LoRaWAN® Time-of-Flight Sensor

MacRay LToF Xx

LoRaWAN® Time-of-Flight sensor for high-precision non-contact distance and level measurement with long-range wireless connectivity.

MACNMAN

Introduction

The MacRay LToF is an industrial-grade LoRaWAN® Time-of-Flight (ToF) Sensor designed for precise non-contact distance, object presence, and level measurement across industrial, smart infrastructure, automation, and environmental monitoring applications.Using advanced optical Time-of-Flight sensing technology, the device delivers highly accurate short-to-medium range measurements. The sensor continuously measures distance and object positioning while securely transmitting real-time data over LoRaWAN® networks.

The sensor is ideal for smart parking systems, object detection, smart bins, industrial automation, occupancy monitoring, robotic systems, proximity sensing, and level monitoring applications where high-speed and accurate non-contact measurement is required.

Features

- High-Precision Time-of-Flight Distance Measurement
- Non-Contact Optical Distance Sensing
- Configurable Sampling & Transmission Intervals
- Real-Time Distance & Presence Monitoring
- Designed for Smart Infrastructure & Industrial IoT Applications
- Compatible with Public & Private LoRaWAN® Networks & MacTalk Protocol

Key Advantages

- Ideal for Smart Parking & Occupancy Detection
- Enables High-Speed Object Presence Monitoring
- Supports Smart Bin Fill-Level Monitoring
- Suitable for Industrial Automation & Robotics
- Reduces Manual Monitoring Requirements

Time of Flight Sensor Measurement Specifications

Distance Range	4 cm to 400 cm
Sensor Grid Options	2 × 2 / 4 × 4 / 8 × 8
Repeatability	< ±10 mm
Accuracy	±3% Typical
Resolution	Up to 1 mm
Measurement Rate	Up to 60 Hz (Adjustable)
Field of View (FoV)	Programmable ~ 26° to 60°
Ambient Light Immunity	Up to 100k Lux (Sunlight)
Wavelength	940 nm Infrared (Eye-Safe & Invisible)

Wireless Specifications

Wireless Protocols	LoRaWAN® (v1.0.4), Macnman MacTalk Protocol
Antenna	Internal high-efficiency antenna
Supported Bands	IN865 / RU864 / EU868 / US915 / AU915
Tx Power	23 dBm @ 865 MHz
Sensitivity	-137 dBm @ 300 bps
LoRaWAN® Class	Class A (Default), Configurable to Class C via Maya
Device Activation	OTAA
Supported LNS	Private LNS ,Chirpstack ,The Things Networks , MQTT, Orbiwise

Device Management

Configuration Method	Via Macnman Maya Android App
Local Configuration	BLE-Based Local Configuration
Remote Configuration	Over-the-Air Configuration (Downlink Commands)
Status LED	X 1 Internal Multi-Color LED

Device Configuration Parameters

Data Reporting Mode	Periodic / Event-based / Hybrid
Transmission Interval	Independent uplink interval for optimized power consumption
Threshold-Based Alerts	Configurable level threshold for event-triggered transmission
Sampling Interval	Configurable data acquisition interval (e.g., 1 min to 24 hours)

Power & Battery Performance

Power Supply	Integrated 8 Ah Lithium Battery
Battery Type	Lithium Thionyl Chloride (Li-$SOCl_2$)
Estimated Battery Life at 25 °C	
5-minute reporting interval	~1 year
15-minute reporting interval	~2 years
60-minute reporting interval	~4+ years

Physical & Environmental Specifications

Enclosure & Mechanical	
Material	Glass Filled Nylon
Protection Rating	IP65
Dimensions	96 mm X 96 mm X 28 mm
Weight	~135 g
Mounting & Installation	
Wall - Mounted Installation	Supported
Pole - Mounted Installation	Supported
Environmental Conditions	
Operating Temperature	-40°C to +80°C
Operating Humidity	0% to 95% RH (non-condensing)

Regulatory Certifications & Compliance

Wireless Certification	WPC
Environmental	RoHS compliant

What's in the Box?

- MacRay Model
- Mounting Clip
- User Manual
- Warranty Card
- IP68 Cable Extender *
- Mounting Screws
- Power Adapters *

Models & Ordering Information

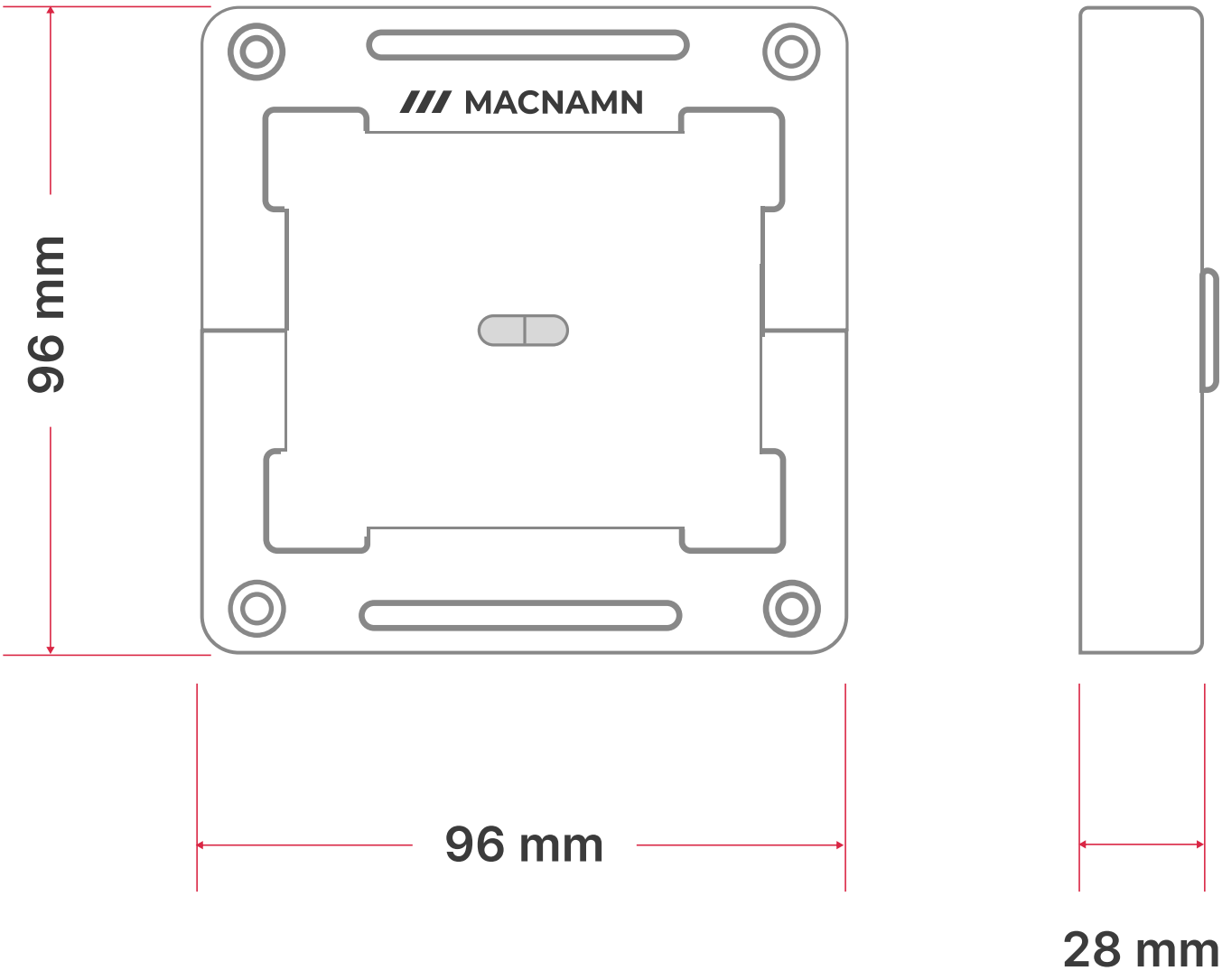
Variant Name	Power Source	Gird
MacRay LToF X1 PO	External Power (9–36 V DC)	2 X 2
MacRay LToF X1 BO	Integrated 8 Ah Lithium Battery	2 X 2
MacRay LToF X2 PO	External Power (9–36 V DC)	4 X 4

MacRay LToF X2 BO	4 X 4
MacRay LToF X3 PO	8 X 8

Notes

- Power operated models are only available with external probe option
- (*) Marked accessories must be purchased separately

Device Dimensions



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