XELA

Catalog

XELA ROBOTICS PRODUCT CATALOG FOR 2025

COMPANY NAME

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Reimagining Automation

THROUGH TACTILE DATA

Mission & Vision

It is our mission to optimise industries with our uSkin technology — a high-density, 3-axis tactile sensor that provides robots with a human-like sense of touch. uSkin significantly enhances robots' precision in handling tasks across assembly, packaging, agriculture, and more.

As we face the challenge of a rapidly aging population, our mission is to boost productivity by integrating uSkin into robots, making them efficient assistants in daily human activities.

Through innovation and technology, XELA Robotics is bridging the gap towards a future where robots can seamlessly support our workforce, ensuring a more productive and sustainable economy.

History

Originated as a spin-out from Waseda University, one of the top universities in Tokyo, XELA Robotics has a strong academic background.

Furthermore, XELA Robotics is at the forefront of developing advanced tactile AI technologies.

Additionally, we have dedicated personnel for business activities, ensuring a well-rounded approach to meet our clients' needs.

uSkin®

Table of Contents

Sensor Features

3-Axis Measurements

HIGH DENSITY 3D TOUCH

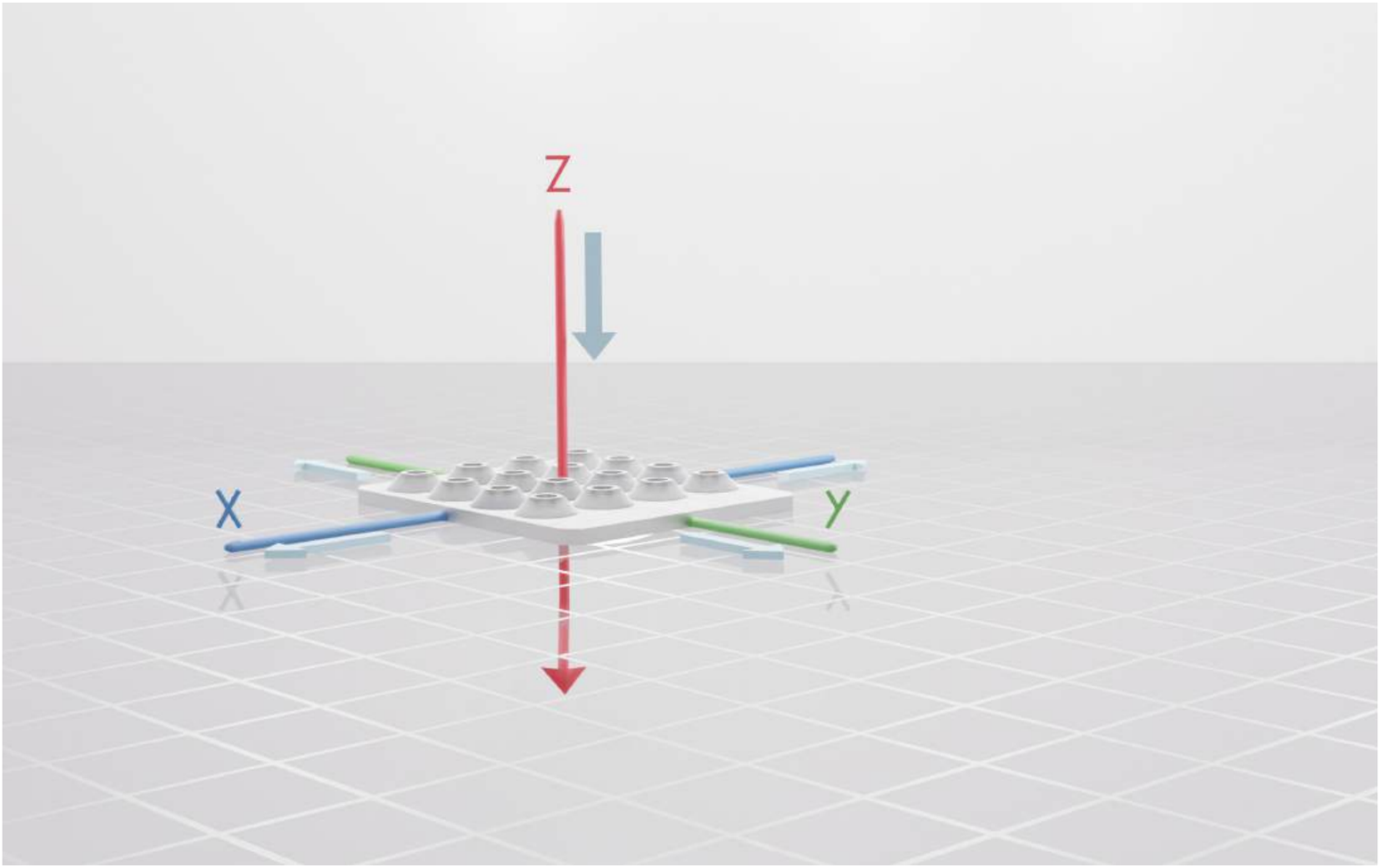
Every sensor module includes multiple sensors, and every sensor can measure 3-axis force, not only pressure.

For example, the uSPa 44 sensor is one of our most popular models and includes 16 individual sensors (or taxels).

These sensors mimic a joystick, measuring X, Y, and Z force:

- Shear forces **tangential** to the surface
- Normal force **perpendicular** to the surface

Providing you with a more detailed and accurate data collection.



500 Hz

Measurement Frequency

(for uSPa 11 model)

Digital Output

FAST & ACCURATE

Most sensors require various cables and large-sized analogue-to-digital converting hardware.

uSkin already provides digital output. Only a few thin wires are needed to collect the measurements, and no additional analogue-to-digital converter is required.

uSkin utilises digital output to provide you with faster, more accurate measurements with minimal electric noise and interference.

1500 gf

Max. Measurable Normal Force per Taxel

(for uSPa 44 model)

Soft & Durable

RELIABLE AND ROBUST

uSkin is a soft sensor capable of handling fragile objects without damaging them. Objects of different sizes, shapes, hardness, and weights can be grasped and manipulated reliably.

The softness of uSkin also ensures that the sensor is highly resilient to overloading, making uSkin very durable.

0.1 gf

Resolution

Highly Sensitive

MEASURE WITH PRECISION

Featuring a resolution of 0.1 gram-force (gf), which enables the sensor to detect extremely light touches, making it suitable for applications requiring sensitive force measurement.

This makes uSkin particularly useful in fields where nuanced detection is crucial.

Sensor Collection

All Sensor Models

Patch

Our flat sensor series available in five adaptable shapes and sizes.

uSPa

uSkin Patch: uSPa

Curved

Specifically engineered as a curved fingertip sensor for robotic hands.

uSCu

uSkin Curved: uSCu

Protect

Encapsulated for protection, designed for grippers.

uSPr

uSkin Protect: uSPr

Multibend

Has the ability to bend and be cut in between the sensing points (taxels).

uSMu

uSkin Multibend: uSMu

Designed for Your Application

Custom Models

In addition to our standard sensor models, XELA Robotics provides customisation services to tailor our sensors to meet your unique requirements, ensuring optimal alignment with the specific needs of our clients.

Flat / Patch

Our standard patch sensor modules come in five shapes and sizes, adaptable for any specific application need. Custom modifications are available to ensure a perfect fit for your project.

uSPa	uSPa	uSPa	uSPa	uSPa
Product Code uSPa 11	Product Code uSPa 21	Product Code uSPa 22	Product Code uSPa 44	Product Code uSPa 46
1×1	2×1	2×2	4×4	4×6
Measurements 1x1 taxel	Measurements 2x1 taxels	Measurements 2x2 taxels	Measurements 4x4 taxels	Measurements 4x6 taxels
Taxel 1	Taxels 2	Taxels 4	Taxels 16	Taxels 24
mm	mm	mm	mm	mm
Dimensions 7 x 7.3 x 4.7 mm	Dimensions 6.3 x 11 x 4.7 mm	Dimensions 11.1 x 11.1 x 4 mm	Dimensions 22.6 x 24.6 x 5.5 mm	Dimensions 30.6 x 50.6 x 4.9 mm
4	4	4	7	7
Only 4 wires	Only 4 wires	Only 4 wires	Only 7 wires	Only 7 wires

Fingertip

The fingertip tactile sensors below are specifically designed to be mounted on the designated robot hand or gripper.

Model **uSCu ALHA**
For Allegro Hand

TAXELS: 30
TYPE: Curved Sensor Series

Model **uSPr HE35**
For Hand-E Gripper

TAXELS: 15
TYPE: Protected Sensor Series

Model **uSPr WSG 50**
For WSG 50 Gripper

TAXELS: 24
TYPE: Protected Sensor Series

Model **uSPr 2F**
For 2F-140 & 2F-85 Gripper

TAXELS: 24
TYPE: Protected Sensor Series

Most Recent Sensor

Model uSPr DS
For Various Grippers
(eg. Robotiq, Franka Emika, and more)

TAXELS: 20 (inside) + 10 (outside)
TYPE: Protected Sensor Series

This fingertip sensor is designed with sensors on two sides, while also being sensitive on the other three sides, as the inside and outside sensors measure shear forces.

Despite its advanced functionality, the sensor remains thin (10.7 mm), and its surface layer can be easily replaced.

Bendable

Explore the adaptable uSkin Multibend sensor, designed for flexibility on cylindrical and curved surfaces.

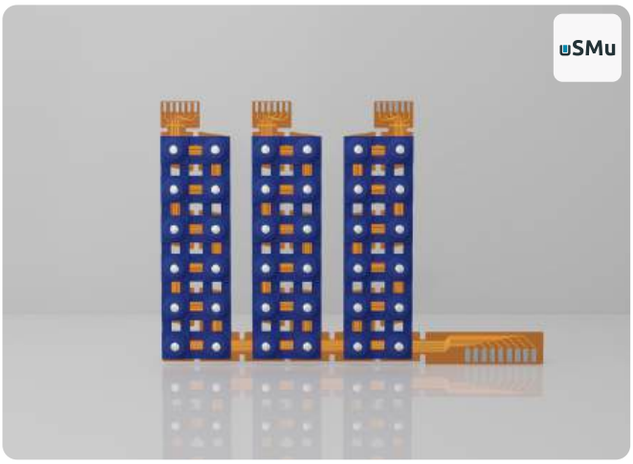
Model uSMu
A Bendable Sensor

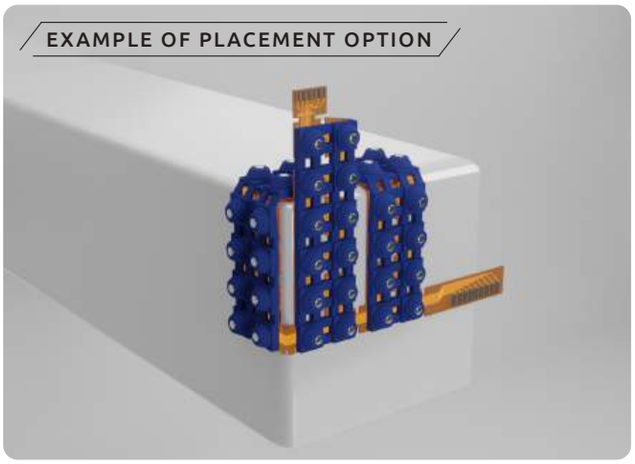
TAXELS: 36
TYPE: Bendable Sensor Series

Configuration

uSkin Multibend's design not only bends between sensing points (taxels) for easy integration on curved surfaces but also offers customisable dimensions for specific applications. Whether for narrow cylinders or broad curves, it can be precisely adjusted and cut in between the sensing points.

Examples of configuration options are illustrated below:





Integration Service

for Allegro Hand (Curved)
from Wonik Robotics

TAXELS: 368
TYPE: uSCu ALHA Integration

for Allegro Hand (Flat)
from Wonik Robotics

TAXELS: 312
TYPE: uSPa 44 & 46 Integration

for 2F-140
from Robotiq

TAXELS: 48
TYPE: uSPr 2F Integration

for 2F-85
from Robotiq

TAXELS: 48
TYPE: uSPr 2F Integration

Your Specialised Integration

If you cannot find the integration you are looking for, do not hesitate to contact us. We can customise our sensors for any gripper or robotic hand, ensuring a perfect fit for your application.

for LEAP Hand
from Open Source

TAXELS: 368
TYPE: uSCu ALHA Integration

for EZGripper
from Sake Robotics

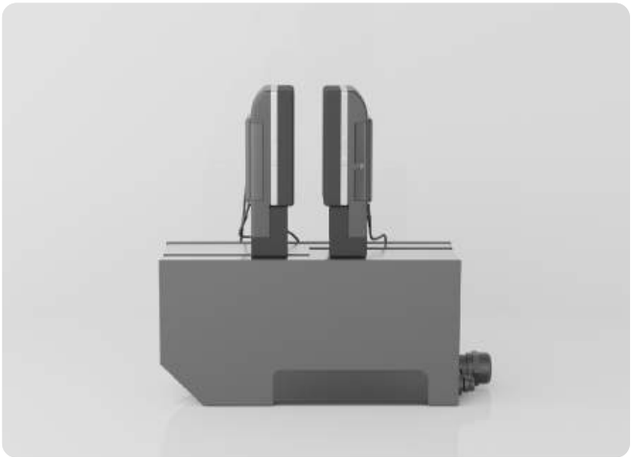
TAXELS: 48
TYPE: uSPa 46 Integration

for Hand-E
from Robotiq

TAXELS: 30
TYPE: uSPr HE35 Integration

for WSG 50
from Weiss Robotics

TAXELS: 48
TYPE: uSPr WSG 50 Integration



uAi Software

Active Functions

ALL RELEASED FUNCTIONS

Tactile Data Visualisation
Basic Tactile Function

All measurements are visualised in real-time, either in Windows or in Linux.

Point of Contact
Basic Tactile Function

Provides the coordinates of all contacts. Different contact areas are separated, and the center of each contact area is provided.

Data Recording
Basic Tactile Function

Obtain tactile measurements. Our software collects the measurements from all skin patches and prepares them for your application. Currently, we provide the measurements in Windows and Linux, as well as for ROS and ROS 2.

Grasping with Set Force/Pressure
Grasping Abilities Function

Grasp objects with predefined force. Set the desired grasping force, and our software ensures that the object is grasped with this force.

Temperature Drift Compensation
Post Processing Function

The sensor measurements could slightly drift due to temperature changes. We can remove this temperature drift from the measurements by using temperature reference sensors.

Magnetic Interference Compensation
Post Processing Function

Our sensors can have interference from nearby magnetic fields. Using our patented technology, we remove this interference by using reference measurements.

This function is an optional add-on.

Force Calibration
Post Processing Function

The raw measurements are converted into force measurements in Newton. XELA Robotics offers two options for calibration.

Both calibration options give the user more control over the grasped object and enable uSkin to measure force in Newton, enabling you, for example, to grasp objects with a predetermined force.

Standard — OPTION 1
Free

For this type of calibration, all uSkin sensors are calibrated with XELA's universal parameters according to our patented technology.

This feature is free of charge.

Individual — OPTION 2
Add On

For this type of calibration, each sensing point is calibrated individually. Slight differences between the sensing points are equalised to guarantee a more uniform response.

This type of calibration improves the sensor's accuracy, resulting in a more detailed data collection.

Upcoming Functions

IN DEVELOPMENT AND POTENTIAL

Grasping Abilities

Only the sense of touch can tell you if you are: grasping the object with the right amount of force, if the object is slipping out of your hand, and so on. Our grasping functions are designed for robotic integration to improve the overall interaction.

- Slip Detection
- Deformation Detection
- Grasping Success Prediction
- Self Learning
- Re-grasping Suggestions for Unstable Grasps

Object Information

Our tactile property recognition functions will provide the user with a much better understanding of a particular object by revealing the internal and external properties of the specific interaction.

- Recognise Objects
- Detect Object Adhesion
- Detect Object Localisation
- Detect Object Weight
- Detect Object Orientation
- Detect Object Texture
- Detect Shape
- Detect Object Stiffness
- Detect Geometry

Potential Solutions

Small Parts Assembly

AUTOMATION

The need for mass customisation assembly remains a challenging problem within assembly line factories. Flexibility to handle a variety of components and the ability to adapt, to manipulate small parts reliably and rapidly remains difficult.

Compact & Customisable Design

Hardware Feature

Force Calibrated Sensors

Postprocessing Software

Magnetic Interference Compensation

Postprocessing Software

Warehouse Piece Picking

AUTOMATION

Tactile sensors can help realizing the automation of warehouse piece picking by providing the robot with the ability to sense and respond to the physical characteristics of the items it is picking.

Detect Object Weight & Hardness

Allows adjusting grasping force to unknown object.

Predict Chance of Dropping Object

Adjust grasp before transporting object.

Detect Slip and Adjust Grasping Force

Transportation without slip or crushing the object.

Delicate Fruit Picking & Sorting

AUTOMATION

Tactile sensors can help the automation of delicate fruit picking by providing detailed information about the physical properties of the fruit and the surrounding environment.

Prevent Damage to Products

Potential Hardware Feature

Detect Ripeness

Potential Software Feature

Reduce Waste & Increase Yield

Potential Solution

Gaming

OPTIMISATION

3D tactile sensing technology offers a wide range of technical advantages for gaming controllers, such as high resolution, sensitivity and fast response time.

Gear & Apparel

OPTIMISATION

Tactile sensors can play a crucial role in optimising gear and apparel by providing valuable insights into the performance and comfort of the product.

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DISCLAIMER

Due to the continuous evolution of our technology, some information in this document might not reflect the latest updates or developments. XELA Robotics provides this content without warranty, encouraging direct contact for assurance on the most current information and data specifications.