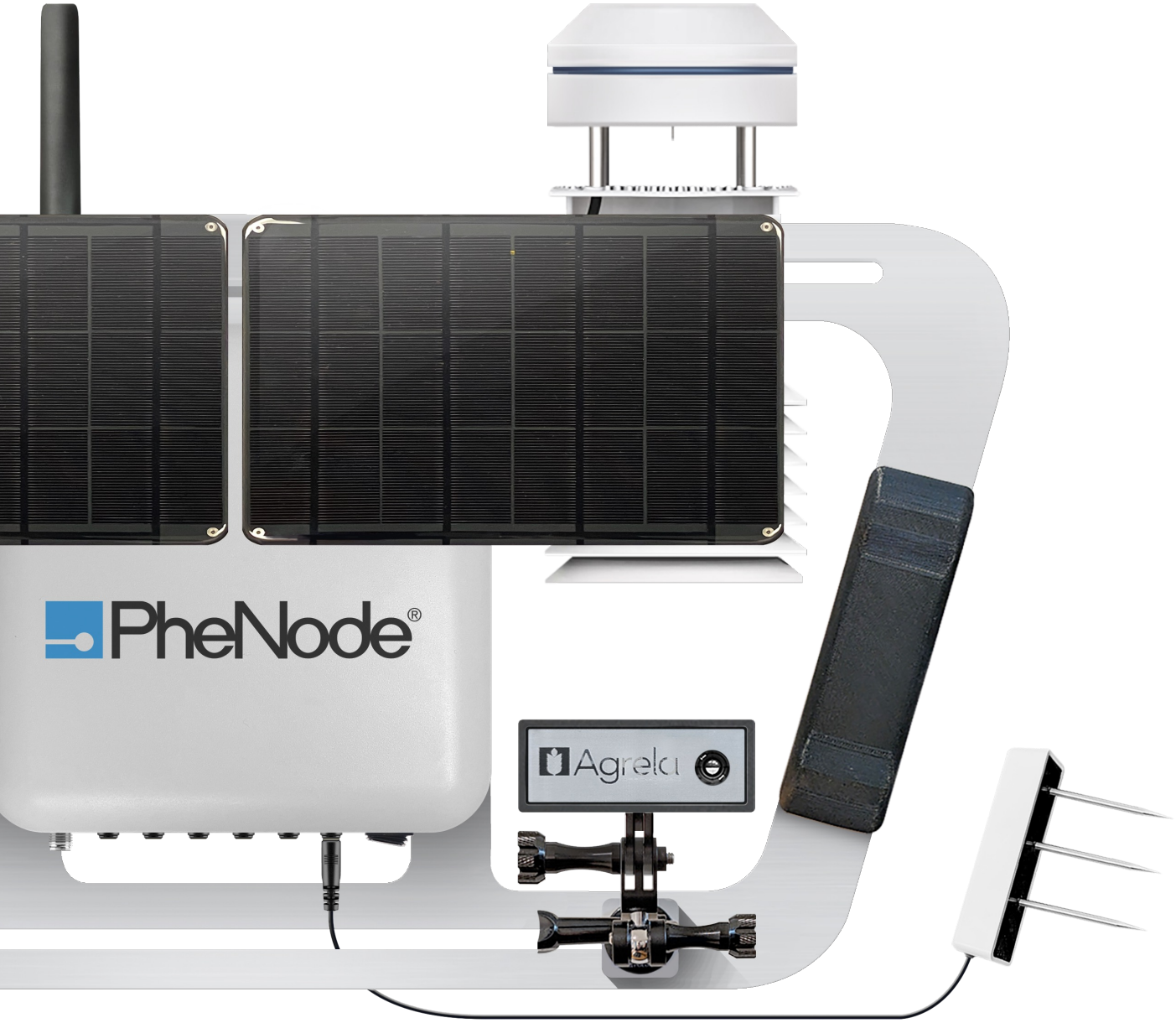


PheNode®

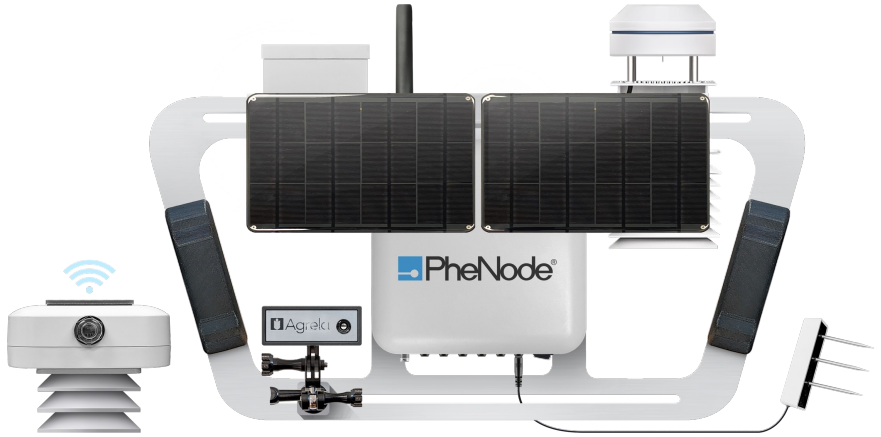
Quick Start Guide

v2

Agrela™ ECOSYSTEMS

PheNode is…

…a flexible, scalable environmental sensor platform that can be tailor-fit to the user's needs.



Customizable
Customize your sensor suite and data cleaning preferences

Modular
Physically reconfigurable for indoor/outdoor operations

Scalable
Command a fleet of wireless sensors with a single PheNode

Adaptable
Integrate new Agrela and 3rd party technologies as they become available, and further customize your experience by utilizing PheNode's API

Robust
Made from aluminum and other durable, recyclable materials

Table of Contents:

3. PheNode System Overview
4. Sensor Frame Components
5. What's in the Box?
6. Setting up PheNode
    6. Mounting the weather sensor(s)
    7. Connect the solar panel(s)
    8. Assembling the tower
    10. Attaching the sensor frame
    11. Orientation
    12. Adding guy wires
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PheNode System Overview

Wireless communications:

LoRa Cellular WiFi Bluetooth GPS

Solar powered for outdoor applications, USB-C plug-in for indoor applications

5MP RGB Camera

Additional connectors for custom sensor integrations (SDI-12, RS-485)

Aluminum Tower Structure
- (3) 24" Tower sections
- 4 Leg base

Wireless Sensors (Bluetooth, LoRa, GPS)
Range: up to 1km
Measures: Temperature, Humidity, Air Pressure, Air Quality, LUX

Add soil probes to wireless sensors for soil measurements

Wind Speed
Wind Direction
Gust
Air Temperature
Relative Humidity
Air Pressure
Vapor Pressure
Rainfall
Solar Radiation
Lightning Strike Detection

Eye screws for secure guy wire connections

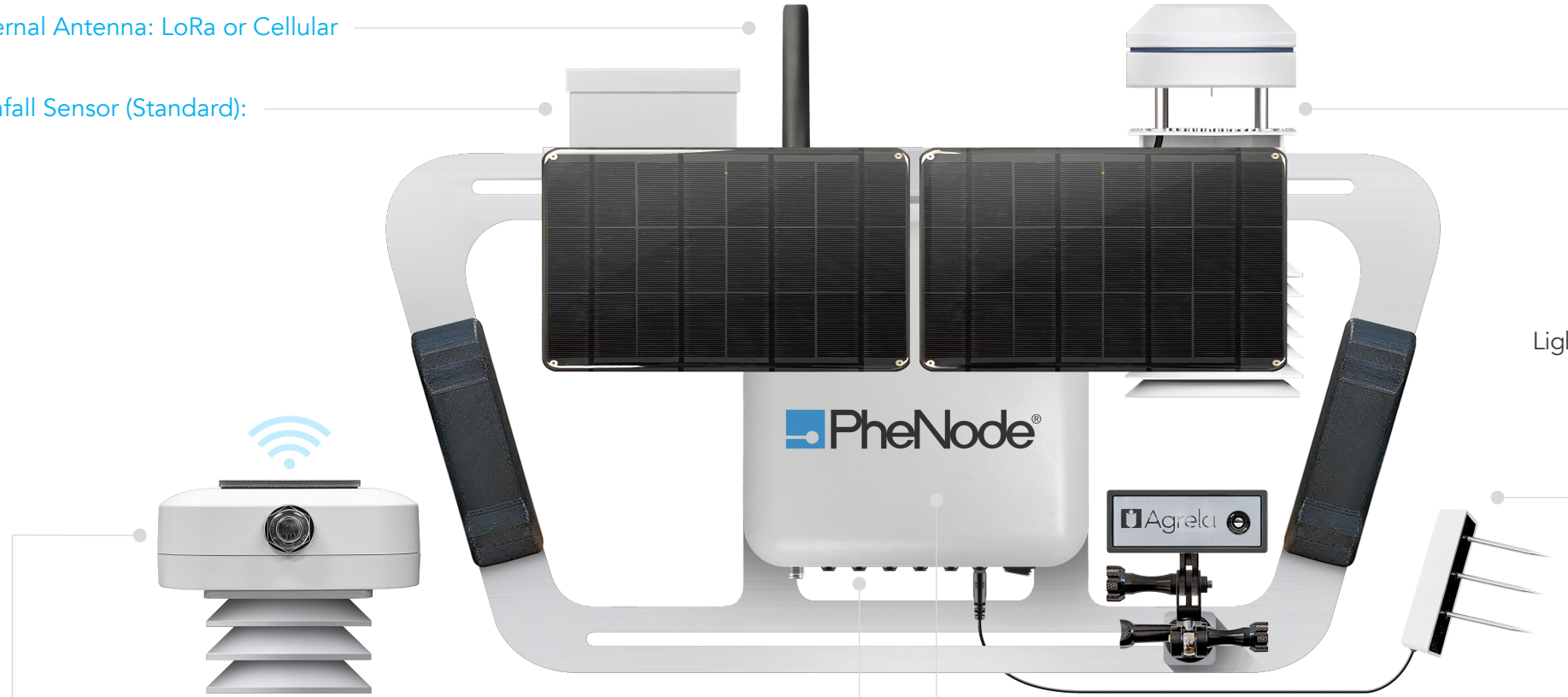
Add Agrela Wireless Sensors to the tower structure for vertical measurement gradients

Soil Moisture
Soil Temperature
Electrical Conductivity

Sensor Frame Components

External Antenna: LoRa or Cellular

Rainfall Sensor (Standard):



Weather Sensors:
Windspeed/Direction/Gust
Temperature
Humidity
Air Pressure
Vapor Pressure
Rainfall (Premium)
Solar Radiation (Premium)
Lightning Detection (Premium)

Soil Probes
Soil Moisture,
Soil Temperature,
Electrical Conductivity

AGRELA WIRELESS SENSOR
- Measures Temperature, Humidity, Air Pressure, Air Quality, LUX
- Plug in up to (2) soil probes
- Solar powered or plug in to recharge
- Communicates via LoRaWAN
- GPS

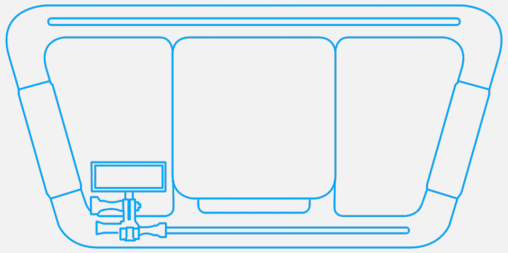
Control Box

Sensor Connectors

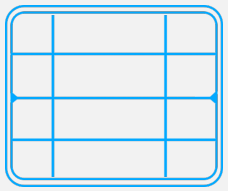
AGRELA IMAGING MODULE:
5MP, compact / lightweight, compatible with many action camera extension arm mounts

What's inside the box?

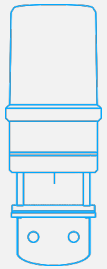
Box 1



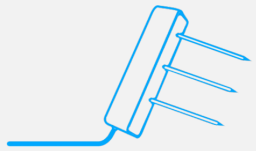
Control Box & Sensor frame & Camera



Solar panel(s) & mount

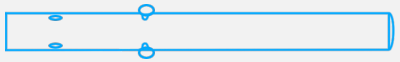


Weather sensor(s)

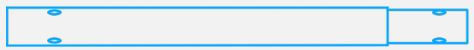


Soil probe(s)

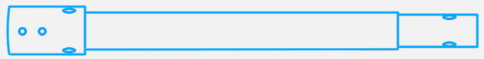
Box 2



Top tower section

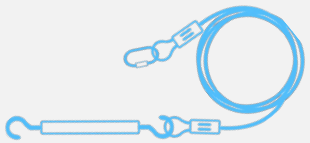


Middle tower section

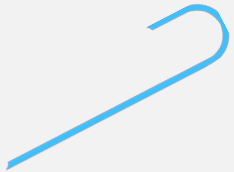


Bottom tower section

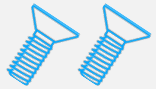
(4) legs



(3) Guy wires



(7) ground stakes



Screws

Metric hex key set

Setting Up PheNode: Mounting the weather sensor

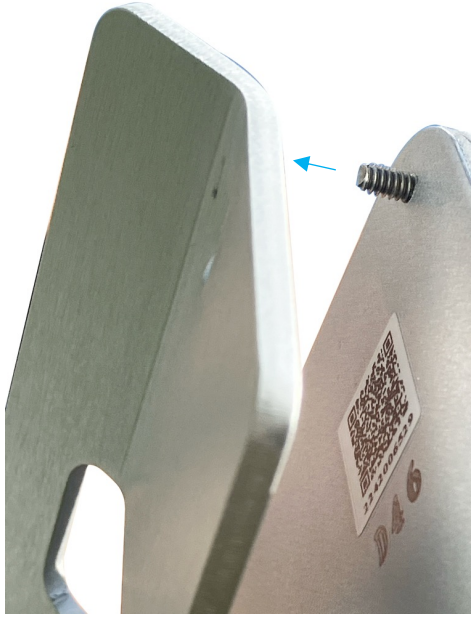
1. Mount the weather sensor by inserting the bolt threads through the back of the top slot of the sensor frame (either side).

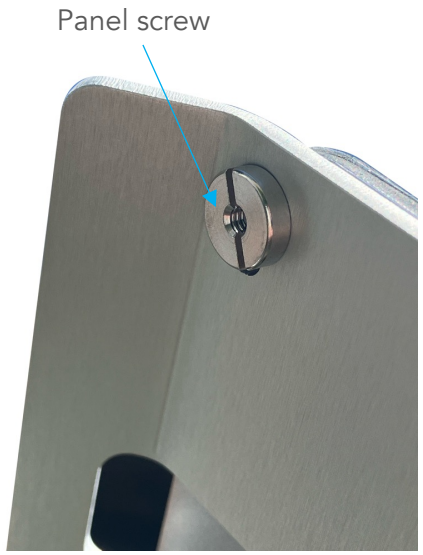
2. Then slide washers over the threads from the other side of the sensor frame.

3. Fasten the weather sensor with a wing nut on each bolt. Hand tighten until snug.

4. Plug the sensor into one of the "SDI" ports on the bottom of the Control Box.

Setting Up PheNode: Connect the solar panel





1. Slide the screw threading on the back of the solar panel through the holes on the solar panel mount.

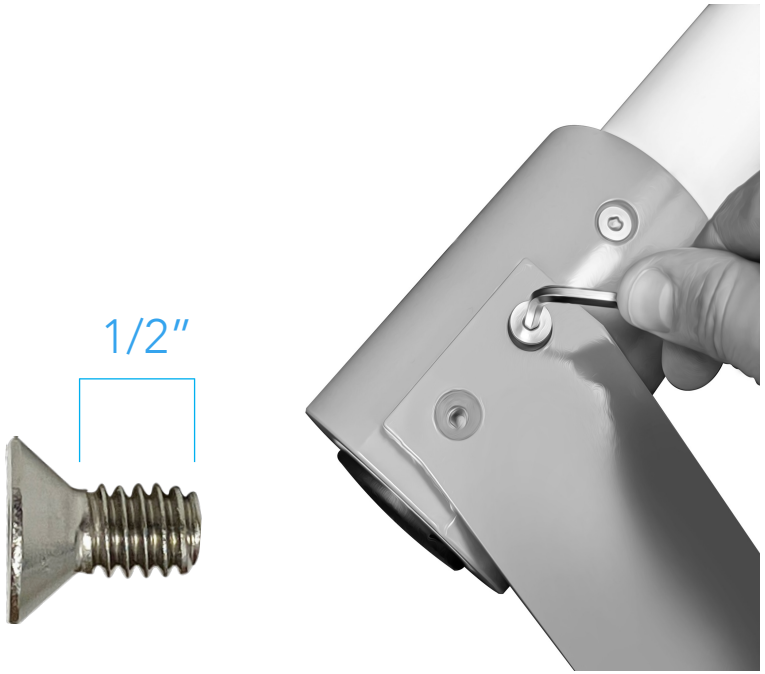
2. Hand tighten the panel screws until snug.

3. Plug the male end of the connector from the solar panel into the female end from the Control Box.

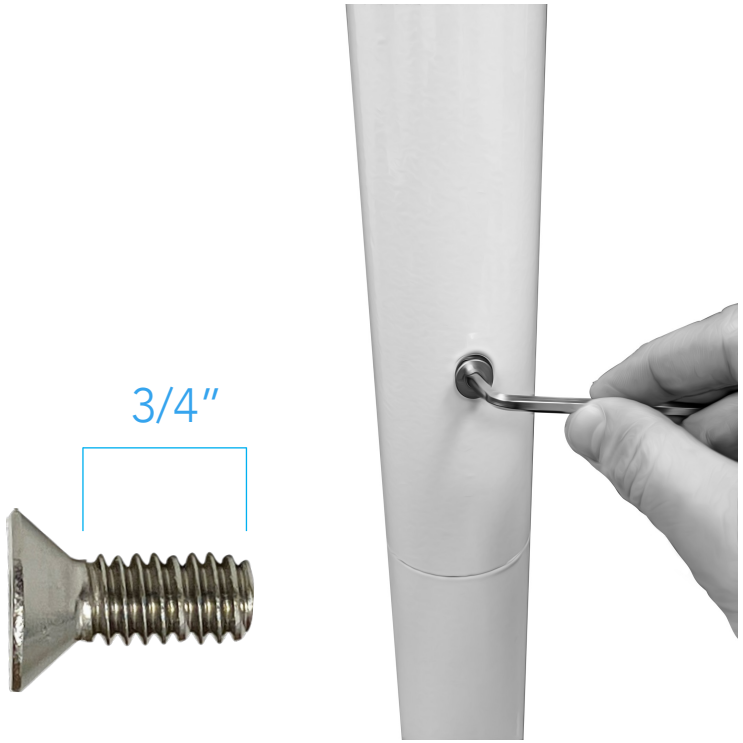
   *NOTE: You must push the male end all the way into the female end until you hear a "snap" otherwise it is not properly connected.

Use a #4 hex key to tighten the hex screws

Setting Up PheNode: Assembling the tower



1. Use ½″ screws to fasten the legs to the bottom tower section (2 per leg)

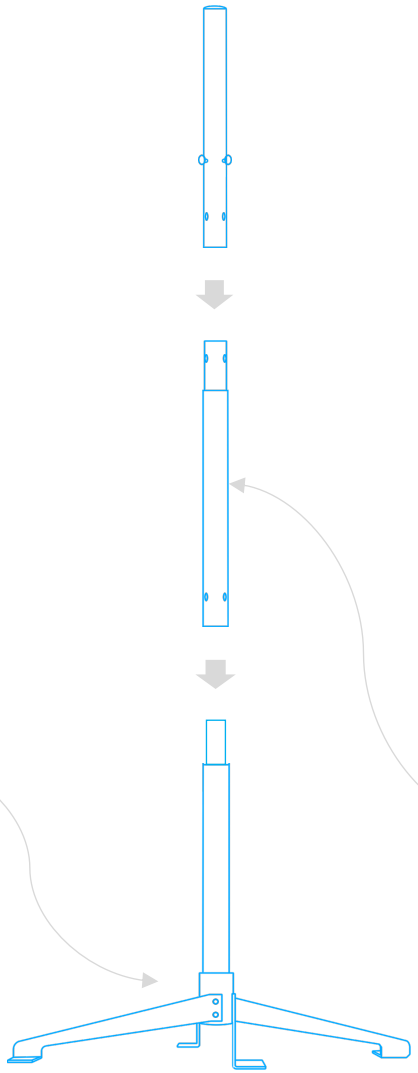


2. 3/4″ screws are for fastening the tower sections to one another (3 per tower section)

DO NOT USE POWER TOOLS.

Only use the provided hex key set to tighten all hex screws on PheNode.

Setting Up PheNode: Assembling the tower

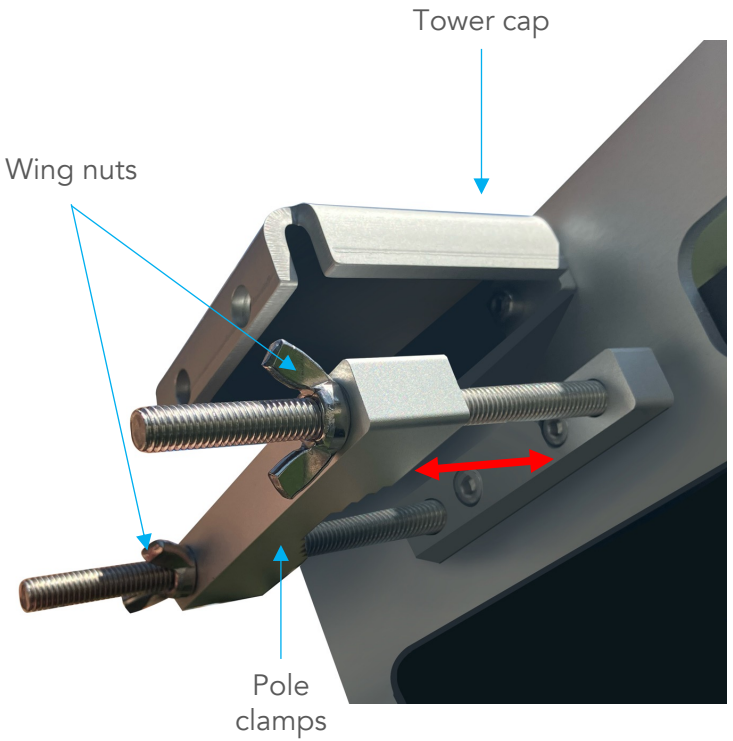


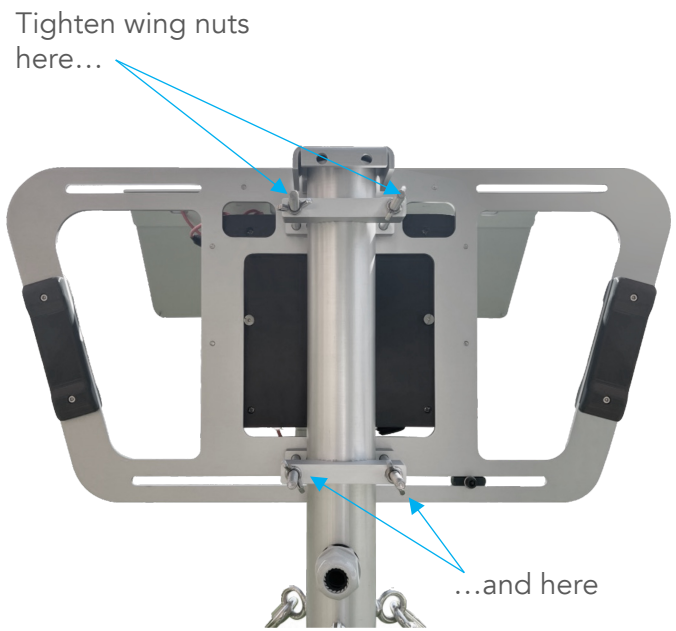
1. Fasten the legs to the bottom tower section with ½" screws.

*Note: Screws should fit flush against the outside surface of the legs.

2. Set the tower base assembly on level ground and fasten each corresponding tower section with ¾" screws.

Setting Up PheNode: Attaching the sensor frame



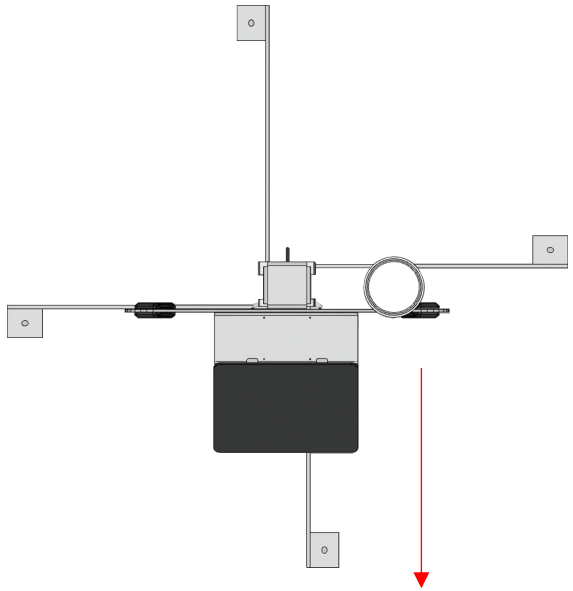


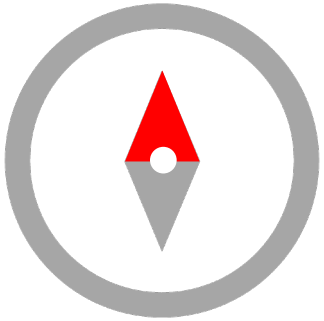
1. Unscrew the wingnuts on the pole clamps and pull them out enough so the sensor frame assembly can slide down onto the tower structure

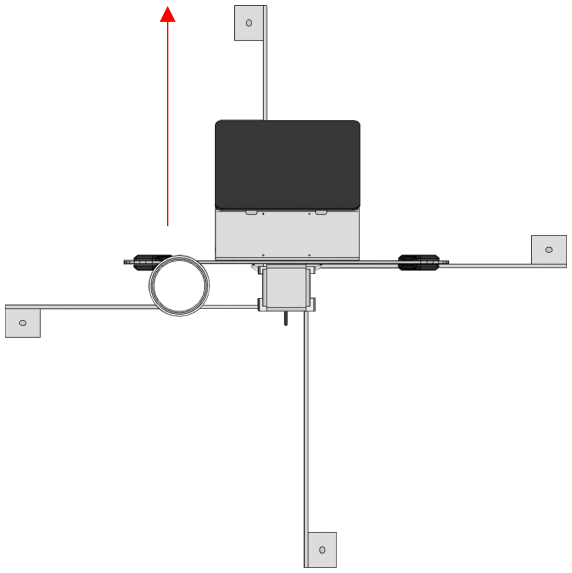
2. Slide the sensor frame down onto the tower structure. The top tower section should slide easily between both pole clamps and the the tower cap should allow the sensor frame to rest on the top tower section.

3. Tighten the wingnuts until the jaws are quite snug on the tower, and the sensor frame does not swivel when pushed.

Setting Up PheNode: Orientation







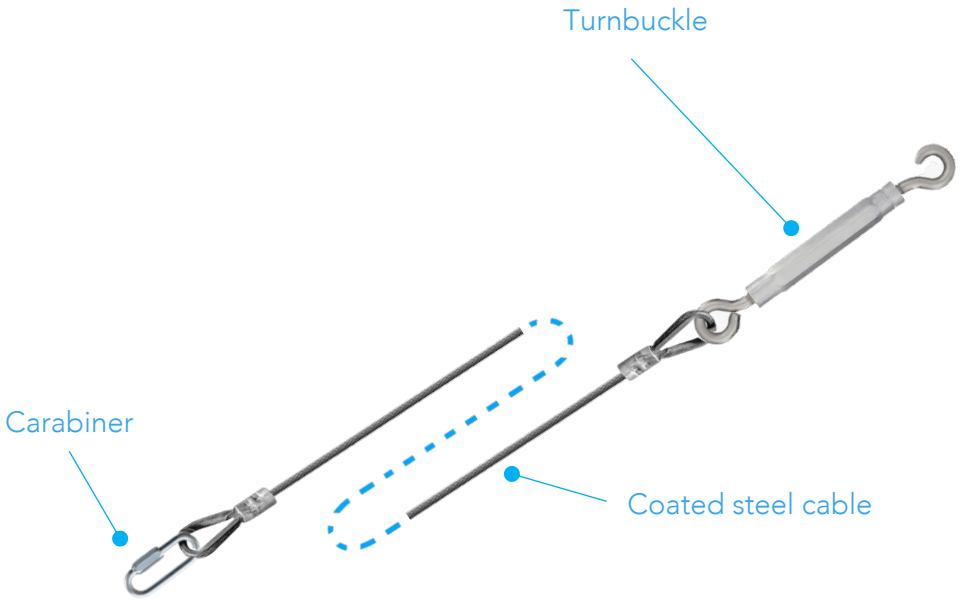
1. Download a compass app to your smartphone, or if you have an actual compass, **face the solar panels due south** if you are in the Northern Hemisphere.

NOTE: If you are in the Southern Hemisphere, face your solar panels due north. Next, unmount your wind sensor, rotate it 180 degrees, and remount it to orient the North arrow on its top towards the north.

Once your PheNode is properly oriented, hammer ground stakes into the four (4) foot holes.

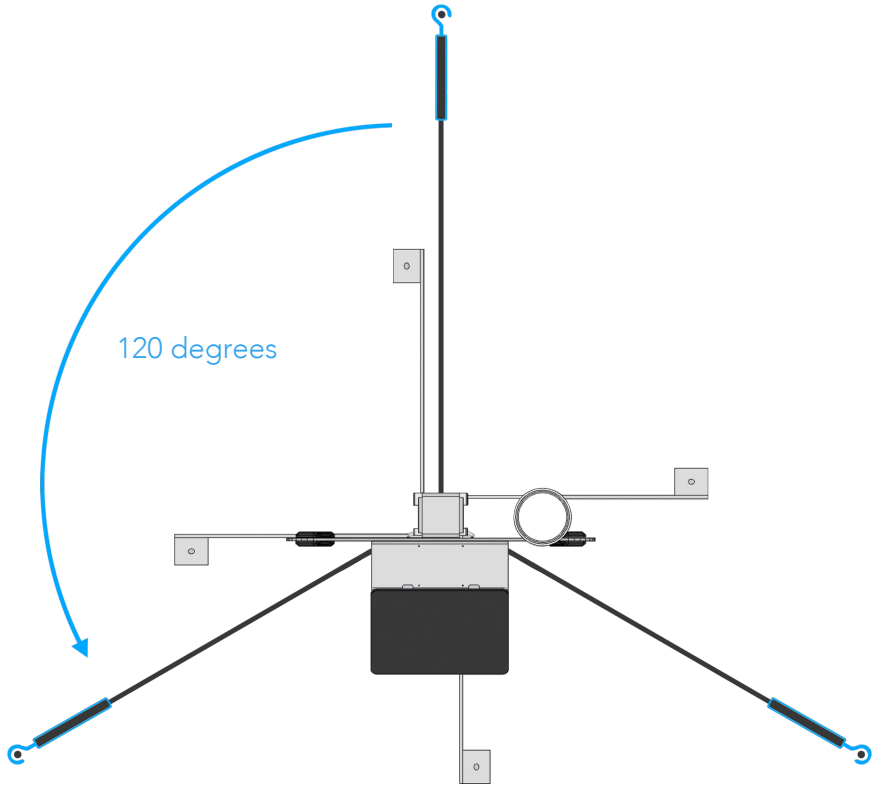
NOTE: Agrela recommends you use guy wires to secure your PheNode in outdoor conditions.

Setting Up PheNode: Adding guy wires



Guy Wire

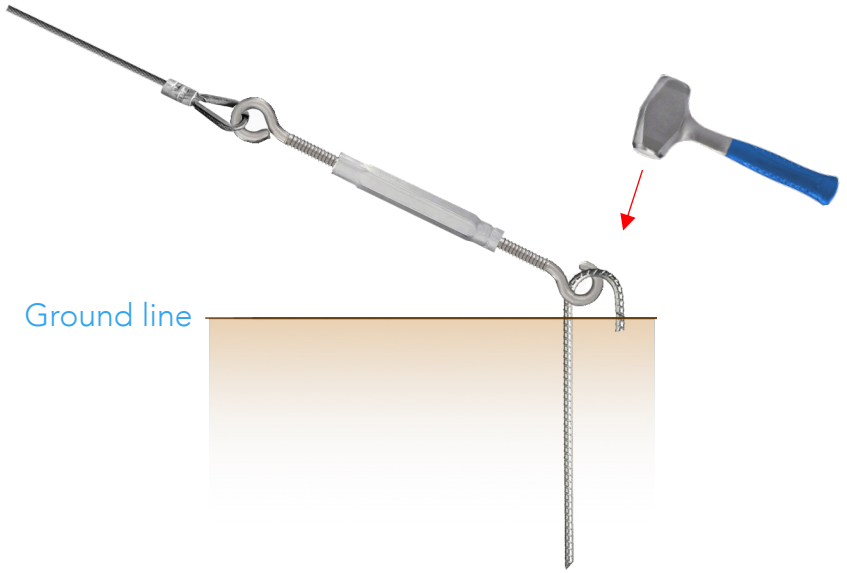
Use a 2-4lb hand sledge to hammer in the ground stakes



Guy wires are intended to stretch out directly from the eye bolts they are connected to. Guy wires are to be 120 degrees from one another as shown.

NOTE: Make sure you orient the solar panels as instructed on page 11 before hammering in your ground stakes.

Setting Up PheNode: Adding guy wires



1. Attach the carabiners on one end of the guy wires to the eye bolts on the top tower section.

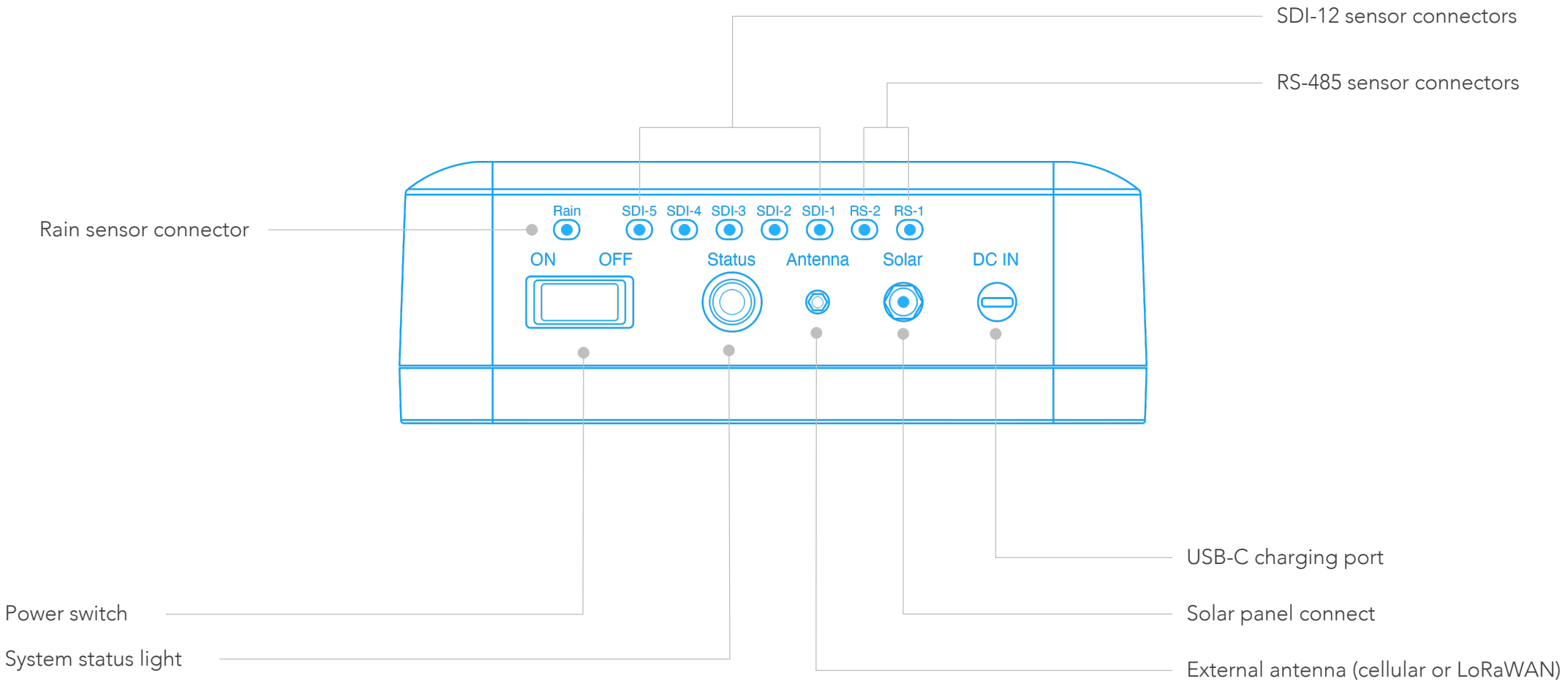
2. Unscrew the turnbuckle until at least 1 inch of threading is showing on each side.

3. Stretch the guy wire until it's taut and mark its location on the ground with a ground stake.

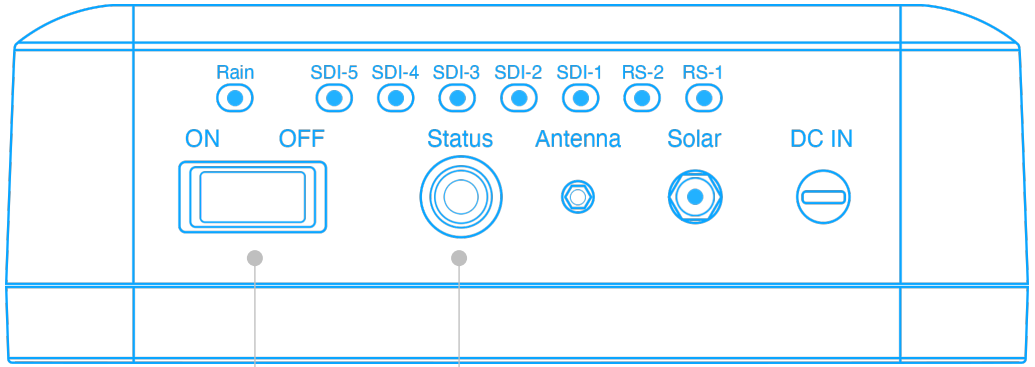
4. Hammer in the ground stake where marked until both ends of the "J-hook" are in the soil but there is still enough room to slide in and connect the turnbuckle hook.

5. Once all three (3) guy wires are connected to ground stakes, tighten the turnbuckles by spinning the middle rod until the guy wire is taut.

Control Box: Operating Panel



Control Box: Powering on your PheNode

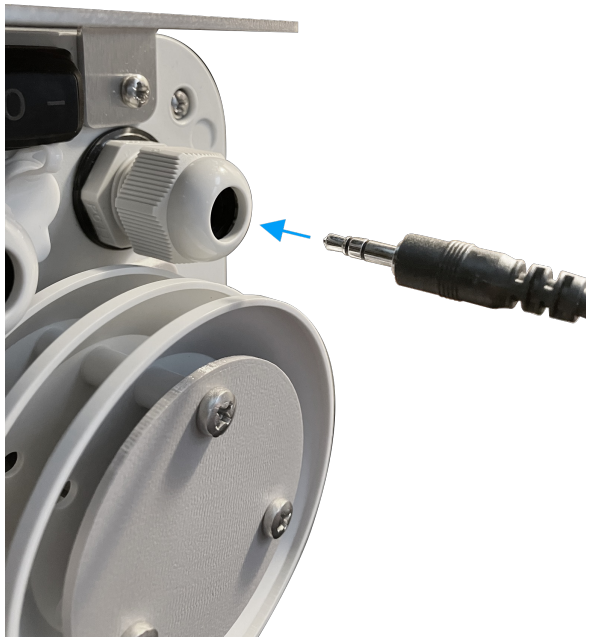


Press the power switch to "On"

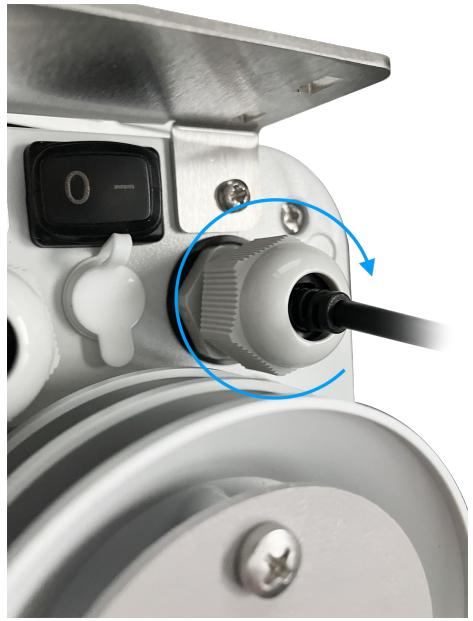
Once the system is powered on, the status light will:

- Blink red at the beginning of the boot sequence
- Blink red three times if camera was not detected
- Blink and hold green while taking sensor measurements from all connected sensors
- Blink blue once it successfully establishes a cellular or WiFi connection and begins sending the photo captured by the camera

If you have soil probes you wish to connect to the wireless sensor, unscrew the cable glands on the bottom of the wireless sensor and remove the rubber plugs to reveal the stereo jacks.

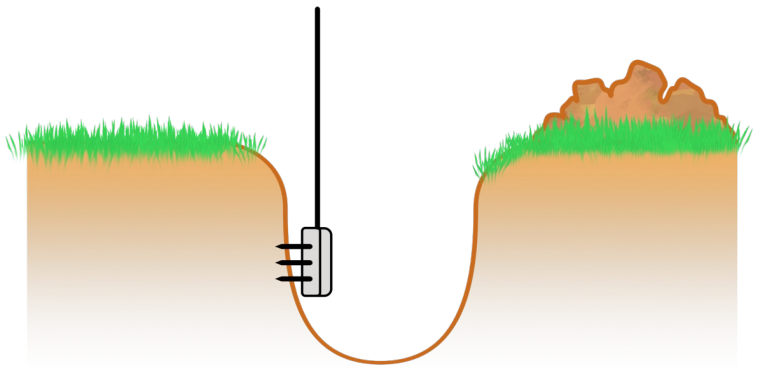


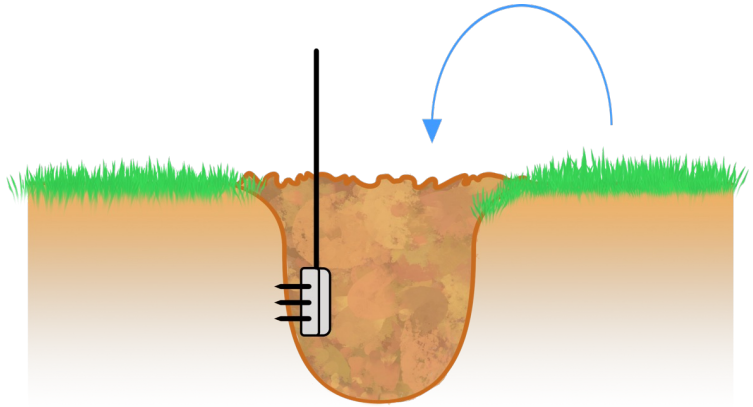
1. Push the stereo plug through the cable gland cap and connect the stereo plug into the stereo jack.



2. Tighten the cable gland cap until the cable is sealed.

Wireless Sensors: Installing soil probes





1. Slide the cable protector (split loom) over the soil probe cable. Allow for at least 8 inches of protection underground and 24 inches of protection above ground.

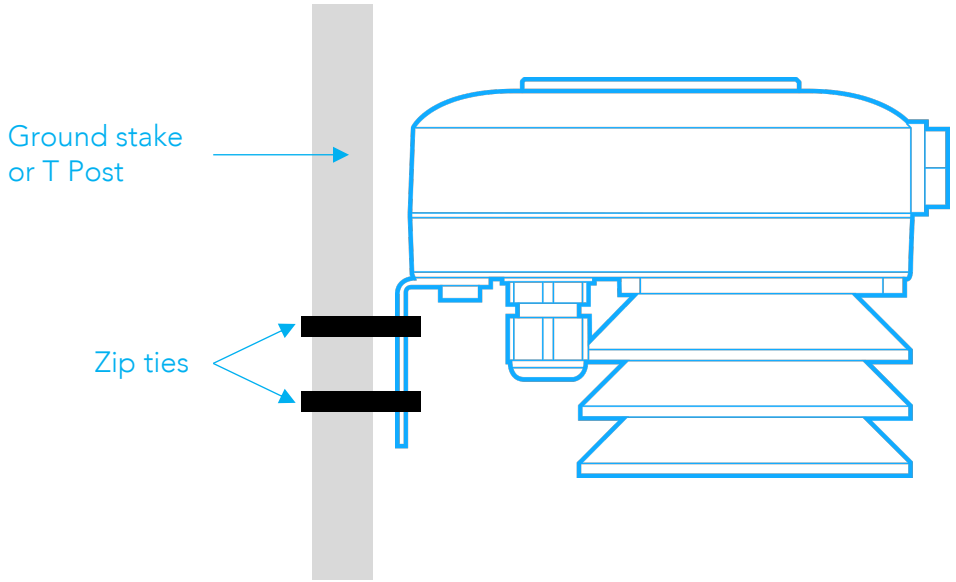
2. Dig a hole to the desired depth and **push the spikes of the soil probe into the wall of the hole.**

3. Back fill all removed soil into the hole and tamp down.

NOTE: If the user prefers to bury all excessive cable slack in the dug hole, Agrela advises the installer to use caution when unearthing the soil probe later as damaging the soil probe cable with a shovel, or metal tool of any kind, could render the soil probes unusable.

Drive a stake or T post into the ground at the location you wish to station your wireless sensor.

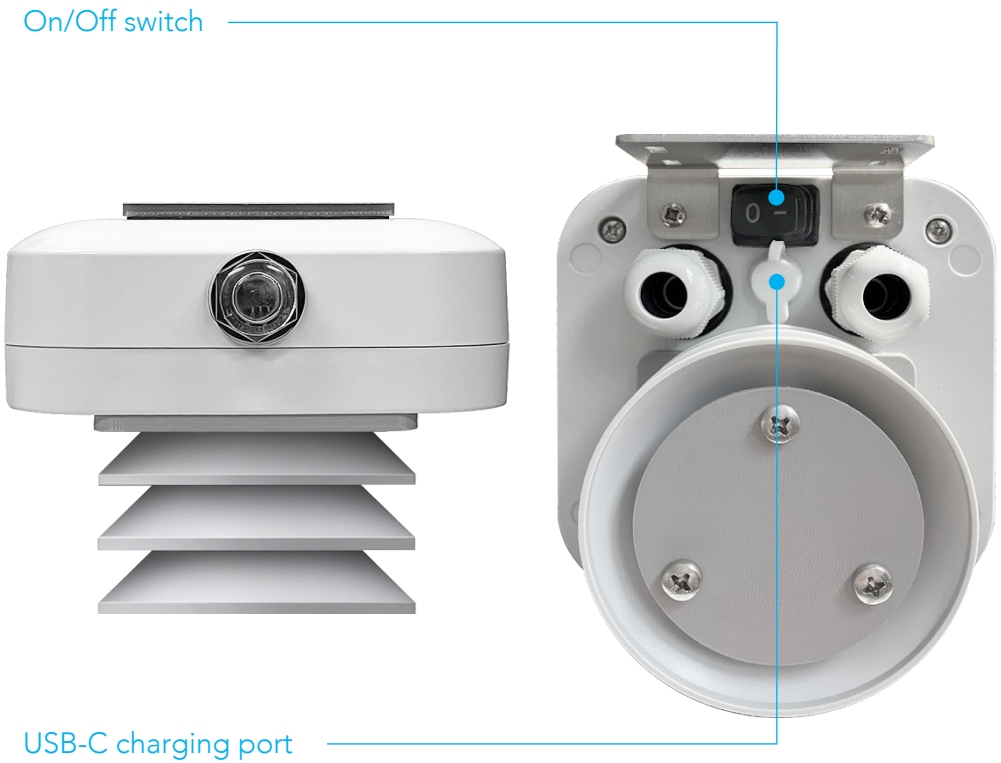
Wireless Sensors: Mounting the sensors



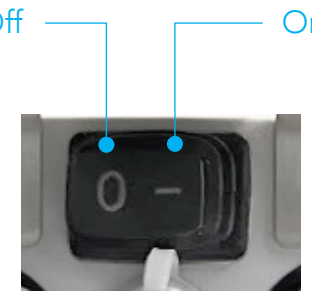
Using a zip tie, attach the mounting plate on the back of the wireless sensor to a ground sake or T post.

NOTE: For optimum results, wireless sensor should be mounted no lower than 1ft (12 inches) off the ground

Wireless Sensors: Powering on the sensors



On the bottom of the wireless sensor, turn the switch to the "On" position.



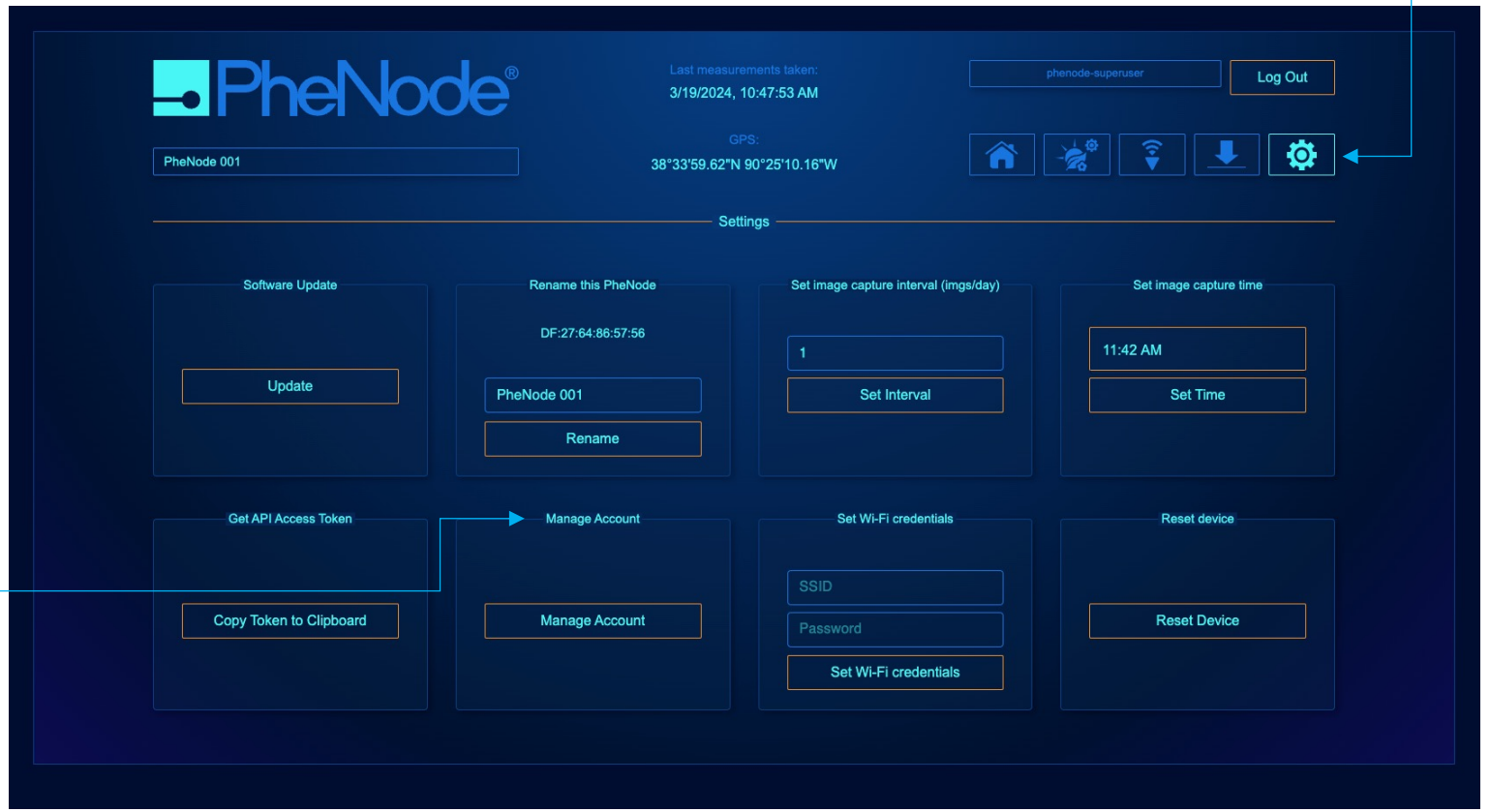
Your wireless sensor is ready and will now report its measurements to the nearest PheNode. You can change the name of your sensors in the PheNode GUI (page 24).

Graphic User Interface (GUI): Logging in

1. You can access the PheNode GUI through any device with a web browser by going to https://phenode-link.com.

Upon the purchasing of your PheNode(s), Agrela will send you a link to your PheNode account and will provide a temporary username and password. Enter the temporary username and password to access your PheNode GUI.

2. Once inside, navigate to the "settings" screen by clicking the "gear" button here:



3. Click on "login credentials" to change your login and password for your account. Once complete, press "Set". You are now ready to view your PheNode data.

GUI: Fleet Screen

The default screen is the "Fleet Screen".

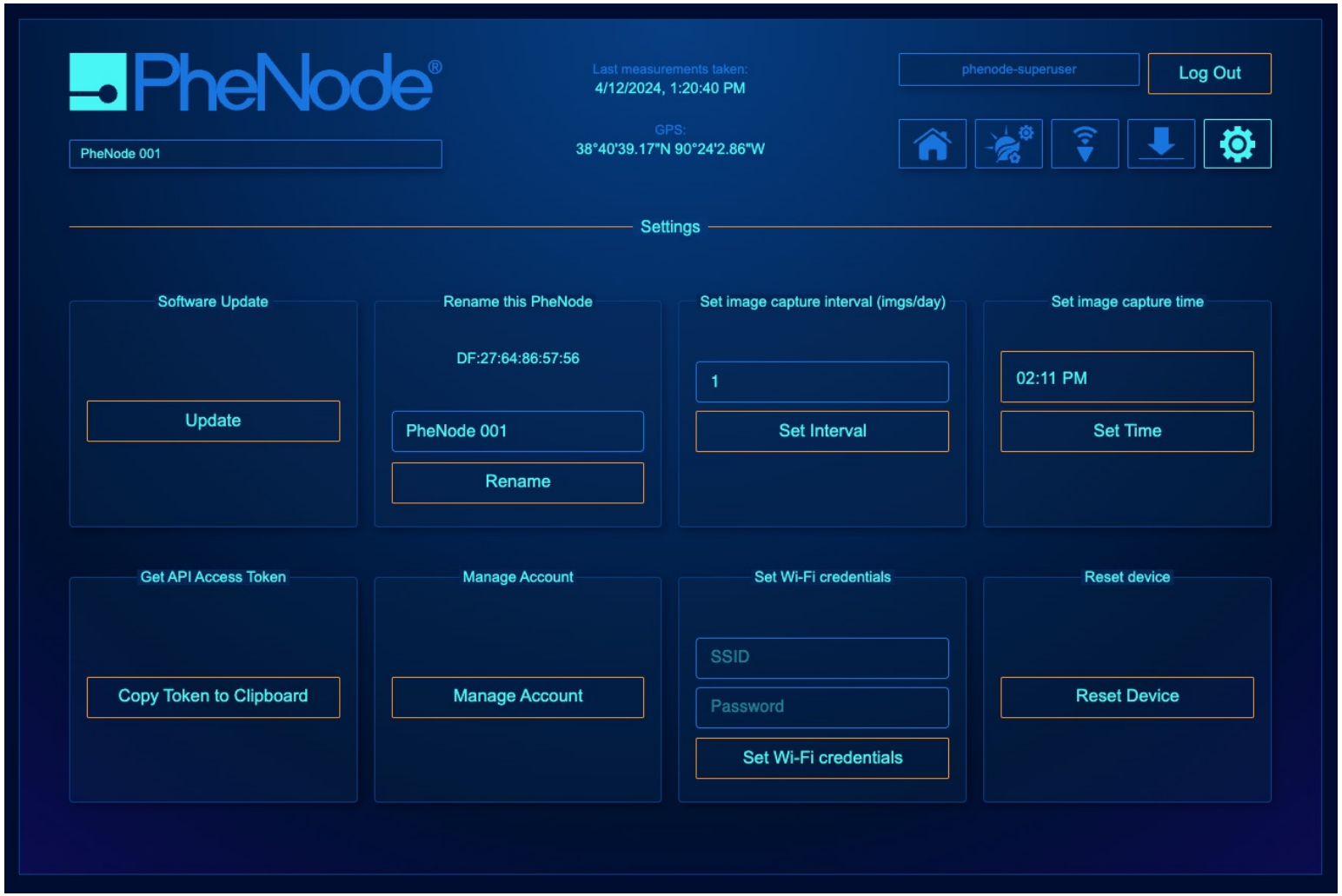
Here, you will see all PheNodes connected to your PheNode account.

Click any PheNode in the list to view its measurements or change its device settings.

Nav bar: Use this to move between screens

GUI: Settings Screen

The “Settings Screen” is where you will set imaging preferences, connect to nearby WIFI networks (if available), reset your PheNode, copy your API token, and more.

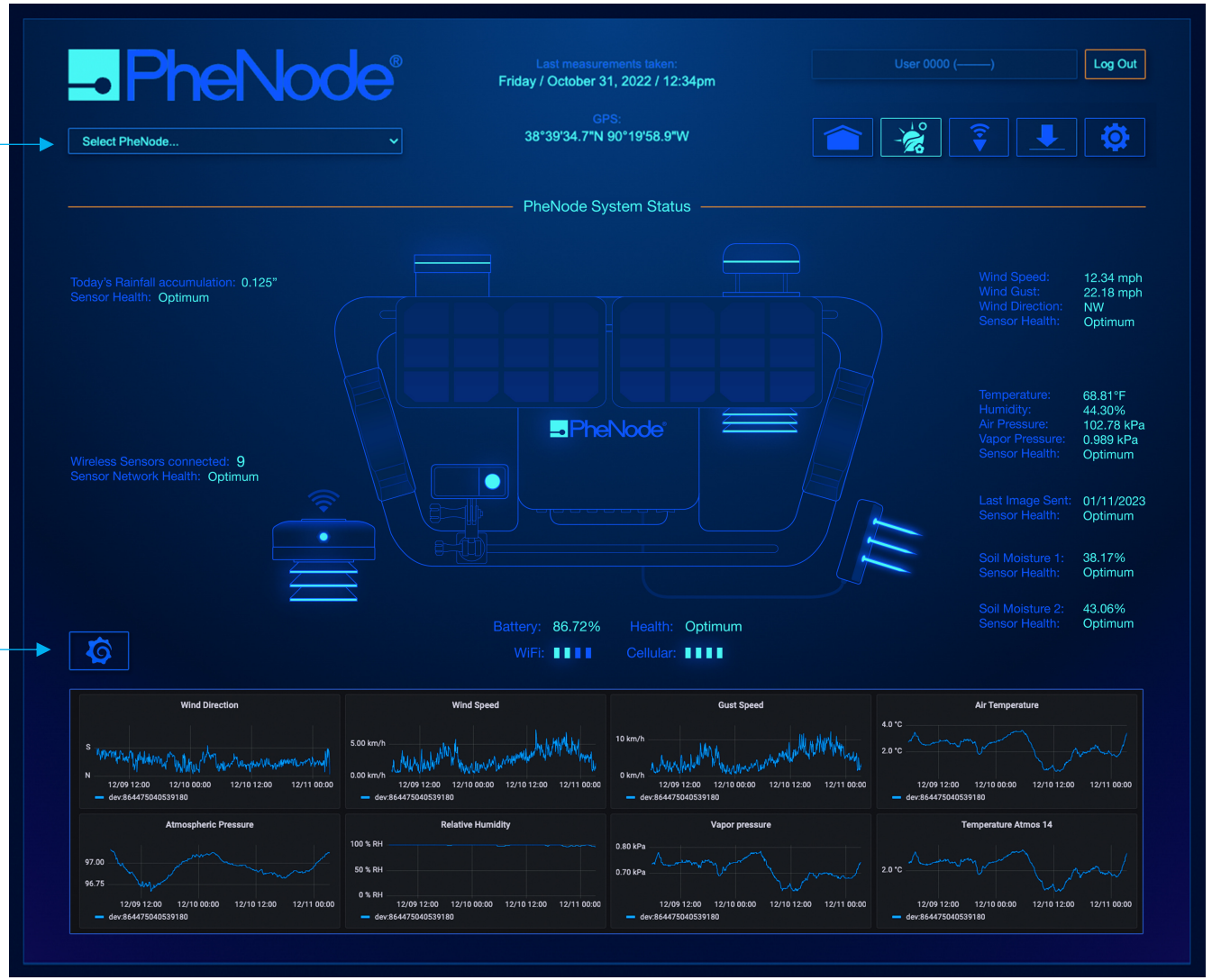


GUI: Status Screen

The "Status Screen" is where you can view your PheNode sensor data, images, device health, GPS coordinates and more.

You can toggle through different PheNodes here, rather than navigating back to the "Fleet Screen".

Click this button to view the data visualization section in full screen mode.



The latest measurements taken and general system functions like battery charge and signal strength are found in this section:

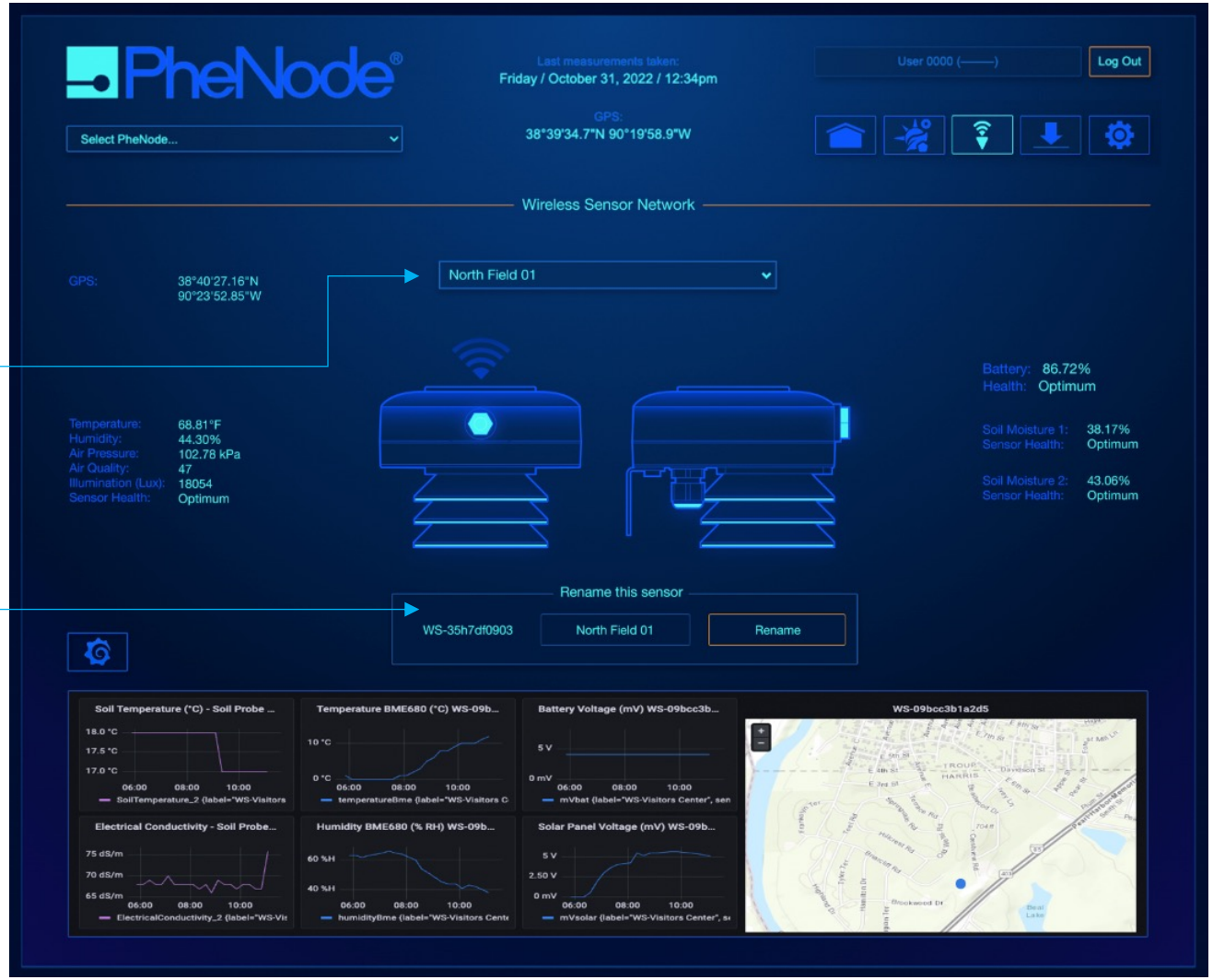
In this section, you can see the data visualized in a manner that shows individual sensor data graphed over time. Click on the header of any panel to expand your view.

GUI: Wireless Sensor Screen

The "Wireless Sensor Screen" is where you can view your wireless sensor data, device health, GPS coordinates and more.

Select a wireless sensor from the drop-down menu

Rename your wireless sensors here:

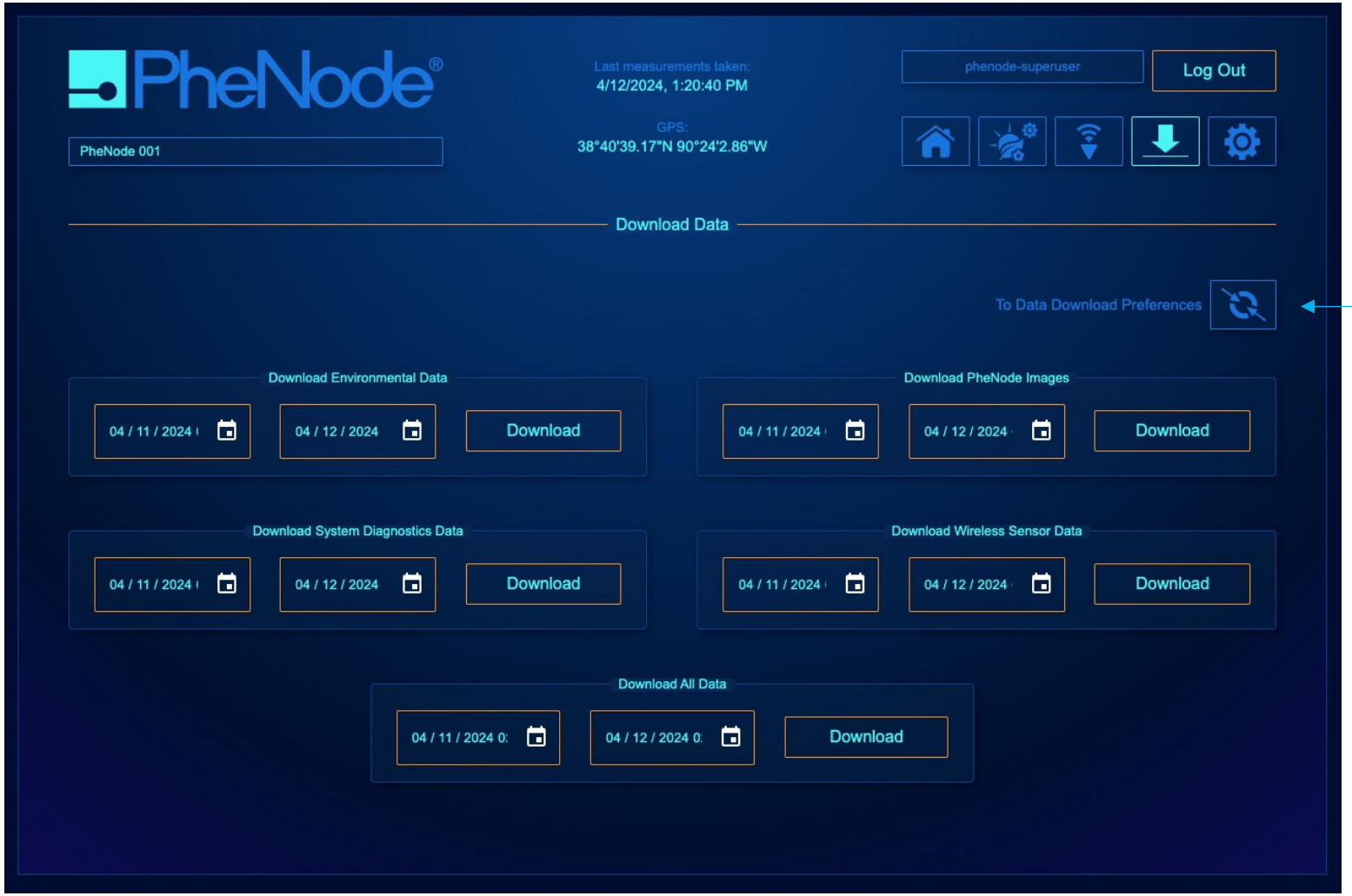


The latest measurements taken and general system functions like battery charge and signal strength are found in this section:

In this section, you can see the data visualized in a manner that shows individual sensor data graphed over time. Click on the header of any panel to expand your view.

GUI: Download Data Screen

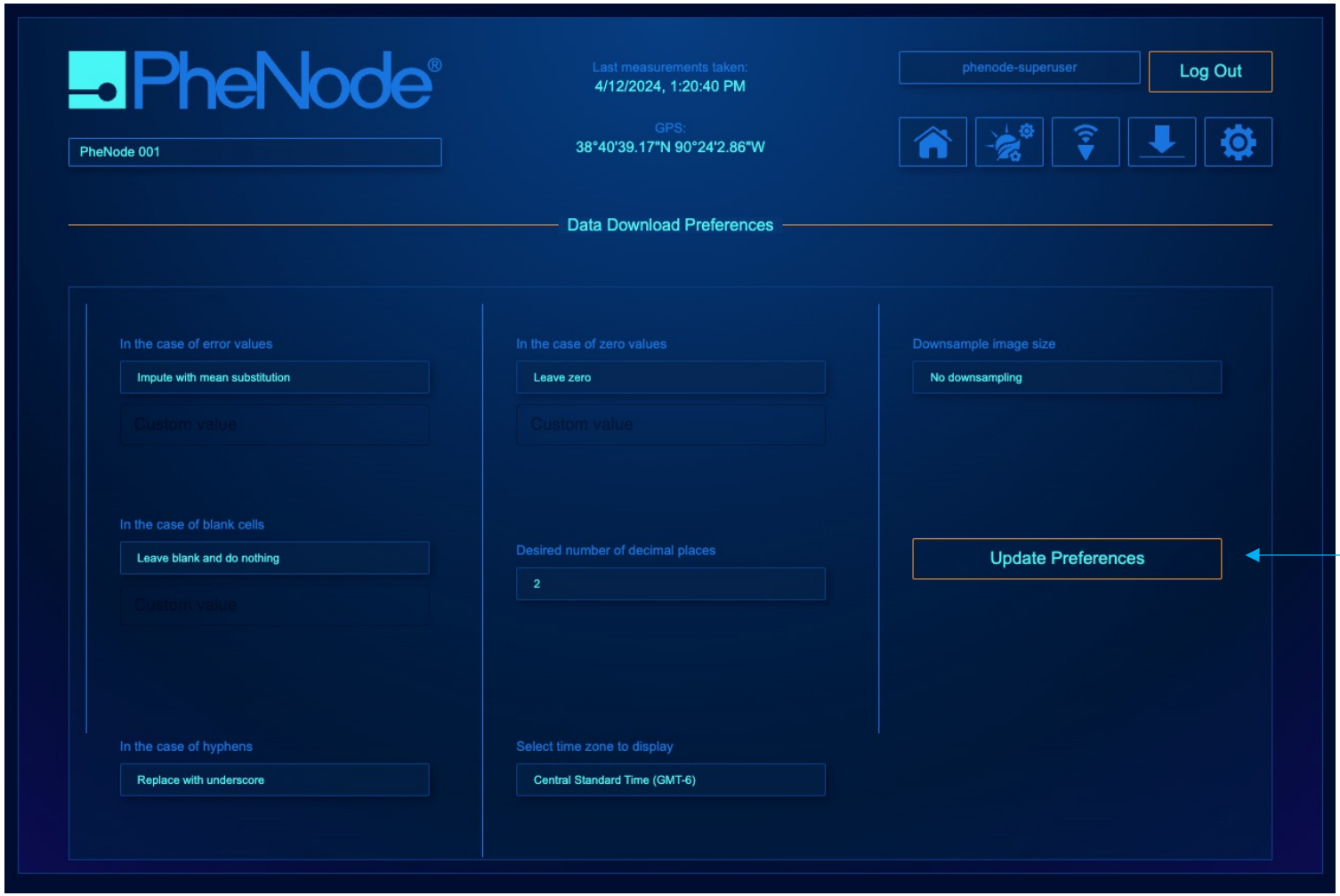
In the "Download Data Screen" you can download PheNode data in .csv format, images in a .zip compressed file containing .jpg format, or click "all Data" to download a master .zip file containing all PheNode collected data.



Click here to set your download preferences:

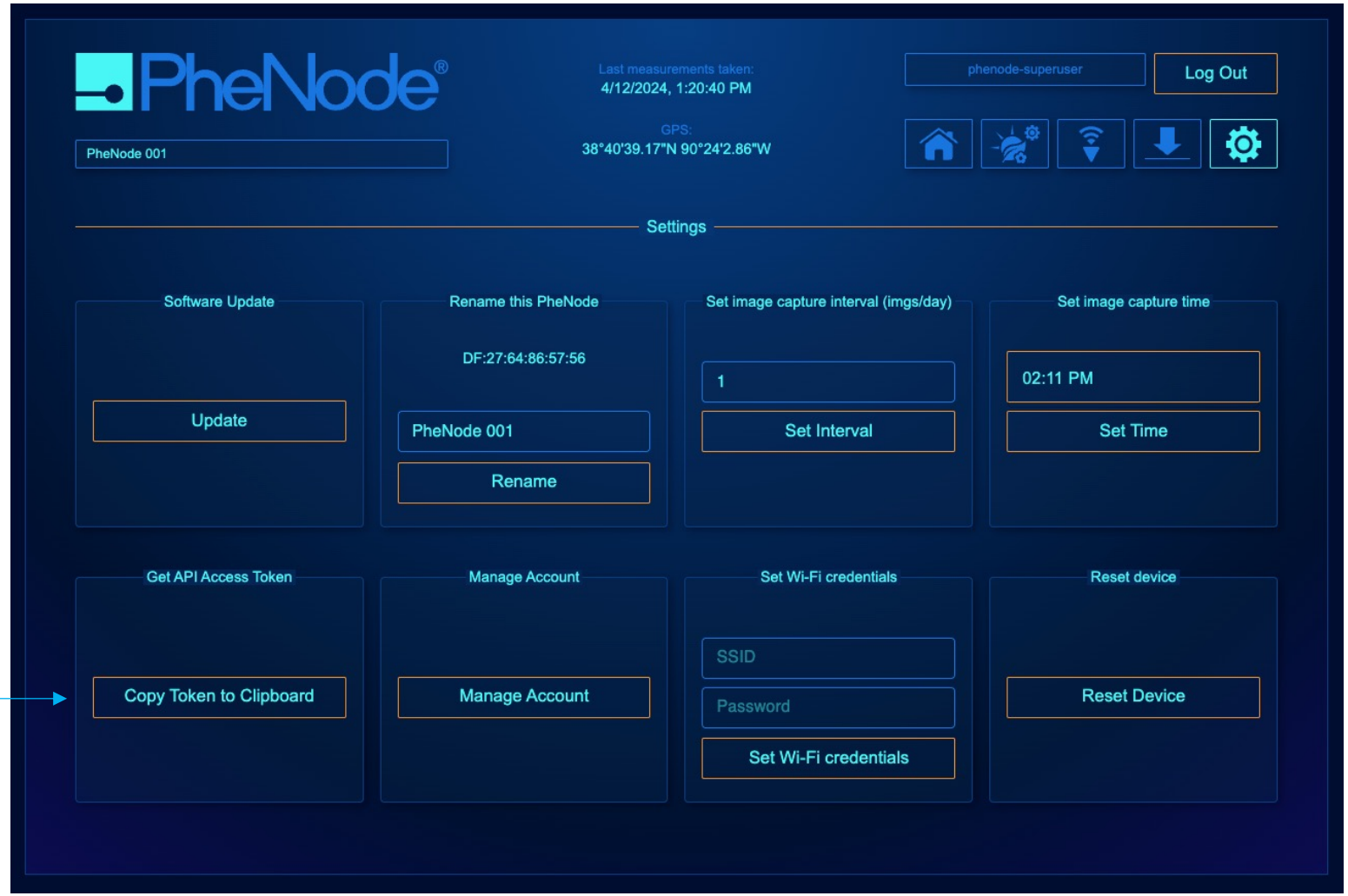
GUI: Data Download Preferences

On the "Data Download Preferences Screen" you can set your preferences for how the data is normalized in the .csv file download.



Click "Update Preferences" to save your settings.

GUI: API Access



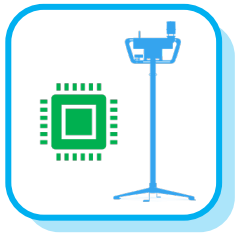
For power users looking to further customize their data pipeline, you can access the PheNode API here in the "Settings Screen":

For more information, download the PheNode User Manual v2 Full Version: https://www.agrelaeco.com/support

PheNode Service Subscription

The annual PheNode Subscription includes the following services:

PheNode Software License: All PheNode GUI features including data visualization, data downloads, data download preferences, API access, and more



Extended Hardware Warranty: See page 28 for Warranty Information

Data Plan: Includes all PheNode data, wireless sensor data, 1x - 4x (one to four) 5MP RGB images per day, and all associated cloud storage fees

Tech Support: The User shall have access to customer service and technical support Monday through Thursday from 9am-5pm CST and 9am-3pm CST on Friday. The User may leave a message at (314) 485-9850 or email support@agrelaeco.com and submit any questions, issues or concerns.

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.
(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

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment.
Such modifications could void the user's authority to operate the equipment.

RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

IC Statement

This device complies with CAN ICES-3 (B)/NMB-3(B). This device complies with Industry Canada license-exempt RSS standard(s).
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.

Cet appareil est conforme à la norme CAN ICES-3 (B)/NMB-3 (B). 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 :

(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement. Cet équipement est conforme aux limites d'exposition aux radiations de la IC définies pour un environnement non contrôlé.

Warranty

For more information about your PheNode's warranty, read our "Terms of Service" at:

https://www.agrelaeco.com/terms-of-service

Contact

Email: Info@agrelaeco.com

Phone: (314) 485-9850

Website: https://www.agrelaeco.com