# FMS20090 Flexible Breathable Fabric Matrix Sensor

**Category:** Flexible Fabric · Smart Textile Array · **Active Size:** 200 mm × 90 mm (Flexible Conductive Fabric)

## 1. Product Overview & Description

Soft, washable, and highly breathable conductive textile pressure sensor array. Designed for smart compression garments, insole gait analysis, rehabilitation braces, and ergonomic mattress monitoring.

## 2. Mechanical & Electrical Specifications

| Parameter | Specification Value | Test Condition / Notes |
|---|---|---|
| **Sensing Range** | 20 g to 5 kg per taxel | Hyperbolic inverse resistance response |
| **Active Sensing Area** | 200 mm × 90 mm (Flexible Conductive Fabric) | Defined piezoresistive printed zone |
| **Outer Dimensions** | 220 mm × 110 mm | Inclusive of tail & borders |
| **Nominal Thickness** | 1.20 mm (Soft Breathable Layer) | Multi-layer PET / Conductive laminate |
| **Actuation Force** | < 10 g | Continuous contact threshold |
| **Response Time** | < 10 milliseconds | Time to reach 90% steady-state |
| **Repeatability** | ±3% | Same device, fixed actuator profile |
| **Hysteresis** | < 12% | Loading vs. unloading curve offset |
| **Operating Temperature** | -20°C to +60°C | Humidity: 0% – 95% RH non-condensing |
| **Mechanical Lifetime** | > 100,000 Bending / Washable Cycles | Tested under 1kg load cycling |
| **Electrical Connection** | Flexible Textile Ribbon Cable | Standard pinout compatible |

## 3. Signal Conditioning & Circuit Integration Guide

FSR sensors exhibit a hyperbolic decrease in electrical resistance as applied compressive force increases. For optimal measurement accuracy:

**A. Transimpedance Inverting Op-Amp Circuit (Recommended):** Connect the FSR between a negative reference voltage (-Vref) and the inverting input of an operational amplifier with a feedback resistor (Rf). The output voltage is directly proportional to applied conductance (and approximately linear to force): $Vout = Vref \times (Rf / Rsensor)$.

**B. Simple Voltage Divider:** Place the FSR in series with a fixed reference resistor (Rm = 1kΩ to 100kΩ) across Vcc and GND. Measure voltage across Rm: $Vout = Vcc \times [Rm / (Rm + Rsensor)]$.

## 4. Custom Engineering & Ordering Information

FSRTEK provides rapid custom tooling within 120 hours for modified sensor dimensions, high-temperature substrates, tailored force sensitivities (10g to 100kg), and multi-channel DAQ acquisition hardware.

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