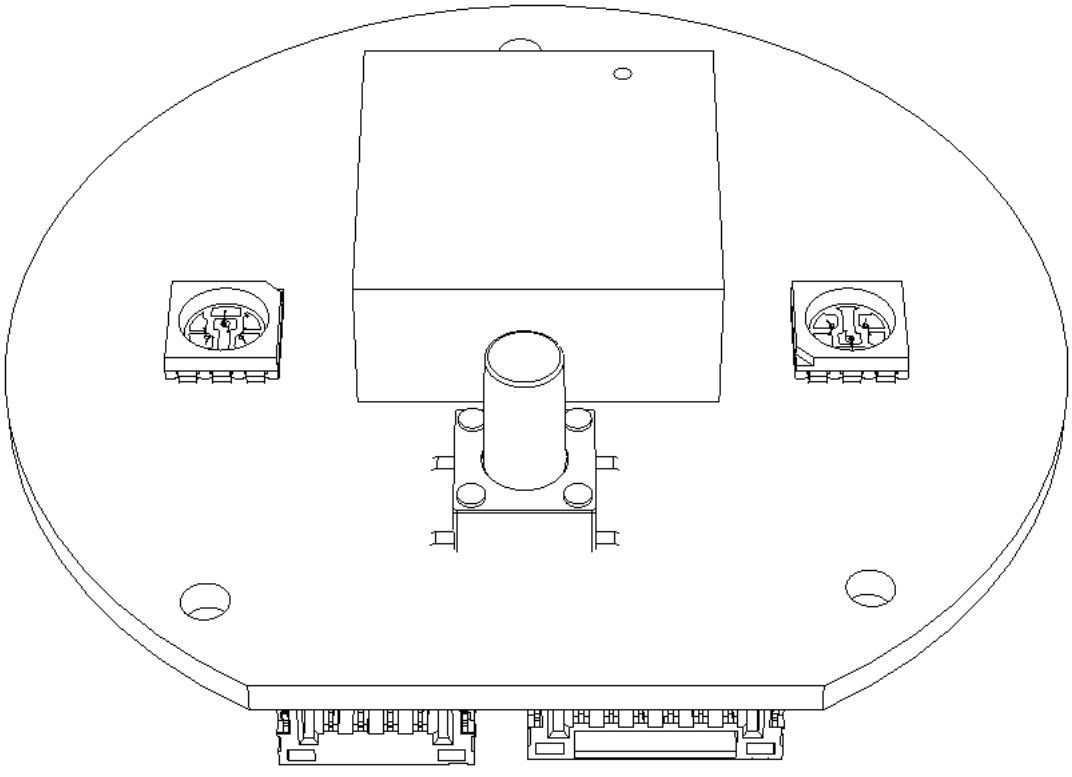
axldrone
your world from above

# axl Orbit-N

User Manual V1.0 | 25.02



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# Introduction

## Overview

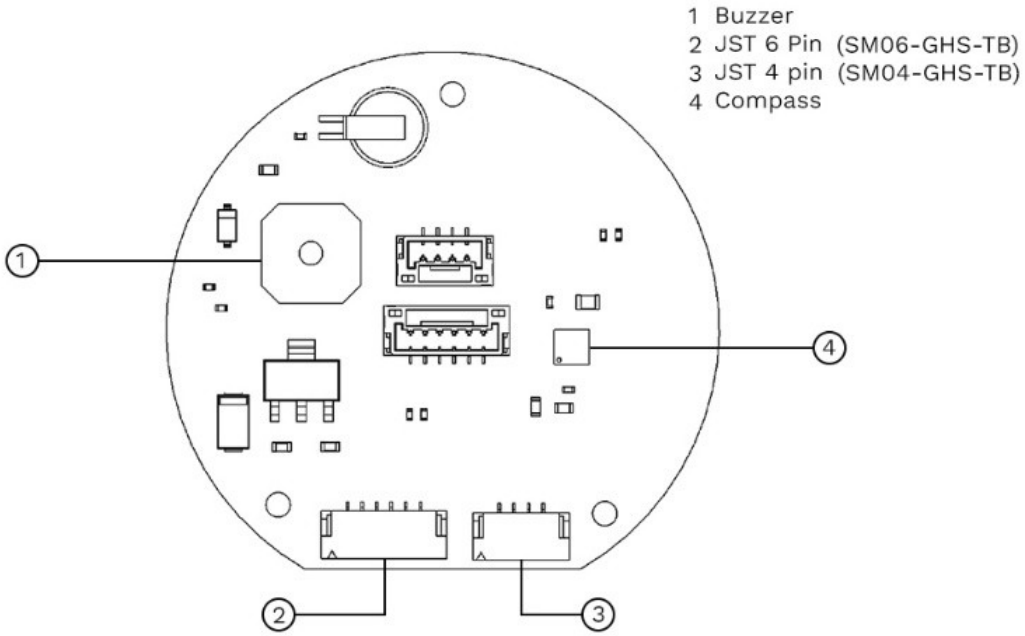
The axl Orbit-N (Non-Enclosure) is a high-precision GNSS receiver designed for integration into drone systems, robotics, and other autonomous platforms. It supports multiple GNSS constellations, including GPS, GLONASS, Galileo, and BeiDou, ensuring robust positioning capabilities in various environments.

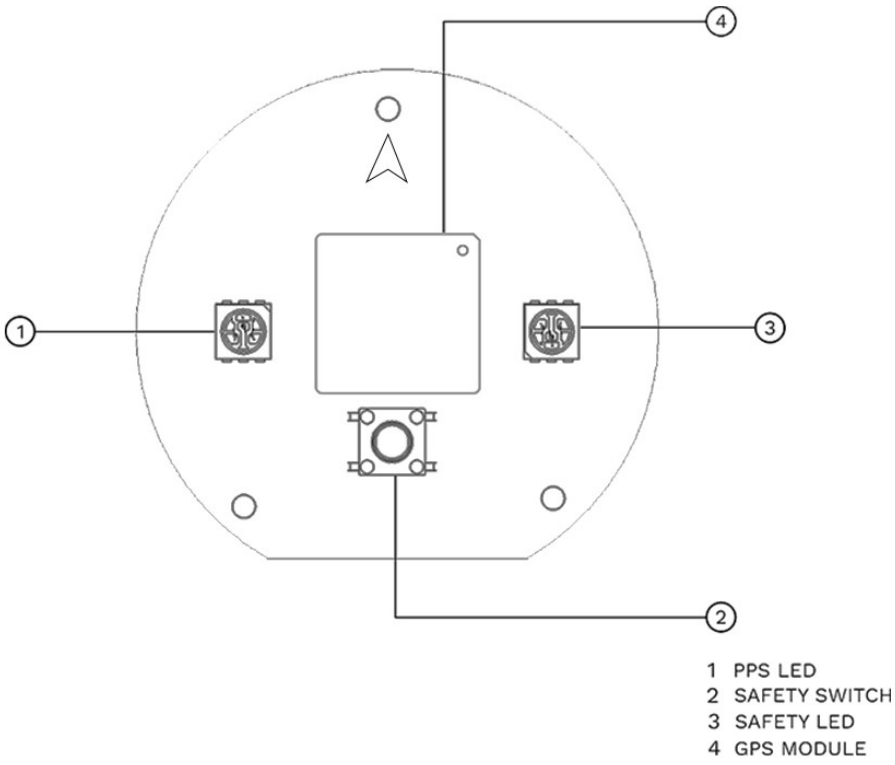
This guide will help you set up, understand, and use your device effectively.

# What's in the Box

- GPS device
- User manual

# Knowing your axl Orbit-N






**GPS Module (M10 series)**

- Provides high-precision satellite positioning.

**Tactile Push Button**

- Safety switch for drone

**Onboard indicator lights**

- LED 1 - Safety switch status

| LED Behaviour | Status Description | Condition |
|---|---|---|
| Red LED blinking | Safety Enabled | Safety switch ON |
| Solid Red (after long press) | Safety Disabled | Safety Switch OFF |

- LED 2 (Green) - D6 - GPS Status

| LED Behaviour | Status Description | Condition |
|---|---|---|
| Solid Green | GPS powered ON | GPS module initializing |

| | | |
|---|---|---|
| Green LED Blinking | GPS lock acquired | 3D Fix established |

### Arrow Marking

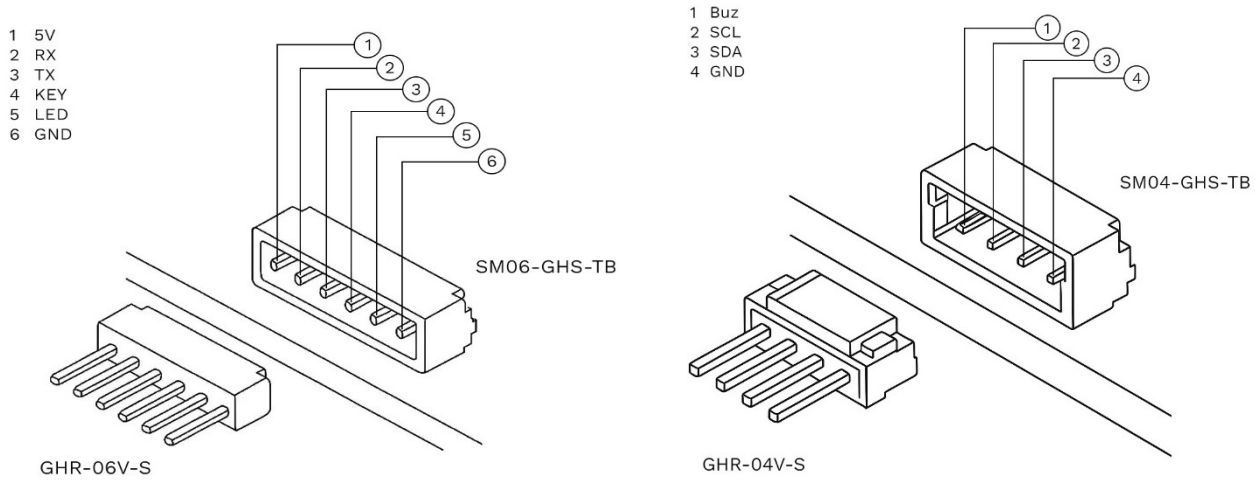
- Denotes GPS Orientation

### Internal Buzzer (BZ1)

### 2x JST Connectors

The board includes two JST connectors for GPS and peripheral interfacing:

- **J1** – 6-Pin JST Connector (SM06 - GHS - TB)
- **J2** – 4-Pin JST Connector (SM04 - GHS - TB)




These connectors are compatible with major flight controllers such as Pixhawk 4 and Cube Orange Plus.

### For Pixhawk 4

Use the 6-pin and 4-pin JST connectors (J1 & J2) to connect to the 10-pin GPS Module Port on Pixhawk 4 using a 6+4 to 10-pin JST cable.

### For Cube Orange Plus

Use the 6-pin and 4-pin JST connectors (J1 & J2) to connect to the 8-pin GPS1 Pinout on Cube Orange Plus using a 6+4 to 8-pin JST cable.

### Rechargeable Backup Battery

The onboard rechargeable backup battery is designed to improve GPS performance by

significantly reducing the time required to acquire a satellite lock after initial setup.

On first startup, the Time to First Fix (TTFF) is approximately 23 seconds. However, once a GPS lock is achieved, the backup battery preserves critical satellite data, enabling a hot start on subsequent power cycles. This reduces the TTFF to as little as 1 second.

The battery can retain this hot-start capability for up to 4 hours after the board is powered off. When powered, the board slowly recharges the battery to maintain optimal performance.

**Integrated Magnetometer IST8310**

The board features a built-in IST8310 3-axis digital magnetometer, offering precise and stable heading information essential for accurate drone navigation.

Key Features:

High-resolution magnetic field sensing for reliable compass data
Integrated directly on board, reducing the need for external modules
Low noise and drift, ideal for maintaining heading accuracy during flight
Fully compatible with major flight controllers via standard communication interfaces

# Technical Specifications

**Positioning**

- GNSS Support: GPS, GLONASS, Galileo, BeiDou
- Satellite Bands: GPS L1 C/A GLONASS L1OF BeiDou B1C Galileo E1B/C
- Module:M10 Series
- Concurrent Reception: Up to 4 GNSS systems simultaneously
- Horizontal Accuracy: ±1.5 meters (with SBAS enabled)
- Maximum Altitude: 80,000m
- Maximum velocity: 500m/s
- Heading Accuracy 0.3deg
- Cold start: 23s

**Electrical**

- Supply Voltage: 5V DC
- Interface Options: UART & I2C
- Current Consumption: 200 mA

- Backup Battery: 3V/1mAh

**Maximum Position Update Rate**

- 16 Hz in multiple GNSS mode
- 25 Hz in single GNSS mode

**Physical Form Factor**

- Shape: Circular
- Diameter: 47.2 mm
- Height (including switch): 15.45 mm
- Mounting: 3x M2 mounting holes
- Weight: Approximately 13 grams

**Features**

- Integrated patch antenna
- Integrated magnetometer

**Environmental**

- Ambient Temperature: -40°C to +85°C
- Storage Temperature: -40°C to +85°C

# Key Features

- Maximum 32 Satellite Connectivity - Enables faster, more accurate, and reliable GPS performance.
- Advanced spoofing & jamming technology
- High-Precision Positioning: Achieves up to 1.5-meter accuracy.
- Heading Accuracy 0.3deg
- Anti spoofing and jamming technology
- Compact Design: Small form factor suitable for integration into space-constrained applications.
- Easy Integration: Provides standard interfaces for seamless integration into existing systems.

- Maximum Altitude: 80,000m
- Maximum velocity: 500m/s

**Advanced Anti-Spoofing & Jamming Feature**

Our GPS system incorporates a cutting-edge anti-jamming solution designed to maintain uninterrupted and accurate GPS signal reception in challenging RF environments. This advanced feature integrates specialized RF absorption and ferrite materials to effectively suppress high-power jamming signals, particularly those originating from ground-based sources.

**How it Works:**

**RF Absorption Sheets:** The GPS receiver's enclosure or antenna path is lined with specialized RF absorption sheets. These materials are engineered to absorb a broad range of radio frequencies, significantly attenuating incoming jamming signals before they reach sensitive GPS circuitry. This drastically reduces the jammer's signal-to-noise ratio advantage.

**Ferrite Sheets:** Strategically placed ferrite materials around the GPS antenna and cable pathways effectively suppress electromagnetic interference (EMI), especially at lower frequencies common with ground-based jammers. This prevents unwanted magnetic field coupling, further enhancing system resilience.

**Directional Shielding:** This solution is optimized for ground-based jamming sources, maintaining open-sky satellite connectivity while minimizing vulnerability to terrestrial threats. This selective shielding technique ensures GPS functionality is preserved without obstructing satellite signal acquisition.

# Installation

**Power Connection:**

- Connect the power input to a stable 5V DC source.

**Mounting:**

- Secure the GPS module onto your platform using mounting screws

# Caution

- Verify that the power supply is stable and within the specified voltage range.
- Check for any physical obstructions or sources of interference near the device.

## Safety Guidelines

- Use a stable 5V power supply to avoid damaging the GPS.
- Keep the GPS device away from motors, ESCs, or strong power lines to prevent interference.
- Mount the device at the highest point of the drone or robot with a clear view of the sky.
- Secure all cables properly to avoid movement or disconnection during use.
- Avoid placing the GPS on or near metal parts that could block signals.

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