

User Guide

FlatMesh Triaxial Tilt Node

FM3N-IX
FM3N-IXH



1.00

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Warnings



Warning

Protection provided by the equipment may be impaired if used in a manner contrary to this user manual.



This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device must accept any interference, and
2. This device must accept any interference received including interference that may cause undesired operation

Changes or modifications not expressly approved by Senceive Limited could void the user's authority to operate the equipment.

This equipment must be professionally installed.

Only the following antennas are to be used with the equipment:

Order Code	Manufacturer / Part Number		Gain
FA-FM-WPS	Linx	ANT-2.4-CW-QW-SMA	1.1dBi
FA-FM-LPS	Siretta	DELTA8A/x/SMAM/S/S/17	0dBi
FA-FM-ADJ	EAD	FBKR35068-SM-KR	2dBi



This product must not be disposed of in the normal waste stream. It contains a battery pack and electronic components and so should be recycled appropriately.

In accordance with the WEEE guidelines, customers in the European Union may return the product free of charge for recycling at the end of its life. Contact your supplier for details.

Chapter 1

Overview

1.1 The FlatMesh System

A FlatMesh network consists of a number of nodes connecting to one gateway device. In some situations multiple networks may be required on a single site, for example a site in which the number of nodes exceeds the number supported by a single Gateway, or a site where there are a set of separate measurement zones.

A FlatMesh Node is a sensing unit with an integrated wireless mesh radio and battery. It participates in a FlatMesh wireless network, forwarding messages as required by the system, and also takes samples from onboard and/or external sensors. Sampling is done on a periodic schedule which may be either fixed or variable. In addition, a sample may be manually requested via the Gateway.

1.2 FlatMesh Triaxial Tilt Node

The FlatMesh Triaxial Tilt Node provides angular tilt measurements in three orthogonal axes. The node reports the angle of each axis in relation to the gravity vector (straight down).

**Note**

Readings can be scheduled anywhere between 1 seconds to twelve hours with a time increment of one second.

1.2.1 FM3N-IX(H) Physical Specification

Dimensions	90 x 90 x 60 mm
Total Mass	0.6 kg (approx.)
Housing Material	Die cast aluminium body
International Protection Marking	IP68 (1m for 24 hours)
Mounting Options	Plates and brackets available for magnetic fixing, track bed, stake and pole mounting, and many other applications
Node Operating Temperature Range	-40°C to +85°C

1.2.2 Internal Battery

Battery Type	Lithium Thionyl Chloride, non-rechargeable
Nominal Voltage	3.6V
Nominal Capacity	19000mAh
Typical Battery Life	12-15 years at 30 minute reporting intervals, including when acting as a relay node. Consult with Senceive for your application.

1.2.3 FlatMesh Radio Specifications

Communication Type	Proprietary FlatMesh v3 Mesh Networking Protocols IEEE 802.15.4 compliant
Frequency Band	2400 - 2485 MHz ISM Band
Maximum Transmit Power	6.5dBm (EN 300 328 v1.8.1)
Maximum Antenna Gain	2.2dBi
Range	Up to 300m depending on the environment and fitted antenna Consult with Senceive for your application
RF Module	Senceive FM3Node

1.2.4 Tilt Sensor Specification

Resolution	0.0001° (0.00175mm/m)
Repeatability (-IX variant)	±0.0005°(±0.0087mm/m)
Repeatability (-IXH variant)	±0.0025°(±0.0436mm/m)
Range	±90°

Chapter 2

Installation

The node will be delivered to you pre-configured. Simply affix the node to a structure within the range of the rest of the network.

2.1 Mounting

The node must be securely mounted to a structure with at least one tilt axis orientated in the desired monitoring plane.



Warning

The Triaxial Tilt Node with brackets could have a mass of up to 1.5kg. Please ensure that the object you are fixing to can handle this load.

Ensure that appropriate methods and materials are used when affixing equipment to a wall.

Chapter 3

Data Readings

3.1 Tilt Readings

The tilt readings are provided in degrees ($^{\circ}$) and the range of each axis is $\pm 90^{\circ}$. The angle of each axis is relative to the gravity vector. If the axis is pointing straight down it will be aligned with the gravity vector and will return a reading of -90° . If the axis is inverted and points straight up, the reading will be $+90^{\circ}$. An axis that is perfectly horizontal/level will return a reading of 0° .

Chapter 4

Maintenance

The product should not require any maintenance after installation.

If the need to clean the product should arise, use only a damp cloth and mild detergent. Do not use any solvents as this may damage the enclosure.



Warning

Only service personnel authorised by the manufacturer may open the enclosure.

No user serviceable parts are located inside.

Chapter 5

Support

5.1 Troubleshooting - General

FlatMesh Nodes are sealed units so checking of devices is confined to visual inspection, checking of connections and measurement of basic device parameters.

5.1.1 No new data from node

Check if other nodes on the same gateway have been updating

The FlatMesh Gateway operates a store-and-forward system. It collects data from nodes on its network all the time, and then periodically establishes a connection to the Web Monitor to transfer data.

Check the other nodes on the same gateway for similar problems to rule out a gateway problem. Check that the gateway battery has been charged correctly in the last two weeks. If the problem is being seen on a number of gateways on the same site, there could be a problem with the backhaul (cellular network or other network connection.)

Check for physical damage

Check to ensure that the node's enclosure is whole and undamaged.

The network relies on neighbouring nodes to pass messages along to the gateway. There is no reliance on any one node, but if all nodes in a large stretch of the network are not in working order, this is likely to impact other nodes' ability to communicate with the gateway.

Check that the antenna is tight

The antenna connects to the node through a threaded SMA connection. This should be tightened by hand against the connector on the enclosure. If this connector is loose, the node's signal strength and therefore its ability to connect to the network will be significantly impaired.

Check that the antenna is correctly oriented

The antenna's orientation can also impact its ability to connect to other nodes. Typically, the correct orientation for the antenna is vertical (perpendicular to the ground.) In tunnels or when monitoring a wall, it may be more appropriate to orient the antenna to be perpendicular to the wall surface. Check with Senceive to ascertain the best arrangement for your site.

5.2 Contact Information

For assistance and support, contact your supplier or the manufacturer:

Senceive Limited
Phone: +44 (0) 207 731 8269
Email: support@senceive.com
Web: <http://www.senceive.com>

Appendix A

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The products described in this user manual contain and use encryption algorithms for data authentication and security. Some countries require registration of these technologies. It is the importer's responsibility to comply with all local regulations. Contact Senceive for more information.

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iconv (Charset Conversion Library) v2.0

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