

AVIUSULD SMART ULD

Manual



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1. Introduction

Welcome to the AviusULD Smart ULD manual. This document provides all necessary information for the installation, operation, and maintenance of the Fire Tag and its variants.

2. Product Overview

The AviusULD Smart ULD is an advanced asset tracking and monitoring device that include the early detection of Lithium Battery fires up to 2 hours before and or monitoring the occupancy of Unit Load Containers (ULD). Its kinetic energy solution generates power and self charges the battery using environmental vibrations.

3. Components and Specifications

Core Components

- A. H2 sensor
 - a. GMV-2021B
- B. Temperature, pressure probe
 - a. Bosch BME680 (extra: humidity, VOC)
- C. Plastic Enclosure
- D. NORA-B106-00B module
- E. MAX-M10S
- F. JGNE 3.2V 3600mAh 26650 LiFePO4 rechargeable battery
- G. Accelerometer BMI270
- H. Kinetic Generator
- I. LEXI-R10011D
- J. Nordic NRF7002
- K. Flash Memory:
 - a. MX25R6435FZAIL0
- L. Antennas:
 - a. GNSS antenna - 2JCP2540101Ca
 - b. LTE antennas - YF0006PA 4G FPC
 - c. BLE antenna - NORA-B106-00B module
 - d. WiFi antenna - 2JF0102P

Specifications

NORA-B106-00B	Bluetooth	Bluetooth® 5.2 specification, BLE, IEEE 802.15.4-2011 PHY and MAC, supporting Thread and ZigBee® 3.0. Suitable for systems requiring compliance with radio frequency regulations ETSI EN 300 328, EN 300 440, FCC CFR47 Part 15 and ARIB STD-T66
	CPU and Memory	Dual-core Arm Cortex-M33 processors
		Up to 1 MB flash memory
		Up to 512 KB low-leakage RAM
LEXI-R10011D	CPU and Memory	Operating voltage: 1.7 V to 5.5 V Operating temperature: – 40 °C to +105 °C Current consumption: 13 nA shutdown mode 600 nA Standby mode + RTC + 32 KB RAM 2.1 µA Stop mode + RTC + 256 KB RAM Active-mode MCU: < 53 µA / MHz when RF and SMPS on
	Cellular	LTE: LTE-FDD: Max 10Mbps (DL)/Max 5Mbps (UL) LTE-TDD: Max 8.96Mbps (DL)/Max 3.1Mbps (UL)
	Protocols	TCP/UDP/PPP/FTP/HTTP/NTP/PING/QMI/NITZ/SMTP/MQTT/CMUX/HTTPS/FTPS/SMTPS/SSL/MMS*/FILE*
	Antennas	1x YF0006PA 4G FPC (Quectel) 1x 2JCP2540101Ca (2J ANTENNAS)
MX25R6435FZAIL 0		Flash memory 64Mbit SPI Operating Voltage: 1.65V to 3.6V QSPI support

JGNE 3600 mAh 3.2V 26650		JGCFR26650-3600mAh-3.2V Nominal capacity 3600mAh(0.2C)) Voltage 3.2V Energy Density 137.14Wh/kg AC internal resistance $\leq 25\text{m}\Omega$ Maximum charging current 3.6A Discharge cutoff voltage 2.5V Standard continuous discharge current 3.6A Fast continuous discharge current 3.6A Maximum sustained discharge current 10.8A Charge: $0^{\circ}\text{C} \sim 60^{\circ}\text{C}$ Discharge: $-30^{\circ}\text{C} \sim 65^{\circ}\text{C}$
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4. Functionality

Key Features

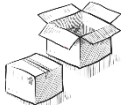
- **Fire Detection:** Utilizing Sudden Increases in Both Hydrogen and VOC,s, the device immediately detects the presence of Lithium Battery Off-Gassing within 1min of Thermal Runaway (for info, Thermal Runaway is term used when a lithium battery begins to uncontrollably over heating resulting in either fire, explosions and or smoke.
- **Occupancy Monitoring:** Ultrasonic sensor measures container occupancy.
- **Communication and Location:** CAT 1bis and GNSS for location tracking, BLE for communication meshing and Angle of Arrival location.
- **Kinetic Energy:** Generator charges the battery using environmental vibrations.
- **Accelerometer:** The accelerometer has several functions, for safe flight mode and also for identifying impact, fall and movement.

Alerts and Notifications

- Device alerts for any deviations from set parameters.
- Alerts via app for disconnection or hazardous conditions.

5. Installation

Steps



Remove from packaging



Place the device to the side of the container



Monitor the device on the dashboard

6. Usage Instructions

Setting Up

- Use the platform to configure device settings.
- Monitor battery life, system status, and receive alerts through the dashboard.

Operation

- Device automatically detects or monitors following events, and records data.
 - Fire hazards
 - Movement, fall and impact
 - Location
 - Temperature
 - Air Pressure
 - Occupancy
- Device automatically sends the data in following cases.
 - Fire hazards
 - 90 seconds after the device stopped moving
- Data and alerts are transmitted via LTE to the app.

7. Maintenance

- Check battery levels regularly.
- Ensure the device is clean and free of obstructions.

8. Safety Information

- Ensure the device is installed correctly to prevent damage.
- Handle the battery with care, avoiding exposure to extreme temperatures.
- Do not assemble and disassemble the device at will.

9. Regulatory Information

FCC RF exposure warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.