

PRODUCT DATASHEET

MatrixAI Smart Waste Management Level Sensor

Model: MAI2026WM-LP (LoRaWAN)

Product Overview

The MatrixAI MAI2026WM-LP is an advanced IoT-enabled waste level monitoring sensor designed for smart cities, municipalities, and commercial facilities. Using ultrasonic sensing technology and LoRaWAN communication, it provides real-time bin fill-level data, enabling optimized waste collection, reduced operational costs, and improved environmental sustainability.

The device is engineered for long battery life, rugged outdoor deployment, and seamless integration with IoT platforms.

Key Features

- LoRaWAN Communication (Class A)
 - Ultrasonic Fill-Level Measurement (Non-contact)
 - Ultra-Low Power Design (Up to 5–10 years battery life)
 - IP67/IP68 Waterproof & Dustproof Enclosure
 - Optional Fire Detection & Tilt Monitoring
 - Optional GPS Location Tracking
 - Real-Time Data & Smart Alerts
 - Easy Installation on Any Waste Container
 - Cloud Integration (MQTT / HTTP / REST APIs)
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Working Principle

The sensor uses ultrasonic waves to measure the distance between the sensor and waste inside the bin. The measured level is transmitted via LoRaWAN network to a central server or IoT platform.

This allows:

- Real-time monitoring

- Fill-level alerts_____

Technical Specifications

Communication

- Protocol: LoRaWAN® 1.0.3 / 1.0.4
 - Device Class: Class A
 - Frequency Bands: EU868 / US915 / AS923 / IN865
 - Communication Range: Up to 5–10 km (LoS)
 - Data Rate: Adaptive (ADR supported)
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Measurement

- Technology: Ultrasonic (Non-contact)
 - Measurement Range: 0.15 m to 4 m
 - Accuracy: ± 3 cm
 - Blind Zone: ≤ 15 cm
 - Measurement Interval: Configurable (e.g., 1–24 times/day)
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Power Supply

- Battery Type: Lithium (Replaceable)
 - Capacity: 8500 mAh (typical)
 - Battery Life:
 - o Up to 5–10 years (typical usage)
 - o Depends on transmission frequency
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Environmental

- Protection Class: IP67 / IP68

- Operating Temperature: -20°C to +70°C
 - Humidity: 0–95% RH
 - Impact Protection: IK10 (optional)
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Mechanical

- Housing Material: UV-stabilized ABS / Polycarbonate
 - Mounting: Top-mount (bin lid installation)
 - Dimensions: ~120 x 120 x 40 mm (typical)
 - Weight: ~250–350 g
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Optional Sensors & Features

- Fire/Temperature detection
 - Tilt & fall detection (3-axis accelerometer)
 - GPS positioning
 - Bluetooth for local configuration
 - Magnetic tamper detection
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Data Parameters

- Fill Level (%)
- Distance (cm)
- Battery Level (%)
- Temperature (°C)
- Tilt Status
- Fire Alert (optional)
- Device Health

Applications

- Smart Cities & Municipal Waste Management
- Commercial Buildings & Malls
- Industrial Waste Monitoring
- Universities & Campuses
- Recycling & Waste Segregation Systems

◇ System Architecture

1. Sensor measures bin level
2. Data transmitted via LoRaWAN gateway
3. Cloud server processes data
4. Dashboard displays bin status
5. Alerts triggered for collection

LoRaWAN enables long-range, low-power communication ideal for distributed IoT deployments

Ordering Information

Model Description

MAI2026WM-LP LoRaWAN Waste Level Sensor

MAI2026WM-LP-GPS With GPS

MAI2026WM-LP-FT With Fire & Tilt Detection