

# Multifunctional Ultrasonic Distance Sensor EM400-MUD

*Milesight*



EM400-MUD is a multifunctional ultrasonic distance sensor designed to detect small-range areas and small blind spots. It features switchable pre-set modes for different applications. EM400-MUD is also equipped with a 3-axis accelerometer and temperature sensor to detect device status. With high protection IP rating and waterproof enclosure, EM400-MUD can withstand harsh environments and operate up to 10 years using two 9000 mAh batteries.

Milesight offers LoRaWAN® version and NB-IoT/Cat.M version to meet different communication needs. The LoRaWAN® version can be integrated with Milesight LoRaWAN® gateway and Milesight IoT Cloud solution, enabling remote and visual management of all sensor data. The NB-IoT/Cat.M version not only supports multiple application modes to compatible with IoT platforms, but also is equipped with GNSS for tracking and security purposes.

## ◆ Features

### Shared Values

- 3-450 cm wide detection range with small blind zone
- Equipped with NTC temperature sensor for the detection and alarm of trash burning
- Built-in 3-axis accelerometer sensor to monitor device tilt status
- Damp-proof coating inside and IP67 waterproof enclosure for outdoor applications
- Two built-in 9000 mAh replaceable batteries that work for up to 10 years without replacement
- Equipped with NFC for one touch configuration, support card emulation mode

## LoRaWAN® Version Only

- Equipped with three pre-set modes for different applications: standard mode, bin mode, packing lot mode
- Ultra-wide-distance wireless transmission up to line of sight of 15 km
- Function well with standard LoRaWAN® gateways and network servers
- Compatible with Milesight IoT Cloud for remote management

## NB-IoT/Cat.M Version Only

- Equipped with two pre-set modes for different applications: standard mode, bin mode
- Equipped with GNSS positioning for tracking
- Support cumulative number report function for power saving
- Support multiple network protocols to be compatible with IoT platforms

## ◆ Specifications

### Wireless Transmission

#### LoRaWAN® Version

|             |                                                         |
|-------------|---------------------------------------------------------|
| Frequency   | CN470/IN865/RU864/EU868/US915/AU915/KR920/AS923-1&2&3&4 |
| Tx Power    | 16 dBm (868 MHz)/20 dBm (915MHz)/19 dBm (470MHz)        |
| Sensitivity | -137dBm @300bps                                         |
| Mode        | OTAA/ABP Class A                                        |

#### NB-IoT/Cat M Version

|                  |                                                                                                                                                         |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cellular Band    | Cat M1:<br>B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/<br>B66/B85<br>Cat NB2: B1/B2/B3/B4/B5/B8/ B12/B13/B18/B19/B20/B25/B28/<br>B66/B71/B85 |
| SIM Slot         | 1 (Micro SIM-3FF)                                                                                                                                       |
| Application Mode | TCP/UDP/MQTT/AWS                                                                                                                                        |

### Measurement

#### Distance

|                      |                                            |
|----------------------|--------------------------------------------|
| Detection Range      | 3 ~ 450 cm                                 |
| Detection Accuracy   | ± (1+0.3%*S) cm, S=distance (-15°C ~ 60°C) |
| Detection Resolution | 1 mm                                       |
| Beam Angle           | 60°                                        |

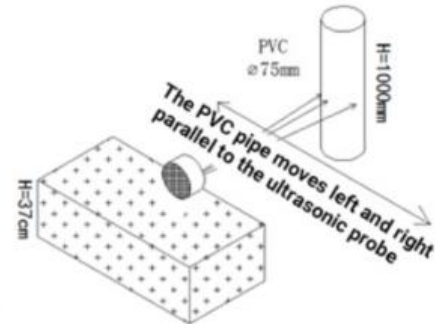
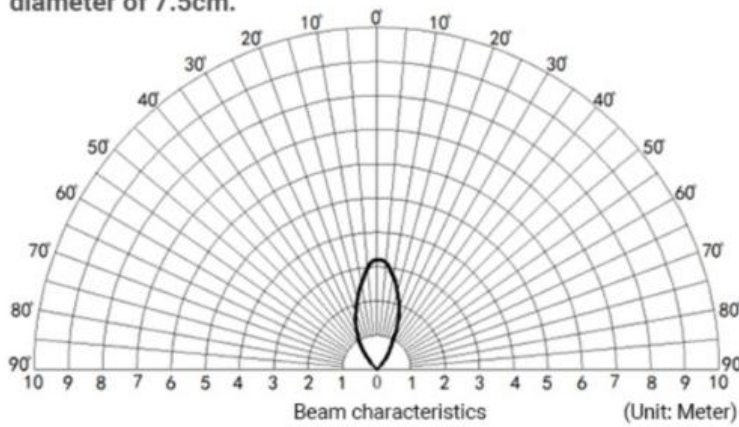
|                                                     |                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Device Position</b>                              |                                                                                                                                                                                                                                                                                                                                                                                            |
| Status                                              | Normal/Tilt                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Temperature</b>                                  |                                                                                                                                                                                                                                                                                                                                                                                            |
| Range                                               | -40 ~ 125°C                                                                                                                                                                                                                                                                                                                                                                                |
| Resolution                                          | 0.1°C                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>GNSS Positioning (NB-IoT/Cat M Version Only)</b> |                                                                                                                                                                                                                                                                                                                                                                                            |
| Parameters                                          | Longitude/Latitude                                                                                                                                                                                                                                                                                                                                                                         |
| Resolution                                          | 0.000001                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Operation</b>                                    |                                                                                                                                                                                                                                                                                                                                                                                            |
| Power On & Off                                      | NFC, Power Button (Internal)                                                                                                                                                                                                                                                                                                                                                               |
| Configuration                                       | Mobile App (via NFC)                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Physical Characteristics</b>                     |                                                                                                                                                                                                                                                                                                                                                                                            |
| Power Supply                                        | 2 x 9000 mAh ER26500 Li-SOCl <sub>2</sub> Batteries                                                                                                                                                                                                                                                                                                                                        |
| Battery Life <sup>1</sup>                           | <b>LoRaWAN® Version:</b><br>Standard mode: > 10 years (10 min interval, 25°C)<br>Bin mode: > 10 years (20 min interval, 25°C)<br>Parking lot mode: 5 years (12 triggers per day, 25°C)<br><b>NB-IoT/Cat.M Version:</b><br>TCP/UDP—Around 10 Years, MQTT/AWS—Around 5 Years<br>(4 Times Report per Day, per Report Includes 12 Packages with 30-min Collection Interval, 25°C) <sup>2</sup> |
| Operating Temperature                               | - 30°C ~ 70°C                                                                                                                                                                                                                                                                                                                                                                              |
| Relative Humidity                                   | ≤95% (non-condensing)                                                                                                                                                                                                                                                                                                                                                                      |
| Ingress Protection                                  | IP67                                                                                                                                                                                                                                                                                                                                                                                       |
| Dimension                                           | 118 × 65 × 32.5 mm                                                                                                                                                                                                                                                                                                                                                                         |
| Material & Color                                    | ABS + PC (Flame Retardant), Black gray                                                                                                                                                                                                                                                                                                                                                     |
| Installation                                        | On the Flat Surfaces with Screws                                                                                                                                                                                                                                                                                                                                                           |
| <b>Approvals</b>                                    |                                                                                                                                                                                                                                                                                                                                                                                            |
| Regulatory                                          | CE, FCC                                                                                                                                                                                                                                                                                                                                                                                    |
| Environmental                                       | RoHS                                                                                                                                                                                                                                                                                                                                                                                       |

<sup>1</sup> Tested under laboratory conditions and for guideline purposes only.

<sup>2</sup> PSM is required for SIM card and will be impacted by cellular base station signals.

## ◆ Beam Pattern

(1) The tested object is a white cylindrical tube made of PVC material, with a height of 100cm and a diameter of 7.5cm.



(2) The tested object is a corrugated box perpendicular to the 0° central axis, with a length \* width of 60cm\*50cm.

