Walfront FS-INS-45Z

WALFRONT FS-INS-45Z Foot Pressure Sensor Insole User Manual

Model: FS-INS-45Z

1. Introduction

The WALFRONT FS-INS-45Z is a flexible film foot pressure sensor designed for various applications including pedometer functions, gait analysis, foot force analysis, and foot correction analysis. This sensor utilizes a flexible membrane where the output changes in response to external pressure, offering excellent force sensing and quick response times.
Each sensor features 45 independent sensing areas, arranged in a 10-row by 6-column layout, ensuring comprehensive foot pressure detection. It includes 16 interface cables with a 1mm pitch, 16-pin, and 0.3mm thick plug-and-unplug interface for stable and reliable connections.

2. Product Overview and Features

The FS-INS-45Z sensor is engineered with a reasonable mechanical design that conforms to the human foot, providing efficient and practical sensing capabilities. Its flexible and flaky construction allows for comfortable integration into insoles.

Key Features:

- **Induction Principle:** Output resistance changes proportionally with external pressure.
- **High Sensitivity:** Excellent force sensing with a quick response time.
- **Independent Sensing Areas:** 45 distinct areas for detailed pressure mapping.
- **Robust Connectivity:** 16 interface cables (1mm pitch, 16-Pin, 0.3mm thick) for stable integration.
- **Durable Design:** Engineered for long-term use in various applications.

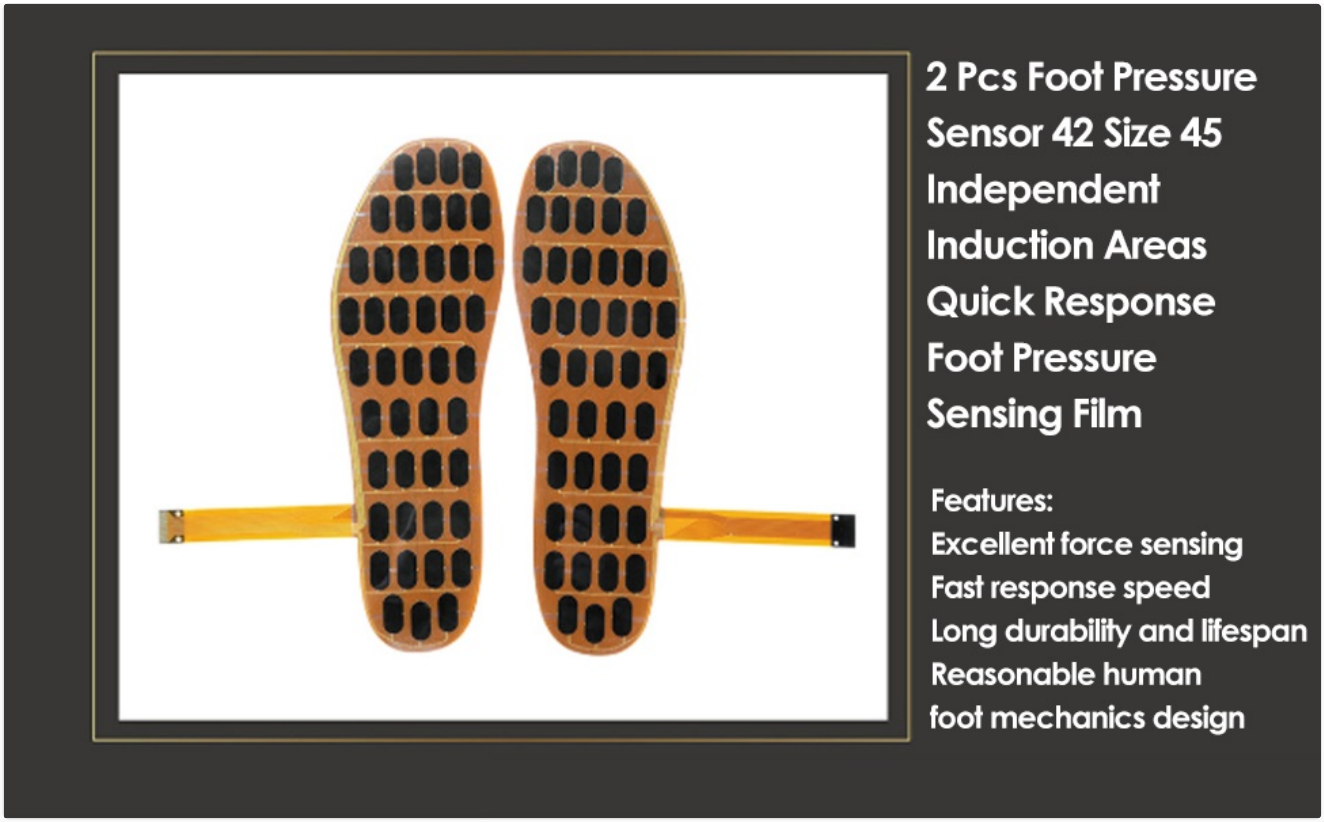

Image: Overview of the WALFRONT FS-INS-45Z foot pressure sensor insole, highlighting its mechanical design, 45 independent sensing areas, 16 interface leads, and applications in pedometer, gait, and foot correction analysis.

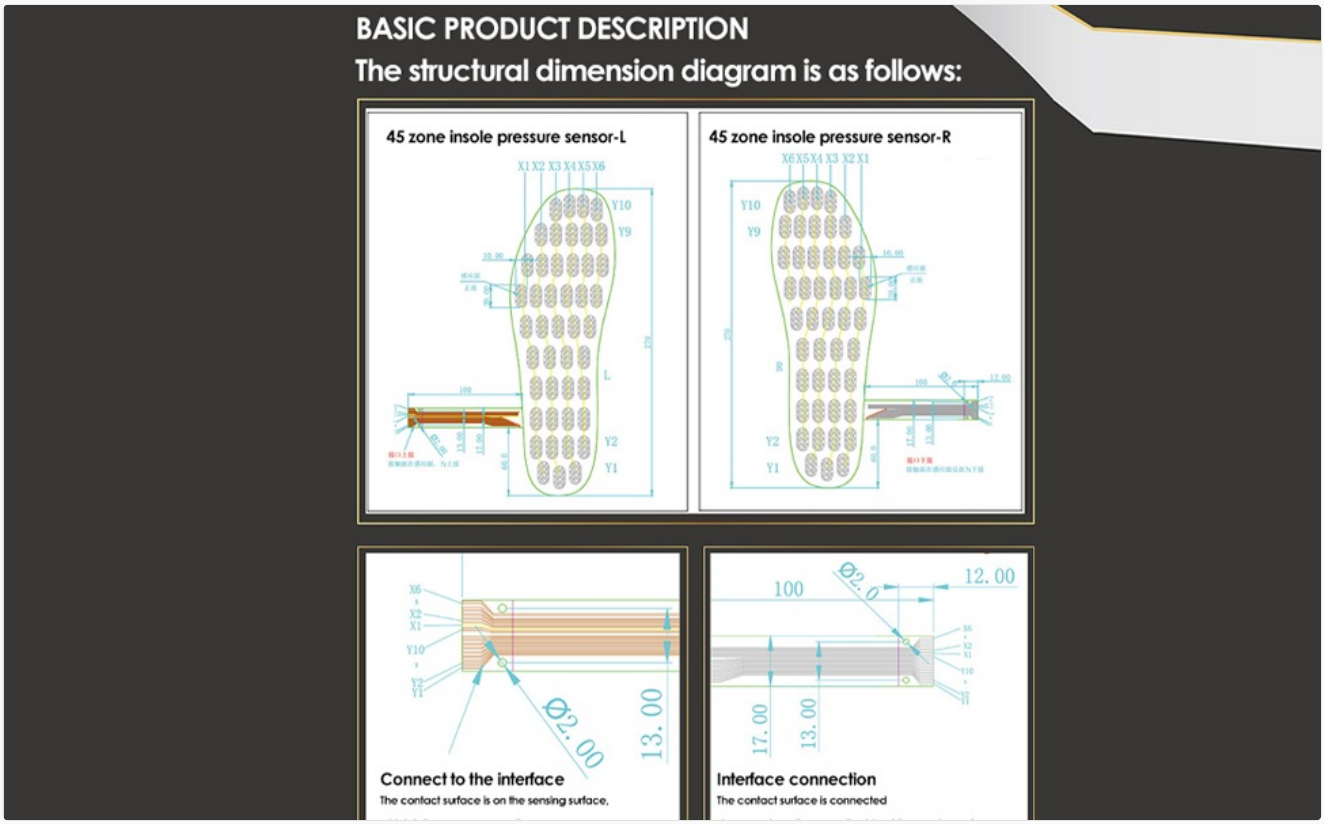

Image: Detailed view of the flexible film pressure sensor, indicating its 42 shoe size, approximate thickness of 0.5mm, and the principle of output resistance changing with external pressure for excellent force sensing and quick response.

3. Specifications

Parameter	Value
Model	FS-INS-45Z
Material	Polyester film, nanometer pressure sensing material
Size	42 (equivalent to 7.5 UK and 8.5 US)
Thickness	Approx. 0.5mm (0.02in)
Force Range	0.1kg to 15kg
Pressure Action Mode	Soft pressing
Activation Time	Less than 10ms
Operating Temperature	-20℃ to +65℃
Durability	More than 1,000,000 times
Resistance Range	0.5kΩ to 50kΩ
Response Time	Less than 1ms
Sensing Areas	45 independent areas (10 rows, 6 columns)
Interface	16-Pin, 1mm pitch, 0.3mm thick plug-and-unplug

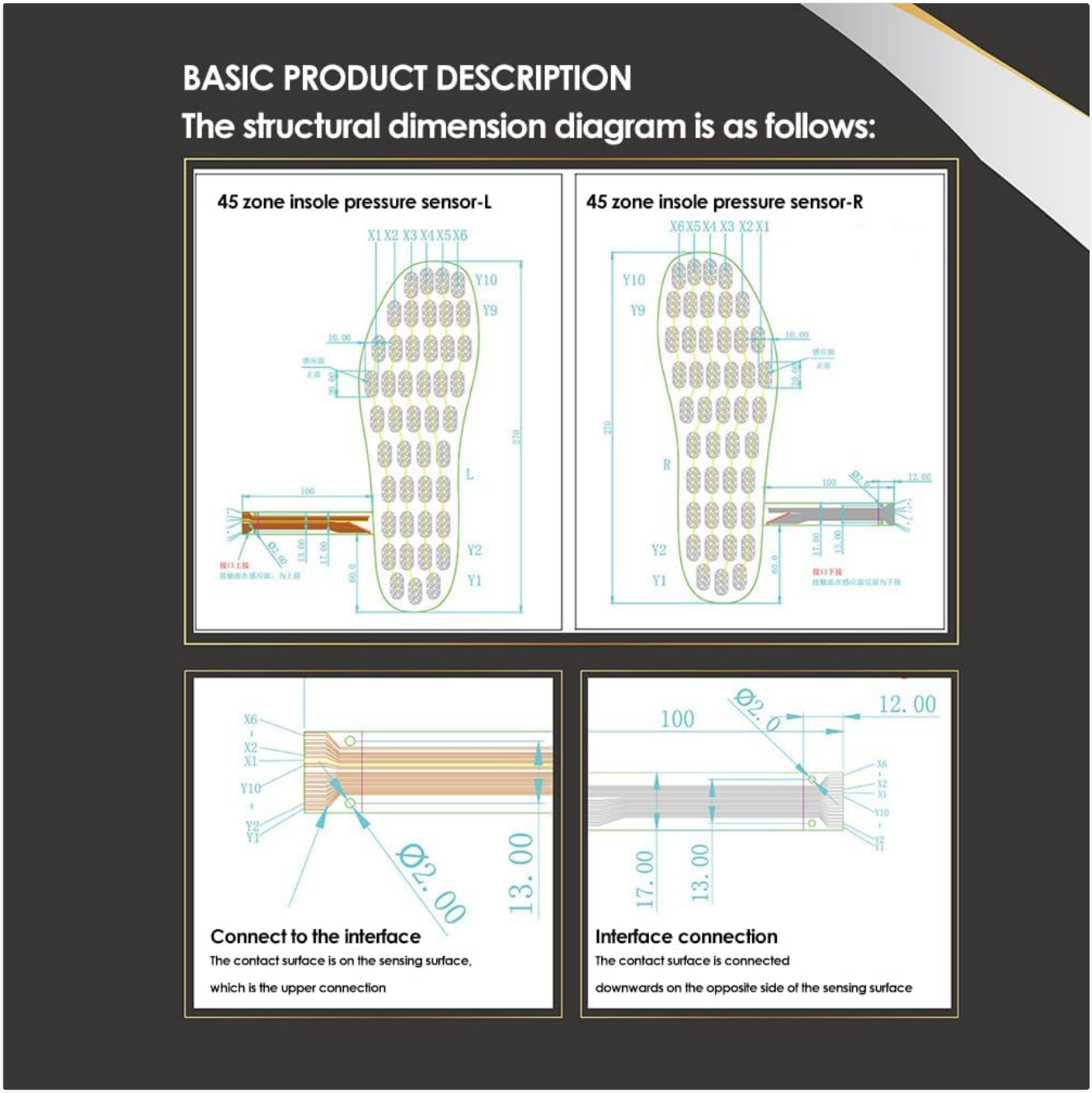

Image: Structural dimension diagrams for the left and right foot pressure sensor insoles, detailing the layout of the 45 sensing zones and interface connection points.

4. Setup Instructions

To integrate and use the WALFRONT FS-INS-45Z foot pressure sensor, follow these general guidelines:

1. **Placement:** Carefully place the sensor insole into the shoe. Ensure it lies flat and is not creased or bent excessively, which could affect sensor performance or durability.
2. **Connection:** The sensor features 16 interface cables. Connect these cables to your data acquisition system or microcontroller. It is recommended to connect a fixed resistor of approximately 2K ohms in series with the sensor.
3. **Voltage Measurement:** Capture the voltage changes across the fixed resistor to obtain the sensor output information. This voltage will vary as pressure is applied to the sensor, allowing for quantitative analysis.
4. **Calibration (Optional):** For precise measurements, perform a calibration procedure with known weights or pressures to establish a correlation between sensor output and applied force.

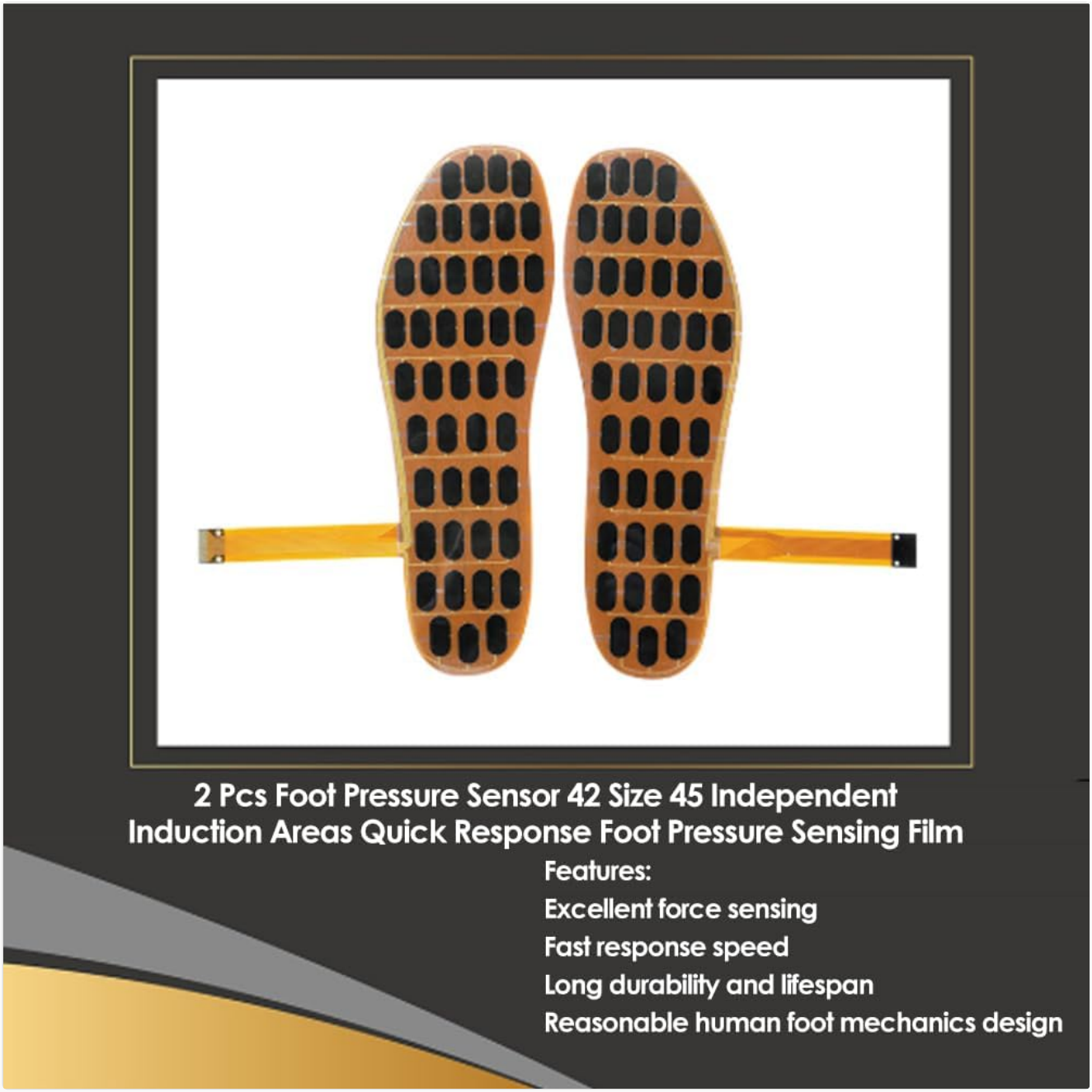

Image: Application circuit diagrams illustrating how to connect the foot pressure sensor (Rs) in series with a fixed resistor (Ro) to measure voltage output (Vout). One diagram shows a basic voltage divider, and the other includes an operational amplifier (U1) for signal conditioning.

5. Operating Instructions

Once properly set up and connected to a data acquisition system, the FS-INS-45Z sensor operates by converting applied pressure into a measurable electrical signal (change in resistance, which translates to voltage change in the recommended circuit). The sensor is designed for continuous monitoring of foot pressure.

- **Data Acquisition:** Begin recording data from your connected device. The system should be configured to read the voltage output from the sensor circuit.
- **Application Use:** Engage in the activity for which the sensor is intended (e.g., walking for gait analysis, standing for pressure distribution).
- **Data Interpretation:** Analyze the collected voltage data to understand pressure distribution, force exerted, and temporal aspects of foot contact. Refer to your system's software or custom algorithms for specific data interpretation.

6. Maintenance

Proper care and maintenance will extend the lifespan and ensure the accuracy of your WALFRONT FS-INS-45Z foot pressure sensor.

- **Handling:** The membrane pressure sensor is a sensitive device. Handle it with care to avoid creasing, folding, or puncturing the flexible film.
- **Environment:** Avoid using the sensor in complex or uneven surfaces without adequate protection, as this can significantly reduce its service life. Ensure the environment is free from excessive moisture or extreme temperatures outside the specified operating range (-20°C to +65°C).
- **Cleaning:** If cleaning is necessary, gently wipe the surface with a soft, dry cloth. Do not use harsh chemicals or abrasive materials. Ensure the sensor is completely dry before use.
- **Storage:** Store the sensor flat in a dry, cool place, away from direct sunlight and heavy objects that could apply pressure.

7. Troubleshooting

If you encounter issues with your WALFRONT FS-INS-45Z foot pressure sensor, consider the following:

- **No Output/Incorrect Readings:**
  - Verify all connections are secure and correctly wired according to the application circuit diagram.
  - Check the integrity of the interface cables for any damage.
  - Ensure the external resistor (e.g., 2K ohms) is correctly placed in series.
  - Confirm your data acquisition system is functioning correctly and configured to read the appropriate voltage range.
- **Inconsistent Readings:**
  - Ensure the sensor is placed flat and smoothly within the shoe, without any wrinkles or folds.
  - Check for any physical damage to the sensor film itself.
  - Recalibrate the sensor if precise measurements are critical and you suspect drift.
- **Durability Concerns:**
  - Review the maintenance section to ensure proper handling and usage in appropriate environments. Avoid sharp objects or excessive localized pressure.

For further assistance, please contact Walfront customer support.

8. Safety Information

Please observe the following safety precautions to ensure safe operation and longevity of the device:

- The sensor is a sensitive electronic component. Avoid exposing it to excessive force, sharp objects, or harsh chemicals.
- Do not attempt to modify or disassemble the sensor, as this may damage the device and void any potential warranty.
- Ensure proper electrical connections are made to prevent short circuits or damage to the sensor or connected equipment.
- Avoid prolonged exposure to direct sunlight or high humidity.

9. Warranty and Support

Specific warranty information for the WALFRONT FS-INS-45Z foot pressure sensor is not provided in this manual. Please refer to the product packaging or the official Walfront website for detailed warranty terms and conditions. For technical support, inquiries, or replacement parts, please contact Walfront customer service through their official channels.