FAQ

Do we have experience fitting the sensors to hands/grippers?
Yes! We have significant experience in this field, having worked with anthropomorphic prosthetics, two finger grippers, and everything in between. These projects have included designing a custom 'glove' for a hand, integrating sensors into the fingers, or retrofitting sensors onto surfaces.

In terms of cabling, how secure are the connections to the sensor? Would they need to develop additional protection around the joints or is it already robust?
We have various ways of reinforcing connectors. They are robust as is, but we can use additional techniques to strengthen this. Please let us know if this is an avenue you would like to explore for your given application.

How large have we made the sensors? Is it possible to wrap large areas of a robot like it's arms?
We've developed sensors up to 380 mm × 380 mm so far, and can go up to 1m x 1m with some screen printers. Fully suitable for robot arms and other areas - we're one of the few that can do this! We would only print this size of senor during a custom order, as we don't have this size readily available.

How large is the sensor surface?
Sensing Area = 57mm x 22mm
Sensor Size = 66mm x 30mm

How large is the readout hardware?
The readout hardware is 25mm x 61.5 mm

Are there cable length restrictions between sensor and readout hardware?
No restrictions within the single digit meters range.

How long are the wires, and what kind of connection do the wires use?
Cables can be at least 5m long without signal degradation. Routing and integration would be custom to your system. We use standard 2.54mm pitch connector headers.

Does the material restore its original shape completely after removing the force?
Unless the sensor has been irreparably damaged, yes.

Is it necessary to re-calibrate the initial state of the skin, i.e. "zero" signal?
We are proud to say that sensors come pre-calibrated to you. Unless seriously abused (our sensors are exceptionally durable), they will not need to be re-calibrated.

Can you track down sensor touches at several points of the sensor simultaneously?
The sensor will average the pressure of the two (or more) points. If you want a multi-point touch sensor we will be able to help with a Matrix array.

What is the output of the sensor?
The output of the eDermis sensor Dev kit are xy location and the normal force magnitude Fz of the applied load/touch in ohms (force calibrated output can be provided at an extra cost), which are delivered either through our visualiser software or can be drawn directly through a serial monitor.

Is it possible to use a customizable board instead of the development board to connect the sensor?
Yes, at an extra cost we can have a look at what are your needs for the readout electronics and adapt our readout accordingly. Please get in touch if this is of interest.

Is the signal measurement / filtering algorithm open?
No, all our code will come obfuscated. We sell software packages separately.

How many sensors can be connected to one board? What size is it?
The development kit comes with a board able to connect 1 sensor. At an increased cost, we can connect up to 16. The size of our board is about the size of an Arduino MKR for 1 sensor, or the size of an Arduino Due for multi-sensor readout (up to 16). We can provide precise dimensions of the system if required.

How firm is the product? Does it deteriorate quickly, or is it durable enough for continuous use over thousands upon thousands of cycles?
We use Kapton as a substrate; this is one of the most durable materials in the world (even used by NASA). During our testing, we've gathered that after 1M+ cycles, the sensor performance will begin decreasing. With that in mind, the exact life cycle varies with the application. Please get in touch if durability is likely to be a key cause for concern in your application – after putting our sensors under a lot of stress in the lab, we will be able to help!

Is there any way of estimating the price per square centimetre of the eDermis?
The sensor price will vary depending on several factors, such as how many we are producing/selling to a given client, the time spent customising the sensor, and the size of each sensor (to name a few). As a result, we don't have a set rate for how much a sensor will cost per square centimetre.

Instead, we opt for understanding a clients' 'full' application. This conversation would help answer questions like where is the e-skin going (i.e. across as much as the robot as possible? Or just the hands/fingertips? Etc.), or what dynamic ranges/sensing capabilities do you require. From here, we can get a better understanding of what is required, and so can come up with a more accurate price.

Is there any software that allows for ready integration with wearable haptic devices?
Haptic integration can be purchased as an additional package, when we work towards a custom deployment. We have significant experience here, mapping our sensors to the Teslasuit and Sensegloves, amongst other products.

Can the sensors go wireless?
This is not a part of our standardized Dev Kits, but we can indeed provide both Wi-Fi and Bluetooth capabilities. This can be explored in more detail at a later stage if of interest (for a custom deployment / larger PO).

Does direct contact need to be made with the sensors to measure force?
Yes. The sensors are tactile and require a load in contact to offer a readout. We can make different variants, with our most sensitive ones able to feel a soft exhalation.

How do the sensors react to the application of shearing forces as opposed to normal forces?
Our Triaxial sensors are capable of measuring the magnitude and direction of 3D force vectors (F_z, F_y, F_x) and exhibit a close-to-linear response to shear F_x and F_y shear forces in the range of 0-25 N. Please get in contact for further information if this is of interest.

How taxing are the sensors on a computer? Do you have the minimum required specs for the employment of these sensors on a computer?
Absolute minimal load, they won't be hogging the CPU or GPU. The computer will be receiving the sensor data over a serial connection, and the Arduino takes care of all the processing.

Is it possible to "daisy-chain" multiple sensors together?
Yes. The sensors can be built into arrays to offer an accurate 'skin'. Alternative methods of getting a 'skin' is through printing larger sensors (we've printed up to ~a computer size sheet). With that in mind, as the sensors increase in size, the accuracy will decrease.

How visible are the sensors?
This is dependent on the deployment. If integrated, the sensors will not be seen. If retrofitted, the sensors are visible. Being thinner than human skin though, the sensors are very low profile, even when visible.

Is the DK1 dev kit returnable?
The Dev Kits are not returnable. We are confident that you will be impressed with our technology, however, if you have any concerns, please do get in touch with us!