User Guide

FlatMesh Nano / NanoPlus / NanoMacro / NanoMacro(High-G Variant)

FM3NT-10
FM3NT-30
FM3NT-50
FM3NT-50H

Senceive
Wireless condition monitoring

0.01

Contents

Worldwide Information

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

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.

0.0.1 USA

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

- This device must accept any interference, and
- 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.

0.0.2 Canada

This device contains a licence-exempt transmitter that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS-247.
Operation is subject to the following two conditions:

- This device may not cause interference.
- This device must accept any interference, including interference that may cause undesired operation of the device.

The safe distance for human exposure to electromagnetic field is 20cm.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:

- l'appareil nedoit pas produire de brouillage, et
- l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

La distance de sécurité pour l'exposition humaine au champ électromagnétique est de 20cm.

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 Nano / NanoPlus / NanoMacro Nodes

The FlatMesh Nano family contains a high precision triaxial tilt sensor. This sensor measures the orientation of the node relative to the direction of gravity using a MEMS accelerometer.

Note
Readings can be scheduled anywhere between two seconds and twelve hours with a time increment of one second, but it should be noted that the repeatability of the measurements are poorer when used at reporting rates faster than 10 seconds.

1.2.1 Physical Specifications FM3NT-10 and FM3NT-30

Model	**FM3NT-10**	**FM3NT-30**
Diameter	40mm	58mm
Height	30mm	45mm
Total Mass	40g	110g
Housing Material	PVC, Aluminium	Polycarbonate, Aluminium
International Protection Marking	IP67, IP68 at 2m for 24 hours	
Mounting Options	Magnetic Masonry screws Gluing Clamping	
Operating Temperature Range	-40°C to +85°C	

1.2.2 Physical Specifications FM3NT-50 and FM3NT-50H

Model	**FM3NT-50**	**FM3NT-50(H)**
Diameter	87mm	87mm
Height	65mm	65mm
Total Mass	305g	305g
Housing Material	Polycarbonate, Aluminium	Polycarbonate, Aluminium
International Protection Marking	IP67, IP68 at 1m for 24 hours, IP69K	
Mounting Options	Magnetic Masonry screws Gluing Clamping	
Operating Temperature Range	-40°C to +85°C	

1.2.3 Internal Battery FM3NT-10 and FM3NT-30

Model	FM3NT-10	FM3NT-30
Battery Type	Lithium Manganese Dioxide, non-rechargeable	Lithium Thionyl Chloride, non-rechargeable
Nominal Voltage	3.0V	3.6V
Nominal Capacity	1000mAh	4400mAh
Typical Battery Life	10 months At 20 minute reporting intervals, including when acting as a relay node Consult with Senceive for your application	4 years

1.2.4 Internal Battery FM3NT-50 and FM3NT-50H

Model	FM3NT-50	FM3NT-50H
Battery Type	Lithium Thionyl Chloride, non-rechargeable	Lithium Thionyl Chloride, non-rechargeable
Nominal Voltage	3.6V	3.6V
Nominal Capacity	19000mAh	19000mAh
Typical Battery Life	12 to 15 years At 30 minute reporting intervals, including when acting as a relay node Consult with Senceive for your application	12 to 15 years

1.2.5 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 v2.1.1)
Range	Up to 270m depending on the environment Consult with Senceive for your application
RF Module	Senceive FM3Nano

1.2.6 Tilt Sensor Specifications

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

Chapter 2

Installation

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

2.1 Mounting

There are several mounting options available, including those designed for:

- clamping to a structure using straps
- magnetic mounting
- gluing to any surface
- fitting to an M8 threaded socket
- fixing to a FlatMesh tilt beam kit

Ensure that the fixing is secure to ensure that tilt measurements are representative of the structure.

Chapter 3

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 4

Support

4.1 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

Import / Export Restrictions

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.