Dynamox

USER MANUAL

DynaGateway

IoT-S LTE-S



Dynamox_s.a | Dynamox | Dynamox.net

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1 First steps

This document addresses the processes of configuration, usage, and operation of the DynaGateway (models LTE, LTE-S, IoT, and IoT-S), the automatic data collector from DynaLoggers for monitoring the health of industrial assets.

The main objective of the DynaGateway is to interact with the DynaLoggers located within its Bluetooth range, collecting vibration and temperature data and requesting waveform analyses at the specified interval. This information is sent to the Dynamox Platform, where the data can be viewed graphically.

In this regard, it is necessary for the DynaGateway to have internet access. Connectivity can be established through a Wi-Fi network, an Ethernet cable, or a mobile data network.

In the following chapters, product installation recommendations, a step-by-step configuration guide, and its main functionalities are presented. It is essential that the information presented in this document is followed to achieve proper functioning of the solution.

2 Product description

The DynaGateway works with the purpose of making vibration and temperature sensor data available on the Dynamox Platform in an automated manner, generating a history of measurements that enable future analyses.

2.1 Product structure

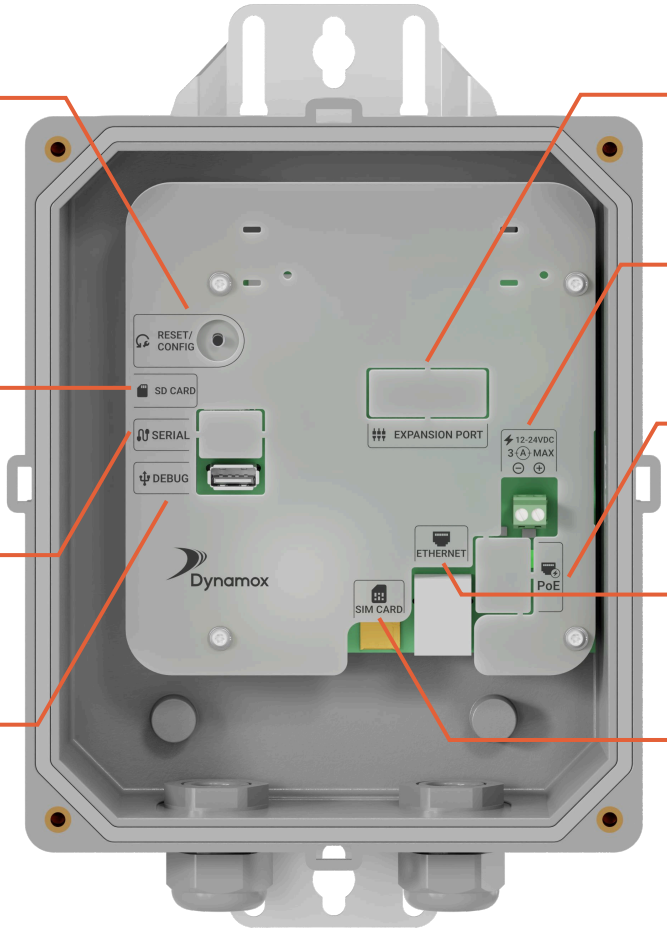
On the front inner part of the DynaGateway, the main product-user interaction interfaces are located. They will be used in the installation and configuration processes:

Reset/Config Button
It leads the Gateway to generate an Access Point (AP), allowing the user to access a DynaGateway settings interface, and offers reset functionality.

SD Card
Local storage of offline collection data for later upload to the Dynamox Platform.

Serial
Communication bus connection port compatible with ISO11898-1 and RS-485 standards.

USB Port
Enables the use of an external device to save Gateway logs (exclusive use by Dynamox Support).



Expansion Port
Provides GPIO pins for connection with external devices.

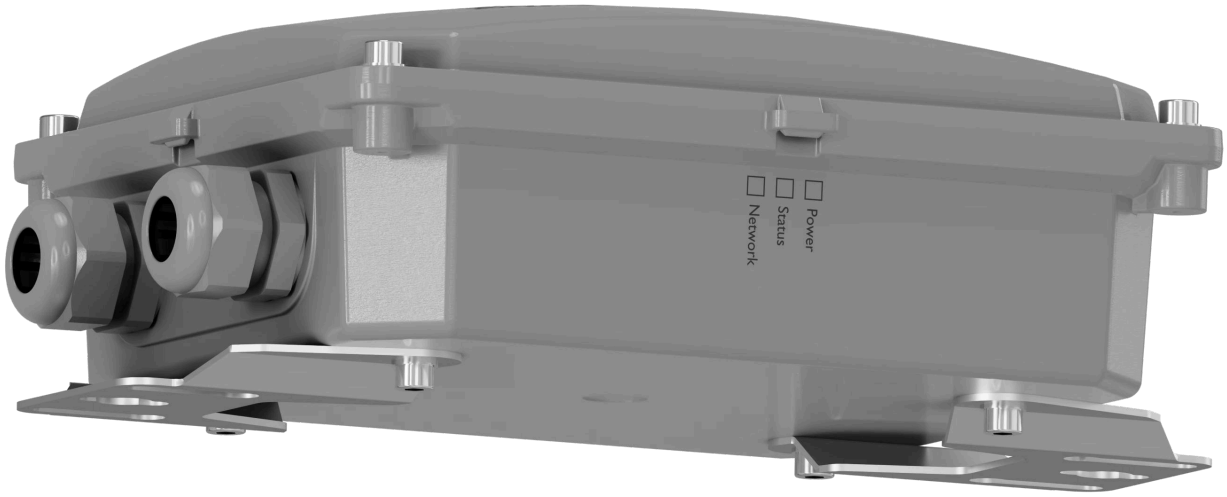
Power input - direct current
Connection port for 12/24Vdc power supply.

PoE
Connection port for external module to use active mode.

Ethernet
RJ45 port for connecting the device to the internet via Ethernet cable.

Sim Card
Chip insertion for connection with mobile networks.

The DynaGateway also provides an operational status indication through three LEDs positioned on the side of the product. They serve the functions of indicating **Power**, **Status** and **Network**, which correspond to power supply, internal status, and connectivity, respectively. The functionalities of each LED and their respective colors are detailed in section 4.3 of this document.



2.2 Models and characteristics

In the central part of the device cover, information such as name, model, serial number, PIN, and MAC address of the DynaGateway is provided. This product offers four different models: DynaGateway LTE, DynaGateway LTE-S, DynaGateway IoT, and DynaGateway IoT-S.



DyG
Serial number of the DynaGateway. It is used in connection with the Dynamox Platform.

Model identification
Modified according to the model.

PN (Part Number)
Identification code of the product.

PIN
Used for device adoption on the Dynamox Platform.

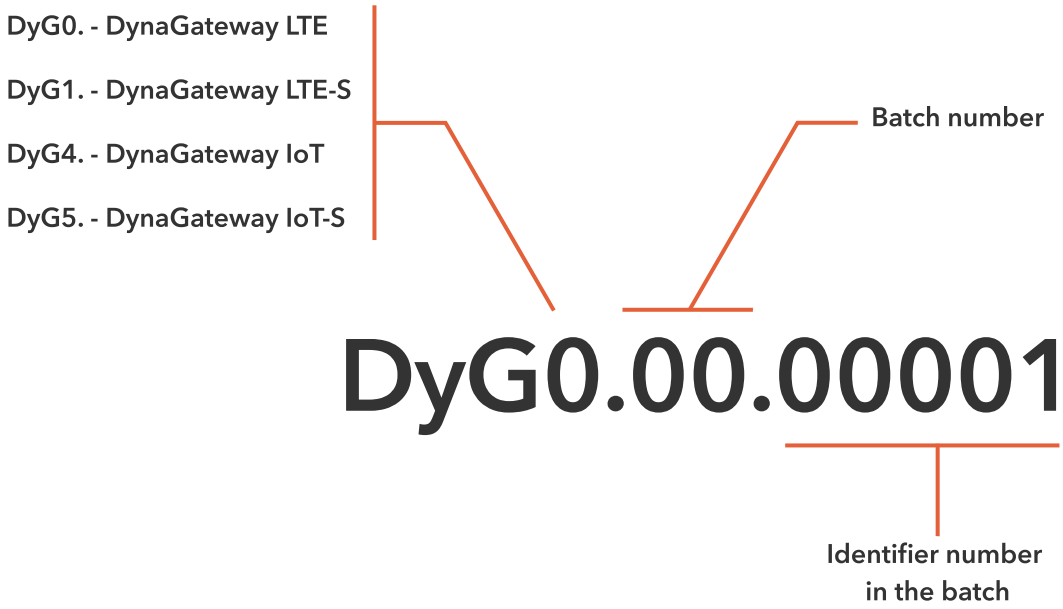
MAC ETH
MAC address of the device on wired networks.

MAC Wi-Fi
MAC address of the device on Wi-Fi networks.

The characteristics of the different models are presented in the following table.

			DynaGateway LTE	DynaGateway LTE-S	DynaGateway IoT	DynaGateway IoT-S
Serial Number			0	1	4	5
Ethernet			✓	✓	✓	✓
Wi-Fi + Bluetooth (2.4 GHZ)			✓	✓	✓	✓
Mobile Networks	2G GSM		✓	✓	✓	✓
	3G E-UTRAN		✓	✓	⊗	⊗
	4G	LTE CAT-1	✓	✓	⊗	⊗
		LTE NB-IoT	⊗	⊗	✓	✓
		LTE CAT-M1	⊗	⊗	✓	✓
Power Supply 110/220 V ~ 5/30 V			✓	⊗	✓	⊗

The identification code format of the DynaGateway follows a construction pattern in the form DyGX.XX.XXXXX, as shown in the image below.



3 Pre-installation

The interaction between the DynaGateway and the Dynamox Platform depends on an internet connection. Information regarding data collection, waveform analysis requests, and parameterization of the DynaLoggers and the DynaGateway itself is included in this interaction.

In this context, to ensure proper functioning of the DynaGateway, it is recommended before installation to:

- Check the availability of an internet connection at the installation site;
- Verify the need for network traffic clearance;
- Plan the installation location of the Gateway in relation to the sensors.

These processes are detailed individually below.

3.1 Internet availability assessment

Checking network availability is particularly critical when using Mobile Networks, as there may be unavailability of the operator, technology, and frequency, or simply the signal may not be strong enough to provide connectivity for the DynaGateway. It is worth noting that the DynaGateway can work with a SIM card from any operator and use GSM (2G) technology and/or CAT-M1/NB-IoT (4G), or CAT-1 (4G). More information about network technologies is available in section 4.2.1. Additionally, the product datasheet describes the frequencies supported by each model.

If the DynaGateway connects to a Private LTE network, or via Wi-Fi or Ethernet, it is necessary to ensure that it is allowed to connect to the local network and that the data sent by it can travel outside the network. More details are presented in section 3.3. Additionally, it is recommended to check if the plant's Wi-Fi network has sufficient coverage and if the network point intended for the DynaGateway is functional in the wired infrastructure at the installation site.

3.2 Positioning recommendations

Proper positioning of the DynaGateway directly impacts the quality of its connection with the DynaLoggers. The maximum connection range with a DynaLogger, in open space and line of sight, is 700 m.

3.2.1 Strategic positioning

It is recommended that the DynaGateway be installed at a level above the plant machinery to reduce possible communication barriers that could impair the Bluetooth connection. Installing the device at a central point in the plant can allow the range to be utilized in all directions.

It is worth noting that installing the DynaGateway inside metal boxes drastically reduces the range of wireless communications.

3.2.2 Environment assessment

Before installation, carefully evaluate the environment where the device will be used. Consider the presence of reflective objects, radio frequency interference, and other factors that may affect the line of sight and connection quality.

3.2.3 Sensors connectivity test

To estimate the sensors within the DynaGateway's range, before field installation, it is recommended to use the Dynamox App, available on the Play Store and App Store. In the side menu, the **Search Spots** option displays all sensors already registered on the platform in a Bluetooth visibility list on the mobile screen. This technique can be used to estimate the feasibility of connection between the sensors and the DynaGateway.

After installation, perform connectivity tests with the Gateway itself to ensure that the line of sight is adequate and that there are no significant interferences. The test can be performed using the functionality described in 7.5.

3.3 Network access release

When using a private LTE network, Wi-Fi, or Ethernet for communication, it is necessary to allow data traffic on the network for the following hostnames:

DOMAIN	PORT	DESCRIPTION
.dynamox.solutions	443	Release all interactions with Gateway (optional)
dyg.gateways.dynamox.solutions	443/8883	Release all interactions with Gateway (optional)
time.google.com	123	Time synchronization via SNTP *Note: NTP server address is configurable.

Dynamox is a company certified by the ISO 27001 standard, which concerns information protection and security. The certification ensures that Dynamox complies with the criteria established by the standard regarding information security in its processes.

For more information about network clearance, contact Dynamox technical support **support@dynamox.net**↗.

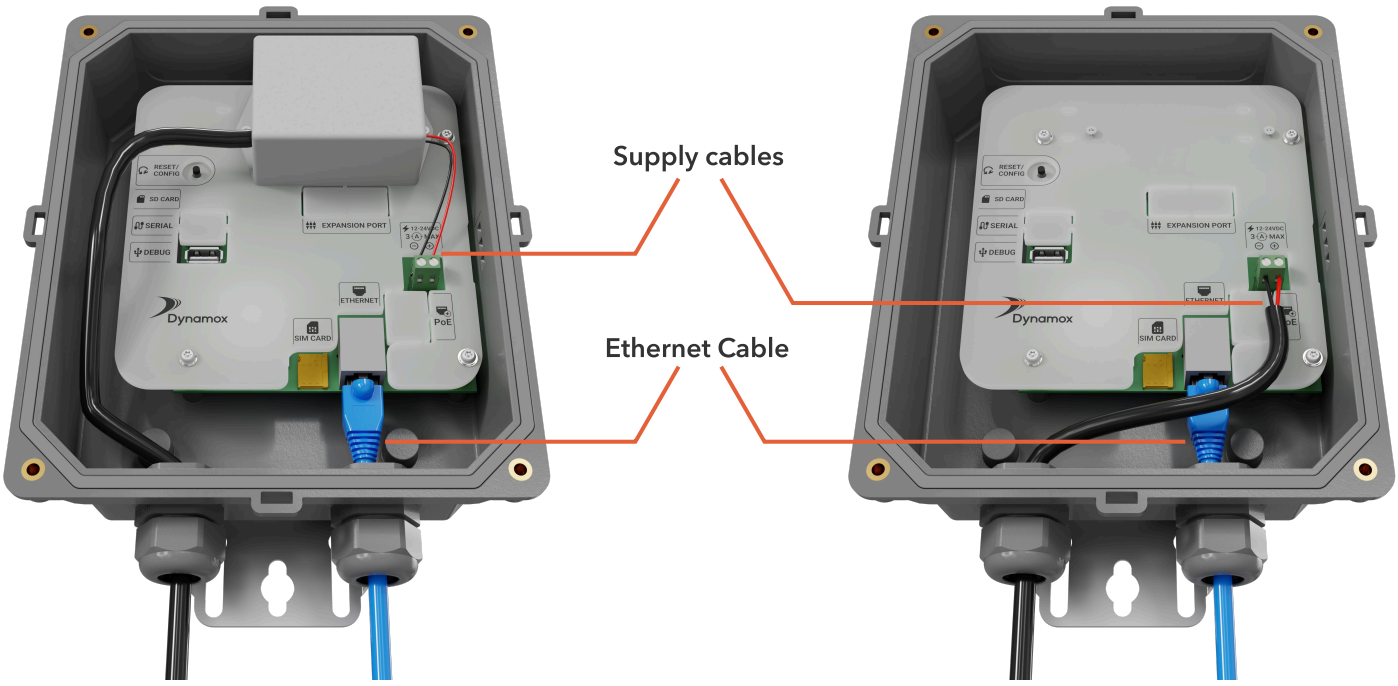
4 Installation

After completing the Pre-Installation stage, the next step is to connect the device to the power supply and the selected communication interface. This section provides the necessary instructions for this process.

> It is recommended that the following procedures be carried out in a location where the product can be easily handled, as it is more convenient to configure its communication interface before positioning it in the chosen location for operation, aiming to ensure greater productivity and safety for the people responsible for the installation. In addition, for increased safety, the **use of protective gloves** is mandatory when handling the product.

4.1 Power supply

The DynaGateway can be powered through a DC source with an output between 12 and 24V. To do this, it is necessary to connect the power cables according to the figure below:



The power terminals are located in the internal compartment of the product, near the physical interfaces (SIM Card slot, RJ45 port, Reset/Config button, etc.). The image above shows the connection of the Ethernet cable and power supply.

4.2 Configuration

To configure the DynaGateway's communication interface with the internet, it is necessary to start the device's configuration mode through the following steps:

1 Hold the **Reset/Config button** for 5 seconds

2 After this period, the **Power LED** will flash yellow

3 Releasing the button will change the **Power LED** to a steady yellow





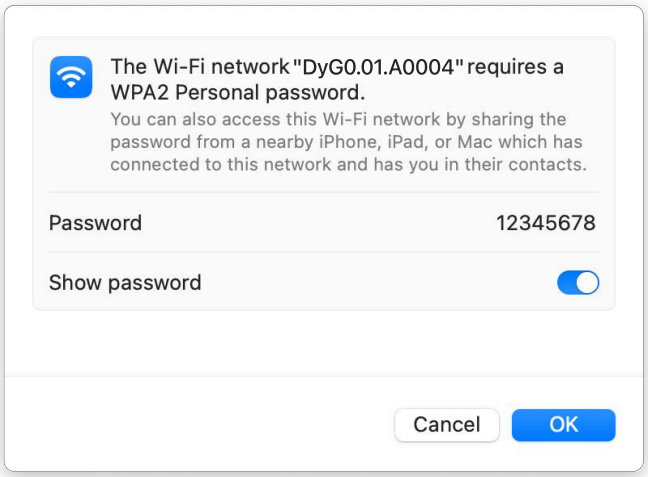


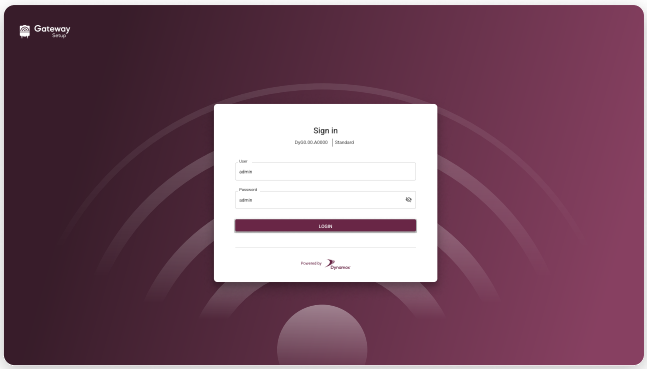
4 Connect to the Wi-Fi network generated by the device using a nearby computer or mobile device. The network generated by the Gateway has the following credentials:

- **Network name (SSID):** serial number of the device
- **Password:** 12345678

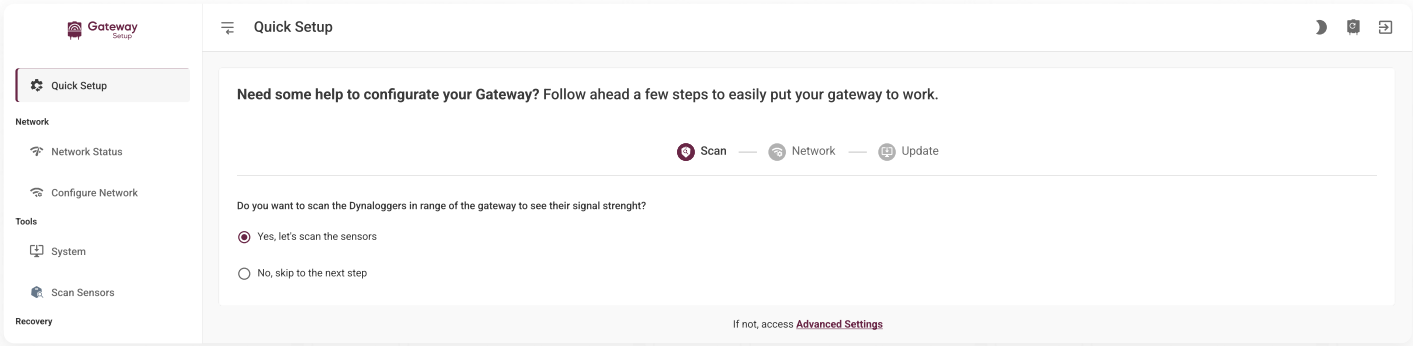
5 Once connected, access the DynaGateway configuration mode by typing http://dynagateway-setup.local/ or 192.168.10.1 in the browser. Use the following credentials:

- **User:** admin
- **Password:** admin

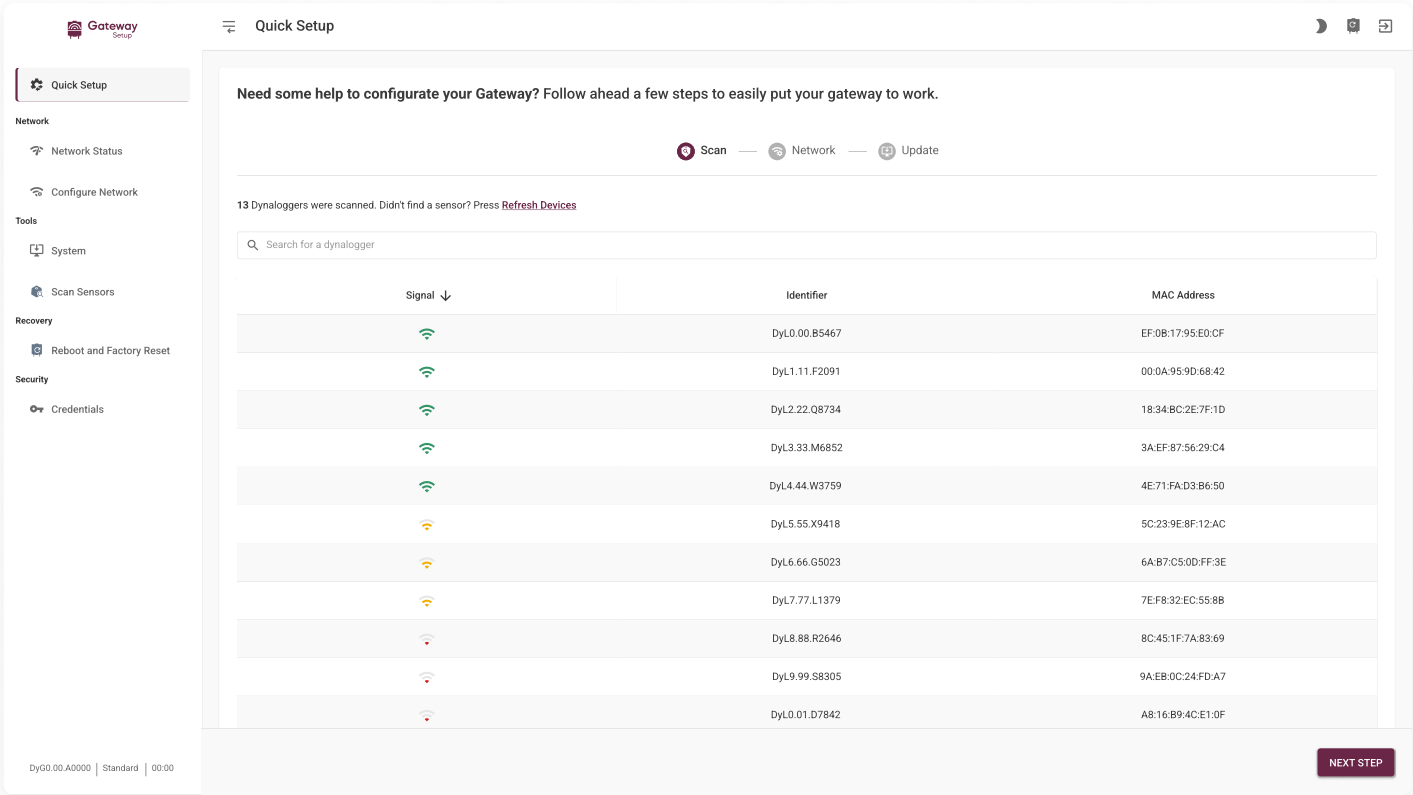




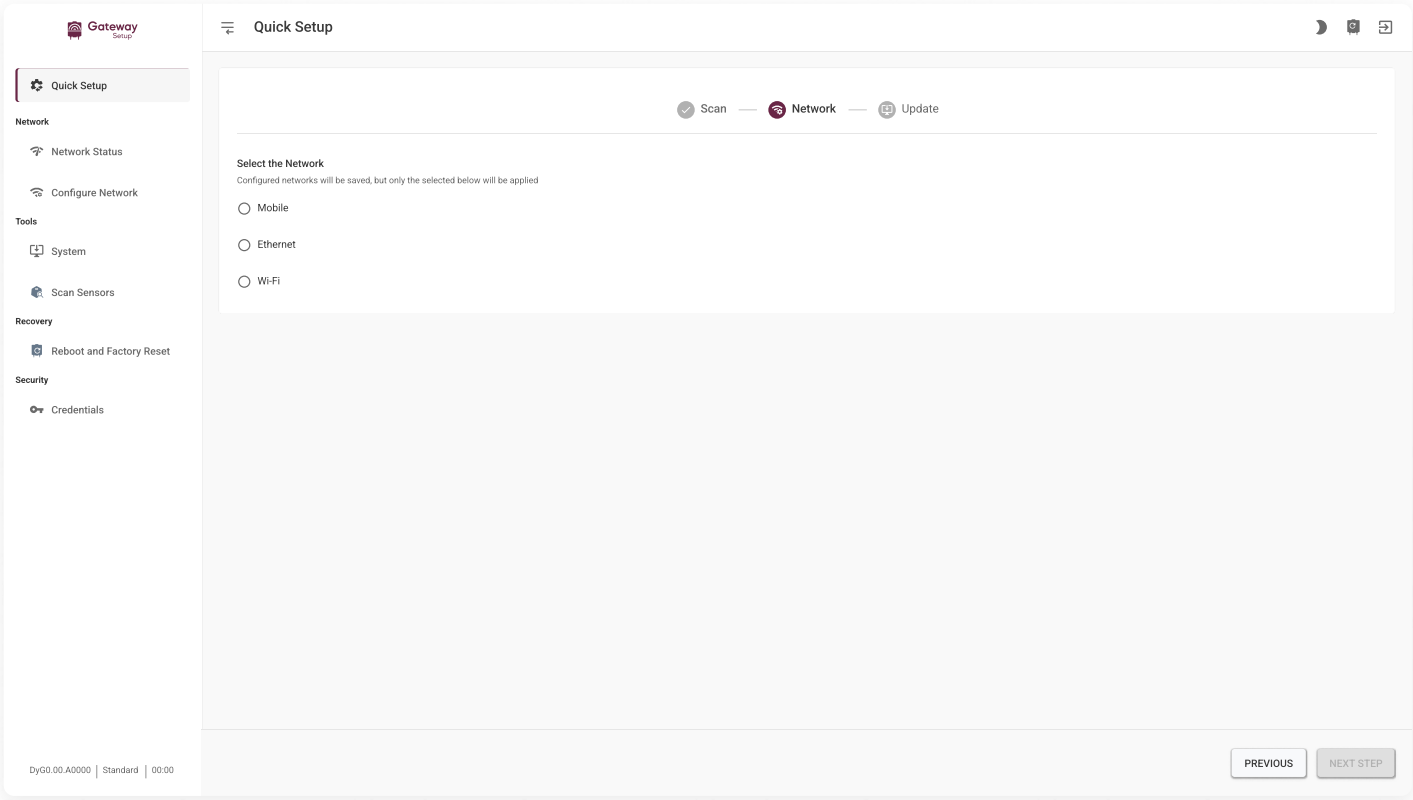
After logging into the system, the user will have access to the Quick Setup tab. It can also be accessed through the side menu. The first step is optional and involves reading the visibility of the DynaLoggers near the Gateway. If it is not necessary, you can select the option **No, skip to the next step**; otherwise, select the option **Yes, let's scan the sensors**. Then, press the button **Next**.



If the option **Yes, let's scan the sensors** was selected, the next screen will display a list of DynaLoggers identified by the DynaGateway. This section is detailed in section 7.5. To proceed to the next step, press the button **Next step**.



The second step of the Quick Setup configuration is Network, to select the network interface through which the DynaGateway should connect to the internet.



Below, the communication interfaces for the Gateway's operation, as well as their installation and configuration process, will be detailed.

4.2.1 Mobile Network

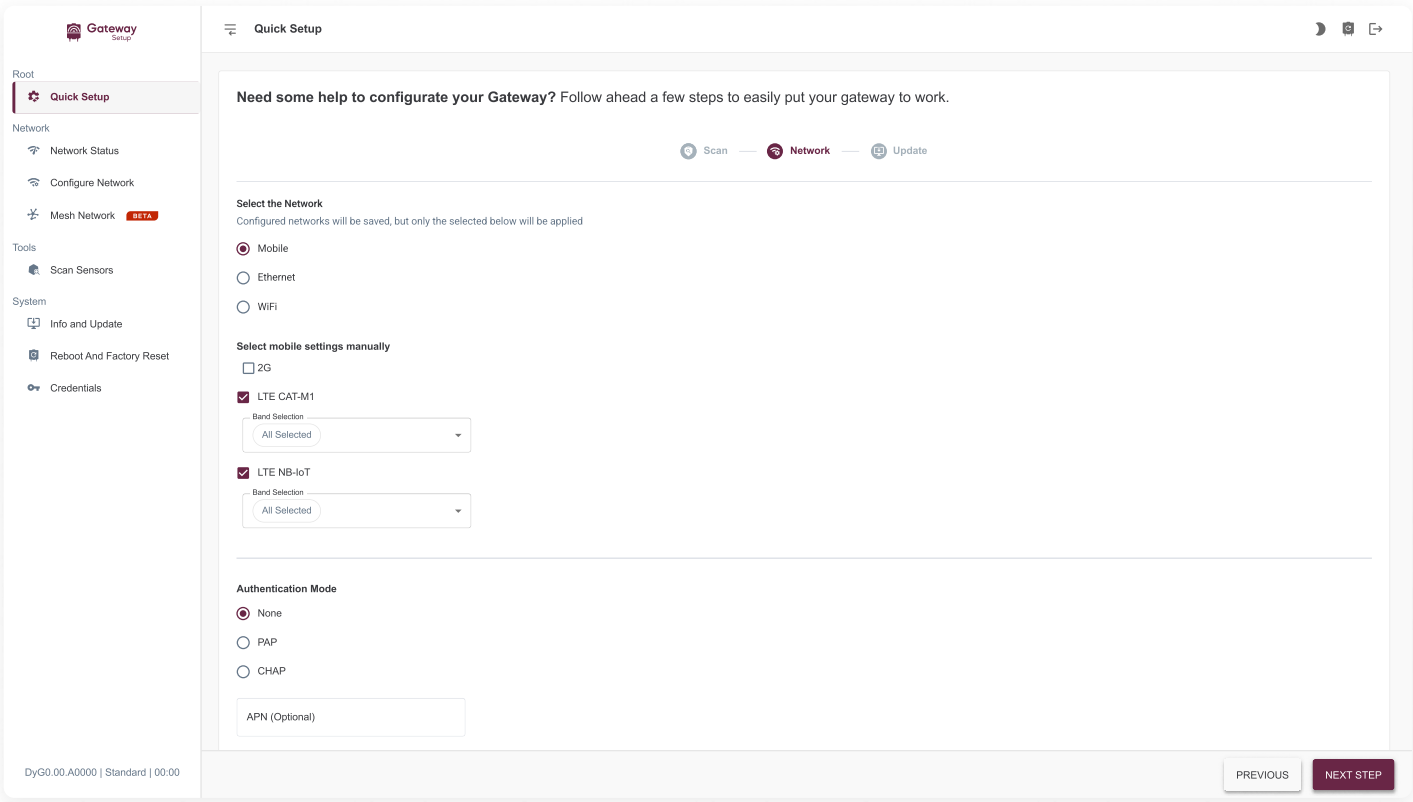
The acquired Gateway model will provide different communication technologies, previously mentioned in the Table in section 2.2. It is important for the user to be informed about local coverage, considering the technologies that their Gateway model can connect to and the bands provided in the Datasheet.

If you wish to use the DynaGateway through mobile data, you need to insert a SIM Card from the carrier of your choice. Then, select the **Mobile** option and fill in the fields.

> The user should not insert or remove the SIM Card with the Gateway powered on to avoid product failures.

The **APN** option is optional and can be left blank; if you wish to configure it, provide the access point as given by the SIM card carrier. In the **Select mobile settings manually** option, the user can define the available networks so that the DynaGateway automatically selects the best connection option based on the detected signal quality, or alternatively, manually select the connection technology or band if using a specific network, depending on the infrastructure provided. The options shown may vary depending on the purchased model. Below, fill in the fields corresponding to the APN (when applicable) and the connection technology available in the region.

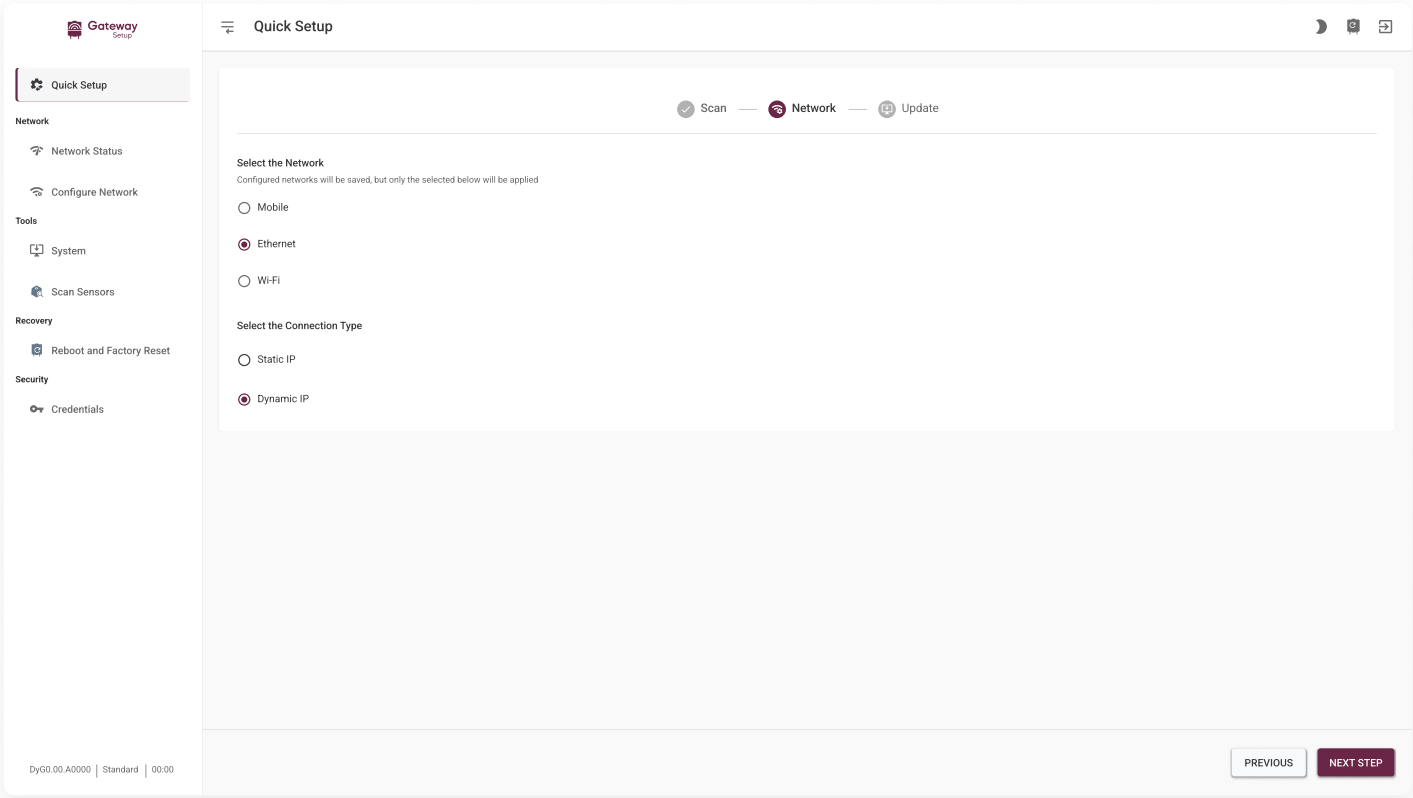
After completion, select the option **Next step** to proceed to the next step.



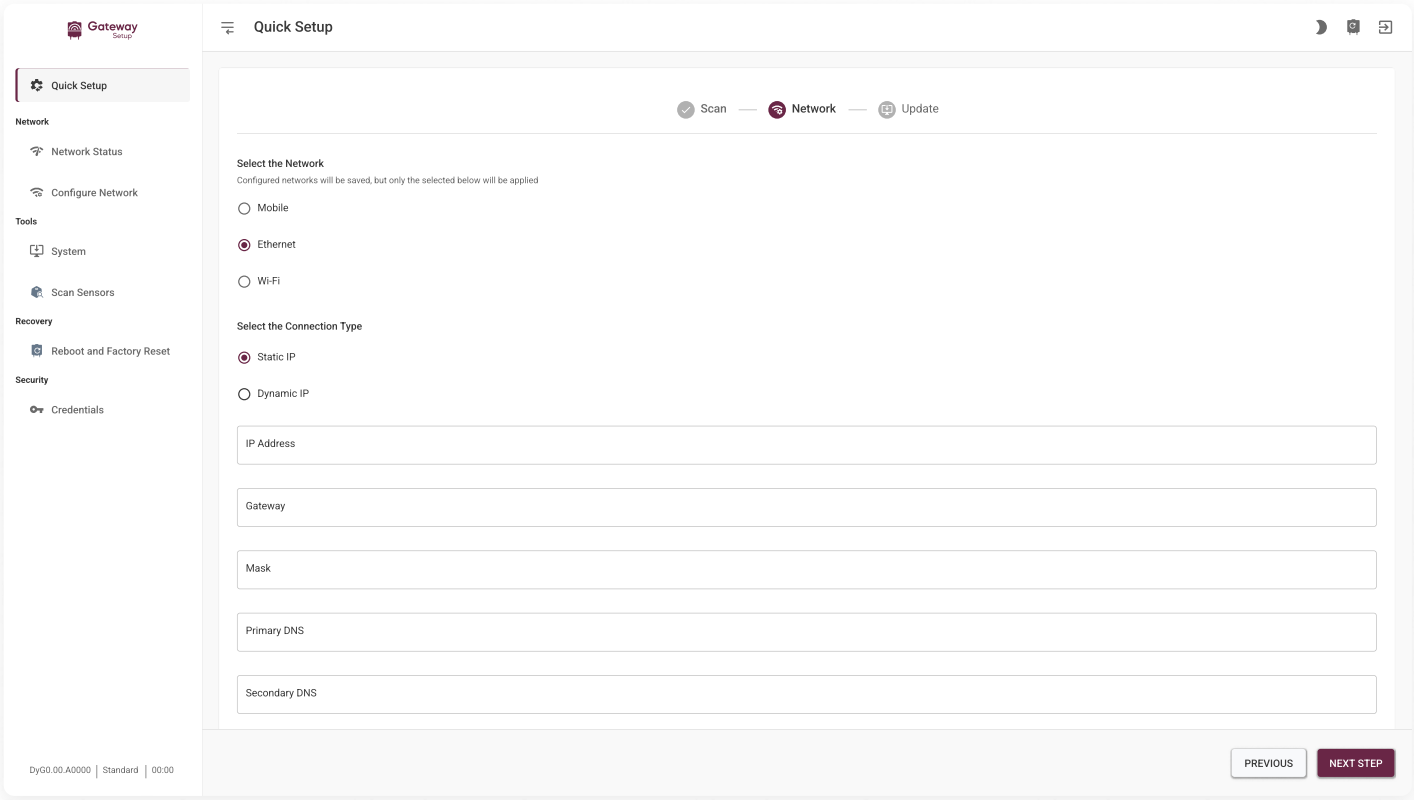
4.2.2 Ethernet

If you want to connect to the internet through a wired network, in addition to network traffic clearance, an RJ45 cable is required to connect it to a network access point. After connecting the cable, select the **Ethernet** option and then the option **Next step**.

After that, the screen to configure the wired network will appear. By default, the **Dynamic IP** option will be pre-selected. If you want to keep this option selected, proceed by selecting the option **Next step** to advance to the next step.



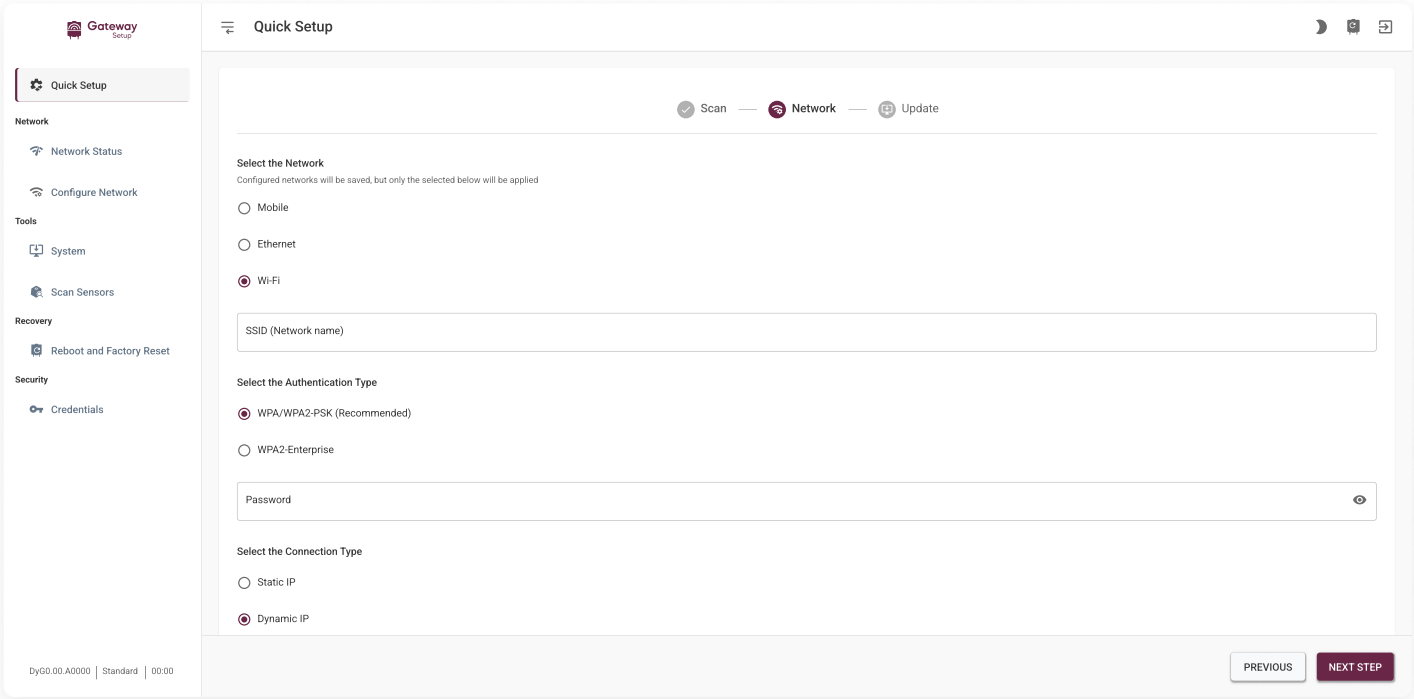
If necessary, you can select the **Static IP** option to assign a fixed IP address, used in networks where IP clearance is required. The department responsible for local network clearance by IP in your company will provide the data for filling in this screen. After completion, select the button **Next step** to proceed to the next step.



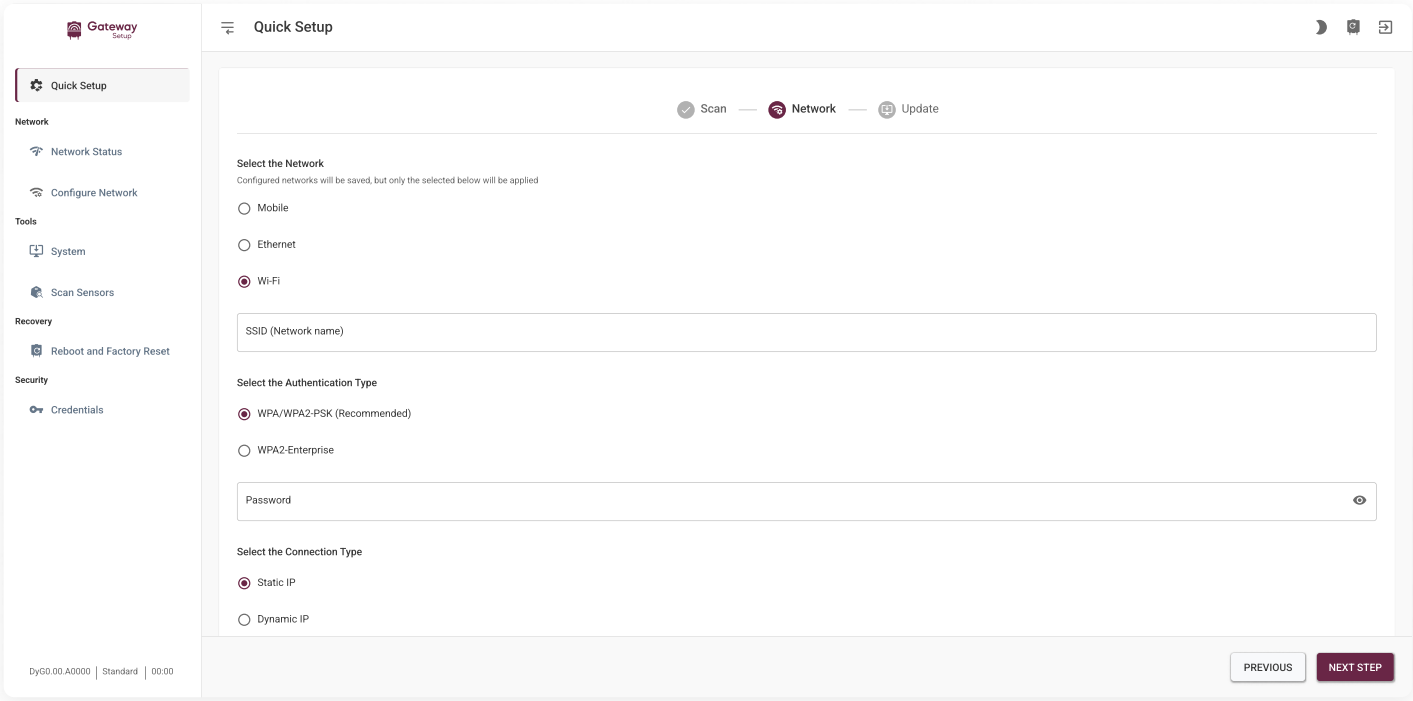
4.2.3 Wi-Fi

If you want to connect to the internet through a wireless network, select the **Wi-Fi** option and then select **Next step** to proceed to the next step.

In the **SSID (Network name)** field, add the name of the Wi-Fi network you want to connect the DynaGateway to. If the default **WPA/WPA2-PSK (Recommended)** configuration is maintained, the **Password** field must be filled in with the password of the Wi-Fi network you want to connect the DynaGateway to.

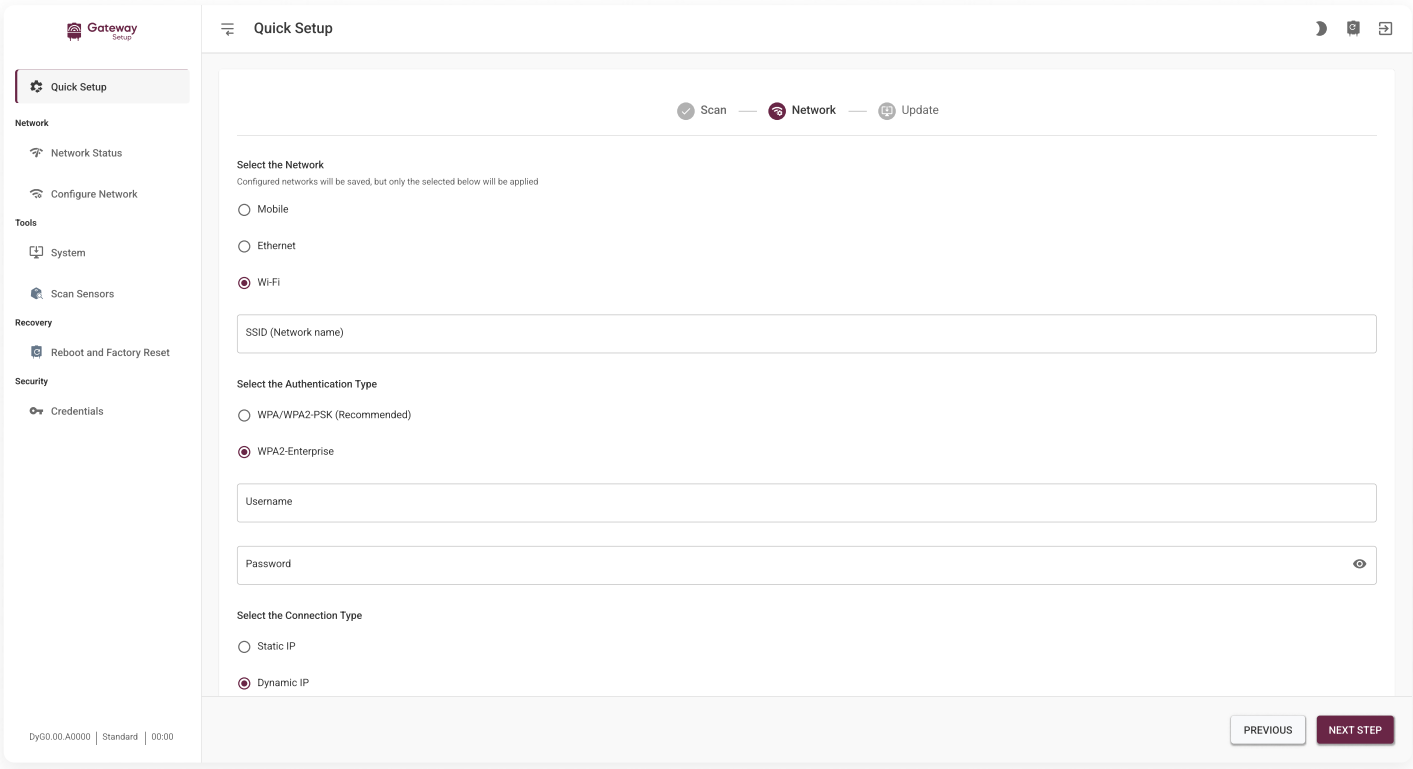


As with the Ethernet configuration, it is possible to use a fixed IP address by selecting the **Static IP** option. If not desired, select the **Dynamic IP** option, which does not require additional configuration.

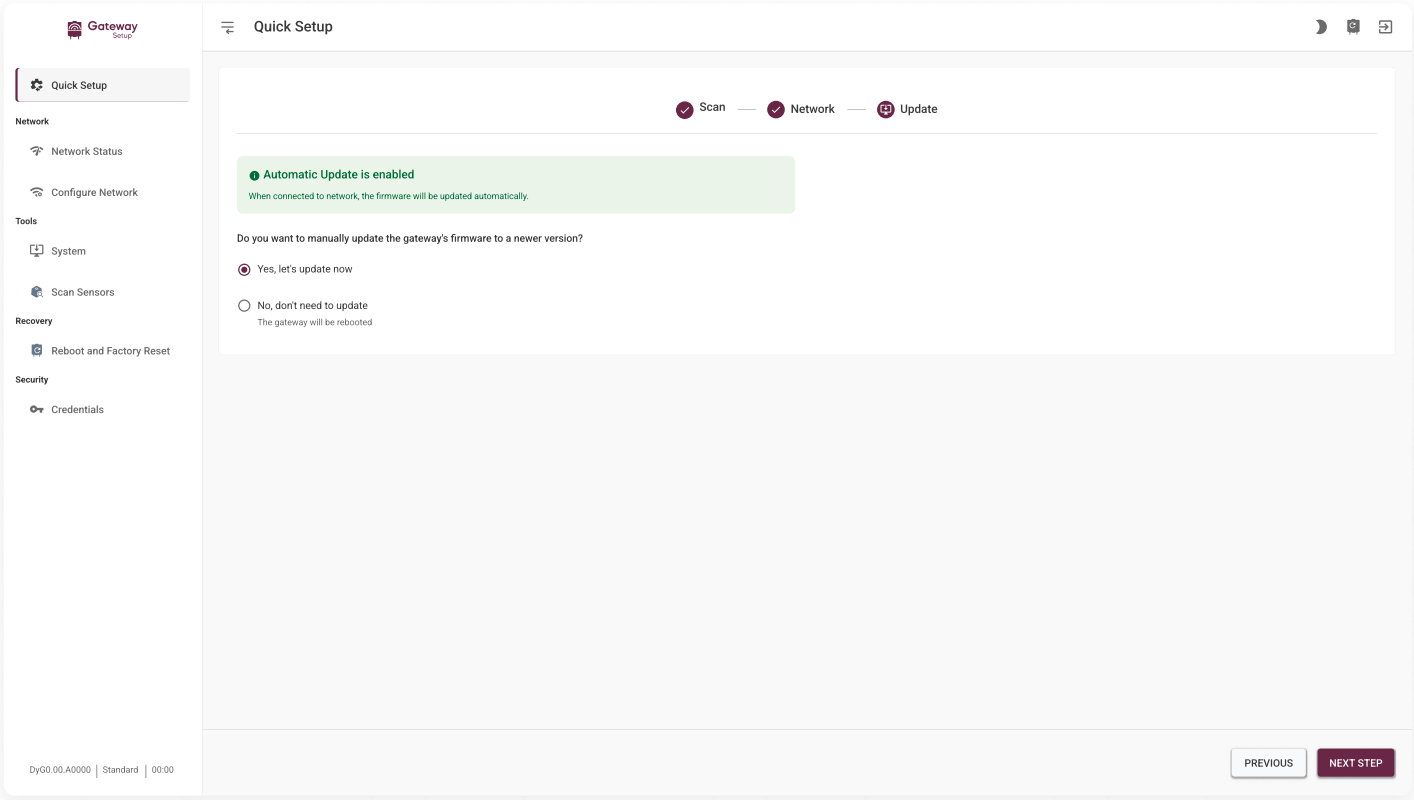


In specific cases, it may be necessary to configure the Gateway on a WPA-Enterprise Wi-Fi network (with user and password per employee). In this case, select the **WPA2-Enterprise** option. After that, the **Username** and **Password** fields will appear, which must be filled in with the information related to the enterprise network user and password.

After completion, select the option **Next step** to proceed to the next step.



The third step of the Quick Setup configuration is Update, to update the DynaGateway firmware. This step is detailed in section 7.4, but it is optional. If you do not want to make changes at this stage, select the option **No, don't need to update** and click **Next step** to finish the Quick Setup.

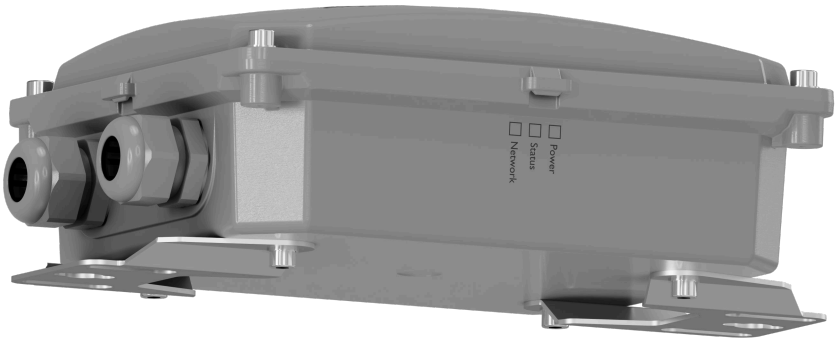


After completing the configurations in the Quick Setup tab, it is necessary to restart the DynaGateway.

Section 4.3 refers to the status of the communication interface configured for the Gateway. In this section, it will be possible to verify if the entire configuration process is correct and if the device is ready for communication with the cloud.

4.3 LED signaling

On the DynaGateway casing, there are indicators of connection status and relevant information for the user through the LEDs. Each of the three LEDs on the product corresponds to: Power, Status, and Network.



The color and behavior of the LED may vary according to the activity the Gateway is performing at the moment or the state it is in, as follows:

1 LED Power

Solid green:
Gateway powered



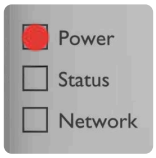
Flashing yellow:
ready to initialize Gateway Setup mode



Solid yellow:
Gateway Setup mode



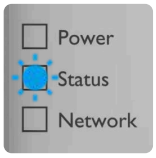
Solid red:
Factory reset



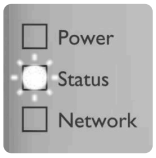
2 LED Status

Alternates between on and off while the Gateway performs one of the following activities, according to the LED color:

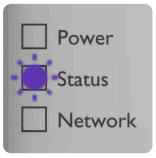
Flashing blue:
communicating with DynaLoggers



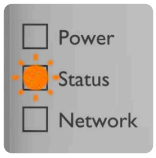
Flashing white:
communicating with the Dynamox Platform



Flashing purple:
updating the Gateway firmware



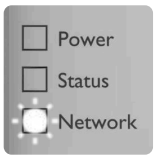
Flashing orange:
internal processing



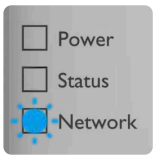
3 LED Network

Changes color according to the chosen communication interface:

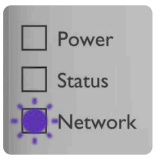
Flashing white:
connecting to Wi-Fi



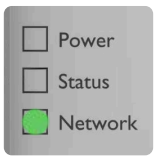
Solid blue:
connecting to Ethernet



Flashing purple:
connecting to Mobile networks



Solid green:
network successfully connected



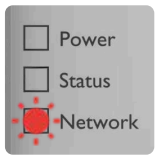
Solid yellow:
Real-time clock (RTC) Off



Solid red:
connection problem[1]



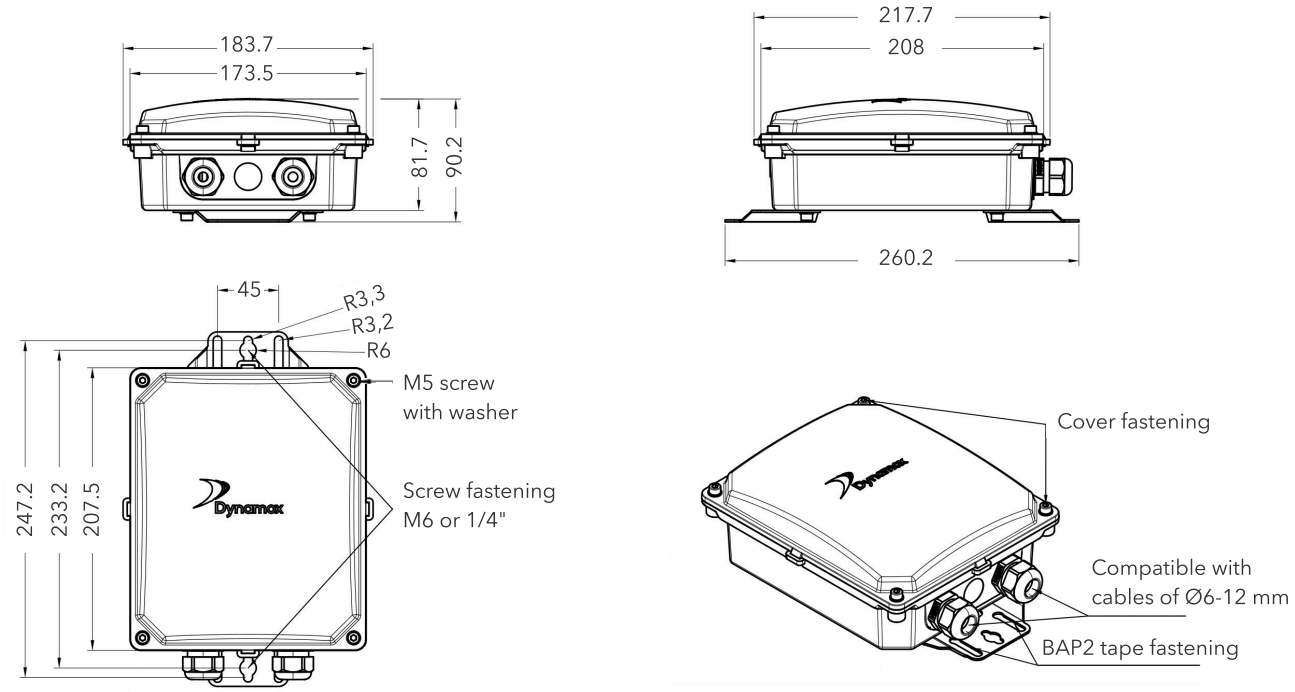
Flashing red:
connection issue on the network interface



1 - Incorrect Wi-Fi password, Ethernet cable removed, or connection refused for mobile networks.

4.4 Mounting

After configuring the communication interface, proceed to the designated location to position the DynaGateway. During the mounting process, it is important to consider the product dimensions and pay attention to the drilling patterns and the recommended screw size for mounting (M4), as follows (measured in millimeters):



Dimensions in millimeters

To access the physical interfaces of the product (USB port, RJ45 connection, etc.), it is necessary to unscrew the front cover. It is worth noting that the tightening torque of this component should be approximately 4 N.m, considering the screw size and the material of the casing.

Below, the cable glands at the bottom provide access to the cable passage area, with the left side for power cables (Vac or Vdc power supply) and the right side for the RJ45 cable (Ethernet).



To ensure proper operation, it is recommended to access the device's configuration interface and check the visible sensors within its range before closing the front cover and positioning it in the final installation location. For this verification, refer to section 7.5 of this document.

Complete the installation of your DynaGateway by closing the front cover, tightening the previously removed screws, and mounting it in the installation location. The positions indicated in the image below represent the three mounting points of the Gateway on the desired structure.



Central drillings
For fixing the product in relation to the central drilling, an M5 or 3/16" internal hex screw should be used.

Lateral drillings
For fixing the product in relation to the lateral drillings, Hellerman straps or screws (M5 or 3/16") should be used.

Fixing tabs
For fixing on large poles or metal structures, it is also possible to fix it using a BAP clamp (Adjustable Pole Clamp).

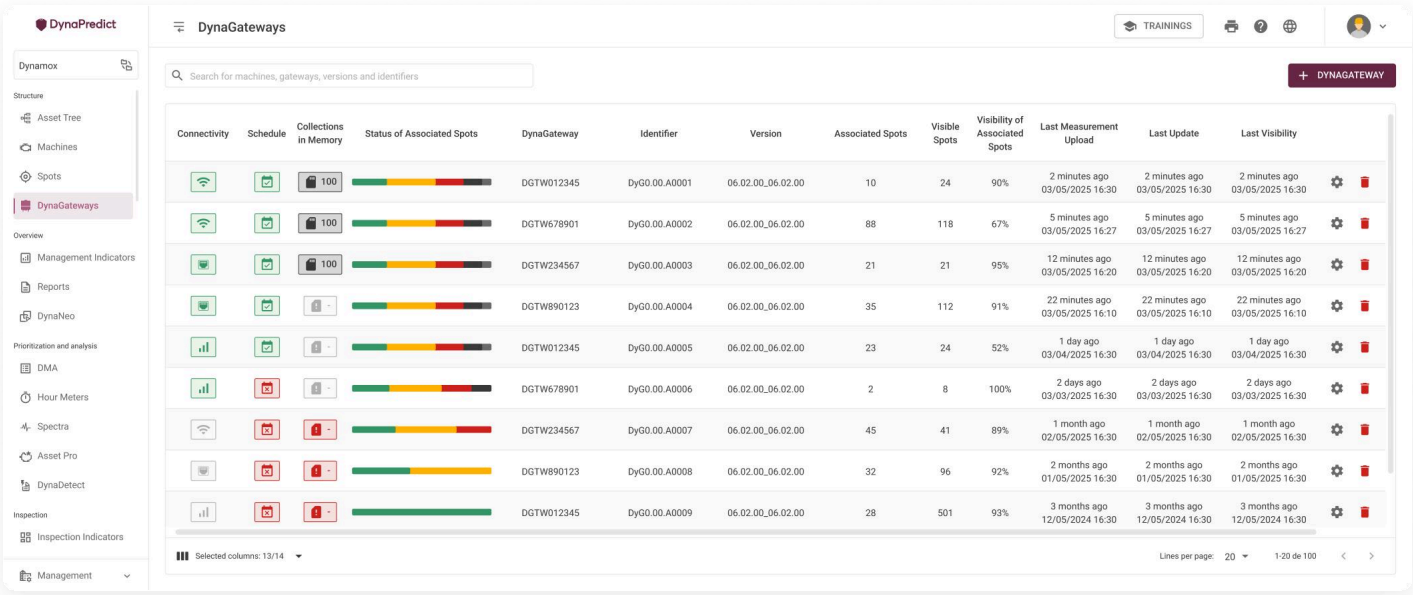
After configuring the communication interface and positioning the Gateway in its operating location, the user can verify the success of the process through the Power and Network LEDs (color according to the chosen communication interface, see section 4.3, both continuously lit).

Finally, to configure which Spots will be collected by the Gateway, the user must perform the adoption and configuration process of the Gateway collections through the Dynamox Platform, described in the following sections.

5 Adoption and configuration

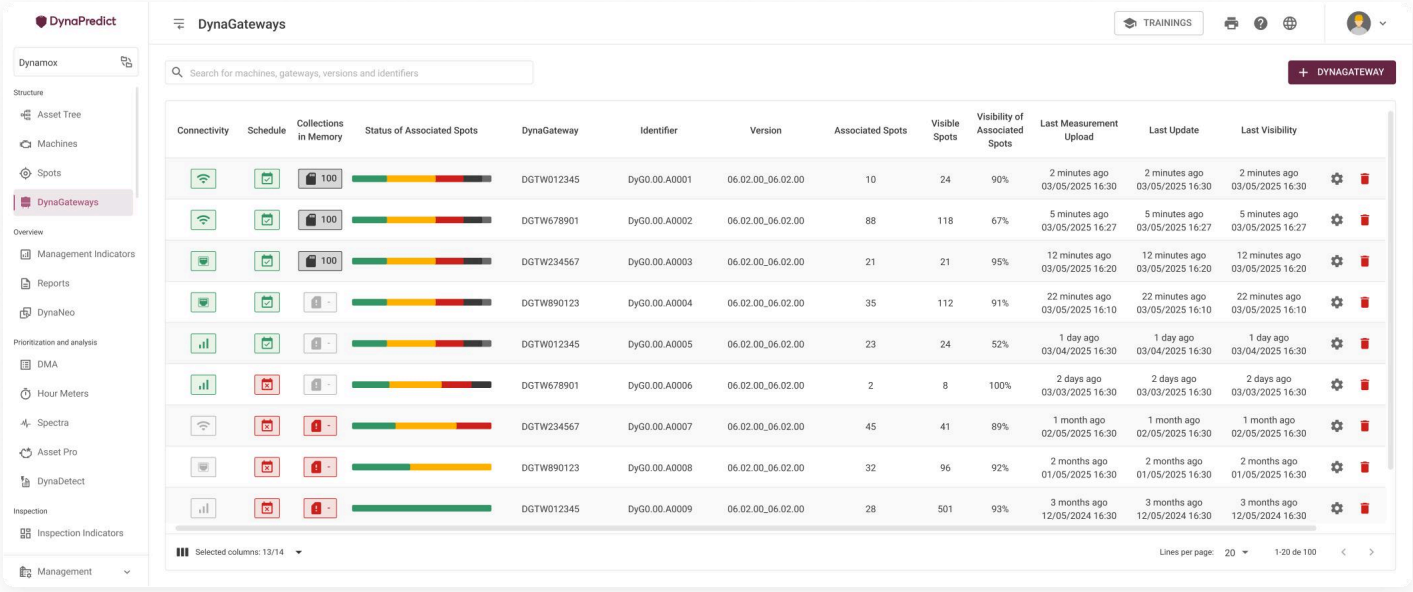
After configuring the network and communication interface of the Gateway, it is necessary to access the Dynamox Platform to adopt the device in a workspace and indicate the operating parameters, such as sensors to be collected and the interval for collecting continuous values and requesting spectra.

To do this, the user must access the Platform at https://dyp.dynamox.solutions/ and, in the side menu, access the Gateways tab. Upon entering, a table with the list of Gateways already registered in the workspace where the user is located will be displayed.

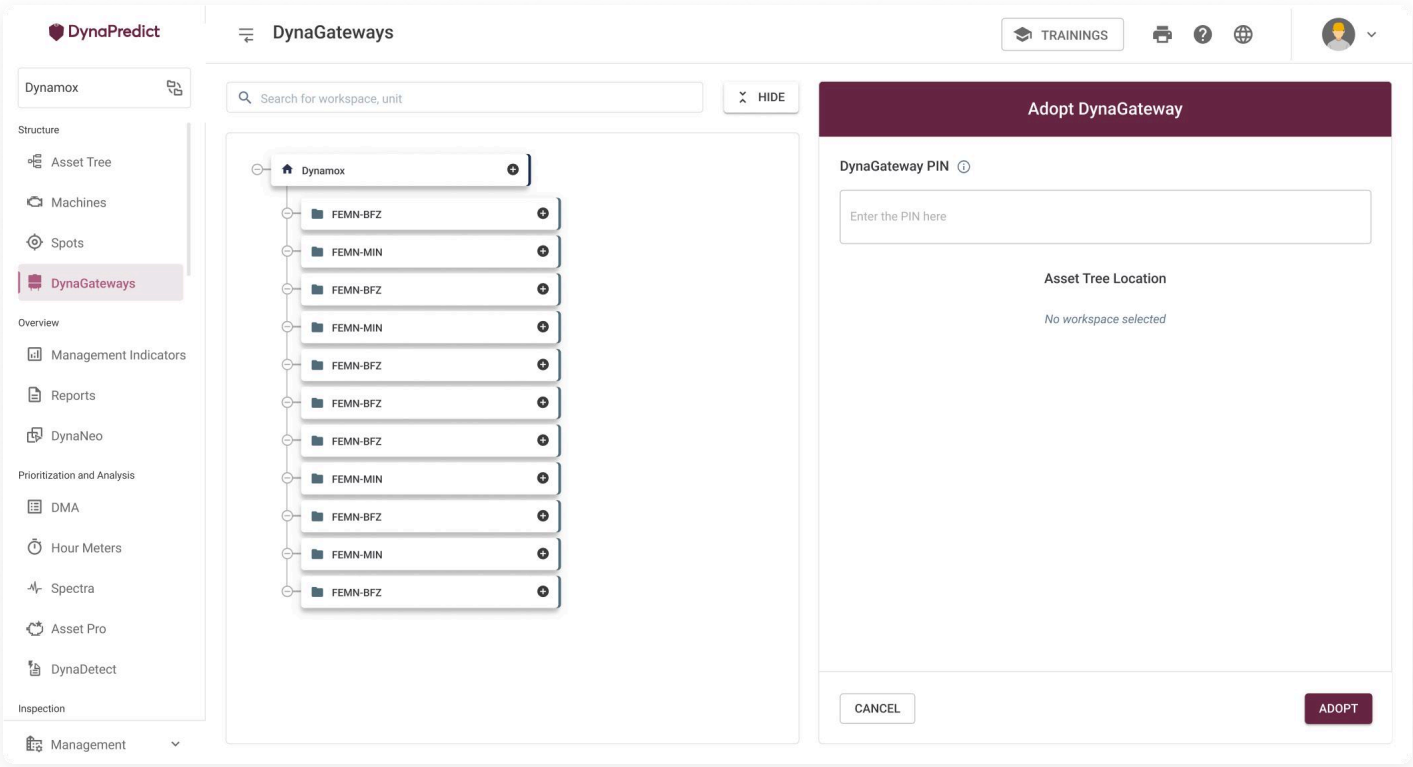


5.1 Adopting a DynaGateway

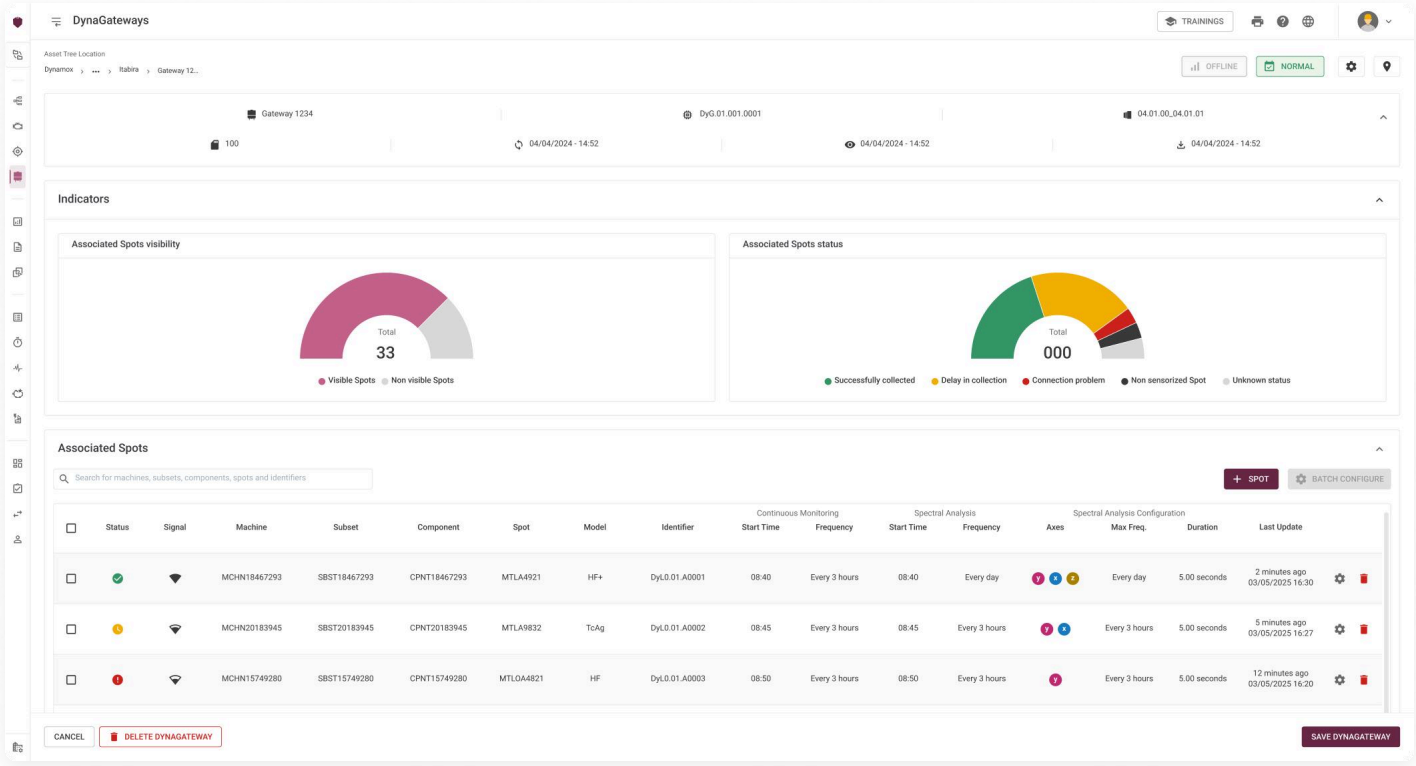
To adopt a DynaGateway, in the Gateways tab, the user must select the **+ DynaGateway** option in the upper right corner.



On the right side of this screen, the user must enter the device PIN, printed on its casing. Using the Asset Tree on the left side, the user must select in which subarea the DynaGateway will be positioned. This will influence the restriction of the group of sensors that can be associated with the DynaGateway, as well as which users can edit its configuration parameters.



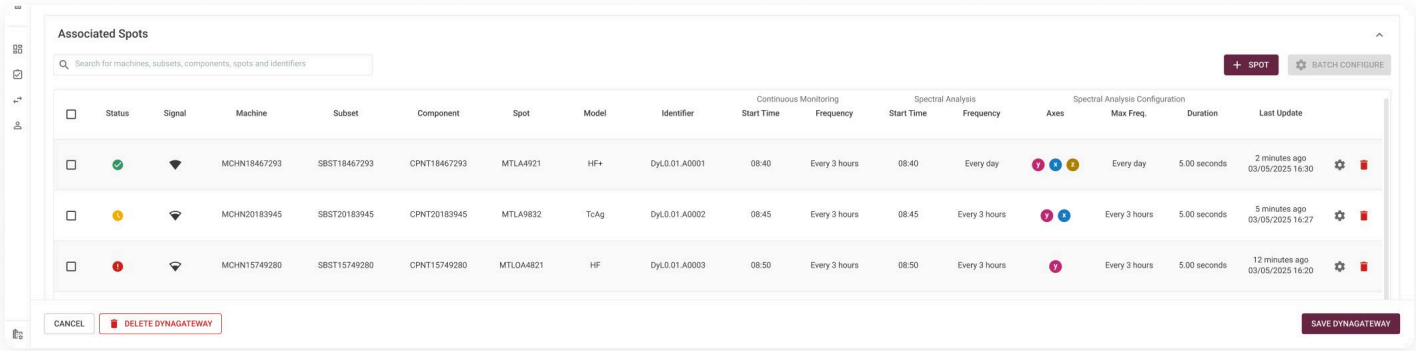
The selection follows the same pattern as the company's Asset Tree, where higher levels can enjoy the same benefits at lower levels. By clicking on the **Adopt** option, the Gateway Configuration page will be displayed to the user.



At the top of the screen, general information about the Gateway is displayed, such as the assigned name (which can be edited), product serial number, last edit made on the Dynamox Platform, and the last visibility update.

At the bottom, there is information related to the status of the Spots within the Gateway's range and the sensors associated with it. The status of each icon is detailed in section 6.1. The Spots visible to the Gateway are all those within its range, including sensors not associated with this Gateway. This concept can help determine better use for the device, ensuring it is configured to collect data only from DynaLoggers that are truly within its range.

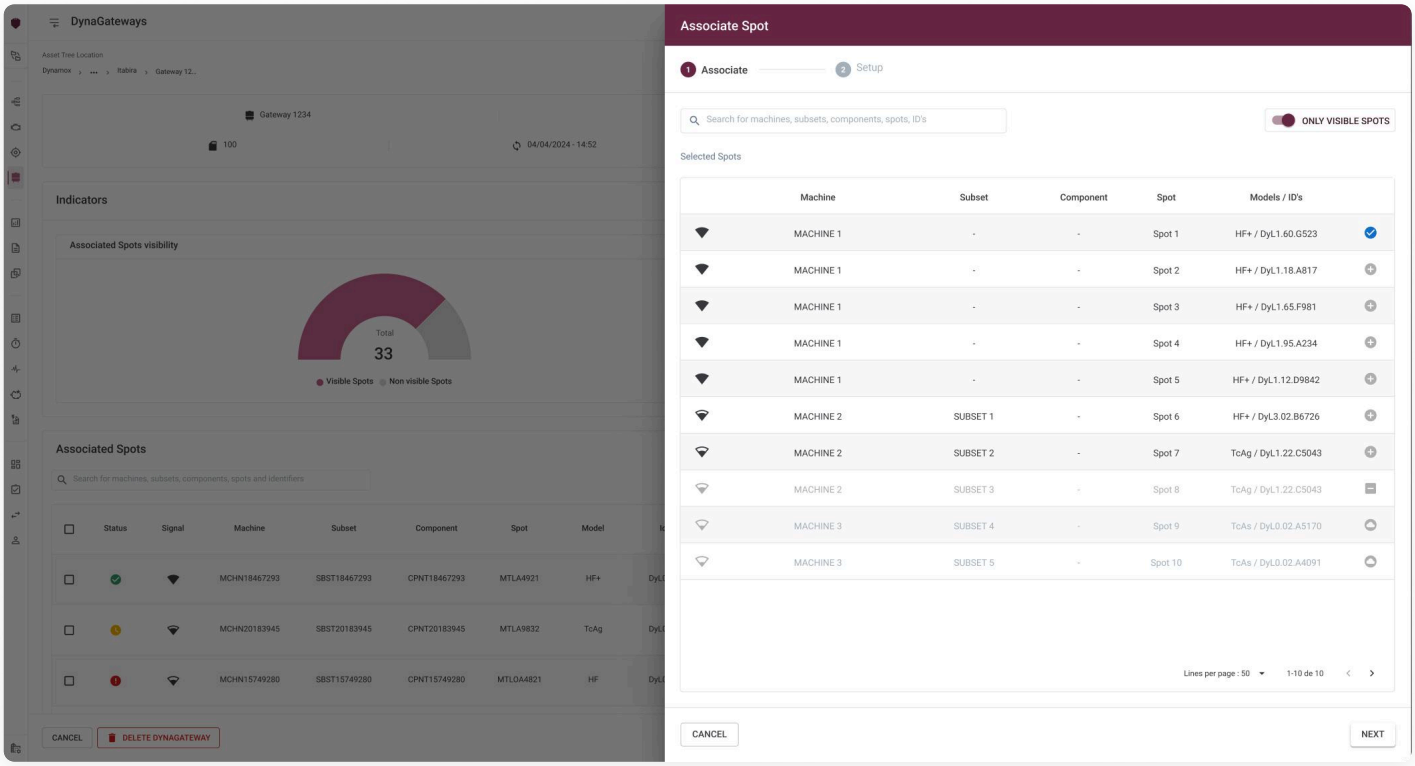
By selecting the **+ Spot** option, it is possible to associate the Spots that should have their data collected by the Gateway. To do this, select the option to view the Spots available for association.



The list of Spots below will be shown according to the workspace where the Gateway was previously configured. The **Only visible Spots** option allows filtering the Spots whose DynaLoggers are within the Bluetooth range of the DynaGateway. It is important to note that to use this option, the device must be powered on and have recently performed a visibility update. This update does not occur at the same time the DynaGateway is connected to the network, meaning this process may take some time to complete.

It is still possible, in all cases, to uncheck the **Only visible Spots** option to associate the Spots, keeping in mind that the DynaGateway does not yet have the information if the sensor is within its communication range. Similarly, it is advisable that the device is also positioned in its installation location, as it will inform the user which Spots are visible to it for future association.

To add a Spot, simply select the icon ⊕ , to its right, changing it to ✔ . If the Spot in question is already associated with another Gateway, the icon shown will be ⊖ . On the left side of the screen, the signal strength of each Spot visible to the Gateway will be displayed, which can help in the device positioning process.

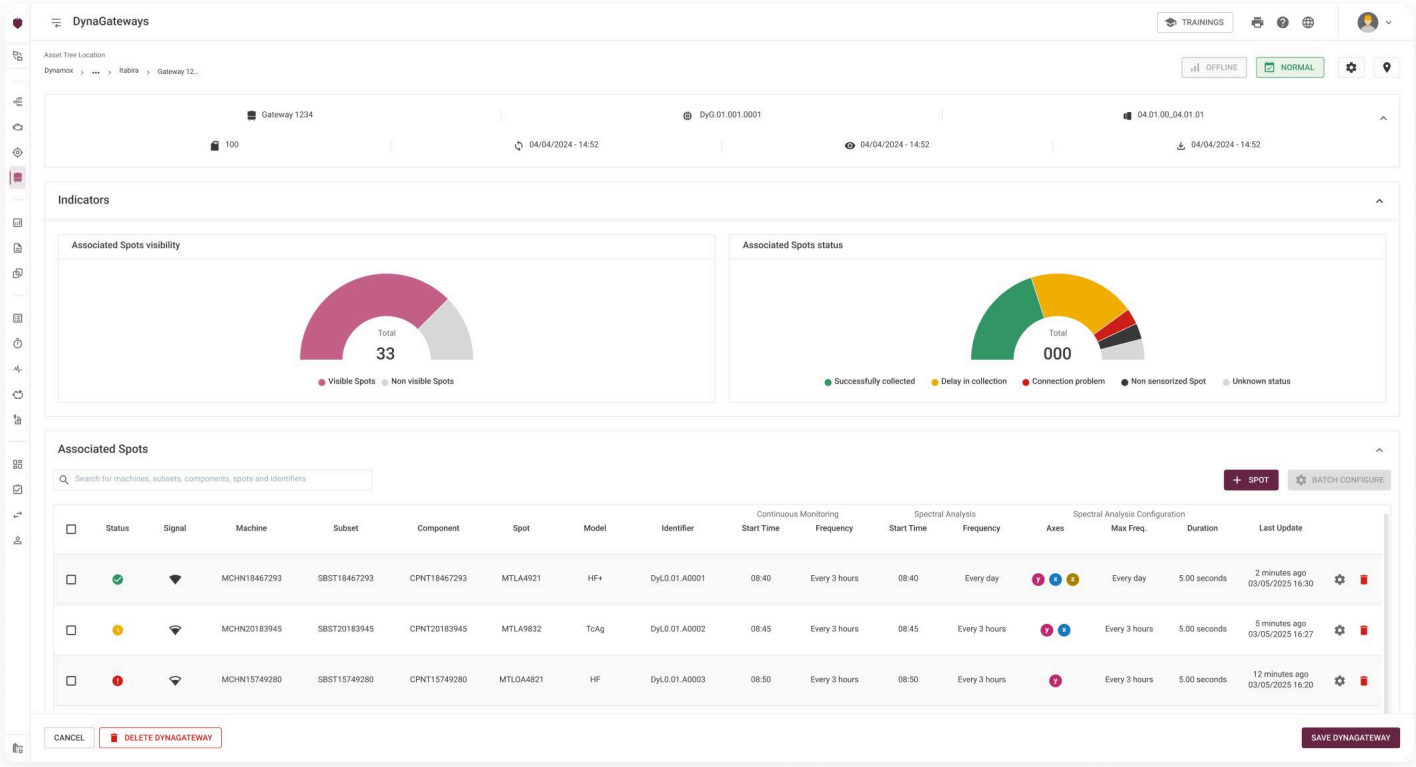


Upon completing the process, select the **Next** option to proceed to the screen to configure the Spots to the Gateway's schedule. It is also important to pay attention to the correct configuration of the collection intervals for each Spot to avoid overloading the Gateway, as described below.

5.2 Batch spot configuration

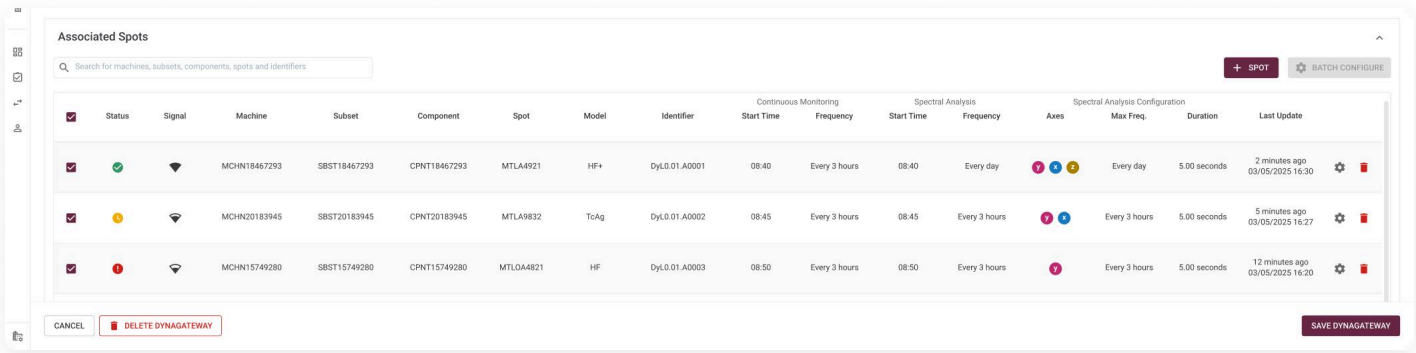
Once the Spots to be collected by the Gateway have been associated, the user needs to configure the desired collection and spectral request intervals.

By selecting the ⚙ , option, the user can configure the continuous data collection and spectral analysis parameters for a specific Spot.



In cases where multiple DynaLoggers are associated with the Gateway, it is beneficial to configure all Spots in a standardized manner, creating uniformity in data posting and speeding up the parameterization process. Thus, in the upper right corner, the user can select the **Batch Configuration** option, which becomes available when more than one Spot is marked in the list.

To define which Spots will be configured simultaneously, check the box to the left of the corresponding Spots. To select all at once, check the box above the Spots list.



The configuration screen for collection and spectral analysis schedules defines the frequency with which the DynaGateway will communicate with the sensors and send data to the Platform. This screen consists of two monitoring options:

- **Collection:** defines the times when the Gateway will communicate with the DynaLogger to request the collection of global data stored in its internal memory.
- **Spectral Analysis:** defines the times when the Gateway will communicate with the DynaLogger to request a spectral analysis on the Spot.

For each type of monitoring, it is necessary to define the start time of the collections and the frequency with which the Gateway will repeat the monitoring, which is the collection interval.

It is important to differentiate the concepts of collection interval and sample interval. The first refers to the Gateway, while the second is the configuration defined when creating the Spot for the DynaLogger. The sensor takes measurements according to its sample interval and stores them in its internal memory until, according to its collection interval, the DynaGateway transfers the data to the Platform and clears the sensor's memory.

> **Example:** a DynaLogger with a sample interval of 5 minutes generates vibration and temperature samples at this interval and stores them in its internal memory. A Gateway with a collection interval of 3 hours (180 minutes) will collect this data and send it to the Platform every 3 hours, collecting 36 samples (180 min / 5 min) of vibration and temperature at a time.

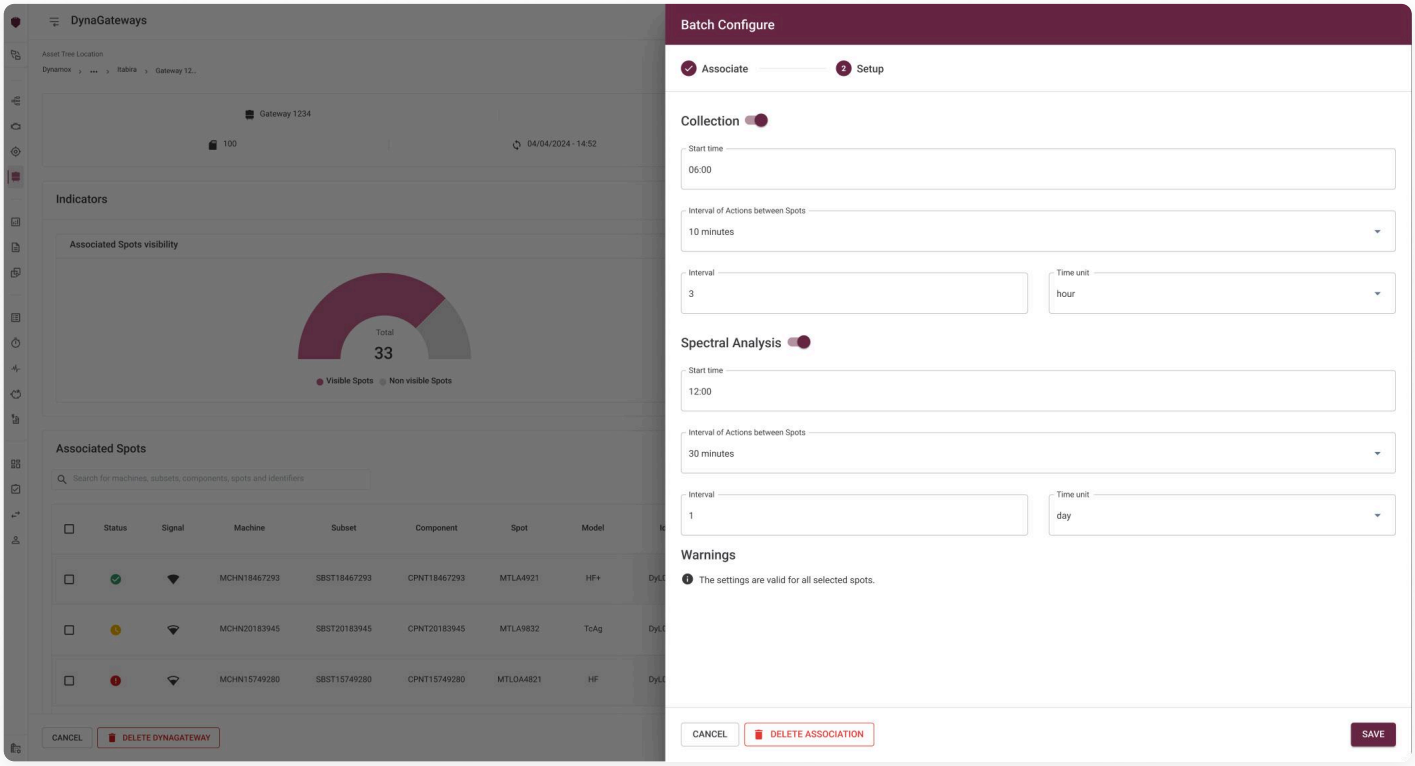
In the case of Batch Configuration, it is also necessary to inform the Action Interval between Spots so that from the start time of the first Spot's collection, the Gateway defines the times for the other Spots. By selecting the option, the configuration window will be displayed for the user to fill in the following fields:

Continuous Monitoring:

- **Start Time:** the start time of the schedule, i.e., the moment when the first Spot on the list will be collected.
- **Action Interval between Spots:** the time interval between the collections of the Spots, starting from the immediately previous point collected. For the second Spot on the list, for example, its collection time will be the start time of the first plus the action interval between Spots, and so on.
- **Interval:** the interval of the complete spectral collection cycle. Unlike the action interval between Spots, this value refers to the cycle's periodicity, i.e., how many hours the monitoring point will have its data collected again. Example: start time 09:00 with an interval of 3 hours, resulting in collection cycles at 09:00, 12:00, 15:00, and so on.

Spectral Monitoring:

- **Start Time:** the start time of the schedule, i.e., the moment when the first Spot on the list will have its spectral analysis requested.
- **Action Interval between Spots:** the time interval between the spectral requests of the Spots, starting from the immediately previous point collected. This field is analogous to continuous monitoring, except the Gateway's action type will be different.
- **Interval:** the interval of the complete spectral collection cycle. Unlike the action interval between Spots, this value refers to the cycle's periodicity, i.e., how many hours the monitoring point will have its spectral analysis requested again. For spectral monitoring, the minimum value for this field is 1 (one) day.



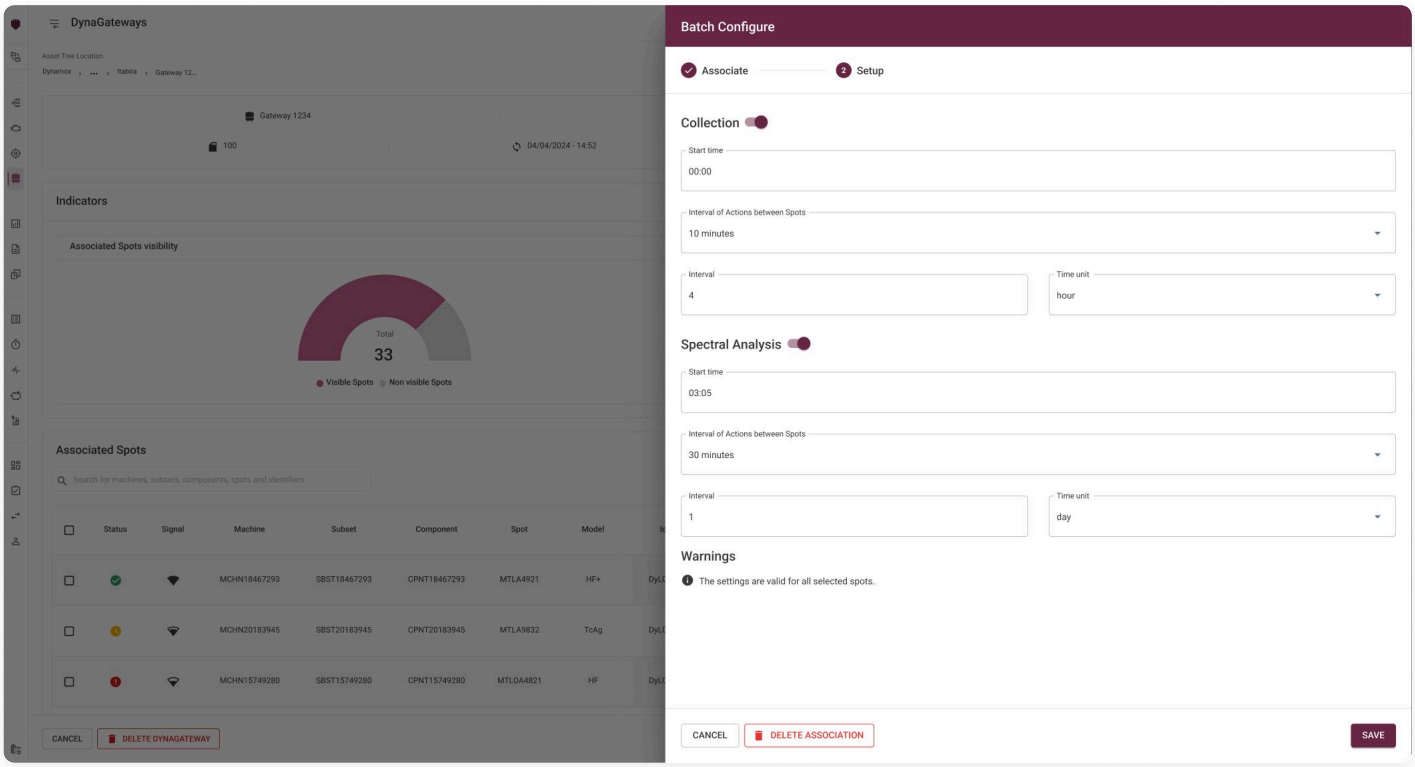
It is possible to perform as many batch configurations as necessary independently, i.e., the collection and spectral parameters can be different for each configured batch.

If the **Operations Accumulate more than 24h** icon appears, it means that the volume of actions associated with this Gateway may be exceeding the time available to execute them. In this situation, the daily operations of continuous data collections and spectral analyses together have an estimated time that exceeds 24 hours to be performed, which may result in a progressive delay in the Gateway's processes. In this case, we recommend reconsidering the volume of collections or the spectral configurations of the Spots to avoid delays.

Upon completing the configuration process, the user must select the **Save** button to finalize it. To save the Gateway changes, click **Save Gateway**.

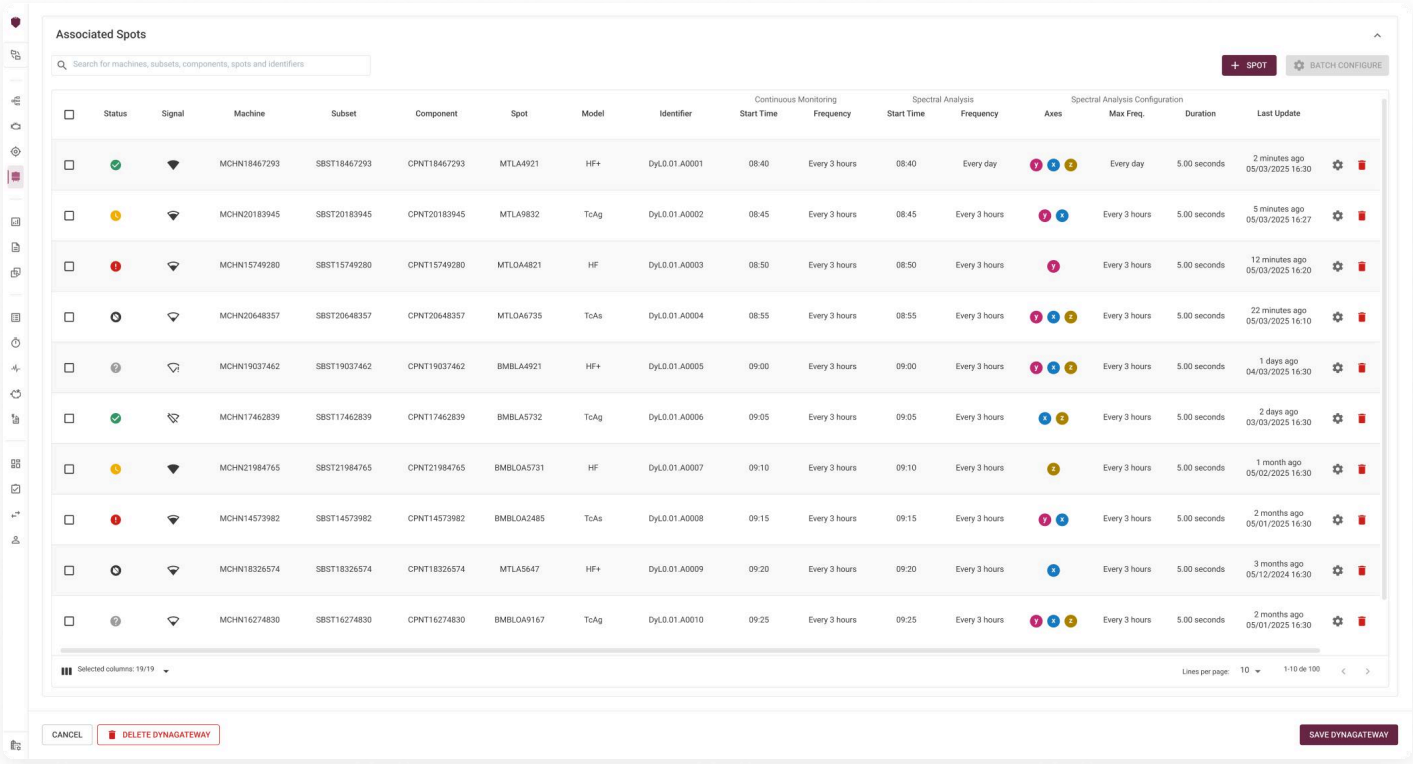
5.2.1 Practical example of DynaGateway configuration

This section will introduce a practical example of configuring a DynaGateway, as well as best practices for performing this process, considering a collection interval of 4 hours and daily spectral analysis for 20 associated Spots: as mentioned earlier, the time taken for the Gateway to perform a spectral analysis depends on the volume of data in the analysis and the stability of the internet. Generally, intervals of 30 minutes are considered for this action and 10 minutes for continuous data collections. In this example, collections alternate with spectral analyses in a schedule with 20 Spots, according to the configuration below:



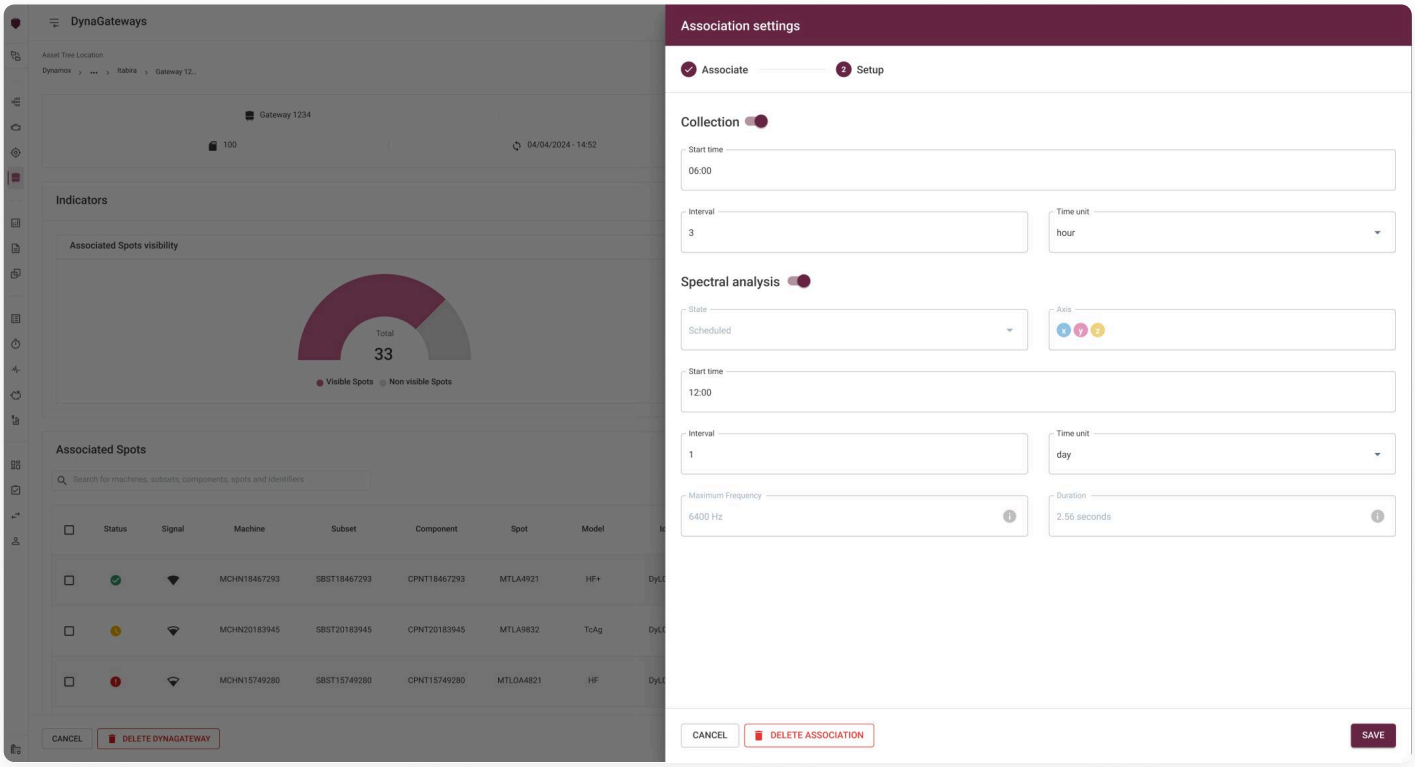
Thus, all continuous data from the Spots will be collected within 4 hours (20 Spots x 10 minutes equals about 4 hours), and therefore, this is a valid periodicity. Additionally, the intervals considered between actions respect the time available for the Gateway to perform them.

Thus, the first Spot is collected at 00:00 and starts its spectral analysis at 03:05. The second Spot is collected at 00:10 and starts its spectral analysis at 03:35, and so on. The collection cycle is repeated every 4 hours, so at 04:00, the first Spot will be collected again. Best practices for configuring the Gateway schedule are those that ensure actions are spaced out and that there is enough time for them to be processed before repeating an action cycle.



5.3 Individual Spot configuration

In some cases, it may be beneficial to configure Spots individually. To do this, you should select the ⚙ option next to the desired Spot, and a window similar to the batch configuration will be displayed. The fields and functionalities follow the same pattern discussed in the previous section regarding batch Spot configuration.



As with batch configuration, if the selected Spot is set to perform triaxial spectral analyses with a maximum frequency above 1600 Hz, a warning about the action's execution time will be displayed.

By clicking the **Save** button, the user will be returned to the Spots screen to configure the remaining selected points.

6 Status

After the configuration and adoption steps of the DynaGateway, it is possible to monitor the connection status with the DynaLoggers to ensure that all assets associated with the Gateway are being effectively monitored. The status of each Spot will vary according to the connection attempts made by the Gateway at the scheduled times during its configuration.

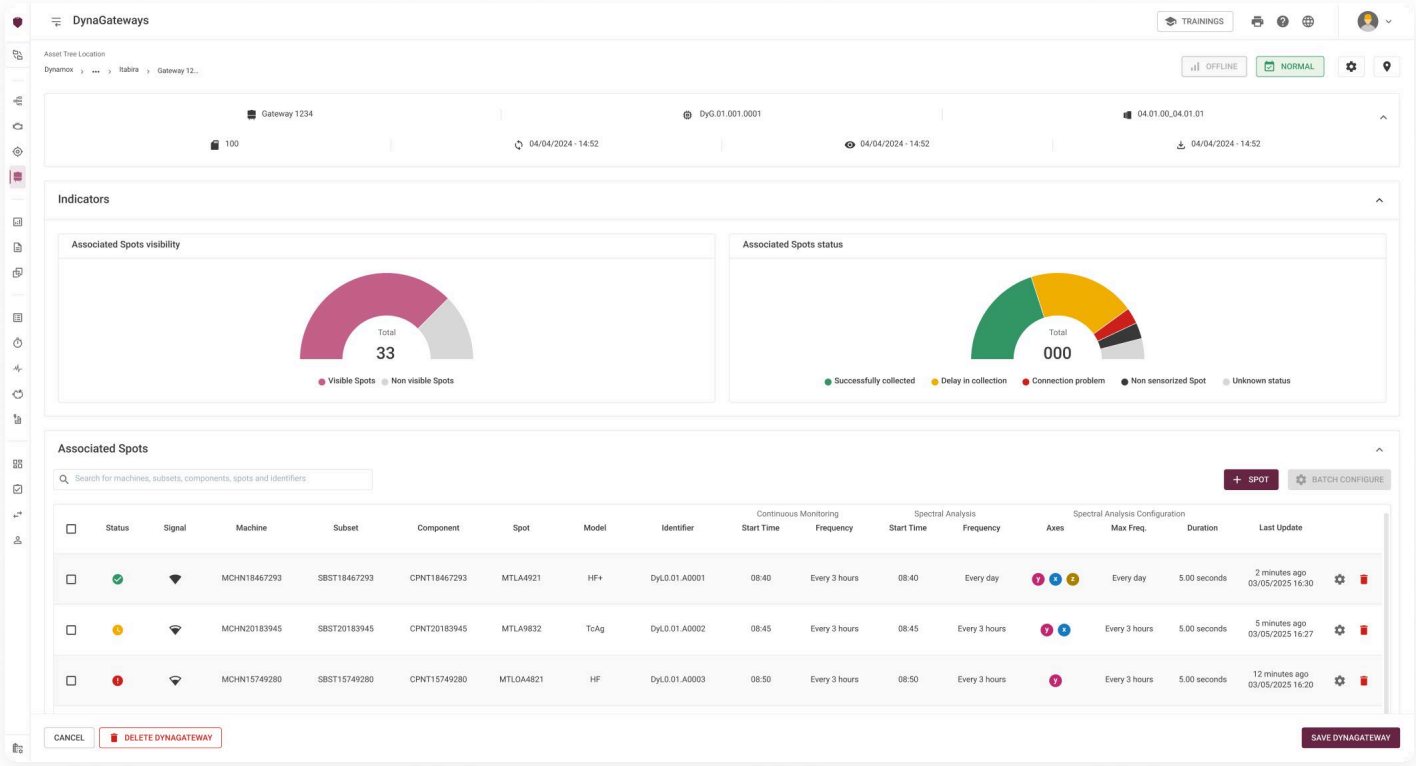
6.1 Spot connection

By accessing the Gateway Configuration screen, it is possible to check the collection status of the Spots associated with the selected Gateway. The colored icons on the left side of the list indicate the last collection status of that point, as follows:

- **Successfully collected:** the Gateway successfully collected data from the associated Spot at the scheduled time.
- **Delayed:** the Gateway did not send the last ccollections from the Spot at the expected time.
- **Not collected:** the Gateway was unable to collect data from the associated Spot.
- **Unknown status:** there are no collections from the Spot sent by the DynaGateway yet, commonly seen in cases where the Spots were recently configured. If all Spots remain with this status, it is recommended to check the connection interface (Ethernet, Wi-Fi, or Mobile Network) and the product's power supply. For isolated cases of Spots, check the signal strength of the sensors.
- **Uninstrumented spot:** the Spot does not have an associated sensor.

6.2 Visibility update

The DynaGateway periodically scans the sensors within its Bluetooth range. By default, every 2 hours, the device performs a visibility update when properly connected to the network. The information on how long since the last update is present in the last visibility field on the Dynamox Platform.



The visibility update procedure ensures that the statuses shown on the Platform reflect the reality of the last 2 hours, identifying which monitoring points need individual verification.

7 Additional resources

The DynaGateway has several tools that can assist in troubleshooting and contribute to the device's usability. Among these are system reboot, factory reset, firmware update, and sensor search within its range.

This section details the functionalities and procedures for using the device's tools. All described processes are performed through the device's Web interface, the same used for configuring the communication interface (accessing http://dynagateway-setup.local/ or 192.168.10.1 in the browser).

7.1 Connectivity

Connectivity is one of the main features of the DynaGateway and is essential for its proper functioning, enabling the collected data to be sent to the Dynamox Platform. Therefore, the device provides a wide range of network interfaces and configurations, adding adaptability and security to the product.

7.1.1 Network interface

Three network interface options are available: Wi-Fi, Ethernet, and Mobile Networks.

7.1.1.1 Wi-Fi

The Gateway has Wi-Fi connectivity operating in the 2.4GHz frequency band, with the following configurable parameters:

- **SSID:** The SSID is the unique name assigned to your wireless network. It is the identifier that allows devices to find and connect to your Wi-Fi network. Enter the name of the Wi-Fi network you are trying to connect to in this field.

Security Settings:

- **WPA/WPA2-PSK:** WPA/WPA2-PSK is a security encryption method for home and small business Wi-Fi networks.
  - Password: When selecting this security option during your Wi-Fi network setup, you will be prompted to enter the network password if there is one.
- **WPA/WPA2-Enterprise:** Enterprise is a more advanced security option designed for corporate and institutional networks. When choosing this security option, users are authenticated individually.
  - Username: Information related to the enterprise network user.
  - Password: Information related to the enterprise network password.

7.1.1.2 Ethernet

The Gateway has Ethernet connectivity, requiring a twisted pair network cable with an RJ-45 connector.

7.1.1.3 Mobile

In many locations, the availability of Wi-Fi and Ethernet network infrastructures is a problem, making it necessary to use mobile networks as a connectivity solution. To use mobile networks, a SIM Card from a carrier with coverage in the installation region and an active data plan is required.

Some network technologies are only available for specific models; information about the models is described in section 2.2. The following options are configurable:

- **APN:** The Access Point Name is an optional configuration.
  - Default: By default, this field is empty; in this mode, the device uses the chip information to select the APN automatically.
    Only public APNs from carriers work in this model.
  - Private APN: For this type of network, this field needs to be filled in.
- **Radio Access Technology (RAT):** Check the technologies (2G, 3G, LTE, etc.) available for each model described in section 2.2 and their availability in the location.

7.1.2 LAN configuration

Access to LAN settings is restricted to Wi-Fi and Ethernet interfaces. It is possible to configure the IP address statically or let it automatically obtain an IP address from the DHCP server:

- **Dynamic IP:** This configuration is selected by default from the factory, and no additional configuration is required.
- **Static IP:** When selecting this configuration, it is necessary to know some network information, such as IP address, Gateway, and mask.
- **DNS**

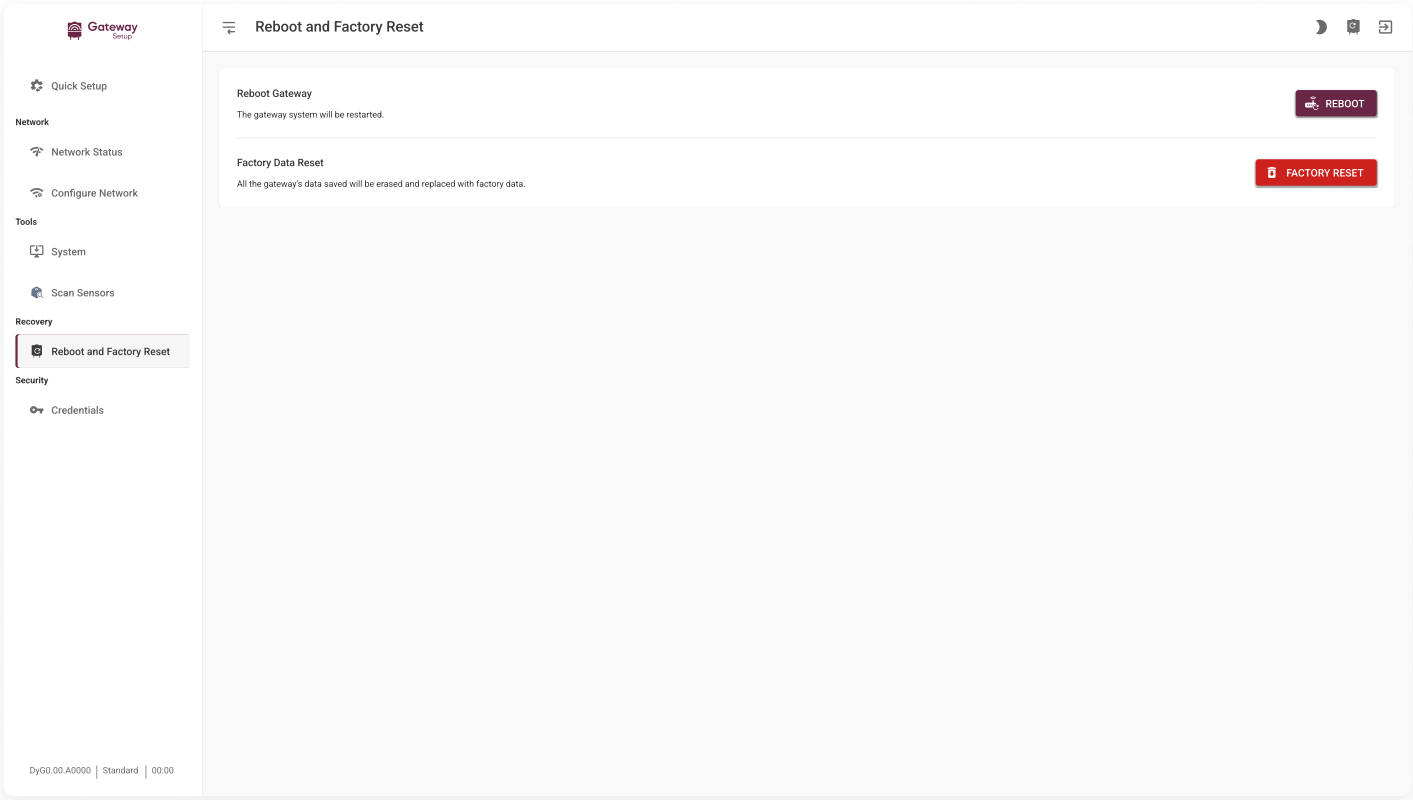
7.1.3 Time

The Gateway uses the NTP protocol for time synchronization, and it is possible to configure the server to be used.

- Server
- Port 123

7.2 System reboot

Rebooting the DynaGateway can be used when the device is not performing its functions as expected. To do this, the user should access the **Reboot and Factory Reset** tab in the side menu.



By selecting the **Reboot** button and confirming, the device will automatically start the reboot process.

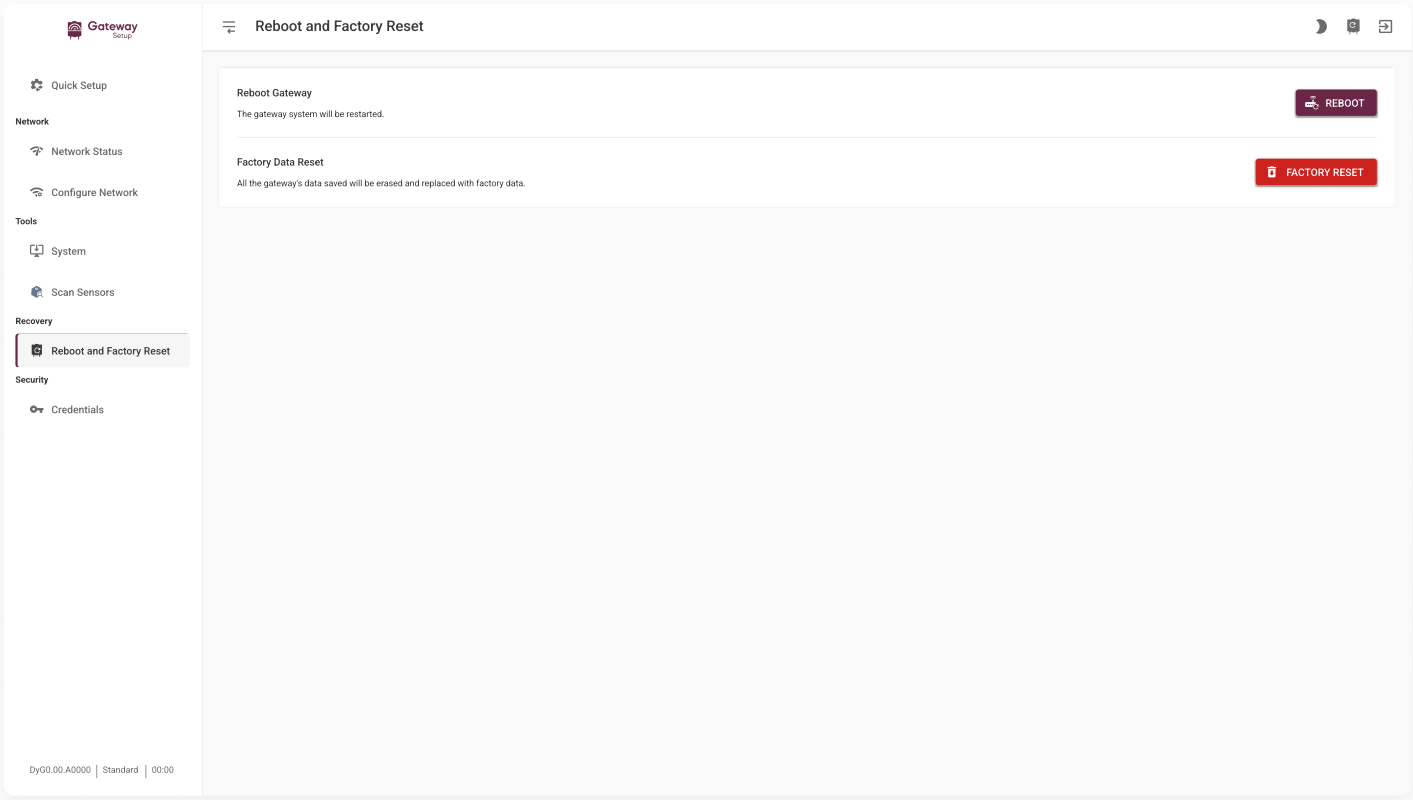
This procedure can also be performed using the physical **Reset/Config** button, requiring only a single touch for the Gateway to reboot. It is important to note that this process does not affect the configurations but rather the operating system that will be rebooted.

7.3 Restore factory settings

Restoring the settings to factory defaults resets the device and erases all previously made configurations, including registered access users and passwords and the communication interface, which will need to be reconfigured later. After the reset, the Gateway restarts and adopts the factory settings specified in 7.3.3.

7.3.1 Configuration restoration via Gateway Setup

To perform the restoration, the user should access the device's Web interface, go to the **Reboot and Factory Reset** tab in the side menu, and then select the **Reset** button. The process will start automatically after confirmation.



7.3.2 Configuration restoration via external button

It is also possible to restore factory settings by pressing the Reset button for 20 to 30 seconds, during which the Power LED will turn red. Releasing the button within this time will cause the LED to flash red for 3 seconds; to proceed with the reset, the button must be quickly pressed once. If this does not happen, the Gateway will reboot without erasing any data. Finally, the Power, Status, and Network LEDs will flash red if the restoration is successful.

If the user forgets the registered username and password for the device's web interface, a factory reset via the button will be necessary.

7.3.3 Factory settings

Factory settings are the configurations that the Gateway has when produced and that it assumes again after a factory reset action occurs.

- **Network Configuration**
  - Ethernet
  - Dynamic IP

- **Access Credential**
  - User: admin
  - Password: admin

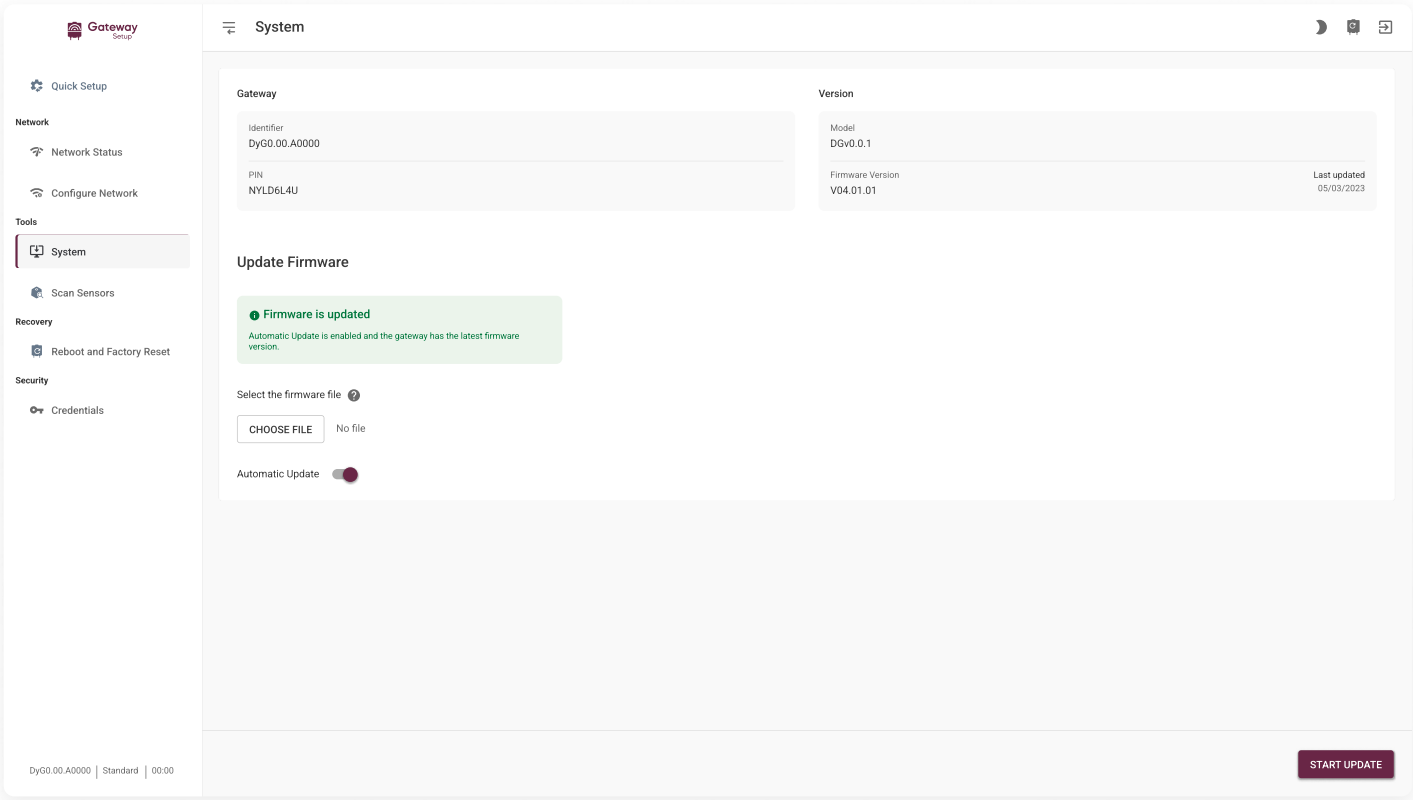
- **NTP**
  - Server address: time.google.com
  - Server port: 123

7.4 Firmware update

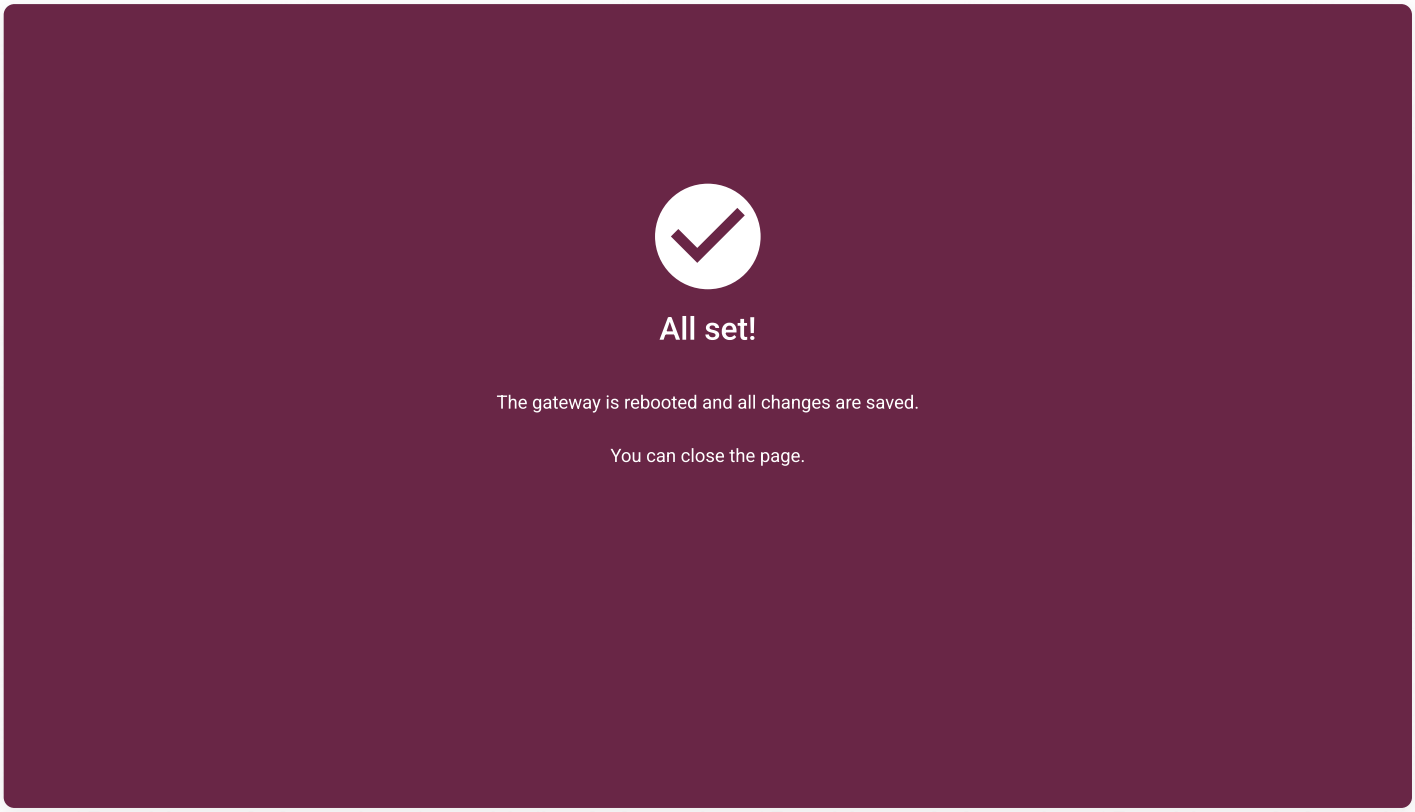
To keep your devices always updated with the latest features, Dynamox provides automatic updates for DynaGateways connected to the internet. In some cases, however, it may be necessary to perform a local firmware update.

To perform the process, the user must have the update file for the DynaGateway module. To obtain the latest update file, contact Dynamox technical support at **support@dynamox.net**.

By accessing the **Tools** tab in the side menu, select the **System** option. The user will have access to the information of the already installed firmware and the fields to perform the update. In the **Select the firmware file field**, select the **Choose file** option and upload the file (already saved on your computer) with the .bin extension.



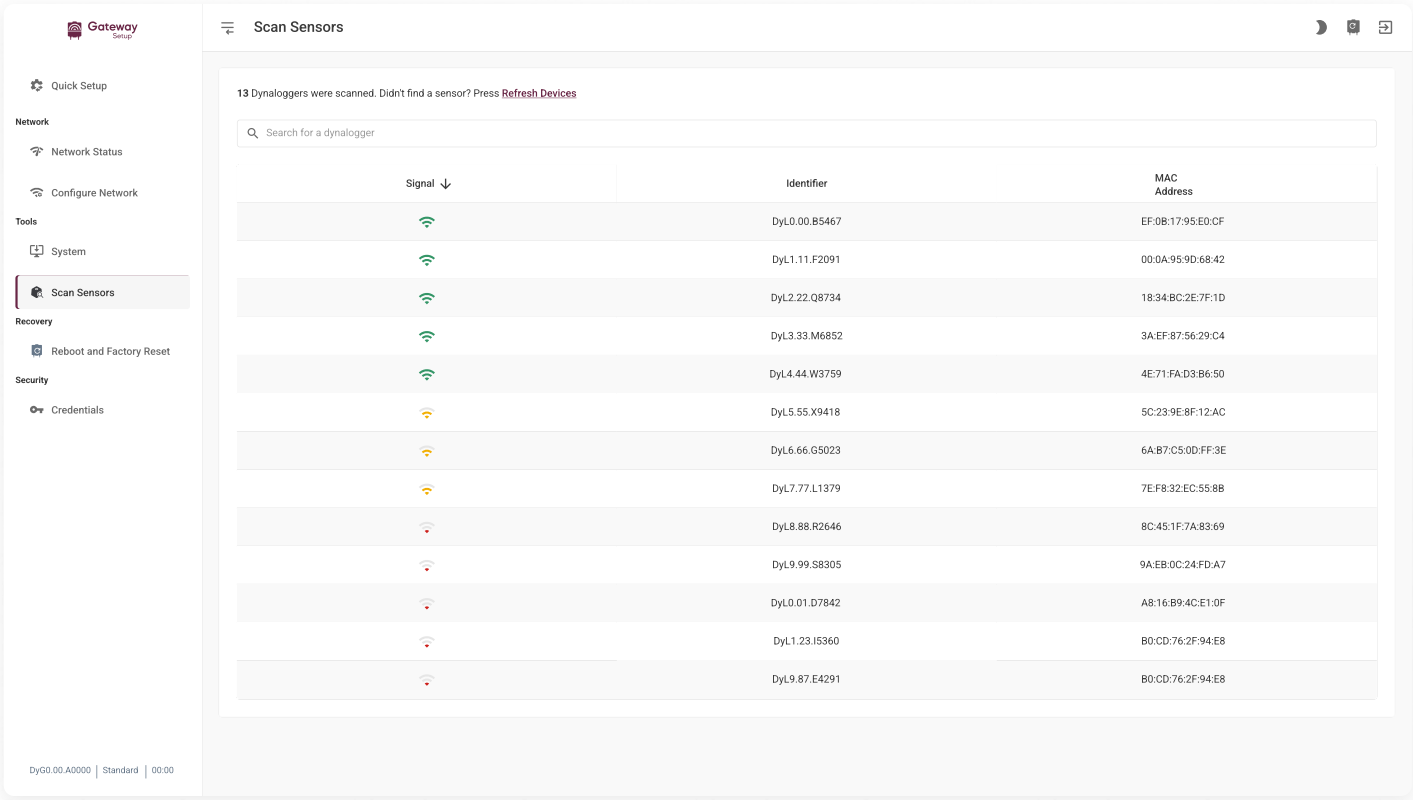
By selecting the **Start update** option, a confirmation window will be displayed to complete the process. Once completed, the user will be notified with a window indicating the success of the operation, and the DynaGateway will restart. The initialization behavior can be observed through the LEDs.



7.5 Sensors search within DynaGateway range

In addition to the sensor visibility information sent to the Dynamox Platform every 2 hours, the user can request a scan of all sensors within the DynaGateway's range at any time through the Gateway Setup.

The option can be found in the side menu under the **Tools** tab, select the **Sensors Visibility** option. After that, a screen with a central **Search devices** option will appear. By selecting it, the device will start searching for all sensors within the Bluetooth range. Upon completion, a table will be displayed containing relevant information such as the number of sensors, identification, MAC address, and signal strength at the time of visibility.



This mapping does not update the **Last visibility** field on the Dynamox Platform. The process only instantly shows the sensors within the Bluetooth range of the Gateway and can be used to help determine the best location for positioning the device.

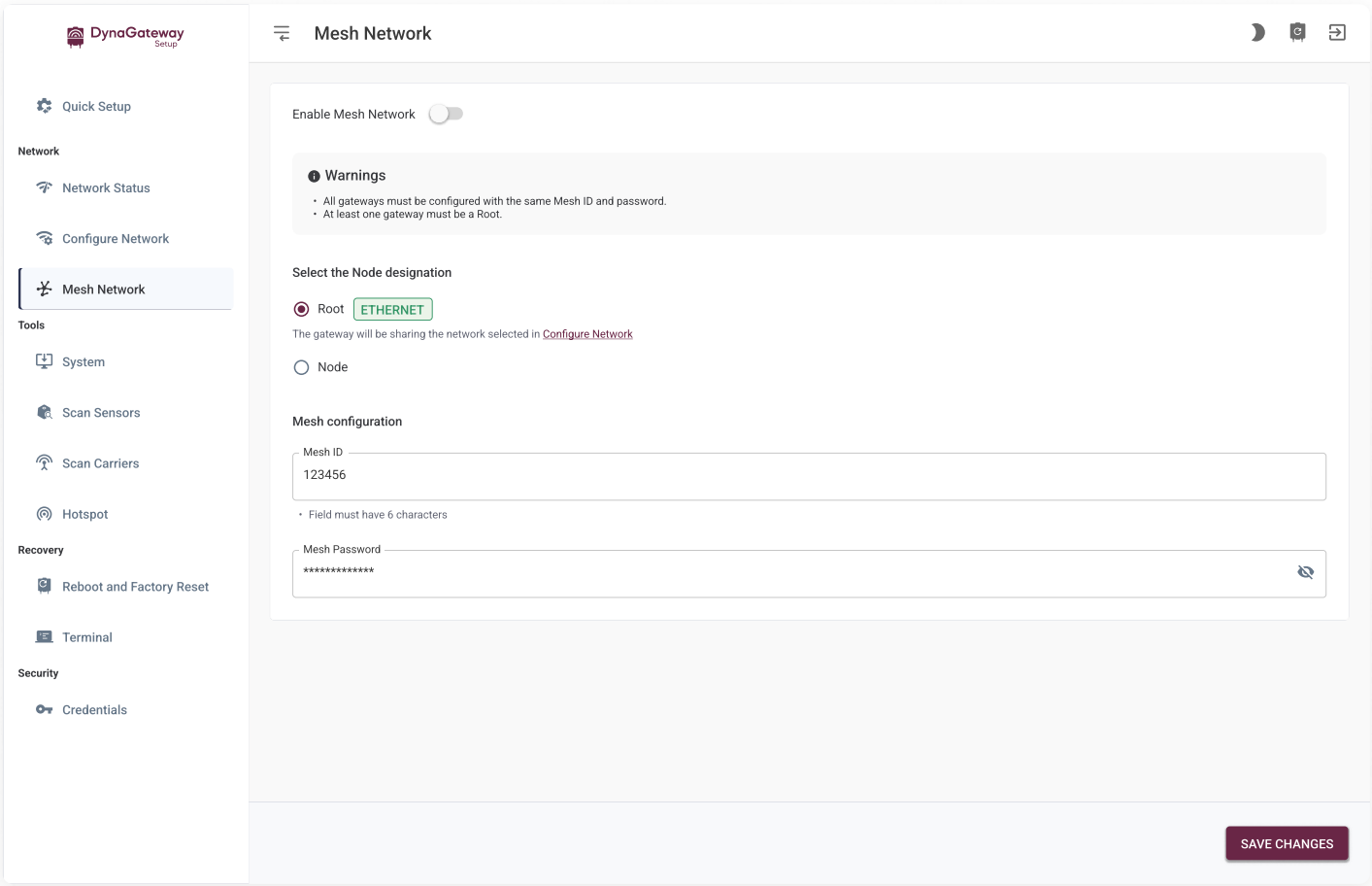
7.6 Mesh Network

A Mesh network is a network topology where each device is directly connected to all others, forming an interconnection mesh, allowing efficient and reliable communication even where individual connections may fail. In the DynaGateway, it is possible to activate this type of network.

By accessing the side menu under the **Network** tab and selecting the **Mesh Network** option, the user can access the Mesh Network configuration screen. To activate this network, enable the **Enable Mesh Network** option.

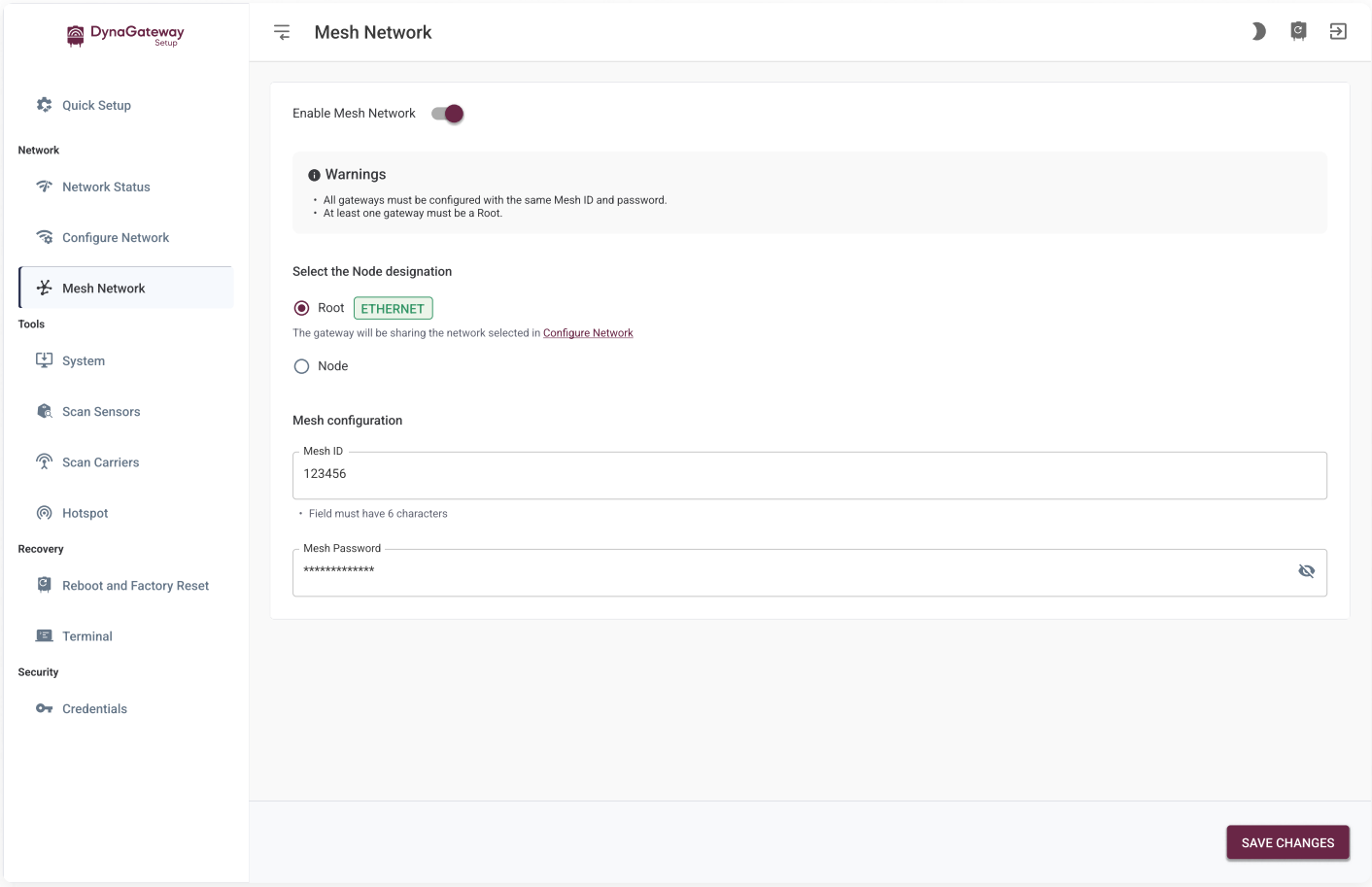
There are two configuration options in this network:

- **Root:** Responsible for communication with the external network.
- **Node:** Devices that will be connected to the sub-network created by the Root.



7.6.1 Configuring the Mesh Network for Root node

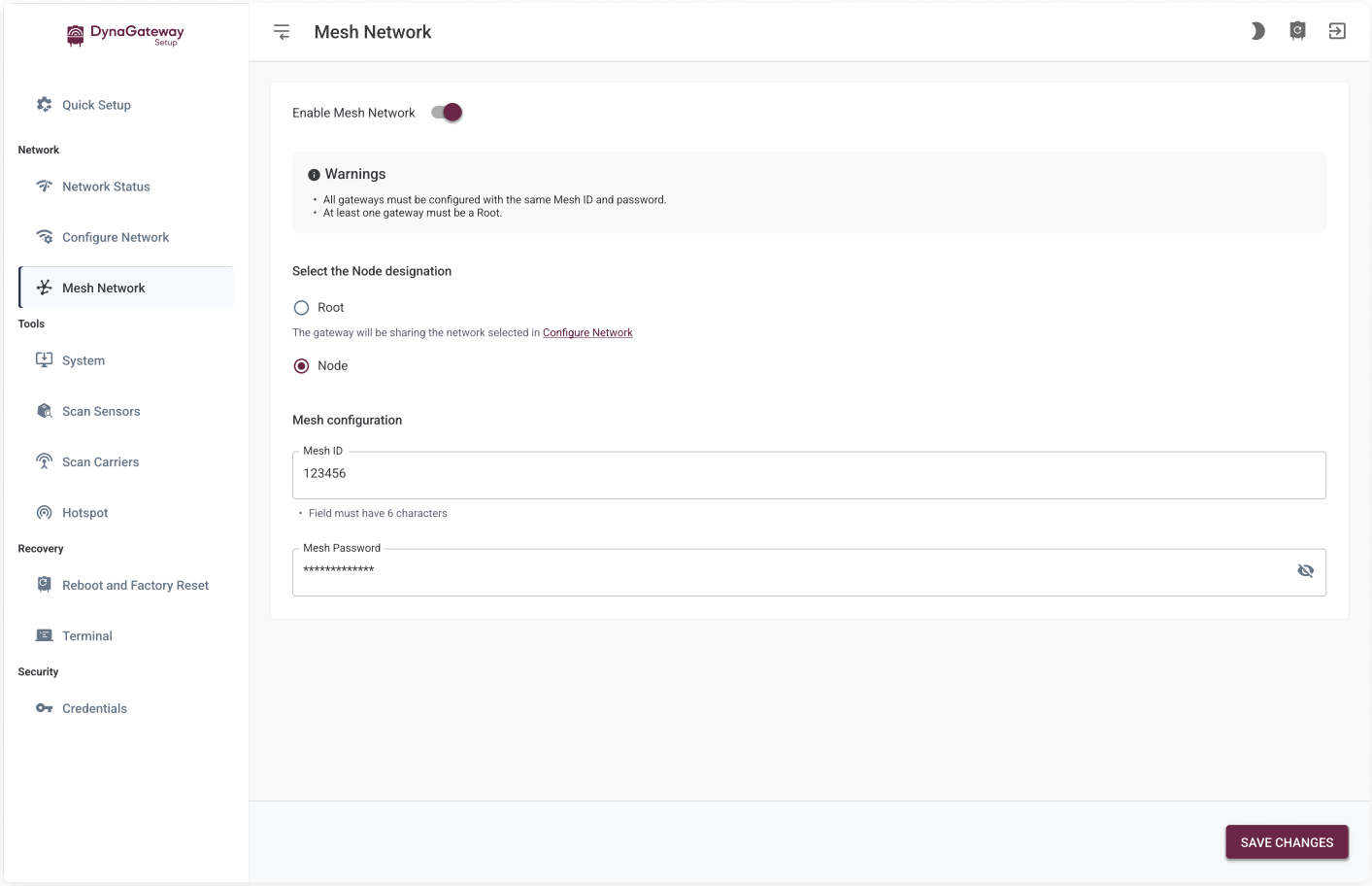
To use the DynaGateway as the Root of the Mesh Network, select the Root option in **Select the Node designation**. Then, in the **Mesh configuration** section, fill in the **Mesh ID** and **Mesh Password** fields to configure the Mesh Network access credentials. Click **Save Changes** to save the configurations made.



Finally, check in **Configure Network** if the interface that the root will use to generate the mesh network (the same indicated next to the **Root** option in **Select the Node designation**) is configured correctly, then restart the Gateway for the configurations to be applied.

7.6.2 Configuring the Mesh Network for Node Mode

To use the DynaGateway as a Node of the Mesh Network, select the **Node** option in **Select the Node designation**. Then, in the **Mesh configuration** section, the **Mesh ID** and **Mesh Password** fields must have the same values defined in the Root Gateway. Click **Save Changes** to save the configurations made and restart the Gateway for the configurations to be applied.



8 Additional information

This product is not entitled to protection against harmful interference and may not cause interference to a properly authorized system.

This product is not suitable for use in domestic environments because it may cause electromagnetic interference, in which case the user is required to take reasonable steps to minimize such interference.

For more information, visit Anatel's website: **www.gov.br/anatel/pt-br**↗.

This equipment has no right to protection against harmful interference and cannot cause interference in properly authorized systems.

This product is not suitable for use in residential environments, as it may cause electromagnetic interference that requires the user to take necessary measures to minimize such interference.

For more information, visit Anatel's website: **www.gov.br/anatel/pt-br**↗

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