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Key Solutions in Electronics

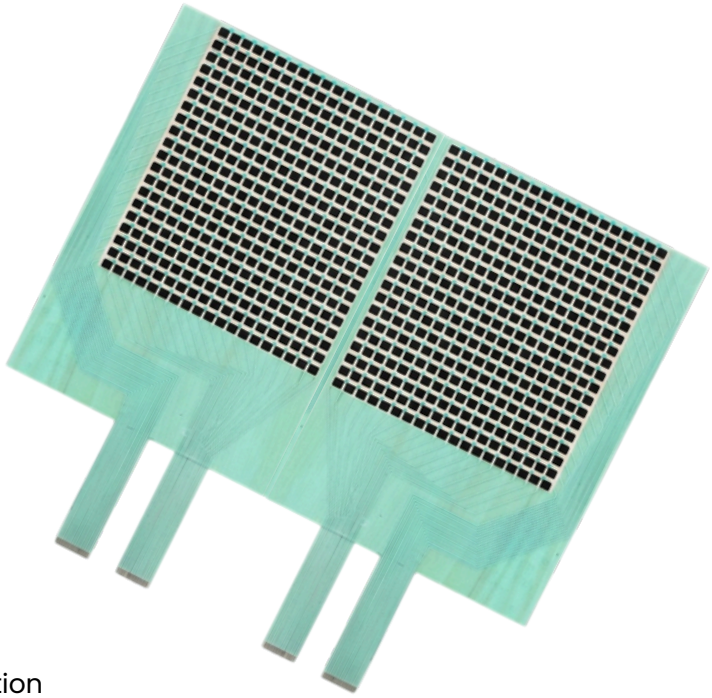
LP4440

FSR matrix sensor 20x20

Description :

FSR Matrix 20 × 20 with Controller is a high-density FSR matrix control system engineered for real-time force acquisition, processing, and visualization. Built around a 20 × 20 force-sensitive resistor (FSR) matrix architecture, the system captures 400 discrete sensing points and converts raw analog force signals into stable, high-resolution spatial maps.

The integrated external controller performs matrix scanning, signal conditioning, and digital filtering to ensure accurate and repeatable measurements across robotics, automotive, research, and industrial applications.



Key Features

- 20 × 20 high-density FSR matrix
- 400 independent sensing nodes
- Dedicated external controller
- Real-time frame acquisition
- Live heatmap visualization
- Integrated digital signal filtering
- Raw frame data logging
- Single USB cable for power and communication
- Flexible and lightweight sensing surface

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System Diagram

System Architecture

FSR Matrix 20 × 20 with Controller uses a row–column scanning architecture to sequentially acquire force data from all 400 sensing nodes. The external controller performs matrix multiplexing, analog signal conditioning, and digital filtering before packaging the data into structured frames.

The processed frames are transmitted in real time to the desktop application, where the force distribution is rendered as a dynamic heatmap and stored for further analysis and reporting.

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Technical Specifications

Controller Specifications

Parameter	Specification
Controller Type	Custom Embedded FSR Matrix Controller
Matrix Size Supported	20 × 20
Total Sensing Channels	400 Nodes
Data Acquisition Method	Row–Column Scanning Architecture
Signal Processing	Integrated Digital Filtering
Frame Transmission	Real-time via USB
Output Interface	Desktop Application
Data Logging	Raw Frame Storage
Power Requirement	5 V DC (via USB)
Communication	USB / Virtual COM

FSR Matrix Specifications

Parameter	Specification
Sensor Type	Force-Sensitive Resistor (FSR) Matrix
Matrix Configuration	20 × 20 Grid
Total Active Sensing Points	400
Sensing Principle	Resistive Pressure Variation
Operating Mode	Real-Time Dynamic Sensing
Construction	Flexible PET Based Matrix
Thickness	0.5 mm
Pressure Range	0 to 50 kg

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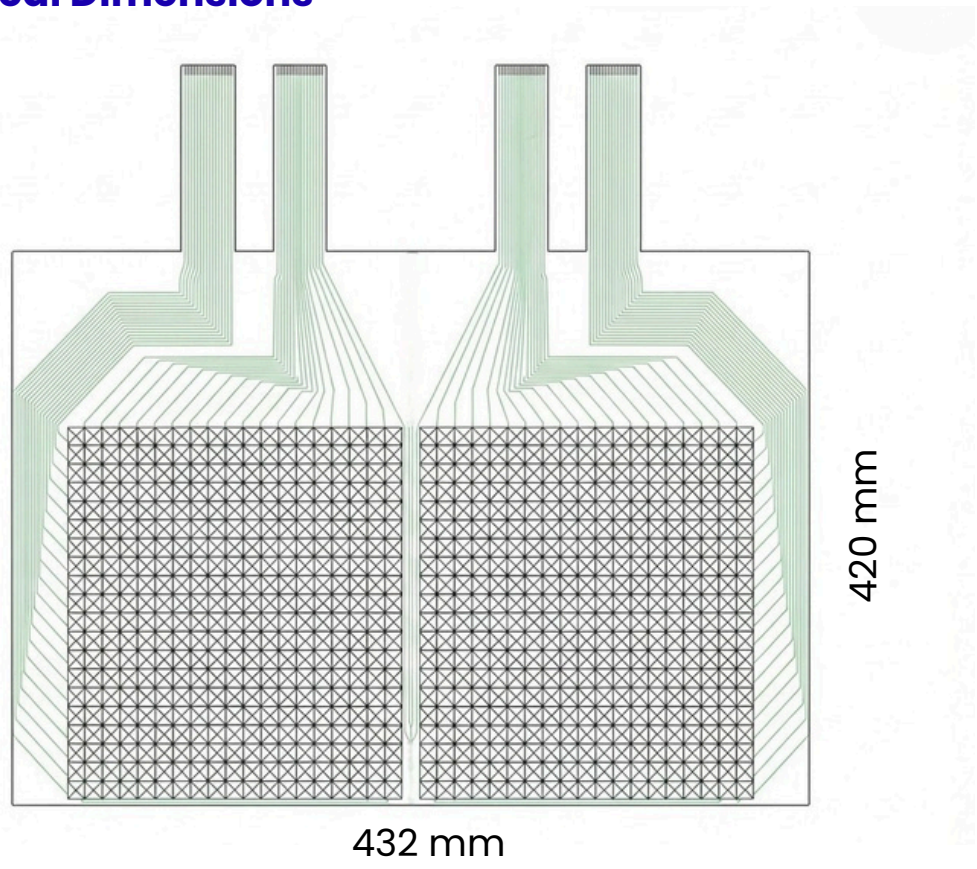
✦ Mechanical Dimensions



Key Dimensions

Parameter	Value
Matrix Length	420 mm
Matrix Width	432 mm
Sensor Grid	20 × 20
Total Nodes	400
Form Factor	Flexible Matrix + External Controller
Cable Interface	Single USB Cable

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System Components

1. Controller

The controller functions as the central processing unit of the system. It acquires force data from the 20 × 20 FSR matrix and converts it into high-resolution digital output. The controller processes and stabilizes the captured data before transmitting structured frames to the desktop interface in real time.

2. FSR Matrix

The FSR matrix is a high-density sensing grid comprising 400 active sensing nodes. It captures spatial force distribution across its surface and provides the raw sensing input for the system.

3. Power Supply

The system is powered directly through the PC via the same USB/COM port used for data communication. This single-cable architecture enables simultaneous power delivery and real-time data transmission.

Applications

- Robotic Tactile Sensing
- Humanoid & Service Robotics
- Automotive Seat Pressure Mapping
- Automotive HMI & Touch Panels
- Industrial Automation
- Smart Surface & Embedded Systems
- Research & Product Development