User Manual

Node: Vibrating Wire Node

Model: Version 2.0

Manual Revision: 1.3

Viotel Limited. S1.2/89 Grafton Road, Auckland, 1010, New Zealand. NZBN: 94 2904 7516 083
Viotel Australia Pty Ltd. Level 2, 127 Macquarie Street, Hobart, 7000, Australia ABN: 34 645 231 34
www.viotel.co

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1 Introduction

1.1 Warning

This guide intends to assist in the preferred mounting, operation, and usage of Viotel's Vibrating Wire Node.

Please read and completely understand this user guide in order to make sure the safe and correct use of the system as well as maintain the longevity of the device.

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

The antenna must be plugged in before any operation occurs.

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

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.

1.2 Theory of Operation

The Vibrating Wire node is a low touch Internet of Things (IoT) device. It is designed to be as simple as possible to install and activate — set and forget. Data is retrieved from the device via our cloud-based platform or via API to yours using the integrated LTE-M (CAT-M1) cellular communications network. The device also uses LTE-M for time stamping to within 1 second for comparison of data between nodes.

The device is always monitoring for events, and can be continuously monitoring, or set to a triggered state to upload data within seconds. Remote configuration is possible to change the acquisition and upload frequency via the myViotel device management tool or API.

1.3 Parts List

PART	QTY	DESCRIPTION
1	1	Vibrating Wire Node
2	1	Battery pack* (pre-installed on the Node)
3	5	Caps (pre-installed on the Node)
4	4	Sensor Plugs
5	1	External Power Plug
6	1	Antenna
7	1	Magnet
8	1	Pole Mounting bracket (optional)

Table 1 Parts List

*Externally Powered Vibrating Wire Nodes will not include internal batteries.

1.4 Required Tools

Tools are not required for installation other than hand tools specific to your installation scenario.

The following tools are required for connecting your sensors to the device.

- Soldering equipment

1.5 Dimensions

Figure 1 Dimensions in mm

2 Usage

2.1 Mounting Options

Viotel's Vibrating Wire Node comes with two primary mounting options.

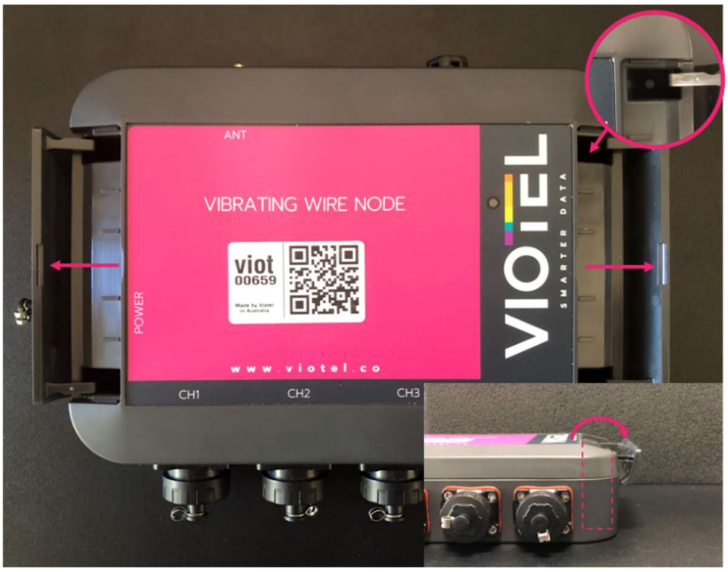
MOUNTING	PHOTO DESCRIPTION
1. **Threaded M3 Holes suitable for optional pole mount bracket or mounting to an enclosure.**	 *Figure 2 Node Rear*
2. **Covered Mounting holes**	 Mounting points designed for M5 bolts or screws. *Figure 3 Node Front*

Table 2 Mounting Options

2.2 Indicated Key Location

WARNING: **The antenna must be screwed into its designated antenna jack before any operation of the device.**

The switch that the magnet (Part 7) operates on the Vibrating Wire Node (Part 1) is located directly behind the “O” on the Viotel logo, as shown below.

Figure 4 Photo highlighting location of the Magnet

2.3 Sensor Plugs

You are supplied with 4x Sensor Plugs (part 4) for soldering to your chosen vibrating wire sensor to.

PIN	DESCRIPTION
1	Sensor +
2	Sensor -
3	Thermistor +
4	Thermistor -

Table 3 Connection process for sensors

Viotel can supply sensors with the plugs pre-installed, or a plug to junction box for quick connection of cables.

Viotel Vibrating Wire Node - 4 Channel

3 Operating Instructions

3.1 Operation

By default, your Viotel Vibrating Wire Node will be set to Sleep mode. To change the mode that the logger is currently in; simply take the **Magnet (Part 7)** and hover it over the Indicated key location.

All operations and LED indications refer to firmware version: 3.02.14, please be aware future states may change some functionality.

TAP INSTRUCTIONS	FUNCTION	DESCRIPTION
Tap once (while in Sleep)	Query Status	This will light up a LED to indicate the device state is currently in Sleep mode.
Tap once (while Active)	Test Shots	The device will quickly perform 10 record-and-upload cycles of 3 minutes each. Once this data has been logged, the device will return to its standard operation.
Tap once, Tap again within 3 seconds	Upload and change mode	This will cause the device to wake up and switch modes. As part of this process, the node connects to the cloud and applies any new settings. If switching from Sleep to Active, the device is fully Active and recording after a few minutes.

Table 4 How to switch between modes

3.2 System Modes

STATUS	DESCRIPTION
Active	In this mode, the device will regularly record data at the user defined interval, check for firmware updates, monitor for user defined triggers and check for Magnet inputs (Part 7).
Test Shots	This diagnostic mode will set the data recording interval to 3 minutes and quickly record 10 entries along with GPS data. After approximately 30 minutes, the device will return to its Active status automatically.
Communicating	The device is currently trying to communicate with the server to download new settings, update firmware, and upload data and status information.
Sleep	The device is in power-saving mode, but will respond to any taps from the magnet (Part 4). Every 7-days, the device will initiate a connection to provide status updates and check for system updates. Then it shall return to Sleep mode unless otherwise specified by the cloud server.
Off	No battery/power at all.

Table 5 Description of Device Status

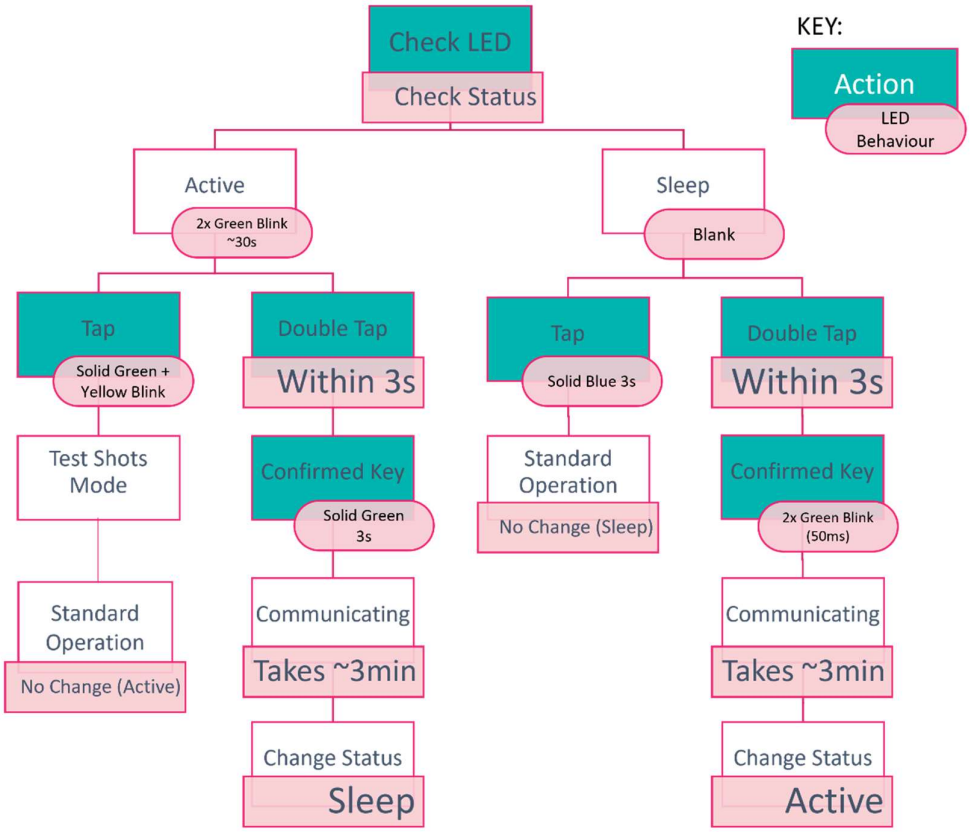
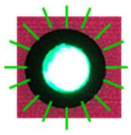
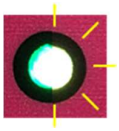
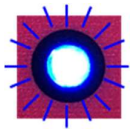


Table 6 Flow Diagram for Cycling System Status with Magnet

3.3 System Status Indicator

Status with intervals that occur regularly (e.g 'every 30s') are default status indicators that do not require a magnet tap, happening continuously. All other system status indicators require a magnet tap to prompt a response.

LIGHT	INTERVAL	MEANING	DESCRIPTION	VISUAL
Green Blink four times	1s	Successful Firmware Update	Firmware update requested, downloaded, and installed successfully.	
Green Blink Twice (100ms)	every 30s	Active	Device is Active, running normally. See the section 3.2 System Modes for details.	
Green Blink Twice (50ms)		Status Change Confirmation	The device has confirmed that it will now switch from Sleep to Active.	
Solid Green	<3s	Status Change Confirmation	The device has confirmed that it will now switch from Active to Sleep	
Solid Green + Yellow Blink	3s 1s	Status Change Confirmation	Device is Active and preparing to enter Test Shots mode	
Yellow Blink (100ms)	Every 1s	GPS Fixing	The device is currently acquiring a GPS signal.	
Solid Yellow	1s	GPS Fixing	The GPS signal has been acquired and successfully got a valid position.	
Red Blink four times	1s	Failed Firmware Update	Firmware update requested and failed to download.	
Solid Red (300ms)		Device is Busy	The device is currently busy and will not accept commands from the magnet.	
Blue Blink Twice (150ms)		Communicating	The device has begun communicating, and the network has successfully connected.	
Solid Blue	3s	Sleep	Device is in Sleep. See the section 3.2 System Status for details.	

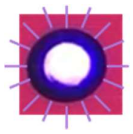
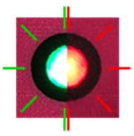
Purple Blink Twice (100ms)	Every 30s	Diagnostic	Device is in Test Shots mode. See the section 3.2 System Status for details.	
Green/Red Alternating		Firmware Update	Firmware update requested, downloading and installation underway.	
Blank	N/A	Off	Device is Off. See the section 3.2 System Status for details.	

Table 7 System Status Indicator

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.

Only service personnel authorised by the manufacturer may open the inner enclosure. No user serviceable parts are located inside.

4.1 External Power

7.5V DC supply is required to power your device. All electrical work must be carried out by suitably qualified technician, and in compliance with local laws and regulations. Switching between internal and external power supply requires opening the enclosure. Power adapters can be purchased from Viotel.

Products and Data Loggers (viotel.co)

4.2 Downloading Data

The only way to upload data is over the cellular communications network. When in standard operation, the device continually uploads data on user-defined intervals, and can also be activated to send data on demand for diagnostic purposes via a magnet command.

If the signal is weak and the device is unable to upload data at that moment, the device is programmed to keep trying in decreasing increments (to conserve battery). If after 4 days of failing to upload, it will reboot.

Uploaded data can be viewed and downloaded from the myViotel platform.

Data is stored in non-volatile memory and survives reboots and power loss.

Data is deleted from the device once successfully uploaded.

4.3 Further Support

For further support, please email our friendly staff at support@viotel.co with your name and number and we will get back to you.

Viotel Ltd

Auckland

Suite 1.2, 89 Grafton Street

Parnell, Auckland, 1010

sales@viotel.co | NZBN: 94 2904 7516 083

Viotel Australia Pty Ltd

Hobart

Level 2 127 Macquarie Street

Hobart, TAS, 7000

Remote Offices

Brisbane, Sydney

sales@viotel.co | ABN: 15 109 816 846