Milesight EM310-UDL

Milesight EM310-UDL LoRaWAN Ultrasonic Sensor User Manual

Your comprehensive guide to installation, operation, and maintenance.

1. Introduction

The Milesight EM310-UDL is a state-of-the-art LoRaWAN ultrasonic distance sensor designed primarily for monitoring fill levels in waste bins and other containers. Its compact design and wide measurement range make it suitable for various applications, including solid or liquid level detection. Additionally, the EM310-UDL integrates a 3-axis accelerometer to detect the status of the container cover, providing comprehensive monitoring capabilities.

This sensor is fully compliant with Milesight LoRaWAN® gateways and the Milesight IoT Cloud solution, enabling real-time remote monitoring of container status and fill levels via web browsers or mobile applications. The EM310-UDL is widely applicable in waste management, water tank monitoring, and manhole cover monitoring.

Sensor data can be transmitted efficiently using LoRaWAN technology, ensuring low power consumption and an extended battery life of over 3 years with two replaceable batteries. When combined with Milesight LoRaWAN gateways and the Milesight IoT Cloud solution, users can manage all sensor data remotely and visually.

Figure 1: Top-down view of the Milesight EM310-UDL LoRaWAN Ultrasonic Sensor, showcasing its compact design and two ultrasonic transducers.

2. Key Features

- **LoRaWAN® Based:** Compatible with industry-standard LoRaWAN® gateways, offering a communication range of up to 15 km in rural areas and 2 km in urban environments.
- **Dual Ultrasonic Sensor:** Equipped with two ultrasonic beams, allowing for precise measurements from 3 cm up to 450 cm, ensuring an ultra-short blind zone.
- **Device Motion Detection:** Features a built-in 3-axis accelerometer for efficient and reliable detection of object movement, such as container cover status.
- **Long Battery Life:** Operates for more than 3 years on two replaceable batteries, thanks to its low-power LoRaWAN technology.
- **Versatile Application:** Ideal for smart waste management, water tank level monitoring, and manhole cover status detection.

3. Specifications

Attribute	Value
Product Dimensions	4.53 x 2.76 x 1.97 inches
Weight	8.11 ounces
Measurement Range	3 cm to 450 cm
Connectivity	LoRaWAN®
Accelerometer	3-axis
Battery Life	> 3 years (with 2 replaceable batteries)
Manufacturer	Milesight

4. Setup and Installation

Before installing your EM310-UDL sensor, ensure you have access to a compatible LoRaWAN® gateway and a Milesight IoT Cloud account or another suitable cloud platform for data management.

4.1 Unboxing and Initial Inspection

Carefully remove the sensor from its packaging. Inspect the device for any visible damage. The package should contain the EM310-UDL sensor unit.

Figure 2: Side view of the Milesight EM310-UDL sensor, showing its mounting tabs.

4.2 Device Activation

1. **Power On:** The EM310-UDL typically comes with pre-installed batteries. Refer to the specific product documentation for initial power-on procedures, which may involve removing a battery insulation tab or pressing a button.
2. **LoRaWAN® Configuration:** Configure the sensor with your LoRaWAN® network server. This usually involves entering the device's DevEUI, AppEUI (or JoinEUI), and AppKey into your network server's interface. These credentials are typically found on a label on the device or in its packaging.
3. **Network Connection:** Once configured, the sensor will attempt to join the LoRaWAN® network. Ensure your gateway is within range and properly configured.

4.3 Mounting the Sensor

The EM310-UDL is designed for easy installation. Consider the following when mounting:

- **Placement:** Mount the sensor vertically above the area where the fill level needs to be measured (e.g., inside a waste bin, above a water tank). Ensure the ultrasonic beams have a clear path to the surface of the material being measured, free from obstructions.
- **Stability:** Securely fasten the sensor using appropriate screws or mounting hardware through the designated mounting tabs.
- **Environmental Considerations:** While robust, avoid direct exposure to extreme weather conditions or environments that exceed its operating temperature and humidity specifications.

5. Operating the EM310-UDL

5.1 Data Transmission

Once connected to the LoRaWAN® network, the EM310-UDL will periodically transmit data packets containing ultrasonic distance measurements and accelerometer status (for cover detection). The frequency of these transmissions can often be configured via downlink commands from your LoRaWAN® network server or Milesight IoT Cloud.

5.2 Interpreting Data

- **Ultrasonic Distance:** This value represents the distance from the sensor to the surface of the material being measured. A decreasing distance indicates an increasing fill level.

- **Accelerometer Data:** The 3-axis accelerometer provides information about the sensor's orientation and movement. This is primarily used to detect if a container lid is open or closed, or if the container itself has been moved or tampered with.

5.3 Using Milesight IoT Cloud

For optimal data visualization and management, integrate your EM310-UDL with the Milesight IoT Cloud platform. This platform allows you to:

- View real-time and historical fill level data.
- Set up alerts and notifications for specific fill levels or cover status changes.
- Manage multiple sensors and gateways from a single dashboard.
- Configure sensor parameters remotely.

6. Maintenance

6.1 Cleaning

Periodically inspect the ultrasonic transducers for any dirt, dust, or debris that might obstruct the signal. Gently clean the surface with a soft, dry cloth. Do not use abrasive cleaners or solvents.

6.2 Battery Replacement

The EM310-UDL is designed for long battery life. When the battery level is low (indicated by your monitoring platform), replace the two internal batteries. Refer to the specific product guide for instructions on safely opening the casing and replacing the batteries to maintain the device's IP rating.

6.3 Firmware Updates

Milesight may release firmware updates to improve performance or add new features. Check the official Milesight website for the latest firmware and instructions on how to perform updates, typically via LoRaWAN® downlink or a dedicated tool.

7. Troubleshooting

Problem	Possible Cause	Solution
No data received from sensor.	Sensor not powered on. Out of LoRaWAN® gateway range. Incorrect LoRaWAN® credentials. Gateway offline or misconfigured.	Ensure batteries are installed correctly and device is active. Relocate sensor closer to gateway or add more gateways. Verify DevEUI, AppEUI/JoinEUI, and AppKey on network server. Check gateway status and configuration.
Inaccurate distance readings.	Obstruction in ultrasonic path. Sensor not mounted correctly (e.g., tilted). Surface of material is highly irregular or absorbent.	Clear any obstructions below the sensor. Ensure sensor is mounted level and stable. Consider alternative mounting or sensor type if material properties are problematic.

Problem	Possible Cause	Solution
Accelerometer data seems incorrect.	Sensor not rigidly mounted. External vibrations affecting readings.	Ensure sensor is firmly attached to the surface. Isolate sensor from sources of vibration if possible.

8. Warranty Information

Milesight products typically come with a limited warranty. For detailed information regarding the warranty period, coverage, and terms and conditions for your EM310-UDL LoRaWAN Ultrasonic Sensor, please refer to the official Milesight website or the warranty card included with your product. Keep your proof of purchase for warranty claims.

9. Technical Support

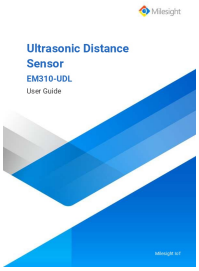
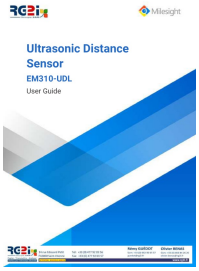
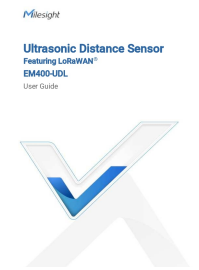
If you encounter issues that cannot be resolved using this manual or require further assistance, please contact Milesight technical support. You can find contact information, FAQs, and additional resources on the official Milesight website:

Visit Milesight Support Website

Please have your product model (EM310-UDL) and any relevant error messages or observations ready when contacting support.

Related Documents - EM310-UDL

	Milesight EM310-UDL Ultrasonic Distance Sensor User Guide User guide for the Milesight EM310-UDL Ultrasonic Distance Sensor, detailing its features, hardware, operation, installation, and cloud management. Learn about LoRaWAN settings, calibration, maintenance, and data payload.
	Milesight EM310-UDL Ultrasonic Distance Sensor User Guide Comprehensive user guide for the Milesight EM310-UDL LoRaWAN ultrasonic distance sensor, covering features, hardware, operation, installation, and cloud management.

	Milesight EM310-UDL Ultrasonic Distance Sensor User Guide User guide for the Milesight EM310-UDL LoRaWAN ultrasonic distance/level sensor, covering hardware overview, operation, settings, maintenance, installation, and cloud management.
	Milesight EM310-UDL Ultrasonic Distance Sensor User Guide User guide for the Milesight EM310-UDL Ultrasonic Distance Sensor, covering product introduction, hardware overview, operation, installation, and cloud management.
	Milesight EM310-UDL Ultrasonic Distance Sensor User Manual This user manual provides detailed information on the Milesight EM310-UDL Ultrasonic Distance Sensor, covering product introduction, structure, configuration, installation, communication protocols, and maintenance. Learn how to set up, calibrate, and manage the sensor for various applications.
	Milesight EM400-UDL Ultrasonic Distance Sensor User Guide Explore the Milesight EM400-UDL, a robust non-contact ultrasonic distance sensor powered by LoRaWAN technology. This user guide details its features for outdoor applications, long battery life, and seamless integration with Milesight IoT solutions for remote monitoring and data management.