

>> SEATING MAT DEVELOPMENT KIT

White Paper

Confidential
Version 2.0



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1. Introduction – Seating Mat Development Kit

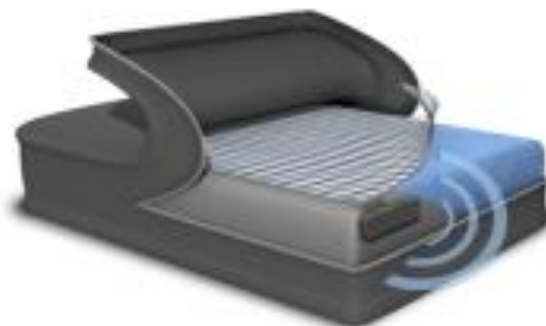
The Seating Mat Development Kit by Sensing Tex is a modular system for multiple applications in the body pressure measurement field.

It can be used for product development in health, wellness for bedding or seating applications such as measure and monitor patient position, evaluate patient comfort, identify pressure on risk areas, measure position for wellness purposes among other applications.

The main application of this Seating Mat Development Kit is for ulcer prevention in reduced mobility persons. The sensor mats provided allows the detection of non-uniform pressures in a certain surface (e.g. cushion) which for a long time could end up making skin ulcers.

An accurate monitoring of the pressure will generate alarms or other ways of interacting with the person being monitored (or personal taking care of him/her) to reduce the risk due to large periods of pressure in certain parts of the body. All bed-bound and chair-bound persons or those whose ability to reposition easily is impaired have high risk of pressure ulcers.

This ulcer prevention system will improve monitoring of special pressure points sensible to ulcers as sacrum, ischium, trochanters, heels, elbows and the back of the head.



About Seating Mat Development Kit



A Non-Intrusive System

The sensors can be integrated on top or under an existing cushion or mattress. The sensor area will be packed accordingly to customer requirements. For instance, in a textile cover or, in worst case in a plastic cover. The possibility to avoid the use of plastic covers will increase the feeling of transparent systems to the user.

Easy Installation

No installation work is required; simply place the Pressure Sensor Tex at a chosen point. Ensure it covers the area you want to monitor.

Easy Maintenance

It is very unlikely for the system to become damaged. However, the cost will be made feasible to replace it. No installation work is necessary.

Modular System

To monitor larger areas (e.g mattress), more than one system may be needed.

Flexibility

There are two generational types of the system; the first generation is a textile flexible sensor and the second generation is a stretchable sensor.

Precision

Since the system compares the pressures in several points throughout an extensive sensing matrix, this could further the development to lead an advanced algorithm, considering a person's weight to distinguish between normal and risky body positions.

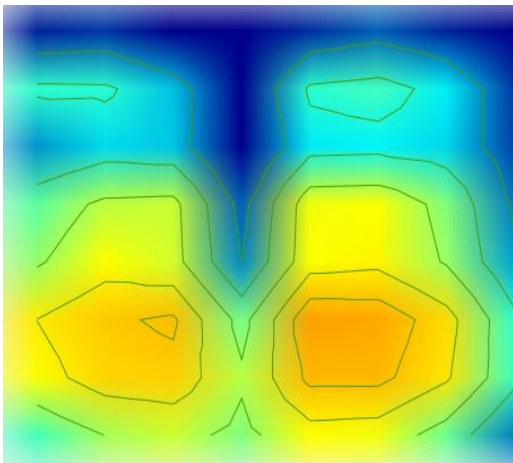


Image 1 Shows a Pressure Map with 114 PST 14 (8x8 matrix) and 114 SDK Premium (Low Resolution, interpolation and image treatment on Windows software)

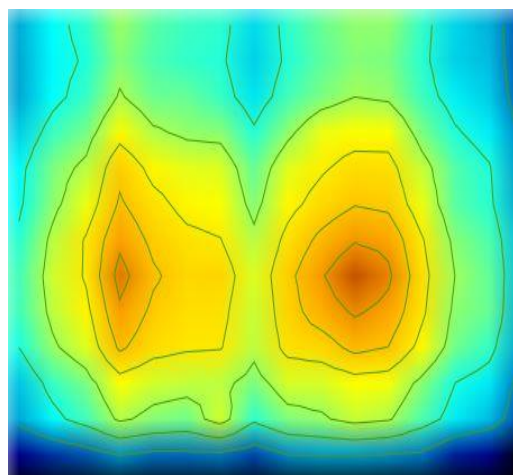


Image 2 Shows a Pressure Map with 114 PST 03 (16x16 matrix) and 114 SDK Premium (High Resolution, interpolation and image treatment on Windows software)

2. Seating Mat Development Kit Technical Features

The Seating Mat Development Kit is a quick proof of concept to test the possibilities of our Sensing Tex product. This Development Kit will allow the evaluation of our solution and fix specific requirements for the final system, including integration requirements.

For instance, after the evaluation of our solution, customers may require a full integrated solution for a mattress size instead of a two-parallel Pressure Tex solution. In the case of a cushion, shape and size may be a final customer requirement for a customized Sensing Tex solution.

The Seating Mat Development Kit is based in the following parts:

Component	Description
SEATING MAT	114 PRESSURE SENSOR TEX 03. 16X16 SENSOR SPOTS
ELECTRONIC MODULE	114 PST SDK 05
VELCRO SYSTEM	Velcro System to fix the MAT to the Cushion Foam
TRANSPORTATION BAG	Transportation Bag



Figure 1. Seating Mat Development Kit components

The source code for the SDK software could be delivered to you, so you can customize it to check specific features you want to test using our ulcer prevention system. Engineering service is available to support you and to define your final product.

3. Mat Features

Our Seating Mat sensor has been designed to offer a higher resolution for applications where it is needed. The standard product is based on the features described below.

Elements	Units	Value
Sensor size	mm	400 x 400
Sensor distribution (rows x columns)	#	16 x 16
Individual sensor size diameter	mm	10
Resolution (distance between sensor centers)	mm	20
Flat Connector	mm	32 ways x 2,54
Total sensor matrix	#	256

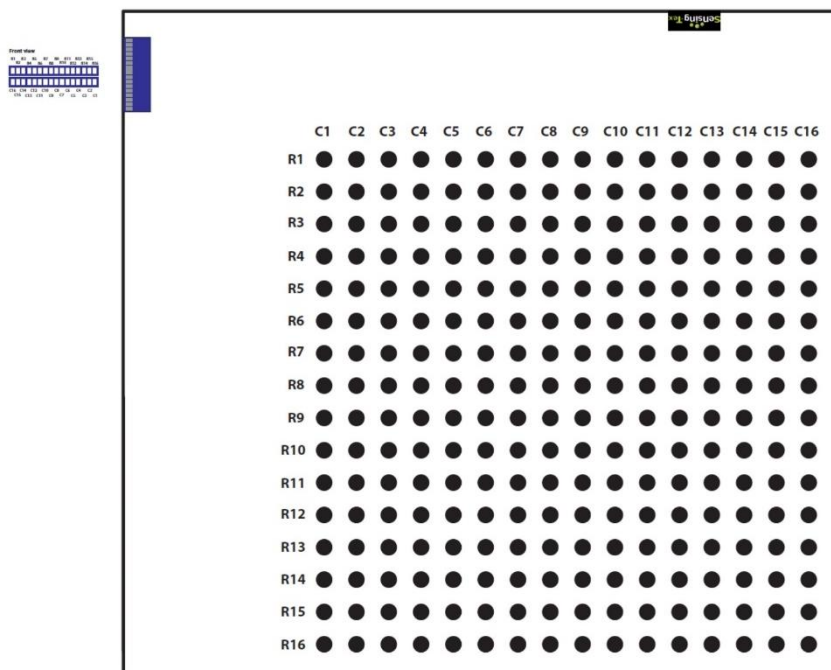


Figure 3. Sensor layout showing the 16 x 16 matrix

4. Electronic Module Features

Elements	Units	Value
Size	mm	90x46x17
Digital Resolution	bits	12
Inputs	# x #	1x1, 4x4, 8x8, 16x16
Communication		BT / USB
Frequency	Frames/s	15
Battery	mAh	500
Cable USB	Type	micro

4.1 Charging the SDK 05

To charge the system, connect the module via USB to a 5VDC source. The INT switch should be at ON/OFF position, otherwise the battery will not be charged.

4.2 Connecting Seating Mat to SDK

To connect the SDK to the cover, connect the pin arrays of the SDK to the connector of the Mat.



Figure 2. 114 PST SDK 05

5. Software Features – Windows App

Seating Mat App allows you to discover the capabilities of the Seating Mat system. You can see the Pressure Maps and recognize human patterns in real-time and set alarms to prevent ulcers.

The App implements a basic algorithm showing the basics of an ulcer prevention monitoring system. It sets a timer when at least one sensor is above a threshold set and sets an alarm when this body position is kept for more than certain pre-programmed seconds.

Your final system can have many other features like WiFi communication to your alarm system, sound alarm, and communication with nurse mobile through Android or iOS mobile, Bluetooth communication to any other device or even warning voice messages to patient when the alarm set conditions happens.

Windows App has been developed with 114 PST 03 and 114 PST SDK 05. Using interpolation and isobars, it generates not only realistic images but also precise information of every measurement point. The different sensors allow you to get different resolution images.

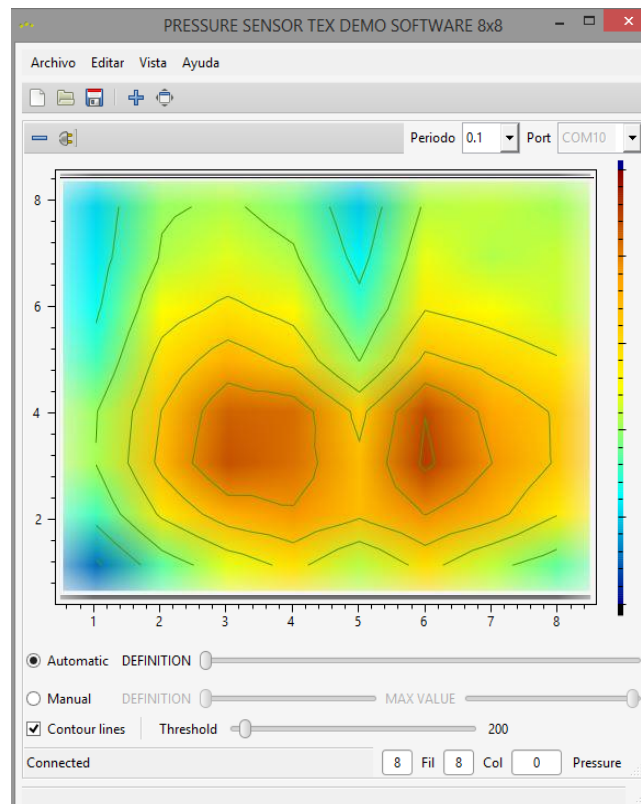


Figure 8. Screen Shot from Windows App

Pattern Recognition

Seating Mat Development Kit allows you to recognize human patterns. In Sensing Tex we offer mats, sensors and systems with higher resolution, and we can also make a customized design to match your needs.

The following images show the pattern recognition of some different patient poses. Figures left and right would be recognized as bad positions.

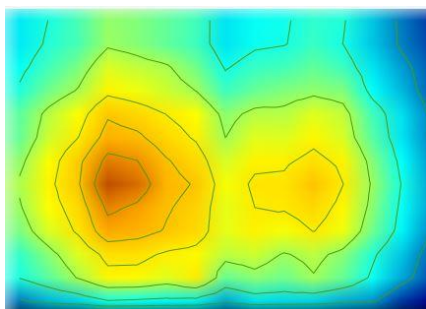


Figure 6: Patient unbalanced to the left

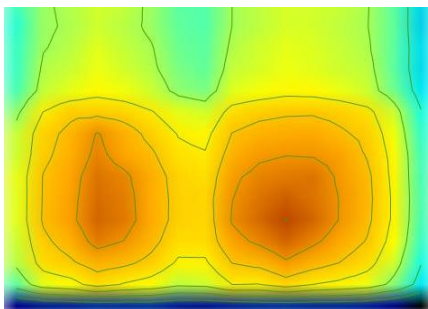


Figure 7: Balanced

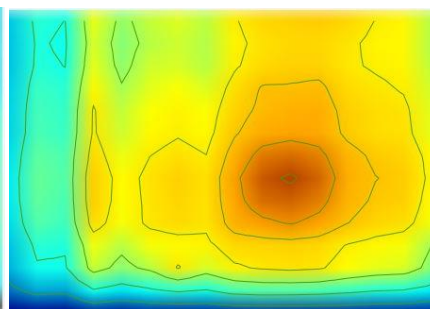
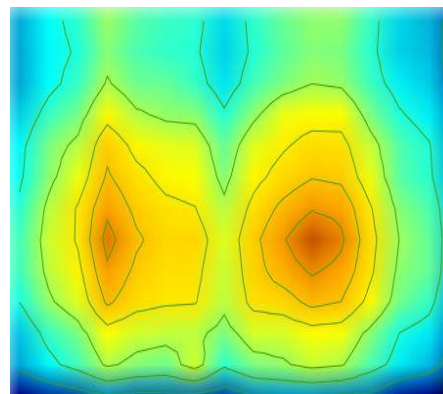


Figure 8: Patient unbalanced to the right

6. Main Applications

Main applications of Seating Mat Dev Kit are bed covers for a mattress and a cushion cover for a wheelchair.



It can be used for product development in health, wellness for bedding or seating applications such as measure and monitor patient position, evaluate patient comfort, identify pressure on risk areas or measure position for wellness purposes among other applications.

Please contact info@sensingtex.com to order our Seating Mat Dev Kit or go to our Online Store: [Seating Mat Dev Kit](#)

7. FAQ's

Which part number we should order if we want to test a mattress size solution?

As a quick solution, two sensor parts and two SDKs can be combined using special software integrating both data. Please contact our engineering team to check availability of this software.

However, we suggest you to take a look to our Mattress Mat Development Kit, which is a system thought for that purpose.

The available size of the Pressure Tex does not fit exactly with our needs. What should we do?

The Seating Mat Development Kit is based on standard customer requirements. A customized solution is normally the expected outcome for your industrial order. Please, do not hesitate to contact our engineer team.

Is it possible to receive more resolution to my measurements?

We can design almost anything you can imagine, from big area sensor mats to high resolution small area pressure sensors. Contact us and you will have the solution you need.

8. Maintenance and Operating Instructions

- Seating Mat has to be rolled up with care.
- Perform a correct battery charge in each use to achieve better long life battery.
- Seating Mat can be cleaned with some soap and water with a tissue.
- Specific finishes on the Sensor Mat for end product applications allow to wash the Mat in standard washing machines.

9. Legal Note

Sensing Tex commercialized products require a careful handling according to the provided instructions. Therefore, any manipulation, modification or transformation applied to Sensing Tex commercialized materials which do not match the standard existing protocols also given to the clients, or which are not strictly authorized by Sensing Tex, will cause an invalid existing product operation warranty, and Sensing Tex will not be responsible for any damage to the product or malfunction.

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