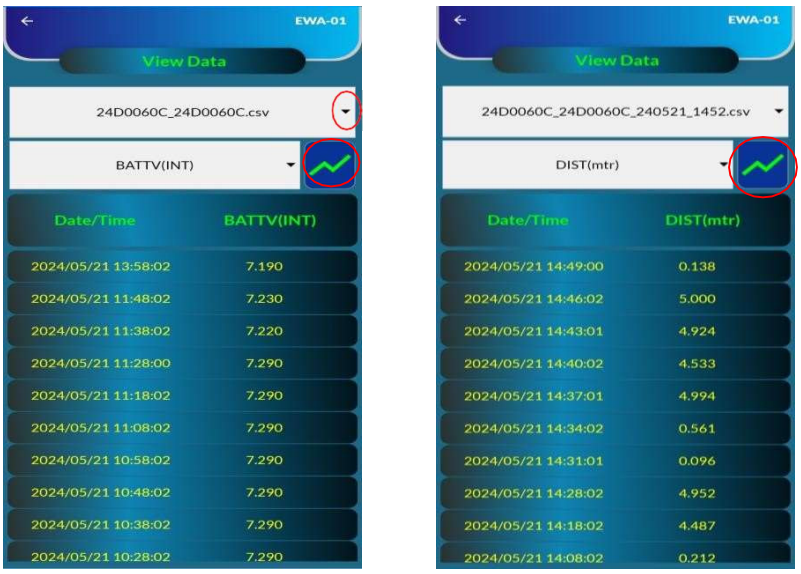
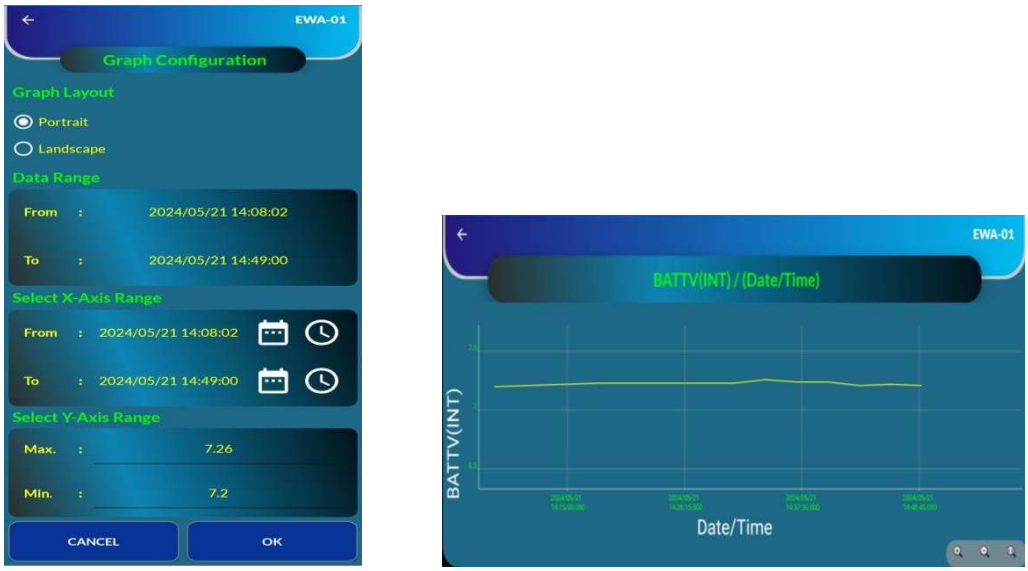


(a) (b)

Figure 6-15 View data

- Graph view of selected parameter is also available. Tap the graph button as shown in figure 6-15 (b). A window as shown in the figure 6-16 appears. To view the graph, select Graph Layout, Data Range, X-axis and Y-axis range and click on "OK" button.



(a) (b)

Figure 6-16 View data in graphical format

6.10 Upload File

Data once downloaded on phone can be sent directly to remote FTP server using upload file option.

- Press the "UPLOAD FILE" tab from "Download" screen (figure 6-10 (c)). Screen as shown in figure 6-13 (a) will appear.
- Tap the "Reset Setting" button. Screen as shown in figure 6-13 (b) will appear.
- Enter the FTP credentials correctly and save it.

- Select the file for upload (from screen in figure 6-17 (a)) and click on the "Upload" button to push the file to FTP server. Internet connectivity in the android phone is must to perform this activity.

(a) (b)

Figure 6-17 Upload data

6.11 Factory Default

Factory default will erase all the user related configuration and data except those configured from factory. Be careful while doing factory reset as data can't be retrieved after this step.

- To reset the node, click on the "FACTORY DEFAULT" tab from "Config Node" screen (figure 6-7 (a)). A prompt window asking for reset password will appear as shown in figure 6-18.
- Enter the password "4TfZ9q7X" and click on the "OK" button to reset the node.

Figure 6-18 Reset settings to factory default

6.12 System Information

System information option provides all the necessary information's about the node.

- Click on the "System Information" tab from the main menu. A window as shown in the figure 6-19 will be displayed. User can click on any tab to see the related information.

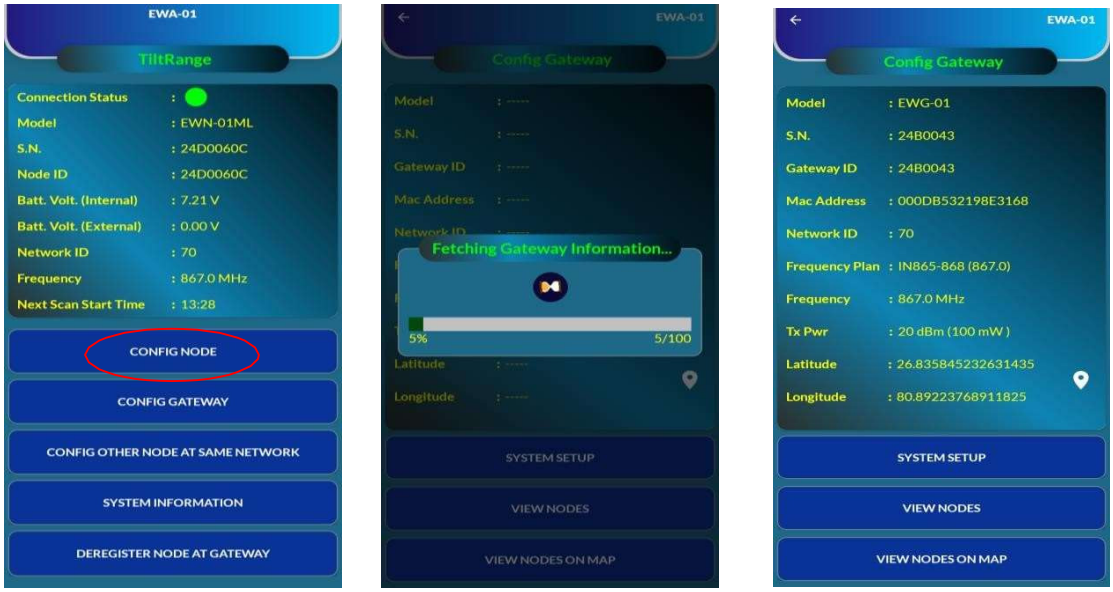
Figure 6-19 System information

7 RE-CONFIGURING GATEWAY & NODES AFTER INSTALLATION

7.1 Re-configuring gateway via node

This is the advanced feature where user can configure the gateway in the network from any node in the same network after its installation. It allows users to modify specific gateway parameters. In a network where all nodes are connected to the gateway, users can conveniently configure these parameters from any type of node in the network by connecting it through an Android phone or Laptop.

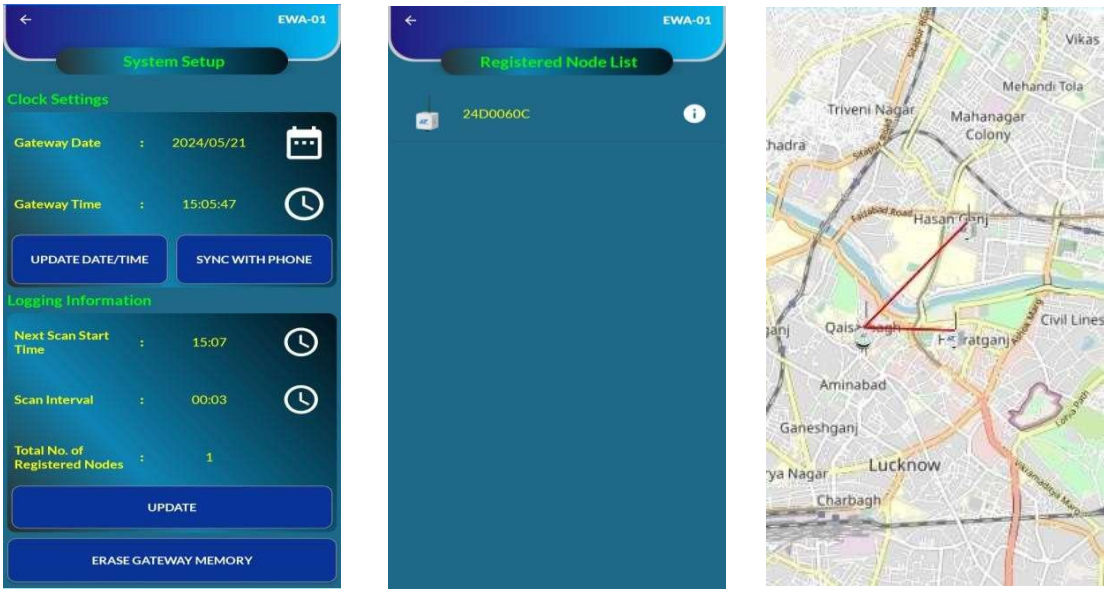
- Click on the "Config Gateway" tab from the main menu. A window as shown in the figure 7-1 (a) will appear. Screen shows the gateway information and configuration options.



(a) (b) (c)

Figure 7-1 Config gateway (via TiltRange node)

- Click on the "System Setup" tab to configure the gateway. Though all the configuration can not be done from Node, but few important parameters like Gateway's Clock Settings, Scan Start Time, Scan Interval can be modified as shown in figure 7-2 (a).



(a) (b) (c)

Figure 7-2 View nodes/wireless TiltRanges within wireless network

- Gateway's memory can also be erased from this window by selecting "Erase Gateway Memory" tab.
- To view all the nodes connected within the wireless network, click on the "View Nodes" tab from screen shown in figure 7-1 (c). Screen as shown in figure 7-2 (b) will appear.
- To view the connected nodes location on the map, tap on the "View Nodes on Map" tab. Screen as shown in figure 7-2 (c) will appear, with a map showing location of nodes.

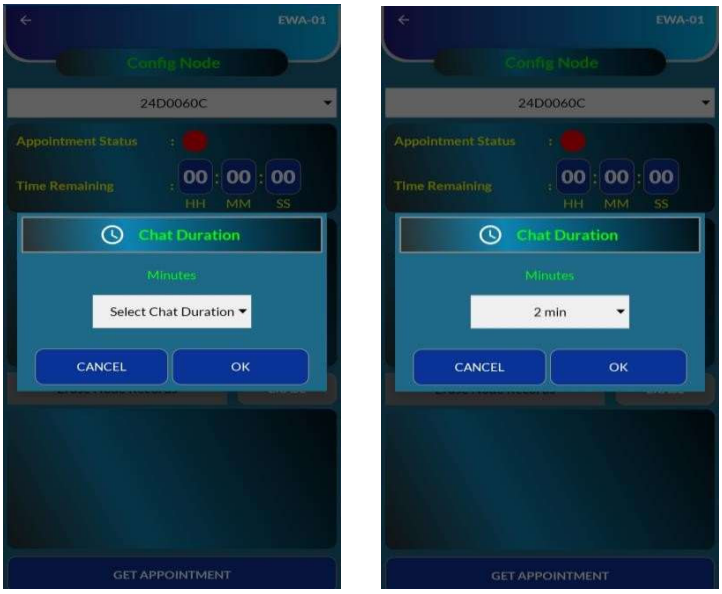
7.2 Re-configuring nodes via gateway

With this feature user can perform node-to-node communication and configure any other node, in the same network, from current node.

- Click on the tab "CONFIG NODE" from the main menu. A screen as shown in figure 7-3 (b) will appear.

(a) (b)

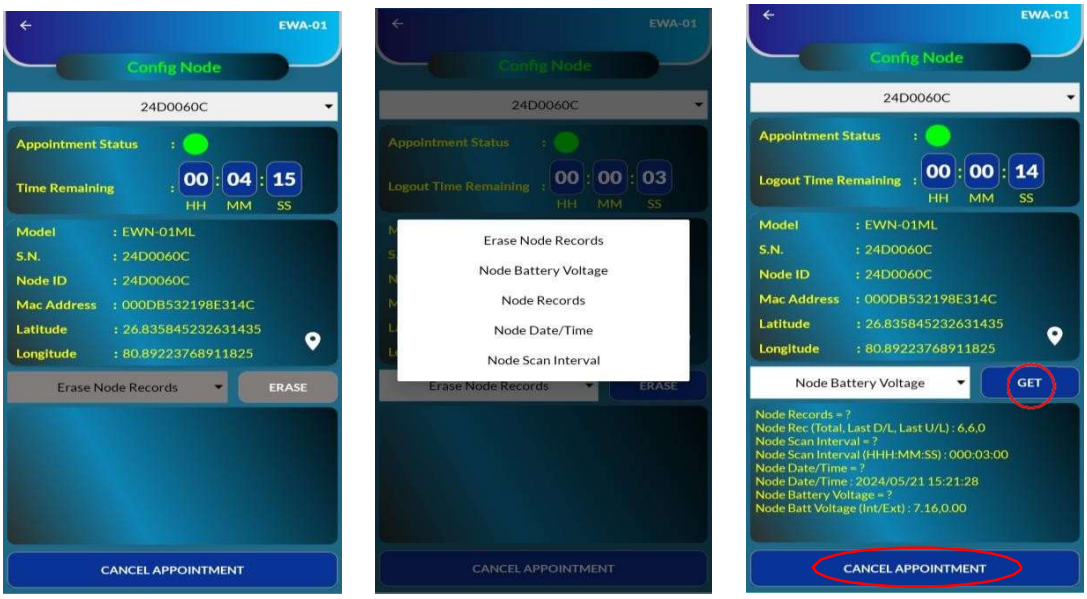
Figure 7-3



(a) **(b)**

Figure 7-4

- To configure a specific node, choose the desired node from the dropdown menu,
- Click on the "GET APPOINTMENT" tab to establish a live connection with the chosen node. Please refer to the images in figure 7-4 for detailed instructions on obtaining an appointment from the node.
- Upon successfully raising the appointment request, the screen as shown in figure 7-5 (a) will appear. It will indicate the remaining time until the node becomes live.
- As the appointed time approaches, the appointment status will turn green, as shown in figure 7-5 (b).
- A countdown timer will initiate based on the selected chat duration from the previous step.
- Once the node becomes live, it will be able to respond to the requested commands, as shown in figure 7-5 (c).



(a) (b) (c)

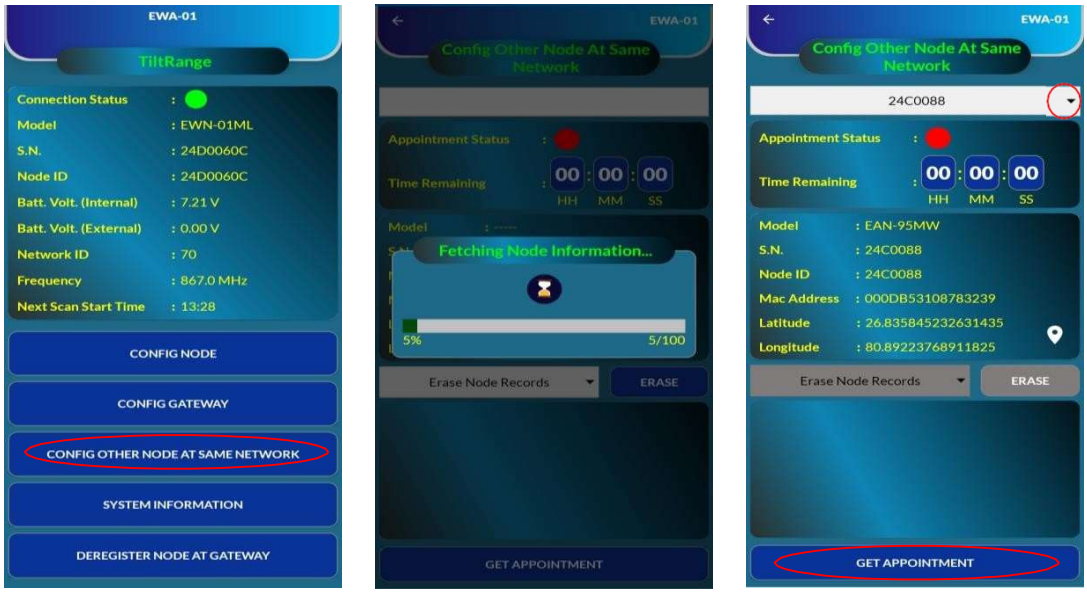
Figure 7-5

- User can cancel the appointment any time by clicking on the Cancel Appointment button.

7.3 Re-configuration other nodes in same network via node

Encardio-rite's RF wireless system allows even node to configure another node. Below are the steps outlining how to configure the node, using gateway:

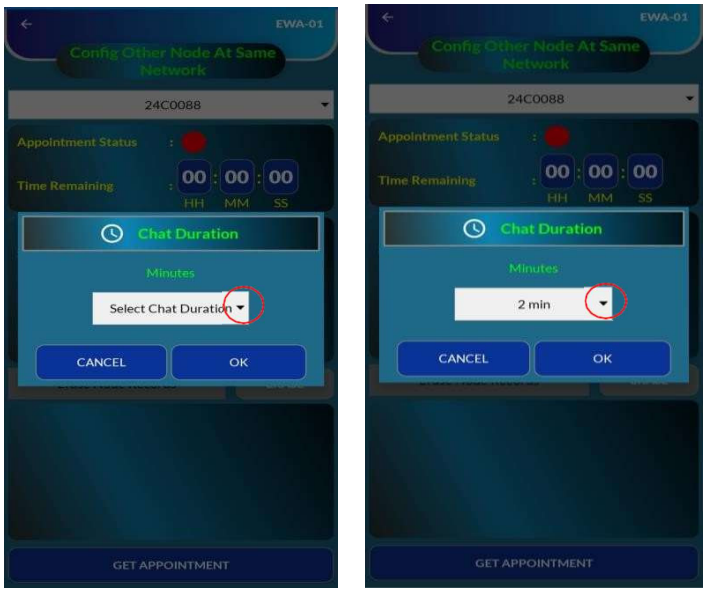
- At the home screen click on the "CONFIG OTHER NODE AT SAME NETWORK" tab, as illustrated figure 7-6 (a).
- Allow some time for the node to retrieve information about all the connected nodes in the network. Once this process is complete, screen as shown in 7-6 (b) will appear, presenting the gathered information about the network's connected nodes.



(a) (b) (c)

Figure 7-6

- To configure a specific node, choose the desired node from the dropdown menu, as shown in figure 7-6 (c).
- Click on the "GET APPOINTMENT" tab to establish a live connection with the chosen node. Please refer to the images in figure 7-7 for detailed instructions on obtaining an appointment from the node.

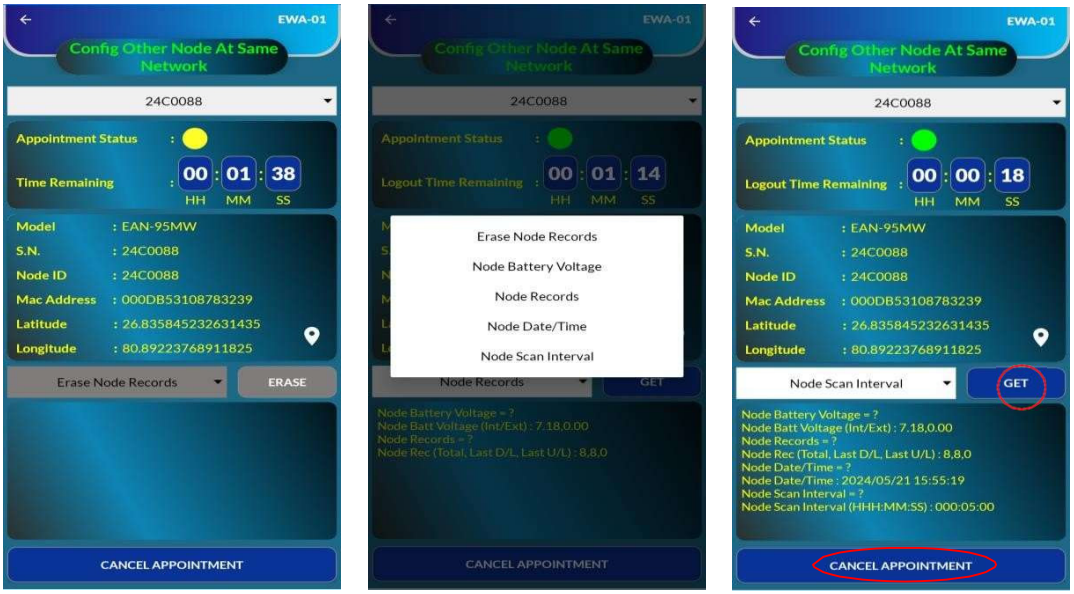


(a) (b)

Figure 7-7

- Upon successfully raising the appointment request, screen as shown in figure 7-8 (a) will appear. It will , indicate the remaining time until the node becomes live.
- As the appointed time approaches, the appointment status will turn green, as shown in figure 7-8 (b.

- A countdown timer will initiate based on the selected chat duration from the previous step. Once the node becomes live, it will be able to respond to the requested commands, as shown in figure 7-8 (c).



(a) (b) (c)

Figure 7-8

- User can cancel the appointment any time by clicking on the Cancel Appointment button.

8 INSTALLATION PROCEDURE

8.1 TiltRange installation

The model EAN-01ML TiltRange (tri-axial) is used to measure rotation of structures in the plane parallel as well as perpendicular to the surface/wall on which the TiltRange is mounted.

The TiltRange can be mounted on a vertical (wall, column, pier, etc) or horizontal plane (floor, ceiling, etc), depending on the application and monitoring requirement.

- TiltRange enclosure has supplied with mounting bracket for mounting the enclosure on vertical and horizontal plane as shown in figure.

Figure 8-1 Mounting bracket & fasteners

- Mark the locations of two mounting holes of mounting bracket.
- Ensure that position of the holes are aligned correctly. For vertical mounting, use a spirit level.
- Fix the TiltRange enclosure on it on mounting bracket. TiltRange enclosure has mounting holes for fixing it on mounting bracket as shown in figure.

Figure 8-2

- Drill holes depending on the mounting fasteners being used for fixing the mounting plate on surface. Normally HST/M8x75/10 Hilti fasteners are supplied, for which 8 mm dia x 75 mm deep hole is reqiured.

- Fix the TiltRange enclosure with mounting bracket on plane surface. Be careful of the orientation of the TiltRange while mounting on a horizontal or vertical plane. Typical installation arrangement for vertical and horizontal mounting is given below.

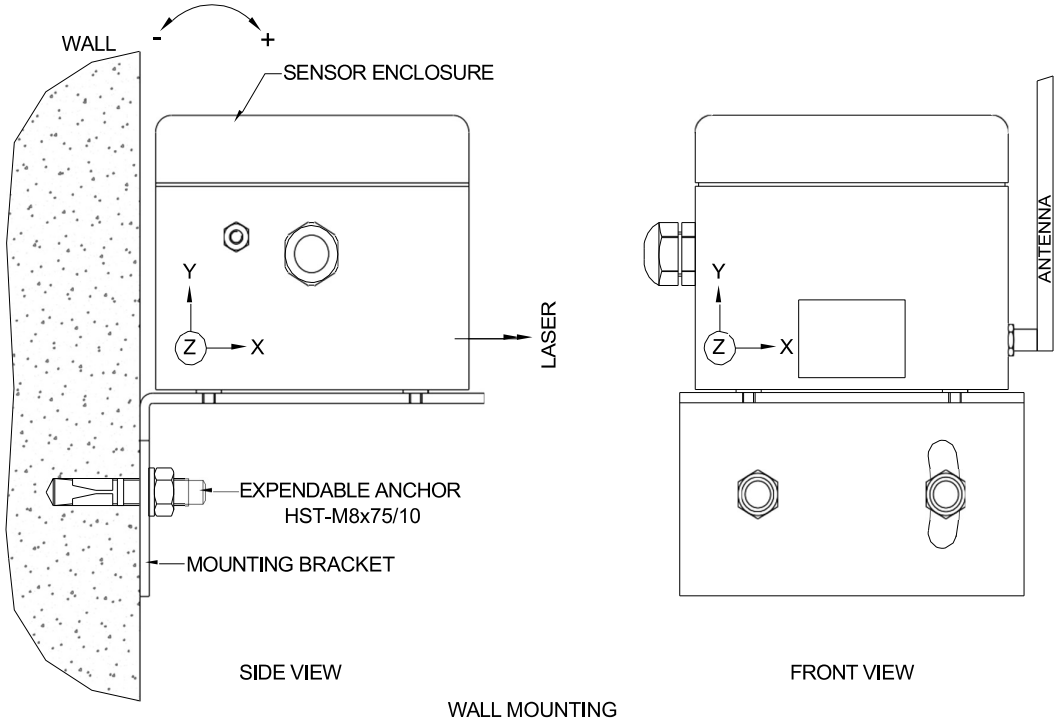


Figure 8-3

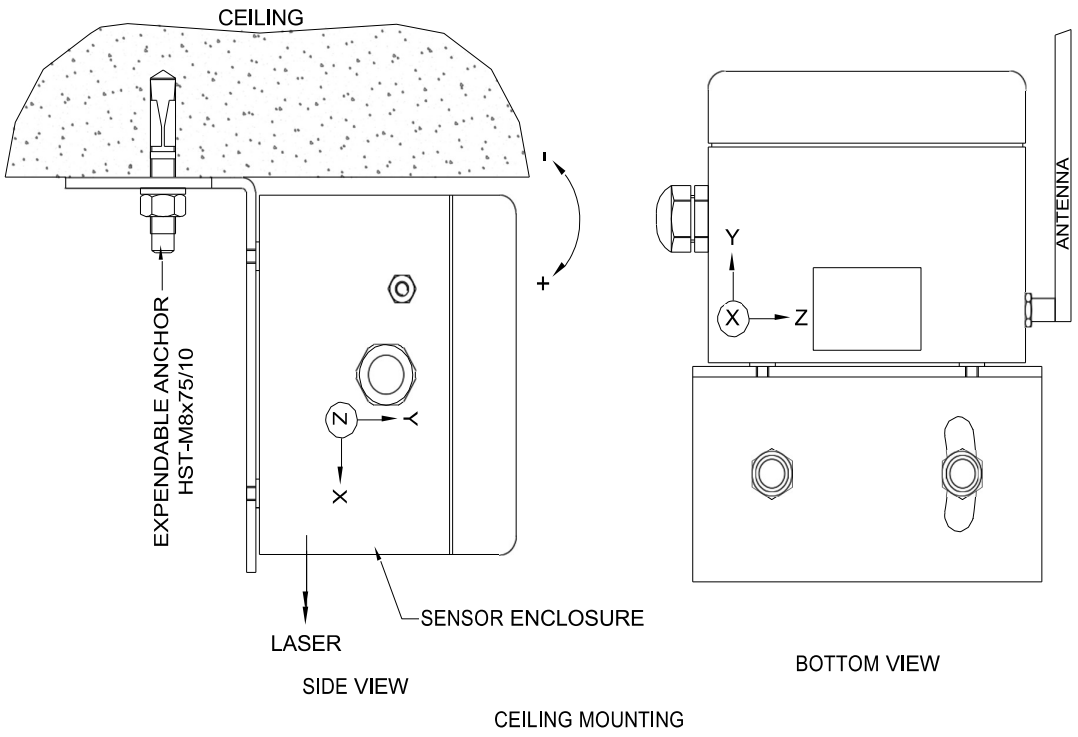


Figure 8-4

- The TiltRange nodes must be oriented with any two axis marked on the label parallel to the horizontal plane, so that the data can be easily interpreted. Refer to section 8.3 for more detail.

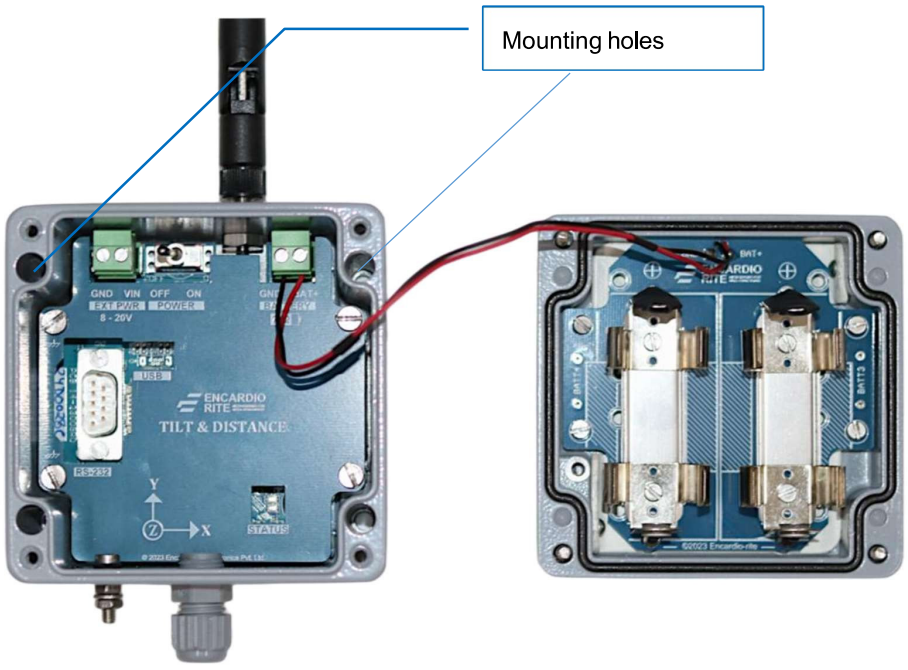


Figure 8-5

- After the TiltRange is fixed to the structure, it is adjusted to the zero reading (initial reading). Subtracting

the initial tilt reading from the subsequent tilt reading gives change in tilt of structure over a period of time.

CAUTION: Install TiltRange on a structural member of a building and not on the façade or boundary wall which may behave in a different manner than the main building. Do not install it at a location having vibrations, for example caused by heavy rotary machinery. Avoid installing at location where it can be vandalized or get hit by pedestrians.

8.2 Protection of TiltRange

Avoid installation of TiltRange in parts of the structure exposed to direct sunlight. If this is not feasible, a box made from Thermocouple or similar heat insulating material should be installed covering the TiltRange and protecting it from direct sunlight.

If certain degree of mechanical protection is also required, wooden or fiberglass protection boxes may be considered. Heat insulating tape can be fixed to the inner surface of such boxes for thermal insulation.

8.3 Sign convention for tilt readings

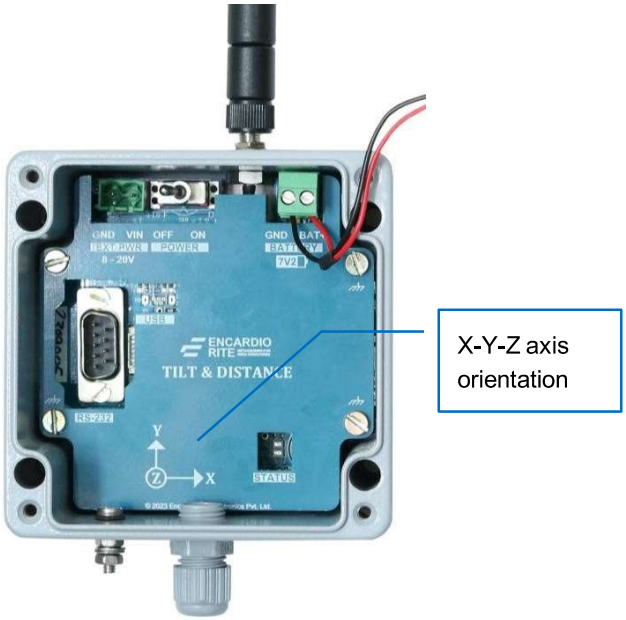


Figure 8-6 Axis marked on node

8.3.1 Vertical plane

- Movement parallel to plane – Clockwise movement will show increase in Y-axis readings (positive sign), while anti-clockwise movement will show decrease in Y-axis readings (negative sign)
- Movement perpendicular to plane – Clockwise movement will show increase in X-axis readings (positive sign), while anti-clockwise movement will show decrease in X-axis readings (negative sign)

8.3.2 Horizontal plane

- Movement parallel to plane – Clockwise movement will show increase in Y-axis readings (positive sign), while anti-clockwise movement will show decrease in Y-axis readings (negative sign)
- Movement perpendicular to plane – Clockwise movement will show increase in Z-axis readings (positive sign), while anti-clockwise movement will show decrease in z-axis readings (negative sign)

8.4 Environmental factors

Several factors can influence the behavior of the structure being monitored for change in tilt using the TiltRange. Having knowledge of the factors influencing the behavior of the structure is essential for analyzing the TiltRange data. Data related to factors such as rain fall, tidal or reservoir levels, excavation or fill levels, construction activities nearby the structure, movement of traffic near the structure and its type, wind, ambient temperature, barometric pressure etc. should also be observed and collected along with the TiltRange data.

9 TROUBLESHOOTING

9.1 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.

9.2 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.

10 SAFETY AND WARNINGS

10.1 Operation Safety

- Before taking any action, please read the users 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.

10.2 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.

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.