ENCARDIO RITE
METASENSING FOR MEGA STRUCTURES

USERS' MANUAL

NEXAWAVE RELAY NODE

Model EWN-01R

Doc. # WI 6002.132 Rev. 01 | Sept 2025

TUNNELS | HYDROELECTRIC | CONSTRUCTION | STRUCTURAL | METRO & RAIL | BRIDGES | MINING

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CONTENT

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IMPORTANT NOTE

Please read the following cautions carefully before using the wireless system:

- **Battery and Power Supply**: Always place the internal batteries (2 x 3.6 V) and the 12V external power supply into the Relay Node before use.
- **Correct Polarity**: Ensure correct polarity of batteries and the external power supply before connecting.
- **Do Not Power On Without Batteries**: Do not switch power ON without placing the internal batteries in the Relay.
- **Battery Specifications**: Always use 3.6V lithium batteries suitable for -40°C to 85°C operating temperatures.

1 INTRODUCTION

1.1 Overview

Relay nodes expand an RF monitoring network by bridging gaps between nodes that can't directly hear each other. They are ideal for underground galleries, tunnels, basements, long corridors, and large multi-building sites—connecting around corners, clearing obstructions, and reaching remote distances where data was previously unattainable or unsafe. The RELAY Node sits between the field node and the hub (gateway), extending connectivity and improving end-to-end data delivery in challenging environments.

Operationally, the RELAY Node listens on a downstream frequency plan and Network ID (from node) and forwards on an upstream plan and Network ID (toward the hub). A configurable Relay Hops limit bounds how many repeaters a packet can traverse, balancing coverage against airtime and latency. Once commissioned via the mobile app, the unit runs unattended with receive-and-forward behavior, exposing health metrics (RSSI/dBm, pass rate) for quick verification. This makes it well-suited to large deployments that need reliable coverage without adding more hubs.

1.2 Wireless network

Wireless sensors are vital in monitoring construction sites, large structures, and landslide areas. They are extensively used in applications where geotechnical and other sensors are used for data collection and transfer to a central server for access by multiple users. Encardio Rite offers an innovative network solution that allows real-time monitoring of wireless vibrating wire sensors and other geotechnical and structural sensors in challenging conditions with reliable data transfer without any delay.

In an end-to-end wireless monitoring system from Encardio Rite , the vibrating wire nodes are interfaced with the long-range, low-power radio frequency network to Gateway. The vibrating wire nodes send recorded data to the Gateway through the RF network with utmost reliability. The Gateway then uploads the collected data from nodes to the central/cloud server.

The system operates on ISM sub 1 GHz operating frequency bands adjustable to the requirement of each territory. The system can be adjusted to different frequency bands; for example:

India	865 – 867 MHz
Europe	868 MHz
USA/Canada/Singapore/Australia	903 - 928 MHz

A detailed reference for frequency bands allowed in different Countries is available at:

https://www.thethingsnetwork.org/docs/lorawan/frequencies-by-country.html

The Gateway also has a provision to set the frequency band, depending on the Country.

1.3 Conventions used in this manual

WARNING! Warning messages call attention to a procedure or practice that could cause personal injury if not correctly followed.

CAUTION: Caution messages call attention to a procedure or practice, which, if not correctly followed, may result in data loss or equipment damage.

NOTE: Note contains essential information from the regular text to draw the user's attention.

1.4 How to use this manual

This users' manual is intended to provide sufficient information for optimum use of relay nodes in your applications.

To make the manual more useful, we invite valuable comments and suggestions regarding any additions or enhancements. We also request you, please let us know of any errors that are found while going through the manual.

NOTE: Installation personnel must have a background of good installation practices and knowledge of fundamentals of geotechnics. Novices may find it very difficult to carry on installation work. The intricacies involved in installation are such that even if a single essential but minor requirement is ignored or overlooked, the most reliable instruments will be rendered useless.

A lot of effort has been made in preparing this instruction manual. However, best instruction manuals cannot provide for every condition in a field that may affect the sensor's performance. Also, blindly following the instruction manual will not guarantee success. Sometimes, depending upon field conditions, installation personnel will have to consciously depart from written text and use their knowledge and common sense to find solution to a particular problem.

NOTE: The sensor is normally used to monitor site conditions and will record even a minor change that may affect behaviour of structure being monitored. Some of these factors amongst others, are, seasonal weather changes, temperature, rain, barometric pressure, nearby landslides, earthquakes, traffic, construction activity around site including blasting, tides near sea coasts, fill levels, excavation, sequence of construction and changes in personnel etc. These factors must always be observed and recorded as they help in correlating data later on and also may give an early warning of potential danger or problems.

2 GENERAL DESCRIPTION

2.1 Model EWN-01R Wireless Relay Node

The **EWN-01R Wireless Relay Node** extends RF coverage by bridging gaps between field devices and the hub (gateway). It listens to downstream nodes and forwards their packets upstream, making it ideal for tunnels, galleries, basements, long corridors, and large multi-building sites where line-of-sight is limited. By using a configurable **Relay Hops** limit and a store-and-forward approach, the relay carries data around corners and over distance while keeping airtime use and latency under control.

Designed for field crews, the relay is commissioned via a simple mobile/PC workflow and then runs unattended. It supports region-appropriate frequency plans, exposes clear health metrics (signal strength and packet pass rate) for quick verification, and offers flexible power options (external supply with optional backup) to suit permanent or temporary installs. A weather-ready enclosure, standard RF antenna mounting, and Bluetooth/serial service interfaces make it easy to place, validate, and maintain—so you can push the network edge deeper without adding more hubs.

2.2 Model EWG-01 gateway

Encardio Rite model EWG-01 wireless gateway is the main networking hardware, which uploads data gathered from all the nodes (connected to geotechnical sensors) to the Encardio Rite cloud server or a third-party server. In addition, it passes control messages through the network to ensure seamless operation.

The Gateway is ideally installed at a location with the cellular network, in line of sight of the installed nodes. It serves as an exit point/central hub for wireless data obtained from the sensors as the readings pass through or communicate with the Gateway before being routed to an FTP or cloud server.

2.3 System components

Provided by Encardio Rite

- Model EWN-01R- **Relay Node** with antenna
- Model EWG-01 Hub (Gateway) with antenna
- Gateway and Node mounting accessories
- RS-232 Bluetooth modem/ USB to RS-232 FTDI cable
- Android Smartphones with Application software

To be arranged by the Client

- Activated data SIM card (for Gateway)
- D-Cell Li-SOCl2 3.6 V 14.5 Ah batteries nominal Voltage - 2 no. per Node and 2 no. for Gateway
- Power supply unit 9-30 V, 1 A for Gateway (12 V, 1 A power supply readily available can be used)

3 TECHNICAL SPECIFICATION

Basic		
Model	EWN-01R	
Relay Hopes	Up to 25 hopes	
Compatibility	Compatible with EWN-01V, EWN-06VC, EWN-01DS, EWN-01ML, EWN-10V, EAN-95MW	
Power supply	Internal Battery: 2x3.6V Lithium Battery External Power: 8 - 20V DC	
Operating External Supply Voltage Range	8 – 20 VDC	
Input current	60 mA (max)	
RF Parameters	12 - 15V / 350mA (max)	
Power Supply	TX Power (max) : 20dBm / 100mW Receiver Sensitivity: -132dBm Operating Freq: 860 – 930 MHz (configurable) Data Rate: 810 bps Antenna Gain: 3dBi Comm. Range: 1km (tested at line of sight)	
Current Consumption	(Does not include sensors excitation current)	
		7.2V Lithium Cell / **12V External**
	Standby Current :	6 uA / 6 uA
	Active Current :	8 mA / 15 mA
Configuration & Data Retrieval	Laptop running Windows OS: using Bluetooth RS-232 FTDI Cable Android Phone: using Bluetooth RS-232 FTDI cable with OTG Adaptor	
Operating Temp	-20°C to +70°C	
Relative Humidity	100% RH	
Environmental Protection	IP-65 (IS-60947 Part-1:2004)	
Dimensions*	L: 120mm, W: 100mm, H: 81.5mm (w/o Antenna) L: 159mm, W: 100mm, H: 187mm (with Antenna)	
Weight*	0.807 kg (w/o Battery) 1.0045 kg (with Battery)	

Reference Specification:

* Reference information only, units not meeting or exceeding these specifications or limits shall Not lead to automatic rejection provided that the ability to the unit to function is not impaired.

4 PRE-INSTALLATION PREPARATIONS

4.1 Pre-installation checks

- Before installation, please check the node and Gateway for any physical damage.
- Open the node and gateway box to check if the internal wirings are intact.

4.2 Setting up the Gateway and Relay nodes location

Selecting the correct locations for the Gateway and Node is essential, especially if more than one Node is installed at the site and connected to a single gateway.

The initial task involves placing the Gateway in a position where it has a clear line of sight to all installed Nodes or, at the very least, to most of the Nodes. The optimal placement should be decided on-site. It is advisable to ensure a robust connection between the Gateway and the Node to achieve optimal performance, ideally with a signal strength exceeding -100 dBm. It's important to emphasize that stronger signal strength will yield superior results.

Selecting the correct locations for the Gateway and Node is essential, especially if more than one Node is installed at the site and connected to a single gateway.

The initial task involves placing the Gateway in a position where it has a clear line of sight to all installed Nodes or, at the very least, to most of the Nodes. The optimal placement should be decided on-site. For best results, the link between the gateway and the Node should be strong, preferably better than -100 dBm. Please note, the stronger the link, the better the results. **When mounting the gateway's antenna, it's crucial to position it at least 6 feet (1.8 meters) away from any surface, including roofs, hills, or walls. This clearance helps ensure optimal signal propagation and minimizes interference.** It is advisable to ensure a robust connection between the Gateway and the Node to achieve optimal performance, ideally with a signal strength exceeding -100 dBm. It's important to emphasize that stronger signal strength will yield superior results.

4.3 Setting up the Gateway & Relay Node

It is recommended that nodes and Gateway be set up and configured before mounting them at respective installation locations.

The gateway configuration needs to be done before nodes are configured. Also when the Node is being configured, it must be ensured that the Gateway is in switched "ON" position.

For setting up and configuring the Gateway, refer to User's Manual # WI6002.117 on Gateway.

The configuration of relay nodes is discussed in Section 5 of this manual.

5 CONFIGURING RELAY NODE

5.1 Setting up the Relay node

- Open the top cover with a screwdriver. A description of each part of the Node is given in the figure 5-2

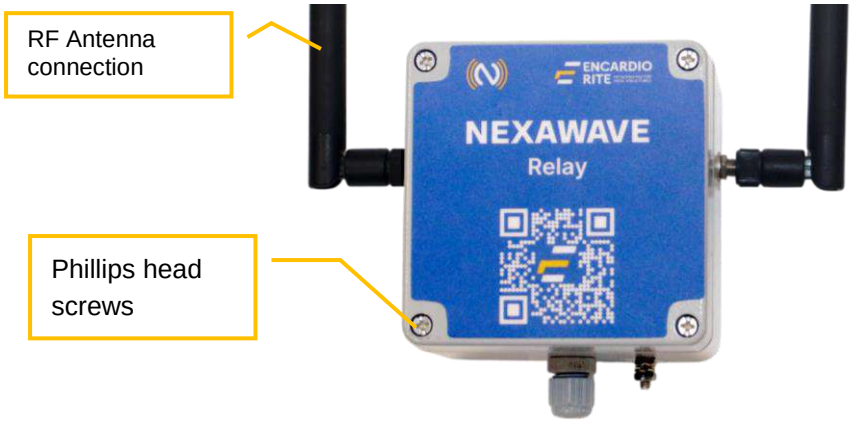


Figure 5-1 EWN-01R Relay Node

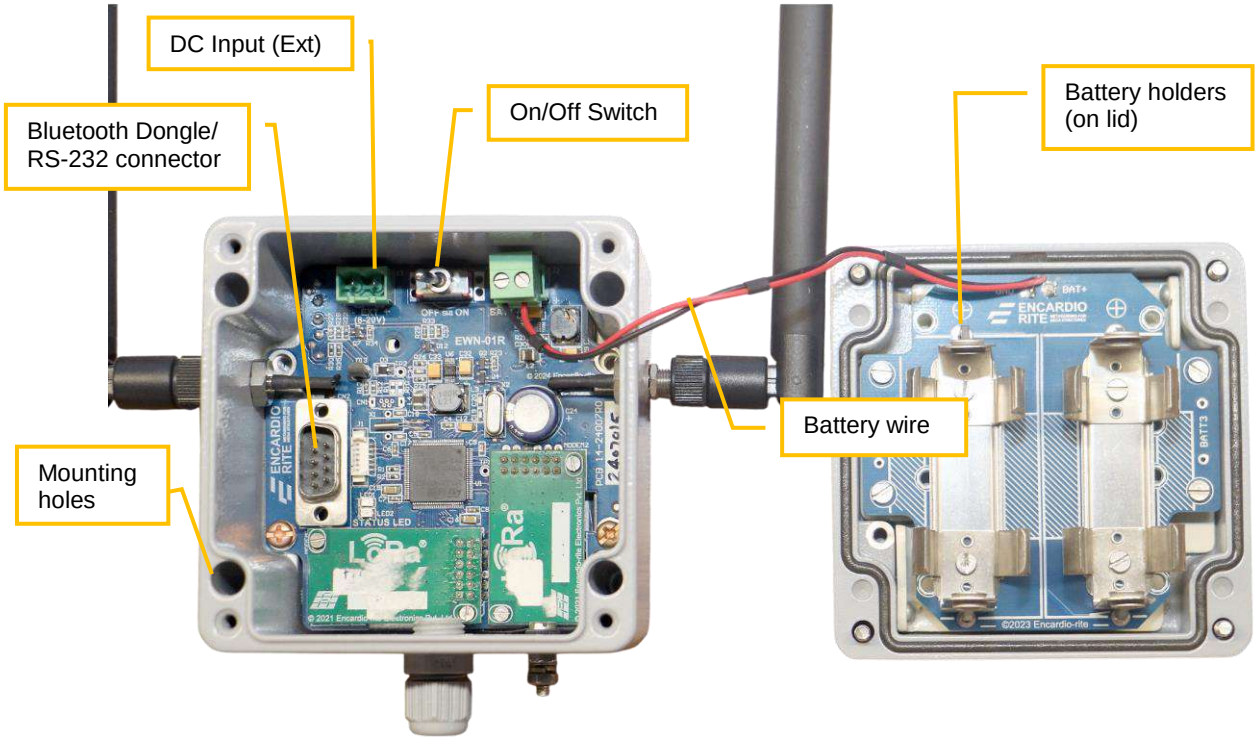


Figure 5-2 EWN-01R Relay Node details

- Connect the RF antenna (provided with supply) to the Node properly.

5.2 Battery Installation

- Open the device by unscrewing the four Phillips head screws on the front of the enclosure.

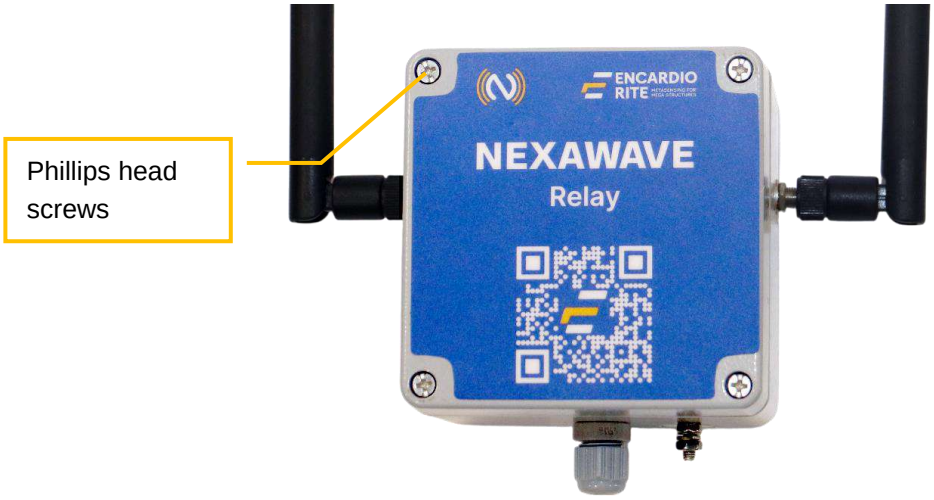


Figure 5-3

- Align the positive (+) side of the batteries with the + indicator in the battery holder.

Figure 5-4

- Slide the positive end of the battery inside the compartment first. Installing the positive end first allows the battery to slide into the compartment more easily. Just push the positive end of the battery into the lever, flattening it down into the holder. Apply a bit more pressure, if necessary, to snap the negative end of the battery securely into place.

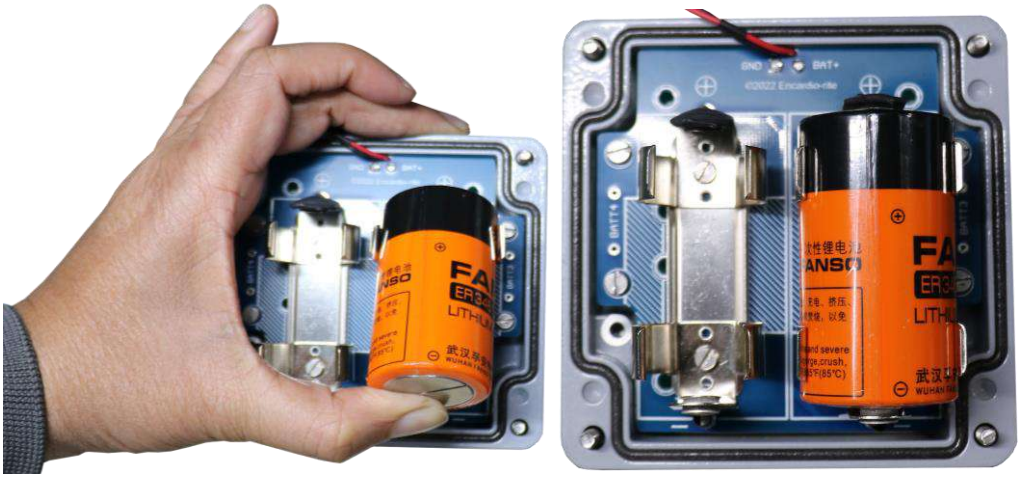


Figure 5-5

- Check for any looseness in the positive and negative clip terminals of the holder. If they are loose, press them down to ensure proper contact with the battery.

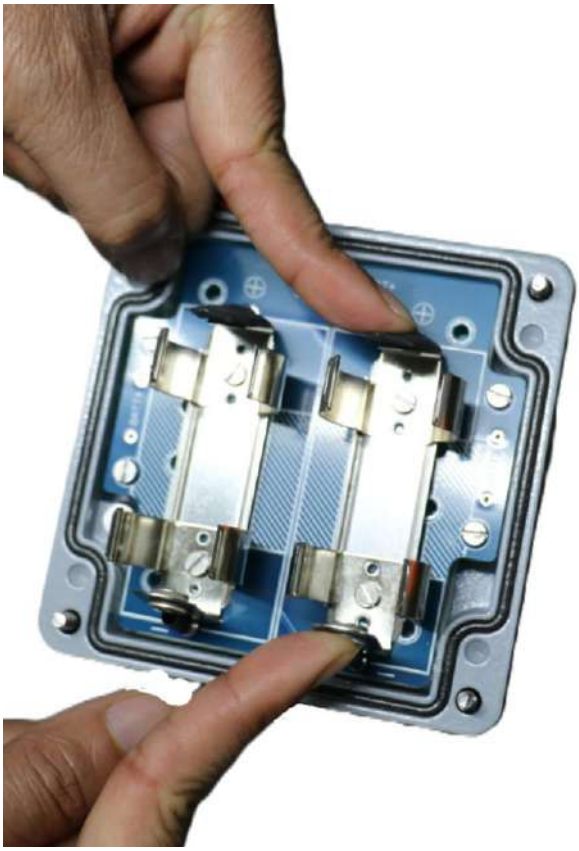


Figure 5-6

- In case fast scanning is required, connect any standard DC power adaptor (9 V, 1 A) to "DC Input".
- Or, Encardio Rite make solar battery charger can also be used (available against order).
- After power up, wait for 30 seconds as during this time tilt meter performs internal operations.

5.3 Connection Relay Node to phone

Install the .apk file (provided with the supply) for the "EWA-01" app on the phone. App shortcuts will be available in the list of application software, as shown in Figure 5-3 (a). Open the application and allow all the permissions required for proper functioning.

5.3.1 Connection through Bluetooth

The Relay node can be connected with mobile by using Bluetooth. Plug Bluetooth modem (provided with supply) at 9 pins D-sub connector of the Node. Ensure that the modem is configured for 115200 baud rate and hardware flow must be OFF. Verify DIP switch settings with the following Figure 6-4.

Figure 5-7 Bluetooth modem DIP switch settings

- Turn on the Bluetooth modem by pressing the ON/OFF switch located near the modem's battery compartment. The power indicator of the Bluetooth modem will glow in GREEN color to ensure that the Bluetooth modem is ON.
- Turn on Bluetooth of the Android phone and go to Bluetooth settings. Click on the "scan" button. The phone will show the list of Bluetooth devices found. Find the Node Name and serial number on the phone screen and click for pairing the phone with Node. Once the pairing button is pressed, it will ask to enter the passkey for authentication.
- Enter pairing code "698269" or "6982698076" and then press OK. On successful authentication, it will show that the device is paired. Now, the phone is paired with Node.

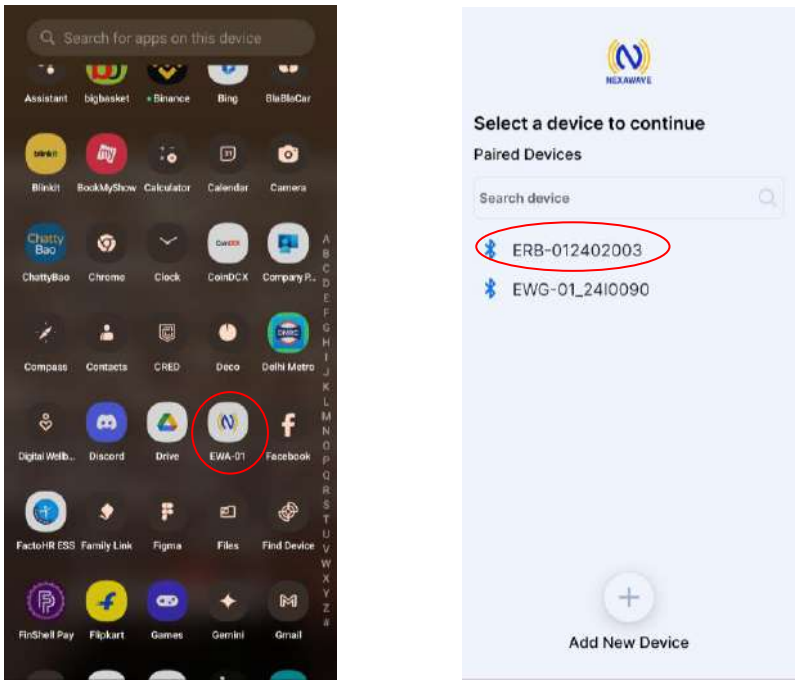
5.3.2 Connection through OTG

- Switch on the Node and connect it to the Smartphone using the FTDI to OTG adaptor provided with the supply.

5.4 Relay Node configuration

The Relay node is configured using the EWA-01 Android application. **Ensure the Hub (Gateway) is configured and powered on before configuring the Relay nodes.** Configuration can be done via Bluetooth or USB OTG. The following subsections detail the configuration process.

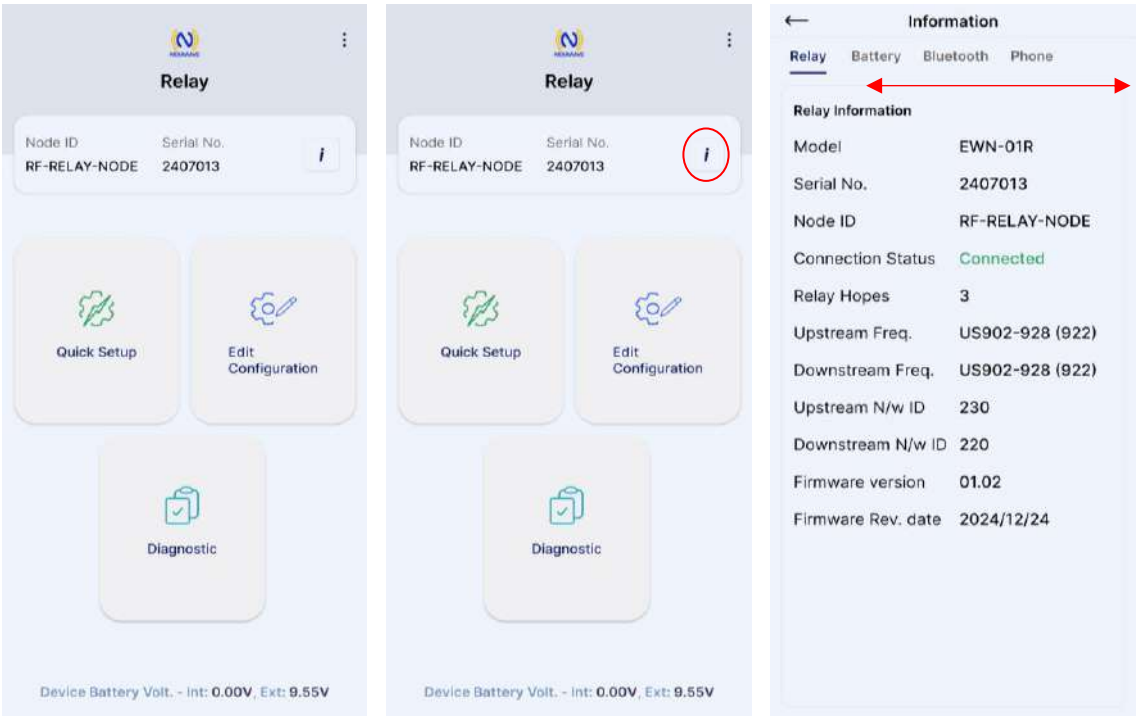
- Open the "EWA-01" apk installed on an Android phone. It will show the list of paired Nodes as shown in Figure 5-4 (b). Select the Node that you paired earlier from the list.



(a) (b)

Figure 5-8

- It will take you to the home screen of the Relay node, as shown in Figure 5-9 (a). Clicking on the 'i' button (Figure 5-9 (b)) will open the information window. Within this window, you can scroll to view information about the Relay, Battery, Bluetooth, and the Phone (Figure 5-9(c)).



(a) (b) (c)

Figure 5-9

5.4.1 Resetting Your Relay Node: Factory Default and Memory Erase Procedures

To access the reset options, navigate to the Advanced Settings menu. This is achieved by clicking the three dots located in the top left corner of the screen (Figure 5-10(a)).

Factory Default

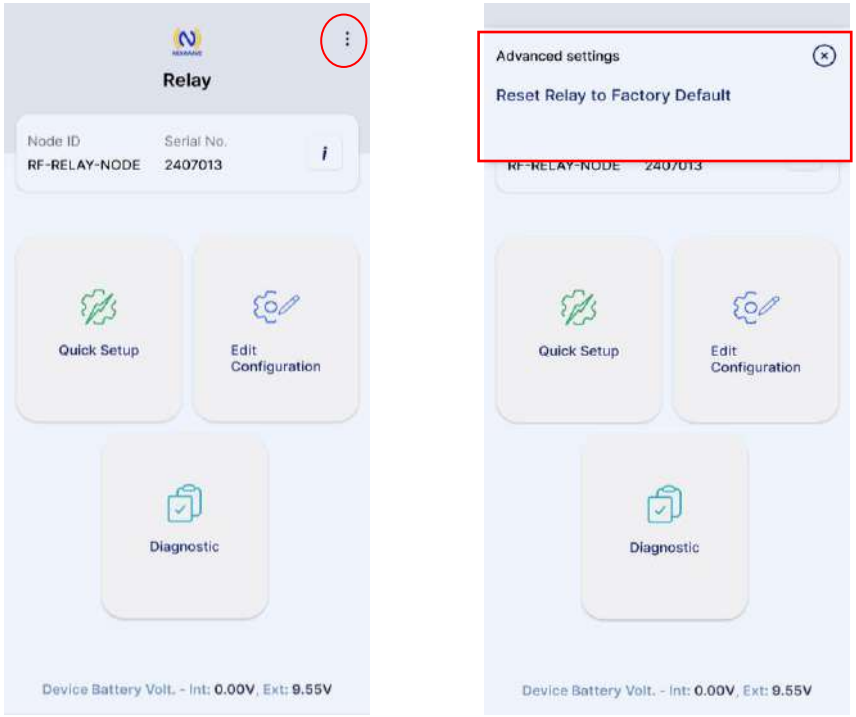
The Factory Default reset restores the relay node to its original factory configuration, erasing all user-defined settings and data.

Important: While user-configured data will be lost, any settings configured at the factory will be retained. This reset is useful for troubleshooting, preparing the device for a new user, or if other configuration changes have led to unexpected behavior.

Caution: All user-generated data will be permanently erased. It is strongly recommended to back up any critical data before performing a factory reset. Data lost through this process cannot be recovered.

To reset the Node, click on the "Reset Relay to Factory Default" tab from the advance setting. A prompt window asking for a reset password will appear.

Enter the password "**4TfZ9q7X**" and click on the "OK" button to reset the Node.



(a) **(b)**

Figure 5-10

On the home screen, click on "QUICK SETUP" to configure the Relay node. This simple three-step process guides you through the setup. A brief, step-by-step guide is provided below:

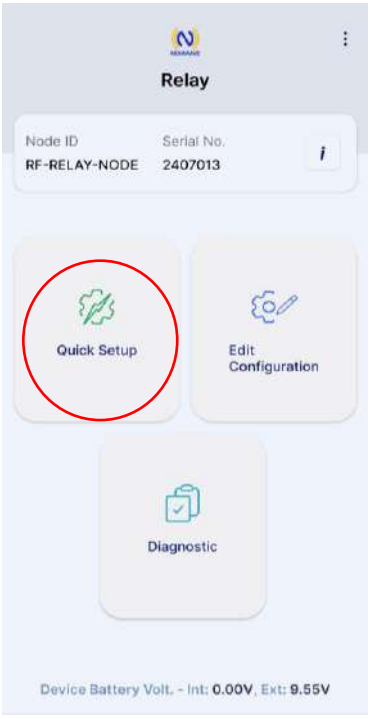


Figure 5-11

5.4.2 Quick Setup

Step 1: Set Relay Configuration, (As shown in Figure 5-12)

- Relay Hops: Select the hop limit from the drop-down (e.g., 2–3). Use the smallest value that still gives full coverage; more hops extend range but add airtime and delay.
- Upstream – Frequency Plan: Choose the region-appropriate plan from the list (tap Filter by Country to search by region). This must match the Hub plan.
- Upstream – Network ID: Pick/enter the Hub's Network ID (e.g., 230). Record it for commissioning notes.
- Downstream – Frequency Plan: Choose the plan used by field nodes (may be the same or different from upstream; must comply with local regulations).
- Downstream – Network ID: Pick/enter the Nodes' Network ID (e.g., 220). Ensure all downstream devices use this same ID.
- Consistency Check: Upstream plan/ID ↔ Hub ✓; Downstream plan/ID ↔ Nodes ✓; Relay Hops reasonable ✓.
- Save: Tap Save & Next to write the configuration. If it fails, move the phone within 1–2 m of the relay and confirm stable power, then retry.
- Click on the Save & Next button to move step-2.

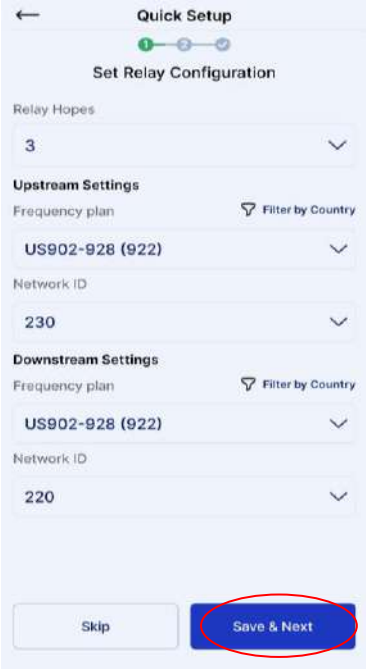


Figure 5-12

Step 2: Test Hub & Relay Connection(As shown in Figure 5-13)

- On Test Hub & Relay Connection, verify the Network ID, Frequency, and Tx Power match the hub, keep the antenna vertical and power stable, then tap Start Test. Let ~100 packets run and target ≥95% pass (≈100% on bench) while watching RSSI/dBm on both Relay and Hub panels (around −70 dBm is strong; worse than ~−105 dBm is weak). If pass rate or RSSI is poor, adjust antenna/placement and recheck IDs/plans, then retest. When stable, note Pass %, RSSI, and Tx Power in the log and continue.

Figure 5-13

Step 3: Setup Complete (As shown in Figure 5-14)

- This confirms the relay was configured and the link test passed. Tap Back to the Setup Home to review info/diagnostics. Tap Setup Another Device to repeat the process for the next relay. Before leaving site, label the unit (Node ID/Serial, Upstream/Downstream IDs), secure the antenna and power, mount the relay in its final position, and—if you moved it—rerun the Test Hub & Relay Connection to confirm ≥95% pass in place.

Figure 5-14

5.4.3 Edit Configuring

- To modify a deployed relay, open the device Home screen and tap Edit Configuration. Set a sensible Relay Hops limit—use the smallest value that still covers your site—then review both link directions: under Upstream Settings (toward the hub), select the correct Frequency plan for the region and enter the Hub's Network ID; under Downstream Settings (from field nodes), select the nodes' Frequency plan and enter the Nodes' Network ID. Confirm that upstream plan/ID exactly match the hub and downstream plan/ID match all nodes, then tap Edit to write the changes (a brief RF interruption is expected).

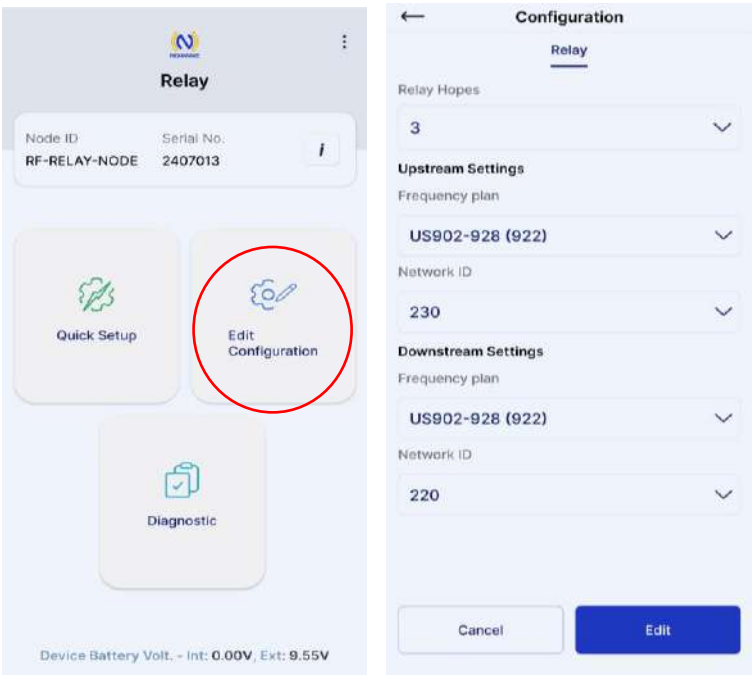


Figure 5-15

5.4.4 Diagnostic

- To test the Hub ↔ Relay connection (separate from Quick Setup), go to the Relay Home screen, tap Diagnostic, then open Test Hub & Relay Connection. Confirm the Network ID, Frequency, and Tx Power shown match the hub's settings, ensure the relay's antenna is fitted and vertical with stable power, and keep your phone within 1–2 m. Tap Start Test and let it run for roughly 100 packets. Watch the Pass bar and Received pkt. counter—target ≈100% on the bench and ≥95% in the field—and check that both Relay and Hub panels display reasonable RSSI/dBm values (e.g., around −70 dBm is strong; weaker than ~−105 dBm is poor). If results are weak or packets stay at zero, re-orient/raise the antenna, improve line-of-sight, and verify that the Upstream plan/ID matches the hub; then rerun the test and record Pass % and RSSI in your log.

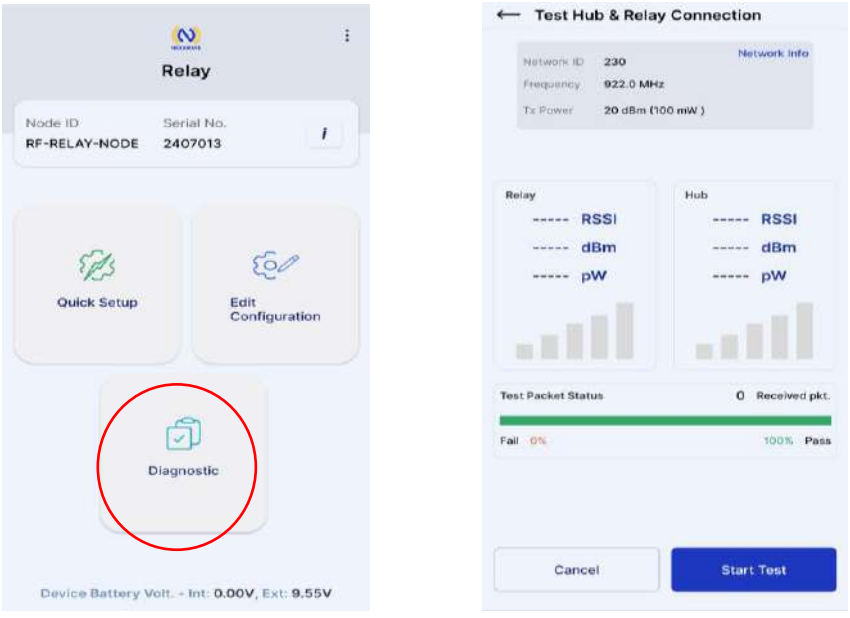


Figure 5-16

6 INSTALLATION PROCEDURE FOR RELAY NODE

6.1 Choose the mounting spot

Choose a position that gives the relay clear air toward both the hub (upstream) and the field nodes (downstream). Height usually helps—mount above head level or on a mast to improve Fresnel clearance. In tunnels or galleries, place the relay just after bends or obstructions so it "peeks" around corners. Keep it away from large metal surfaces and motors that can shadow or detune the antenna. Aim for a location that is safe to access later for maintenance.2) Fix the bracket / plate.

6.2 Mounting the enclosure

Offer up the bracket/plate, mark holes, drill, and fix with appropriate anchors for the substrate (concrete, steel, brick). Mount the enclosure upright with the antenna connector pointing up. Leave a few centimeters of clearance around glands so cables can enter without tight bends. On masts, use stainless clamps, add a secondary safety tie where required, and ensure the assembly is rigid against wind-induced vibration.

6.3 Antenna fitment & orientation

Always attach the RF antenna **before** applying power. Hand-tighten the SMA (finger tight plus a gentle nip—do not over-torque) and keep the radiator **vertical**. If you use an external antenna with coax, keep the run as short and straight as practical, avoid crushing or tight coils, and maintain separation from power cables. Outdoors, weather-seal the RF joint and any adapter with self-amalgamating tape, finishing with a downward **drip loop** so water cannot track into the connector.

6.4 Connect power and switch ON

An internal backup battery is fitted, seat it properly and check for secure contacts before closing the lid. After power-up, confirm basic life (status LED/app visibility) without changing any configuration.

6.5 Grounding, earthing & surge practices

If site standards require, bond the bracket/mast to earth using approved lugs and gauge. On tall or exposed installs, fit surge protection on long DC runs at the panel end. Maintain minimum clearances from lightning conductors and overhead lines as per local safety codes.

6.6 Quick post-mount test (mechanical/electrical only)

In the app, open **Diagnostic → Test Hub & Relay Connection** and run a short test.

Aim for a high pass% and reasonable RSSI on both Relay and Hub panels.

If weak, straighten/raise the antenna or nudge the relay to a more open spot, then retest.

6.7 Finish and label

Lightly weather-tape exposed joints; confirm glands are tight.

Label the enclosure with **Node ID**, **install date**, and location/height.

Take a photo of the final install for the site record.

7 TROUBLESHOOTING

7.1 Unable to connect relay node over Bluetooth

- Android phone's Bluetooth may not be enabled.
- Bluetooth modem may be out of Bluetooth range from Android phones.
- Bluetooth modem may not be paired with android phone.
- Check Bluetooth modem baud rate settings. It must be configured for 115200 and hardware flow control should be OFF.
- Turn OFF the relay node and then turn ON again.
- Remove the power from Node, wait for 30 seconds and then connect the power again. Now try to connect.

7.2 Unable to connect Node with FTDI-OTG Cable

- RS232 interface connector may be loose.
- Check the interface cable's connector for damage.
- RS232 interface cable may be broken.
- Node battery may be discharged.
- Remove the batteries, wait for 30 seconds and then mount the batteries. Now try to connect.

7.3 Unable to communicate with Gateway

- Check the antenna for loose connection.
- Antenna to RF modem connecting cable may be damage.
- Antenna itself may be damaged try with another antenna
- Node battery may be discharged.

8 SAFETY AND WARNINGS

8.1 Operation Safety

- Before taking any action, please read the user's manual carefully,.
- Ensure that all the procedures and installations are correctly carried out.
- The case and mountings should be grounded, where practicable.
- This product has been designed to meet a certain water-proof level. However, it becomes vulnerable to water ingress when the lid screws are not tightened properly, or if the cable gland has not been sealed properly.
- This product must not be disassembled under any circumstances. If done, it will void the warranty and may leave the product in a dangerous state.

8.2 Battery caution & warning

- To install the battery into a holder, please follow the "+" (positive) and "-" (negative) signs carefully. Wrong orientation of a battery could potential cause unit damage.
- If battery is incorrectly replaced, there may be danger of explosion.
- Use only with the type recommended by the manufacturer. Observe any warnings specified by the battery manufacturer.
- The battery has a relatively high capacity, so please take special care during storage and usage.
- When disposing of the batteries please contact your local authorities or dealer and ask for the correct method of disposal.
- When disconnecting the battery, please take special care not to apply excessive force, otherwise the battery holder and the nearby circuitry can get damaged.

If the above safety precaution and warnings are not followed, the manufacturer cannot be held responsible for any damage and injury caused to the users.

9 WARNING RADIATION EXPOSURE

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

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.

Note: 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 20cm between the radiator& your body.

Antenna Specification: 4.44dBi

10 ENVIRONMENTAL RESPONSIBILITY DECLARATION

Encardio Rite Group ("**Encardio**") is committed to ensuring full compliance with environmental responsibilities under all applicable Indian environmental statutes, collectively referred to herein as the **"Law(s)"**. This declaration is applicable to all products manufactured and marketed by Encardio.

1. **Scope:** This declaration binds and guides every stakeholder involved in the product's lifecycle including individuals, institutions, organizations, or entities hereinafter referred to collectively as the **"User(s)"**.
2. **Waste Segregation and Handling:** All Users are required to manage the product and any waste generated from its use in accordance with the law, including proper segregation of waste at the source into biodegradable, recyclable, and hazardous categories; authorized disposal of all end-of-life products, electronic components, batteries, and packaging materials only through government-authorized collection, recycling, or refurbishing systems; and ensuring that products bearing the crossed-out wheeled bin symbol are not mixed with general household or municipal waste streams.
3. **E-Waste Disposal and Battery Waste Management:** All electronic and electrical equipment and components manufactured or sold by Encardio must be disposed of only through authorized recycling or refurbishing facilities as per applicable law, ensuring no harm to human health or the environment; users shall ensure that all used items are returned to designated collection points and shall also maintain proper documentation and adhere to return, reporting, or record-keeping obligations; products nearing end-of-life must not be discarded along with general household waste, as improper disposal of e-waste may lead to toxic chemical release and pollution.
4. **Plastic Waste Management:** Users must not discard plastic components or packaging into unsorted municipal waste; instead, they should separate and hand over such plastic waste to authorized waste processors and ensure that no banned plastic items, as notified under law, are used or circulated.
5. **Industrial and Hazardous Waste:** If the User operates any facility where industrial, hazardous, or biomedical waste may arise due to the installation, maintenance, or testing of the product, all necessary consents and permits must be obtained and renewed from competent authorities; adequate protective measures must be taken to ensure no harm is caused to the environment or human health; and such waste must be stored, treated, and disposed of in accordance with the law.
6. **Pollution Control:** Users operating manufacturing, repair, or testing premises must not emit air or water pollutants beyond prescribed limits, must operate only after securing applicable consents under the law, and must maintain environmental records and submit reports as required
7. **Record Keeping and Reporting:** All Users associated with Encardio must maintain comprehensive records of production, sales, collection, and disposal in accordance with applicable Law(s) and submit timely reports to regulatory authorities.
8. **Contact and Support:** Encardio urges all Users to act responsibly and support sustainable environmental practices by adhering to this declaration and the Law. For safe disposal and further compliance assistance, Users are encouraged to contact their local municipal waste authorities, or authorized recyclers. Non-compliance with the above obligations may constitute a violation of Indian environmental laws and attract penalties under the relevant Law(s). Users can contact Encardio at:

Contact Number: +91 522 2661039-42

Website**:** https://www.encardio.com/

11 WARRANTY

The Company warrants its products against defective workmanship or material for a period of 12 months from date of receipt or 13 months from date of dispatch from the factory, whichever is earlier. The warranty is however void in case the product shows evidence of being tampered with or shows evidence of damage due to excessive heat, moisture, corrosion, vibration or improper use, application, specifications or other operating conditions not in control of Encardio Rite. The warranty is limited to free repair/replacement of the product/parts with manufacturing defects only and does not cover products/parts worn out due to normal wear and tear or damaged due to mishandling or improper installation. This includes fuses and batteries

If any of the products does not function or functions improperly, it should be returned freight prepaid to the factory for our evaluation. In case it is found defective, it will be replaced/repaired free of cost.

A range of technical/scientific instruments are manufactured by Encardio Rite, the improper use of which is potentially dangerous. Only qualified personnel should install or use the instruments. Installation personnel must have a background of good installation practices as intricacies involved in installation are such that even if a single essential but apparently minor requirement is ignored or overlooked, the most reliable of instruments will be rendered useless.

The warranty is limited to as stated herein. Encardio Rite is not responsible for any consequential damages experienced by the user. There are no other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and of fitness for a particular purpose. Encardio Rite is not responsible for any direct, indirect, incidental, special or consequential damage or loss caused to other equipment or people that the purchaser may experience as a result of installation or use of the product. The buyer's sole remedy for any breach of this agreement or any warranty by Encardio Rite shall not exceed the purchase price paid by the purchaser to Encardio Rite. Under no circumstances will Encardio Rite reimburse the claimant for loss incurred in removing and/or reinstalling equipment.

A lot of effort has been made and precaution for accuracy taken in preparing instruction manuals and software. However best of instruction manuals and software cannot provide for each and every condition in field that may affect performance of the product. Encardio Rite neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damage or loss that results from use of Encardio Rite products in accordance with the information contained in the manuals or software.

Products described in Encardio Rite's catalogs are subject to modification and improvement as dictated by subsequent developments. Encardio Rite reserves the right to modify, change or improve products, to discontinue them or to add new ones without notice.

12 RECOMMENDATION OF BATTERIES FOR DATALOGGERS

We recommend to use any of the following batteries in all Encardio-rite products (Dataloggers, Wireless Nodes and Gateway). These batteries can be sourced locally.

SN	Manufacturer	Mfr Part No.	Battery type	Datasheet	Photo	Example Links to buy
1	ACT	ER34615M	LI-SOCL2 (Power Type)	https://actsales04.en.ec21.com/ACT_ER34615M_3.6volts_Lithium_Battery--8201912_8271376.html		actsales
2	SAFT	LSH 20	LI-SOCL2 (Power Type)	https://www.saft.com/products-solutions/products/ls-lsh-lsp?text=&tech=84&market=&brand=764&sort=newest&submit=Search		Digikey Atbatt.com Potensa Batteryexperts.com

3	SAFT	LSH 20 HTS	LI-SOCL2 (Power Type)	https://www.saft.com/products-solutions/products/ls-lsh-lsp?text=&tech=84&market=&brand=764&sort=newest&submit=Search		Tteckai.com indiamart patareid Aliexpress.com globalbat
4	Ultra Life	ER34615M	LI-SOCL2 (Power Type)	https://www.ultralifeindia.com/wp-content/uploads/2020/01/TDS_ER34615M.pdf		mouser
5	FANSO	ER34615M	LI-SOCL2 (Power Type)	https://www.texim-europe.com/product/battery-and-power-supplies/batteries/primary-batteries/lithium-li-socl2/detail/er34615m-fso		texim-europe tme.com ecocell.com batterydirect.com
6	RAMWAY	ER34615M	LI-SOCL2 (Power Type)	http://en.ramwaybat.com/product_46/		Alibaba.com Lazada zgqjnyw.mobi

7	Bex Batteries	ER34615M	LI-SOCL2 (Power Type)	batteryExperts		batteryExperts
8	PKCELL	ER34615M	**LI-SOCL2 (Power Type)**	Pkcellpower.com		Pkcellpower.com electronicworld Amazon Alibaba
9	HCB	ER34615M	LI-SOCL2 (Power Type)	https://www.enhcb.com/products/li-socl2-lithium-thionyl-chloride-cylindrical-battery/		Enhcb.com
10	FORTE	ER34615M	LI-SOCL2 (Power Type)	Fortebattery		Fortebattery zinchu ozon

11	EVE	ER34615M	LI-SOCL2 (Power Type)	https://microchip.ua/battery/er34615m.pdf		Jm.pl repairnspares
12	TekCell	ER34615M	LI-SOCL2 (Power Type)	https://www.tme.eu/Document/69a4b065e0660fedf2cdae1c1c0fb8d4/BAT-ER34615M.pdf		tme