Tactile Sensor Kit

Technical Specification Sheet

Overview:

The tactile sensor kit is designed for high-precision measurement of contact force magnitude and force distribution mapping.

Key Features:

- **High-accuracy, high-resolution measurement capability with 12-48 simultaneous sensing channels**
- **High sensitivity based on capacitive sensing technology**
- **Measurement range: 0-30 PSI relative pressure**
- **Power supply: DC 3.3V or DC 5V**
- **Digital output interface for seamless system integration and data transfer**
- **Direct-contact sensing capability**
- **Long-term stability with optional online calibration algorithms**
- **Flexible construction using conformable materials for curved surface applications**
- **Rapid deployment across diverse applications with customization options available**

Intended Use

The tactile sensor (flexible multi-channel pressure sensor) is engineered for applications in robotics, medical instrumentation, physiological signal acquisition, industrial automation, scientific research, battery technology, sports equipment, and haptic interface systems. Core functionalities include pressure monitoring, tactile feedback, data acquisition, and performance analysis.

Application Fields

- **Robotics:** Tactile feedback for robotic grippers and end-effectors, enabling precision manipulation and intelligent control systems.
- **Medical Instrumentation:** Integration with medical devices and rehabilitation equipment for pressure monitoring and biomedical signal acquisition (e.g., blood pressure measurement).
- **Human Biomechanics:** Sleep monitoring, posture analysis, spinal correction applications for human force distribution assessment.
- **Industrial Applications:** Screen lamination processes and associated functional testing.
- **Aerospace Research:** Aerodynamic studies of aircraft and spacecraft, measuring surface pressure distribution and flow characteristics.
- **Battery Technology:** Internal expansion force detection in battery modules. Ultra-thin multi-channel design enables seamless integration in space-constrained modules for real-time monitoring of expansion forces between cells and end plates, or inter-cell forces.
- **Sports Equipment:** Integration with footwear, rackets, and athletic gear for performance data collection and biomechanical analysis.
- **Haptic Systems:** Virtual reality applications, game controllers, assistive technologies providing tactile feedback and enhanced user interaction.

Accessories Example

Model	Part Number (SSN)	Description	Technical Document
Model 1	Sxxxx-S318	Wired data transmission	-
App_v1	Sxxxx-v1	Supports data collection and analysis, with online calibration algorithm	-

Principle of Operation

The tactile sensor operates using a capacitive pressure mapping principle. The sensing layer is in direct contact with the medium to measure pressure. Measurement values are converted inside the main controller into encoded digital signals.
*) Applicable to Model 1-4.

Sensor kit

The tactile sensor kit includes:

1. Sensor
2. Main controller, compatible with multiple sensors
3. Cables

Modifications or adjustments are allowed.

*) Different models use different pressure-sensitive materials.
**) Main controller is compatible with all sensor models.

Installation & Usage Instructions

Installation instructions are included in the sensor packaging. For further installation information, refer to the "Sensor Installation Manual" in the Download Center.
Optional: Visualization and basic data acquisition, processing, and analysis software.
Default: Equipped with API library and documentation (for developers to integrate with existing data collection platforms or systems).
On-site installation and training support available.

Software

High-performance desktop application for data display, supporting continuous long-term measurement, historical data review, data saving, matrix graphical display, preliminary data analysis, buffer processing, zoom in/out, etc. Includes basic waveform analysis features such as data buffering, peak detection, filtering, etc.

API Support

Data acquisition API provides essential data reading, control, and status query functions for efficient and stable data acquisition. Includes API dynamic/static libraries, header files, usage examples, and detailed API documentation. Supports secondary software development for clients.

Important Notes

Ensure appropriate sensor installation procedures to prevent pressure impact, which may damage the sensing layer.

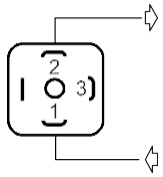
Disposal

This device must be disposed of as waste electrical and electronic equipment in accordance with European directives and must not be treated as household waste.
• The device must be disposed of through designated collection channels.
• All applicable local laws and regulations must be observed.

Technical Data

Interface	Power Supply			
	Supply Voltage		DC 3…5 V	
	Current Consumption		<7 mA, < 0.5 VA	
Main Parameters	**Model 1**			
	Sensor Total Area		17 mm x 94 mm	
	Sensing Area		14 mm x 4 mm	
	Number of Sensing Elements		12 (3 × 4, rows × columns)	
	Spatial Resolution		1.2 mm x 3.25 mm	
	Model 2			
	Sensor Total Area		17 mm x 104 mm	
	Sensing Area		12 mm x 8 mm	
	Number of Sensing Elements		24 (6 x 4, rows × columns)	
	Spatial Resolution		1.25 mm x 2.25 mm	
	Model 3			
	Sensor Total Area		17 mm x 104 mm	
	Sensing Area		14 mm x 10 mm	
	Number of Sensing Elements		36 (6 x 6, rows × columns)	
	Spatial Resolution		1.25 mm x 2.5 mm	
	Model 4			
	Sensor Total Area		17 mm x 104 mm	
	Sensing Area		14 mm x 12 mm	
	Number of Sensing Elements		48 (6 x 8, rows × columns)	
	Spatial Resolution		1.25 mm x 2.5 mm	
Performance Data	Applications		Refer to "Model Overview"	
Measurement Accuracy	Characteristic Curve [1)]		±0.5 % FS	
FS = Full Scale	Resolution		0.5 % FS	
	Time Drift		<±0.25 % FS	
	1) Typical; max. 0.5% FS (including zero, end, linearity, hysteresis, repeatability)			
	Dynamic Response		Response time: < 10 ms, typical 9 ms	
	Pressure Sensitivity		0.2 %	
	SNR (Signal-to-Noise Ratio)		690:1	
	Repeatability Error		0.4%	
	Linearity		99.8%	
	Pressure Range		30 PSI	
	Max. Allowable/Destructive Pressure		4 x full scale	
	Maintenance		None required	
	Installation Position		Any	
Electronics Parameter				
	Sampling Rate		110 Hz	
	Host Computer Interface		Wired/Bluetooth	
	ADC Resolution		16 bit	
	Input Power		2.5W	
Environmental Conditions			Operating	Storage
	Temperature		-20 ... 100 °C	-40 ... 100 °C
	Humidity		Sensitive to condensation	Sensitive to condensation
Materials	Plug Housing		Polyphthalamide 50% GF VO	
	Materials	Contacts	Fabric and Polyimide	
		Sealing	Fluoroelastomer FPM	
Other Parameters	Cable Included		0.07 kg	
	Sensor Thickness		0.5 mm	
	Cable Length		approx. 1.5 m	

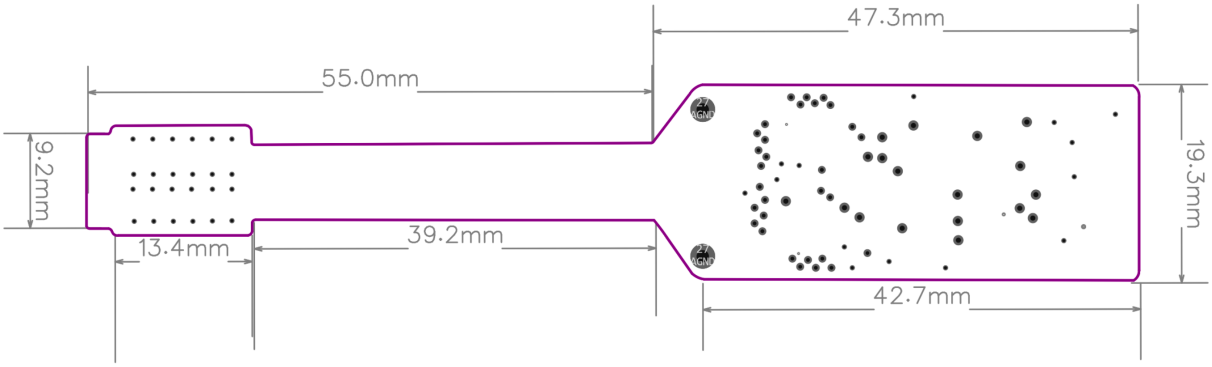
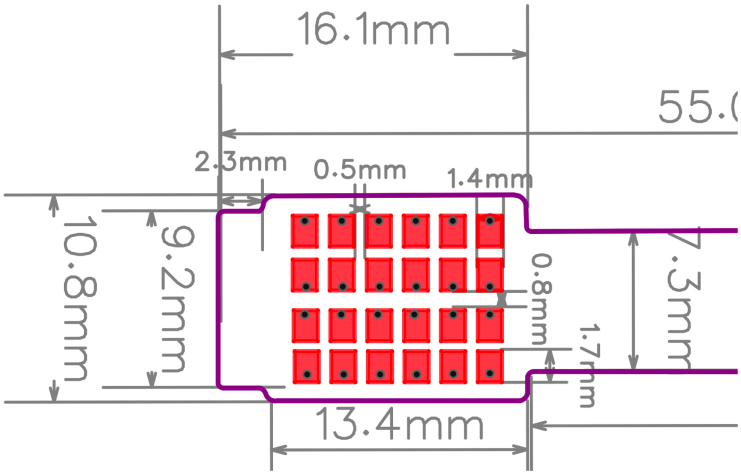
Wiring Diagram



Terminal Label	*Terminal Number*	*Description*
RX	*1*	Receive digital signal for sensor configuration
TX	*2*	Transmit digital signal to read sensor values

Dimensions (Model 2)

tactile sensor：



sensing area：