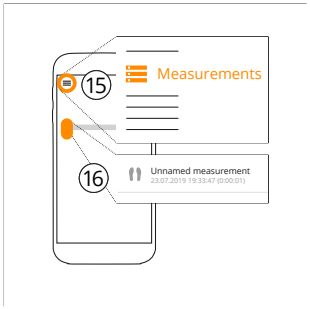


11. After returning, wait for reconnect and press "STOP" to stop the measurement

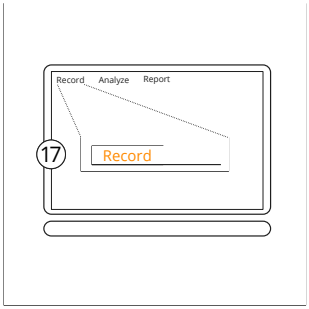
12. Remove sensor insoles from the shoes



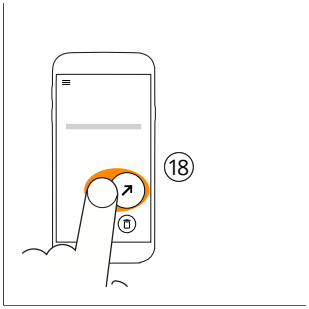
13. Remove the battery lid
14. Remove coin cell batteries and attach battery lid



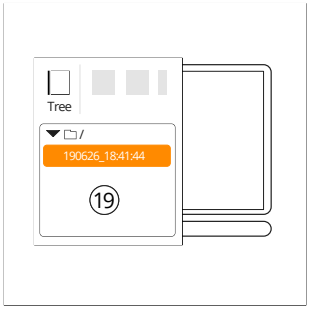
15. Go to "Measurements" section
16. Wait for sync and check measurement



17. Put SCIENCE Desktop Software in "Record" screen to wait for incoming data



18. Press transfer button for transferring measurement to SCIENCE Desktop Software



19. Wait until transfer and decoding is finished, measurement appears in measurement tree

20. Switch to "Analyze" section
21. Replay or analyze measurement data

Troubleshooting
FAQ
www.moticon.de/support

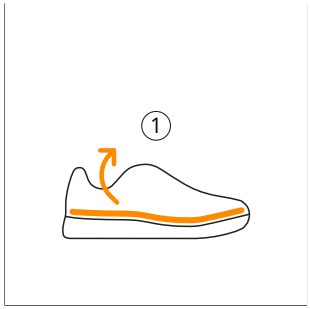
If you encounter technical problems during data acquisitions, visit our support pages

Handling Instructions

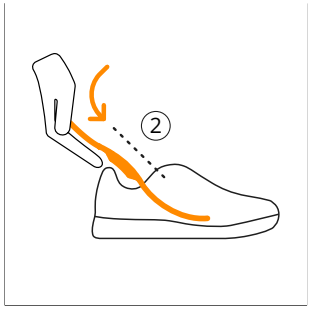
Refer to the corresponding video tutorials and documentation on www.moticon.de/support about how to carry out the below procedures.
Refer to the sensor insole setup instructions (P12) for how to get ready for data acquisition.

Do not bend or twist the middle part of the sensor insole when putting it into or taking it out from a shoe.

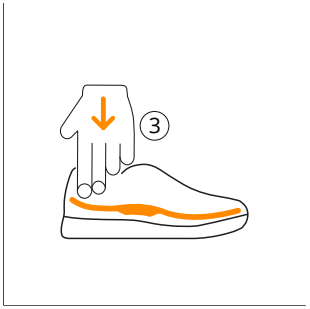
Wireless connections are potentially unstable. When starting a recording, check in the Moticon SCIENCE Mobile App that the recording has started before letting the wearer walk away.



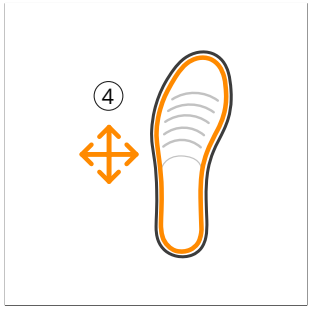
1. If the shoe has a removable inlay or liner, remove it before inserting the sensor insole.



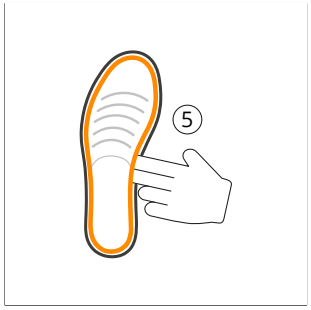
2. When sliding the sensor insole into the shoe, pay attention not to bend the mid foot area



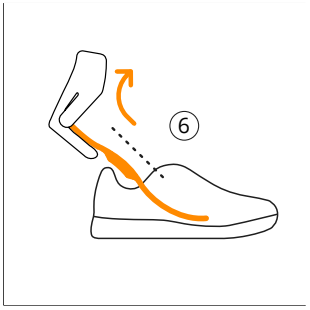
3. Push heel area down to ensure sensor insole sits completely in the shoe



4. Ensure flush rest in the shoe without bended edges or gaps, otherwhise select proper size



5. To remove the sensor insole, slightly lift sensor insole in medial mid foot area with fingers



6. Pull on the heel area to remove sensor insole from shoe, do not bend in mid foot area

Reprocessing

The Moticon SCIENCE Sensor Insole surface can be cleaned with desinfectants and a samp soft wipe.

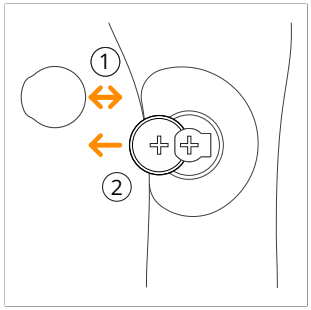
The sensor insole is not a sterile product.

Do not spray the desinfectant on skin or feet. Pay attention to the safety instructions provided by the desinfectant manufacturer.

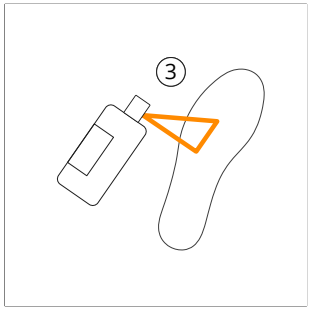
Only use desinfectant based on the active ingredients didecyldimethylammonium chloride and ethanol.

If worn by different wearers, the sensor insole must be reprocessed before it can be reused.

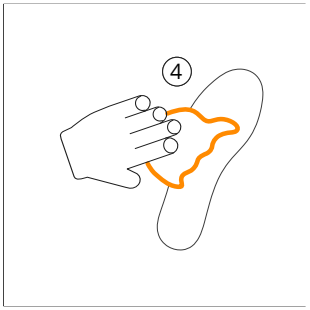
Cleaning and disinfection procedure:



1. Remove the battery lid
2. Remove coin cell batteries and attach battery lid



3. Spray disinfectant on the bottom side and on top side of sensor insole



4. Clean the bottom side and the top side of sensor insole with damp soft wipe, then dry with a clean soft wipe

Environment

Waste of Electrical and Electronic Equipment (WEEE)

According to the WEEE Directive 2012/19/EC, electrical and electronic equipment (EEE) covered by this directive should be disposed of and collected separately and use the best available treatment, recovery and recycling techniques.

It is important to collect WEEE separately from other wastes, since it contains hazardous substances to the human health and environment, and is also a valuable resource of raw materials.

Moticon products are subject to the Directive. We therefore urge you to not dispose the equipment as normal household waste. Instead, please send all products back to Moticon. We will take care of proper disposal of these products.

Environmental conditions

The sensor insole operates in the 2.4 GHz ISM band. Disadvantageous radio performance may occur if used in an environment with other devices operating at 2.4 GHz (e.g. WiFi, Bluetooth). In this case, stop using the sensor insole in this environment.

The sensor insole must not be used in environments where radio emissions at 2.4 GHz are potentially harmful or forbidden by law.

Operation temperature range	20 °C to 30 °C
Storage temperature range	-10 °C to +50 °C
Storage humidity range	5% to 95%
Air pressure range for storage and operation	690 hPa to 1070 hPa (equ. max. 3000m altitude)

Product Compliance

FCC Part 15.19 Statement
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.

FCC Part 15.21 Statement
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Imprint

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Further Information

For more detailed product information, please visit
www.moticon.de/insole3-overview
www.moticon.de/insole3-specs
www.moticon.de/support

Release Notes

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