DynaGateway

Configuration and use

Dynamox

DynaGateway Manual - Version 4 - July 2024 - Public Disclosure - Publication controlled by SGI

SUMMARY

1. Introduction

This document covers the processes of setting up, using, and operating DynaGateway, the automatic collector of data obtained by DynaLoggers, which monitors the health of industrial assets.

The DynaGateway's main purpose is to interact with DynaLoggers within its Bluetooth range, collecting vibration and temperature data and requesting spectral analysis periodically. The collected data is sent to the DynaPredict Web Platform, where it can be graphically visualized. To do this, it is necessary to provide the gateway with Internet access, using a Wi-Fi network, an Ethernet cable, or a cellular operator's network (mobile data).

In the following chapters, the recommendations for installing the product, the step-by-step configuration, and its main functionalities will be presented. It is essential that the information presented is followed so that the solution works as intended.

2. Product description

The DynaGateway works with the purpose of making the data from the vibration and temperature sensors available in the DynaPredict Web Platform in an automated way, generating a history of measurements to enable future analysis. In the lower front part of the DynaGateway are the main interfaces for product-user interaction, which are used in the installation and configuration processes:

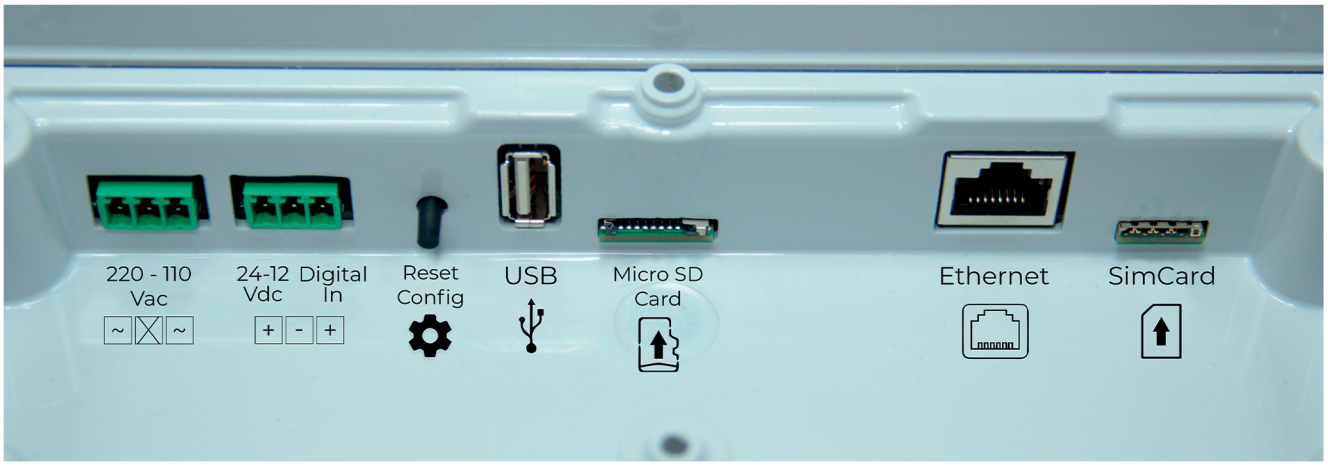


Image: physical interfaces for product-user interaction

1. Power input - AC voltage*:

Connection terminals for 110/220Vac power supply.
*Available only in models that have this feature.

2. Power input - direct voltage:

Connection terminals for 12/24Vdc power supply.

3. Reset Config Button:

Generates an Access Point (AP) for the user to have access to the DynaGateway configurations, and also has a reset functionality.

4. USB Port:

Enables the use of an external device to save gateway logs (use Dynamox Support).

5. SD Card:

Local storage of offline collection data for later submission to the Web Platform.

6. Ethernet:

RJ45 port for connecting the device to the Internet, via Ethernet cable.

7. Nano Sim Card:

Chip insertion for connection to mobile networks*.
*Functional only in DUO model.

The top center of the device housing contains the name, model, and serial number (DyG) of the DynaGateway. Due to the various communication interface possibilities for sending data to the cloud, the product is divided into models according to their basic connection characteristics:

- **DUO:** Allows the Gateway to connect via Mobile Networks (GSM/LTE), Wi-Fi or Ethernet.
- **EWI:** Allows the Gateway to connect via Ethernet or Wi-Fi.

	ETHERNET	WIFI	MOBILE NETWORKS
EWI	✓	✓	✗
DUO	✓	✓	✓

To better visualize the gateway's operating state, LEDs are also present on the product casing. They are: *power, status, and network*, which refer to power, internal status, and connectivity, respectively.

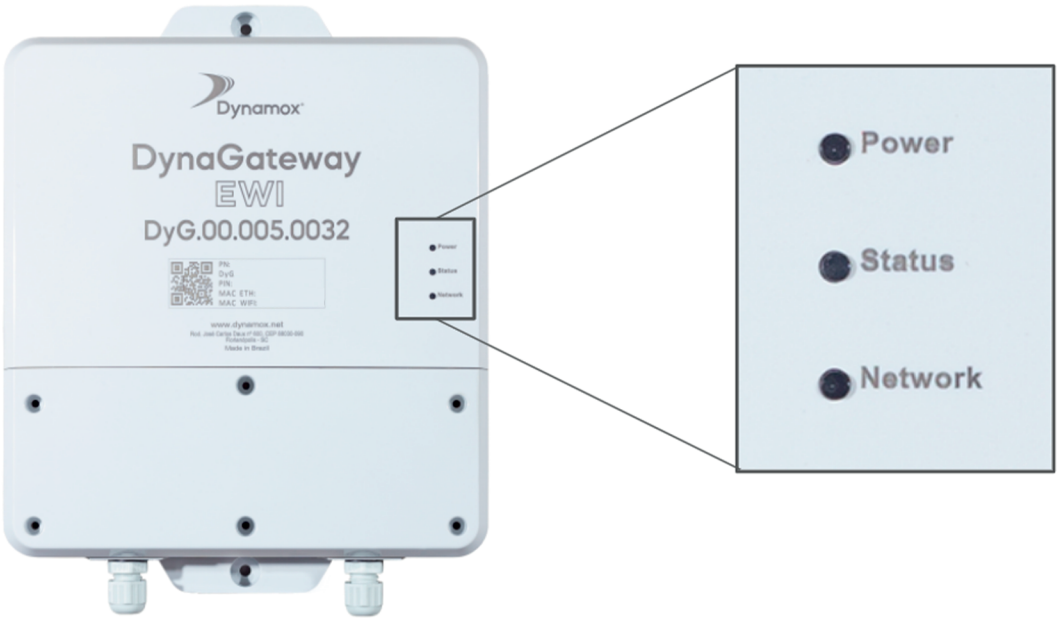


Image: Product connectivity LED

The functionality of each of the LEDs and their respective colors are detailed in section *4.3 - Communication Interface Status* of this document.

Next to the LEDs mentioned above, in the central part of the housing, you will find information about the product's Part Number, serial number, PIN number, and MAC address. This information is identified as below:

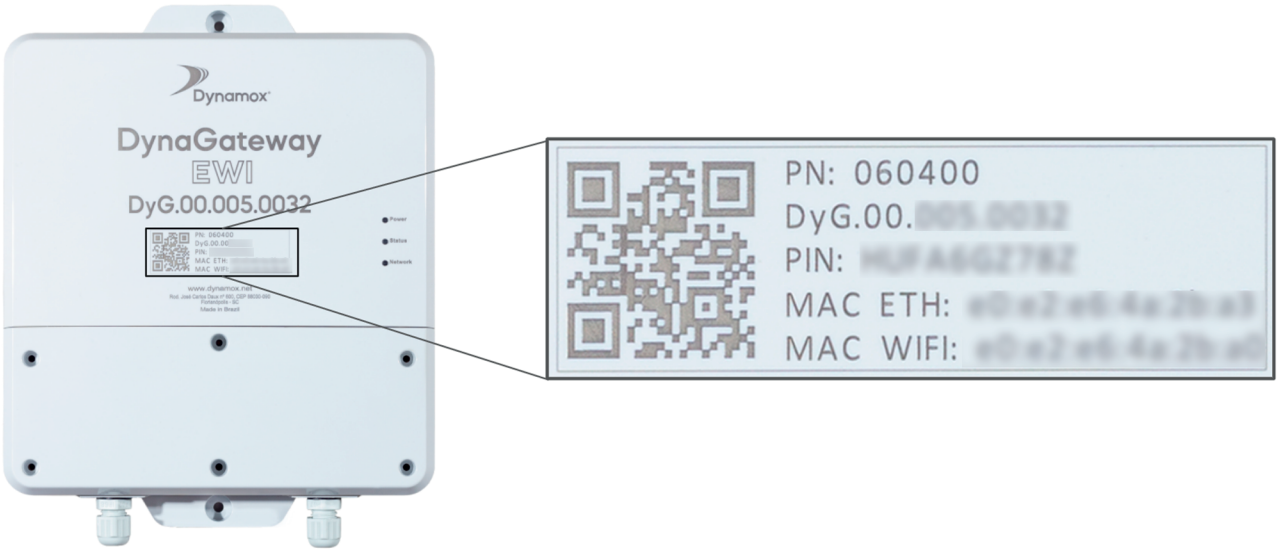
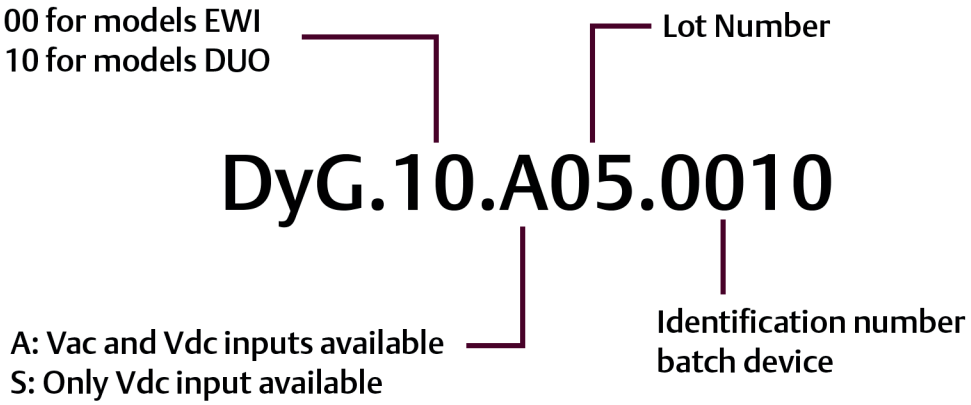


Image: Product serial information

- **PN (Part Number):** identification code of the product model, for commercial purposes;
- **DyG:** identification of the DynaGateway, used for connection to the device configuration Web interface;
- **PIN:** Used for adoption of the device in the Dynamox Web Platform;
- **MAC ETH:** MAC address of the device if the chosen connection interface is Ethernet;
- **MAC Wi-Fi:** MAC address of the device if the chosen connection interface is Wi-Fi.

The formatting of the DynaGateway ID code follows a standard construction of the form DyG.XX.WYY.ZZZZZ, where:



3. Pre-installation

The Gateway uses an Internet connection to send and receive information from the Web Platform regarding collections, spectral requests, and sensor parameterization. For a better usability of the DynaGateway and a better use of the functionalities it offers, some preparation requirements must be taken into account before installing the equipment in the field. Among the main ones, we highlight three (3):

- Verify the availability of internet connection;
- Release network traffic;
- Plan the gateway installation site in relation to the sensors.

3.1 Evaluating internet availability

Before positioning the device, it is recommended to check the availability of the chosen communication interface. This point is particularly critical when using Mobile Networks, since it is necessary to check the availability of Internet by carrier, technology and frequency, as well as the desired signal strength.

In the case of Mobile Networks, it is important to keep in mind that DynaGateway is enabled to work using a SIM card from any carrier, operating with GSM (2G), CAT-M1(4G) or NB-IoT (4G) technologies. In section 4.2.3 of this manual “Mobile Networks” you will find more information about each technology. Please refer to the product datasheet to know the frequencies supported in each technology.

For Wi-Fi and Ethernet connection, it is paramount to ensure that DynaGateway is cleared to connect to the local network and that the data it sends can travel outside the network (details in section 3.3, “Network Access Clearance”). In addition, it is recommended to verify that the plant Wi-Fi network has sufficient range, or that the Ethernet cable infrastructure is functional for connecting the DynaGateway.

3.2 Positioning recommendations

The correct positioning of the DynaGateway directly impacts the quality of the connection it will have with the DynaLoggers when receiving and sending information. In open field, the Bluetooth range of the gateway with the sensors is approximately 60 meters. However, the layout and materials of the machinery in a plant vary according to the standard of each company, and may generate different levels of interference in the communication.

It is recommended that the DynaGateway be installed one level above the plant machinery in order to reduce possible communication barriers that could interfere with the Bluetooth connection. The installation of the device at a central point in the plant is also worth considering, since it optimizes the range of the connection in all directions.

It is worth mentioning that the installation of the DynaGateway inside metal boxes drastically reduces the Bluetooth communication range.

To estimate the sensors within DynaGateway's range before field installation, we recommend using the DynaPredict application available at Play Store and App Store. In the side menu, the option "Search Spots" will find all the sensors already registered in the Bluetooth range of the cell phone, and can be used for an estimate of the signal quality of the connection between the sensors and the Gateway.

3.3 Releasing network access

When using a Wi-Fi or Ethernet network for communication, it is necessary to clear the network for outgoing data traffic for the following hostnames:

Hostnames:

- *.dynamox.solutions | Port: 443 and 8883 | Automatic communication and updating
- time.google.com | Port: 123 | Time Synchronization via NTP * *

*If it is not possible to release by wildcard (*), release dyg.gateways.dynamox.solutions on the ports 443 and 8883
* * All these can be replaced by simply *.google.com | | port: 123

Important Note: **The release must be done by hostname and not by IP address, since a hostname can assume different IP addresses.**

Dynamox is an ISO 27001 certified company, which concerns itself with information protection and security. The certification guarantees that Dynamox complies with the criteria established by the standard with regard to information security in its processes.

For more information about network release, please contact technical support (**support@dynamox.net**).

4. Installation

After clearing the network ports (if using Wi-Fi or Ethernet for communication), you need to connect the device to the mains (electrical power supply) and to the selected communication interface. This section provides instructions for the user to perform the installation and configuration of the chosen communication interface.

It is recommended that the procedures described below are performed initially in a place of easy handling of the product, since it is more convenient to configure its communication interface before placing it in the chosen location for its operation, to ensure more productivity and safety of the people responsible for the installation.

4.1 Power Supply

You can connect the DynaGateway directly to the power supply using the 110/220V AC voltage input (depending on the device model) or through a DC supply with 12/24V output. To do this, you need to connect the power cables according to the below configuration:

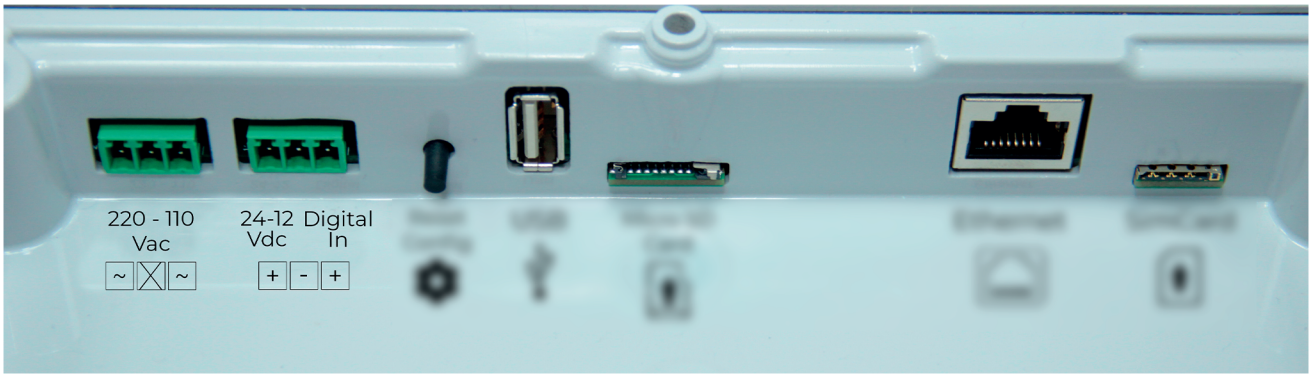


Image: Connecting the power cables

The power terminals are located in the front compartment of the product, along with the physical interfaces (Nano SIM Card slot, RJ45 port, Reset/Config button, etc.).

4.2 Communication Interface

To configure the DynaGateway's communication interface with the Internet, you must start the device's configuration mode, as follows:

1. Press the Reset/Config button for approximately 7 seconds, until the Network LED turns yellow when released.

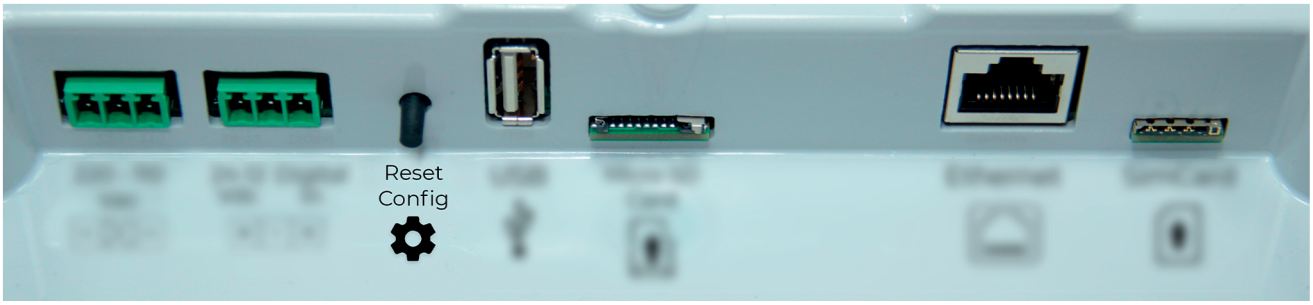


Image: Reset/Config Button

2. Connect to the Wi-Fi network generated by the device via a nearby computer or mobile device. The network generated by the gateway has the following credentials

- **Name (SSID):** serial number of the device, printed on the casing of the device. This number follows the standard DyG.XX.YYY.ZZZZZ, mentioned in chapter 2 - Product Description.
- **Password: 12345678**

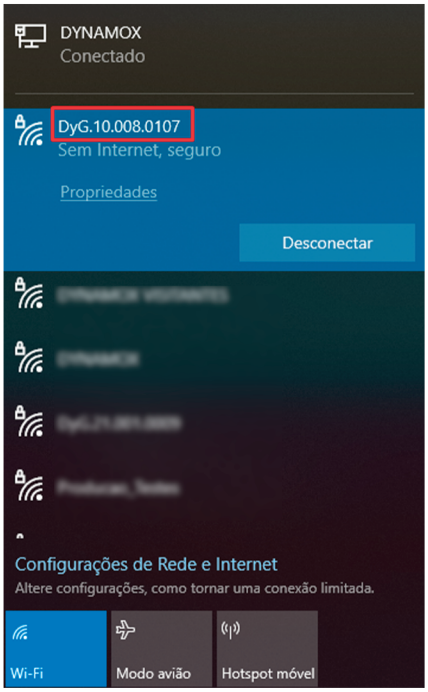


Image: Accessing the Wi-Fi network generated by DynaGateway.

3. In a web browser, access the IP address: **192.168.10.1** The subsequent screens will be the gateway's configuration interfaces, and so credentials are required so that changes can be made. To do this, the user must use:

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

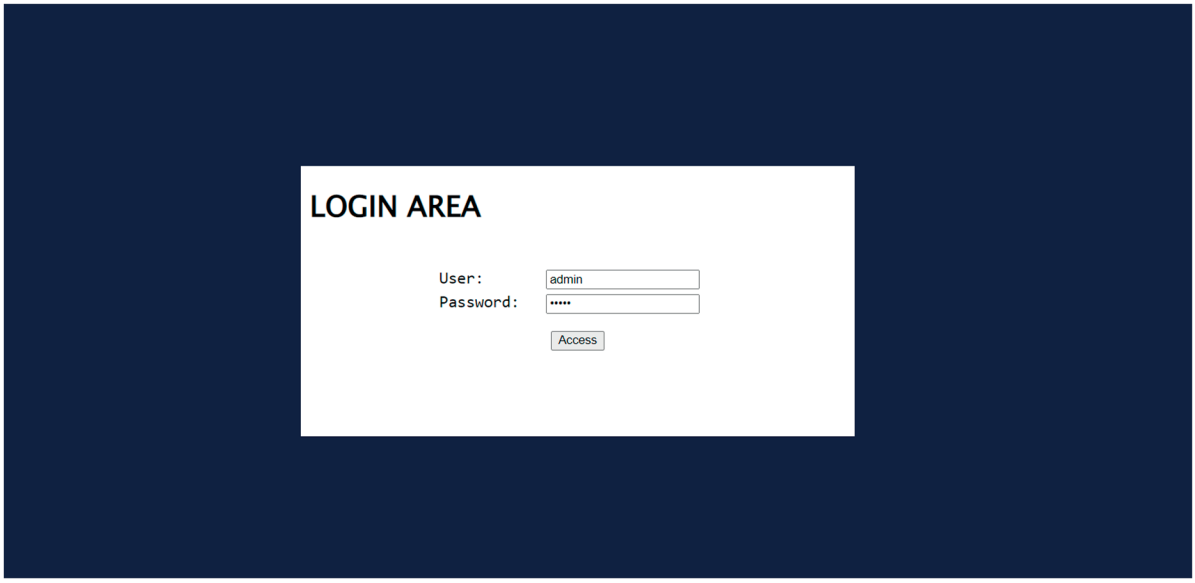


Image: Authentication procedure

When you log into the system and select the Status tab, you will see which interface is being used and, consequently, its current connection status. When accessing the top menu, on the Wan tab, the user will have access to the selection box of the desired communication interface.

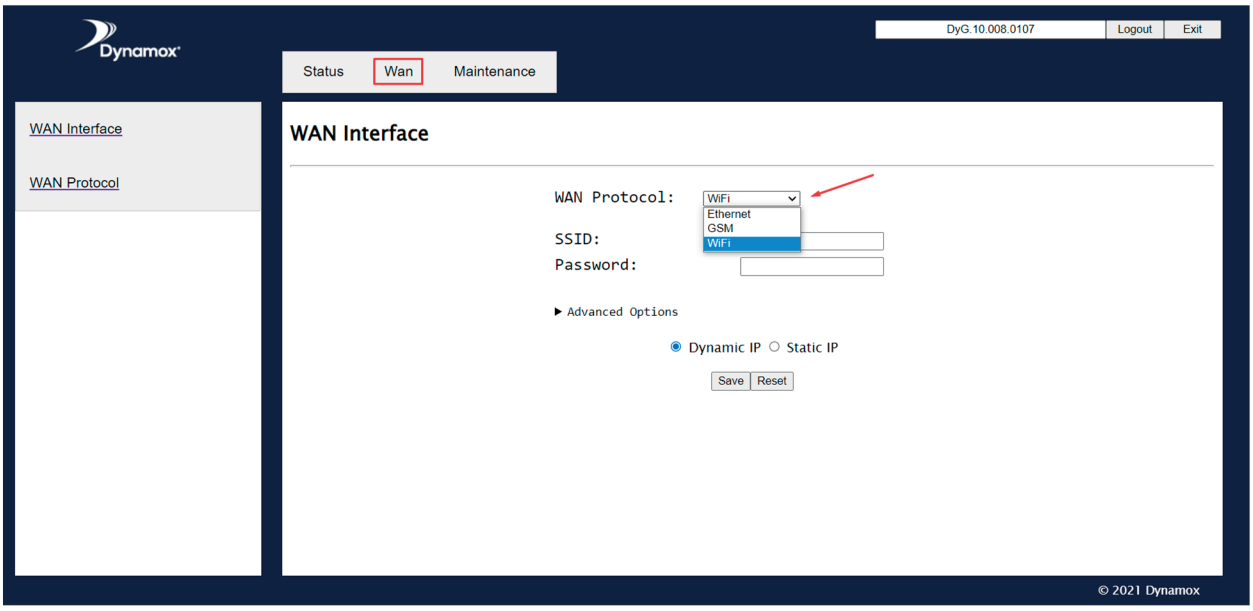


Image: Selecting the communication interface on the WAN Interface tab

In the following, the communication interfaces for the operation of the gateway will be detailed, as well as their installation and configuration process.

4.2.1 Ethernet

Connecting the device via Ethernet requires, in addition to network traffic clearance, an RJ45 cable connecting the device to a network access point. After connecting the cable, you must configure the interface via the WAN Interface tab, selecting the Ethernet option in the WAN Protocol box.

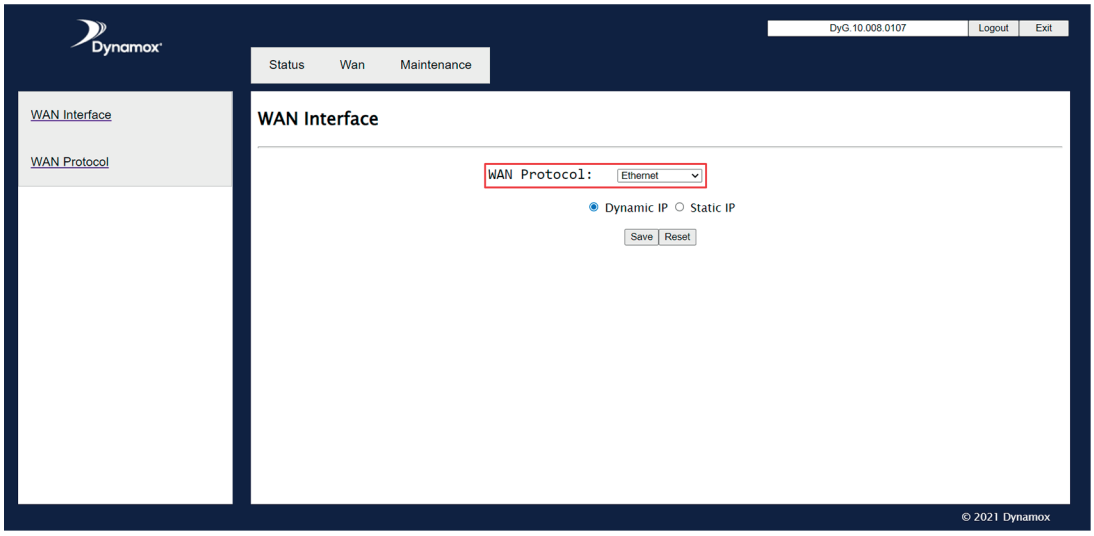


Image: Communication setup via Ethernet

If the Internet connection is valid (via RJ45 cable) and network traffic is properly cleared to the hostnames mentioned in section 3.3 - Clearing Network Access, the interface configuration is complete. By default, below the WAN Protocol checkbox, Dynamic IP is pre-selected and recommended for ordinary connections. If required, you can select Static IP to assign a fixed IP address, used in networks where IP liberation is required.

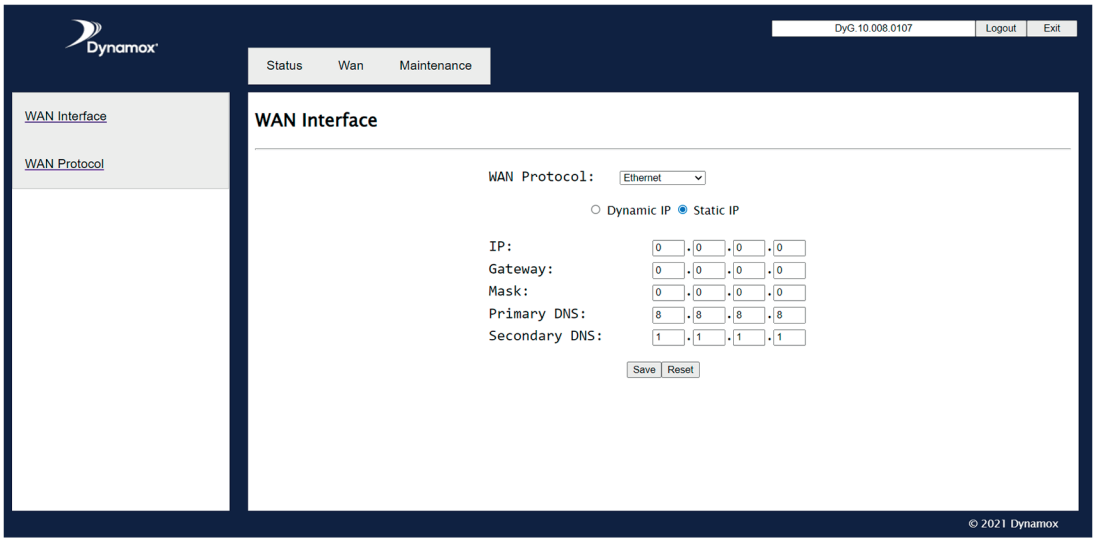


Image: Communication configuration via Ethernet with fixed IP

The department responsible for releasing the IP local network of your company must provide the data to be filled in on this screen. After completion, select the Save option to finalize the configuration.

4.2.2 Wi-Fi

The configuration of the DynaGateway connection via Wi-Fi is done entirely through the configuration interface. Starting, analogously to the Ethernet configuration, from the WAN Interface tab, the user must select the Wi-Fi option.

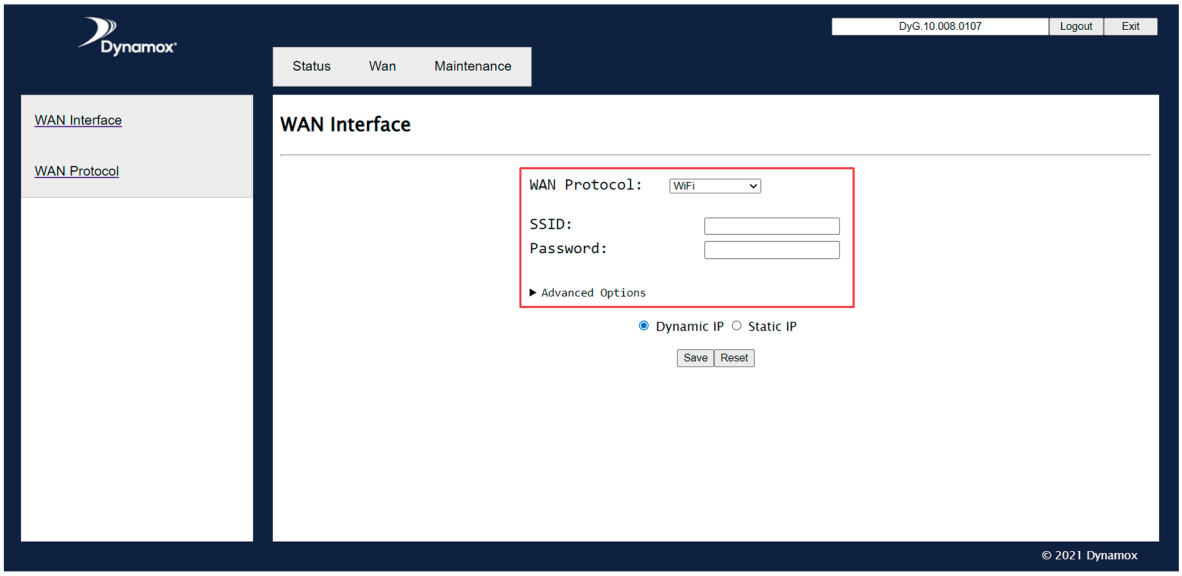


Image: Communication setup via Wi-Fi

Two fields will appear just below the selection. You must fill in the name (SSID) and password of the Wi-Fi network you wish to connect the DynaGateway to. As with the Ethernet configuration, you can use a fixed IP address by selecting the "Static IP" option. If this is not desired, the "Dynamic IP" option is already pre-selected and requires no additional configuration.

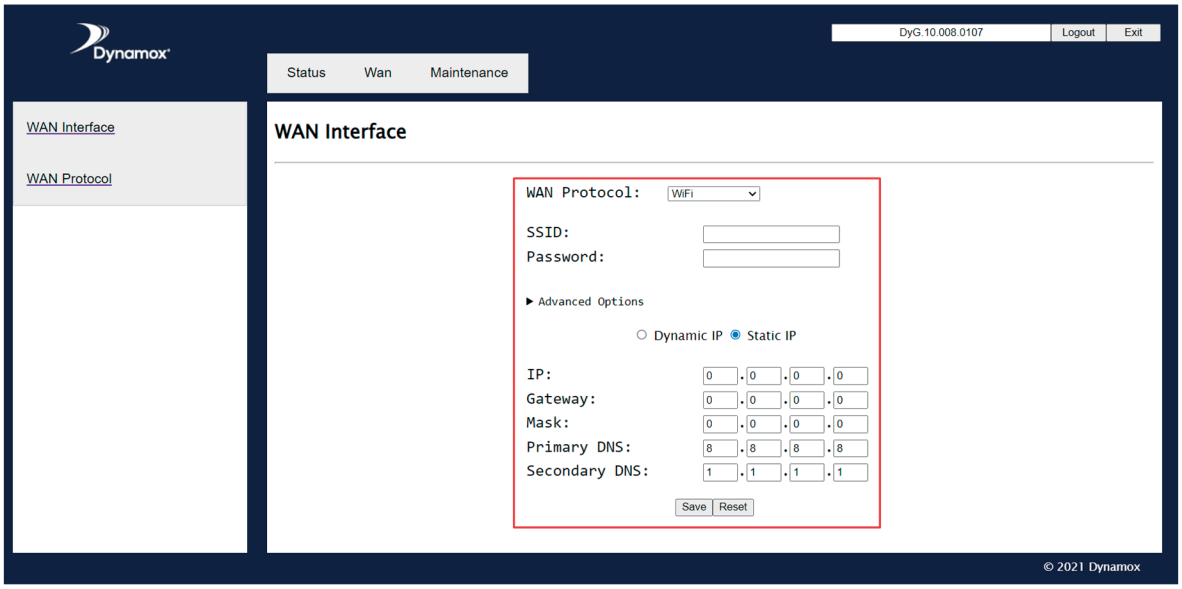


Image: Configuration of Wi-Fi communication with fixed IP

After filling out all fields, select the Save option to complete the 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). When you select Wi-Fi on the WAN Interface tab, the Advanced Options field will be shown, where the options for the WPA-Enterprise configuration will be displayed. The user must fill in the information regarding the user and password for the enterprise network. In this case, the user should leave the Password field below SSID blank.

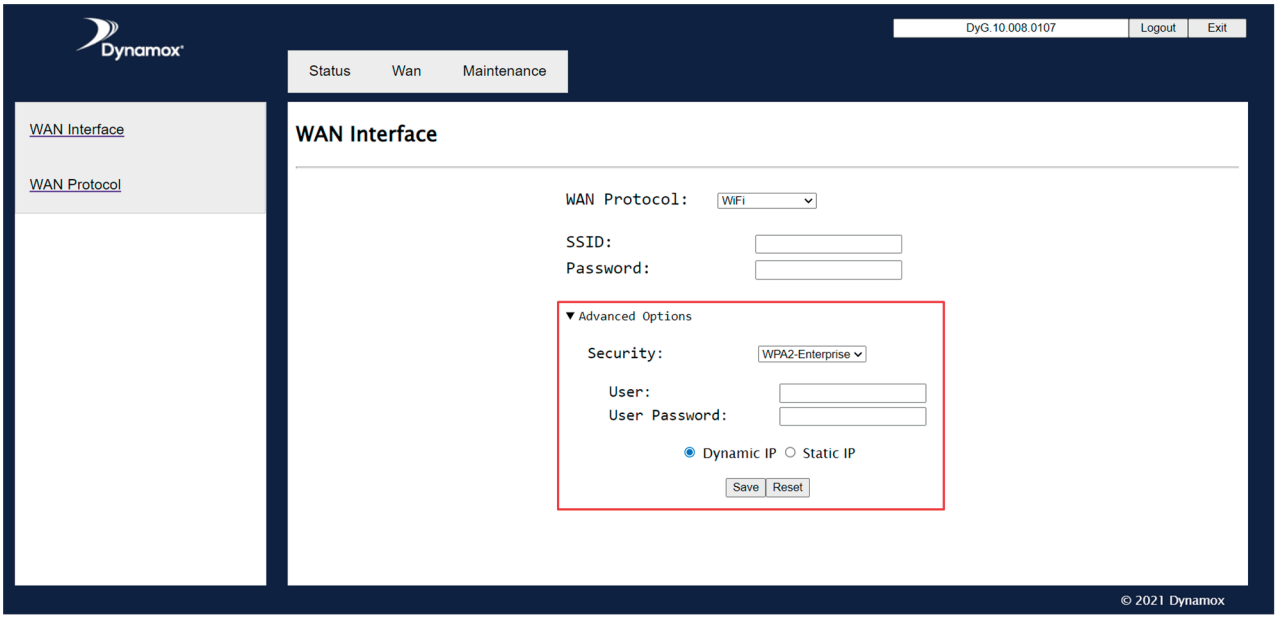


Image: Wi-Fi communication settings

When you select Save, the configuration of the Wi-Fi Gateway is complete.

Section 4.3 - Communication Interface Status mentions the status of the communication interface configured for the gateway. Here you can check whether the whole configuration process is correct and whether the device is ready to communicate with the cloud.

4.2.3 Mobile Networks

To use DynaGateway via mobile data (interface available only for DUO model), the user needs to have in hand a Nano SIM Card from the telephone operator of his choice, and the user, password, and APN information provided by them.

In addition to this data, it is important that the user also inquire about local coverage, taking into account that the Gateway can connect using any of the following technologies:

GSM (2G)

Despite being an older technology, 2G meets the needs of the DynaGateway well, and there is no compromise in its performance. A simple test that can be done to check the availability of its coverage is to access the Mobile Network settings of a smartphone and choose the option "2G only", and then try surfing the Internet using the SIM card of the chosen carrier. It is also possible to see details of the frequency and strength of the available signal using applications with this functionality.

CAT-M1 or NB-IoT (4G)

Within the fourth generation (4G) we find technologies aimed at communication between machines (Internet of Things - IoT). Because they are newer technologies, they have less coverage in some regions. It is important to understand that 4G coverage in a location does not necessarily guarantee CAT-M1 or NB-IoT coverage. Therefore, it is essential to find out about their availability in your region.

Depending on the location of the plant where the DynaGateway will be installed, all technologies may be present. If there is no recommendation from the telecom operator, you should verify (on a trial basis) which one has the best performance.

After inserting the Nano SIM Card into the device, it is necessary to configure the communication through the configuration interface.

Do not insert or remove the Nano SIM Card while the Gateway is powered on to avoid product failure.

On the WAN Interface tab, the user must select, in the WAN Protocol field, the "GSM" option. Below are the fields that the user must fill in, respectively: APN, login, password and connection technology according to those available in your region.

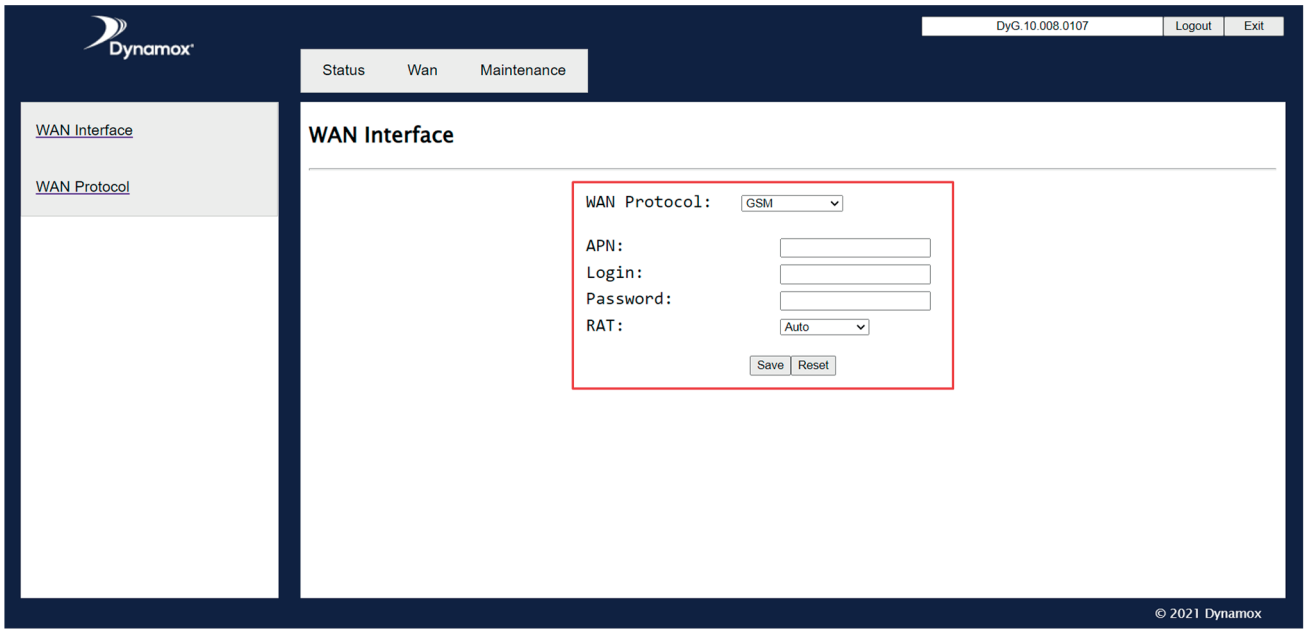


Image: Communication configuration via Mobile Data

After filling out the fields, select the Save option to complete the configuration.

4.3 Communication Interface Status

On the DynaGateway housing there are connection status displays and relevant user information via LEDs. Each of the three LEDs on the product refers to: Power, Status and Network. The color and behavior of the LEDs vary according to the activity the Gateway is currently performing or the state it is in:

1. Power

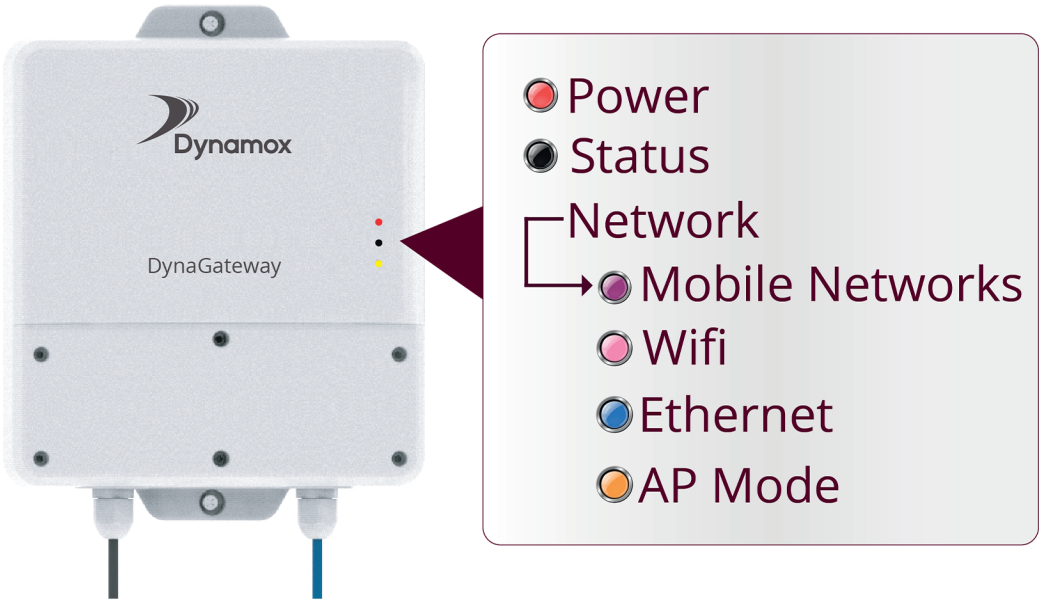
Continuously lit with red indicating that the device is powered:
Red: powered

2. Status

Alternates between on and off while the Gateway performs one of the following activities, depending on the color of the LED:
Blue: Communication with DynaLoggers
Green: Communication with DynaPredict Web Platform
Pink: Internal processing

3. Network

Changes color according to the communication interface chosen. If the LED is on continuously, the connection is successful. If the LED is blinking, this means that the gateway is trying to establish a connection:



4.3.1 Wi-Fi connection status

The DynaGateway Wi-Fi connection has some features that allow the user to visually identify the connection status. The LEDs are intended to show the user, at the time of installation, if the connection was performed correctly. Through the Status and Network LEDs, in pink (Wi-Fi), we have the following possible scenarios:

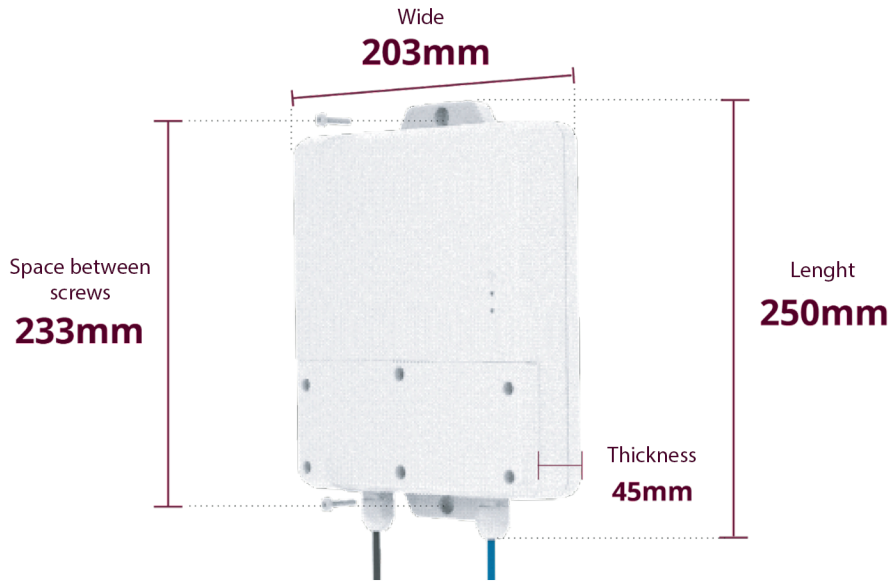
- **Network not found:** Status and Network LEDs synchronized, on for 9 seconds and off for 9 seconds.
- **Incorrect network password:** Status and Network LEDs synchronized, on for 12 seconds and off for 6 seconds.
- **Connected, no Internet:** Status and Network LEDs synchronized, on for approximately 1 seconds and off for approximately 1 seconds.

If one of the above patterns is reproduced at the time of configuration, the user should check the fields filled out on the DynaGateway configuration web interface, as per section 4.2.2 - WiFi.

The WiFi and Ethernet connections need to be able to access both the internal network and to send data out to the Dynamox platform via the wider Internet. If there is a communication failure in either of these, even if the settings are correct and there is a network signal at the site, the gateway will show an error pattern. Therefore, it is important to have the support of the company's IT department to identify whether the gateway was able to connect to the internal network and, in these cases, it is recommended to investigate whether there is any network disruption.

4.4 Mounting

After configuring the communication interface, you need to go to the set location to mount the DynaGateway. To perform the mounting process, it is important to consider the product dimensions and pay attention to the drilling patterns and the size of the recommended screw (M4) as such:



To access the product's physical interfaces (USB port, RJ45 connection, etc.), it is necessary to unscrew the lower front cover. It is worth noting that the tightening torque for this component should be approximately 3 N.m, considering the size of the screw and the manufacturing material of the case.

Just below, the threads attached to the bottom part give access to the passage of cables as such: on the left, the passage of power cables (Vac or Vdc power supply); and on the right, the passage of RJ45 cable (Ethernet). By turning counterclockwise, the passage will become looser and the cables can be inserted. To tighten, simply turn clockwise.

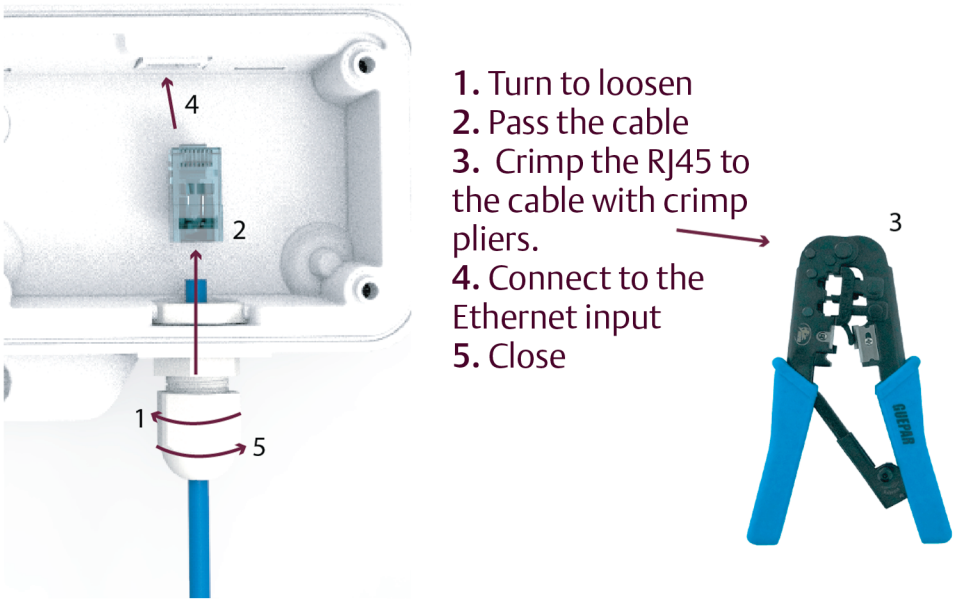


Image: Procedure for connecting the RJ45 (ethernet) cable

To ensure proper operation, it is recommended to access the configuration interface of the device and check the visible sensors in its range before closing the front cover and placing it in its final installation location. To perform this check, please refer to section 7.4 - Searching for Sensors in Bluetooth Range of this document.

Finalize the installation of your DynaGateway by closing its front cover, tightening the previously removed screws, and securing it in place. The positions indicated in the image below represent the gateway attachment points on the desired structure. To fix the product, consider a diameter of 5mm for the body and 12mm for the screw head, as such:

Image: Position of the screws

After configuring the communication interface and positioning the gateway in its operating location, the user can check the success of the process on the Power and Network LEDs (color according to the communication interface chosen, see section 4.3 - Communication Interface Status), both lit continuously.

Finally, to configure which Spots will be collected by the gateway, the user must perform the process of adopting and configuring the gateway collections through the DynaPredict Web Platform, described in subsequent sections.

5. Adoption and Configuration

After performing the necessary network and communication interface settings of the gateway, it is necessary to access the Web Platform to adopt the device in a work area and set the operating parameters, such as: sensors to be collected, collection interval of continuous values and spectra request.

To do so, the user must access the Platform (dyp.dynamox.solutions) and, from the side menu, access the tab Gateways. When entering, a table will be displayed with the list of gateways already registered in the work area where the user is located.

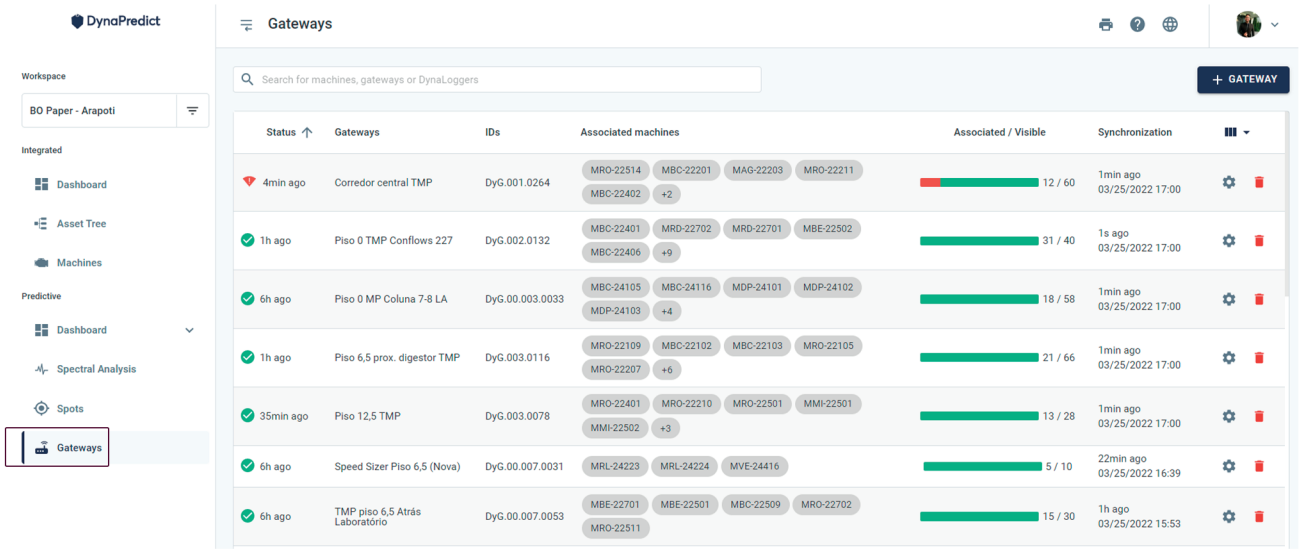


Image: Dashboard Gateways

5.1 Adopting a DynaGateway

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

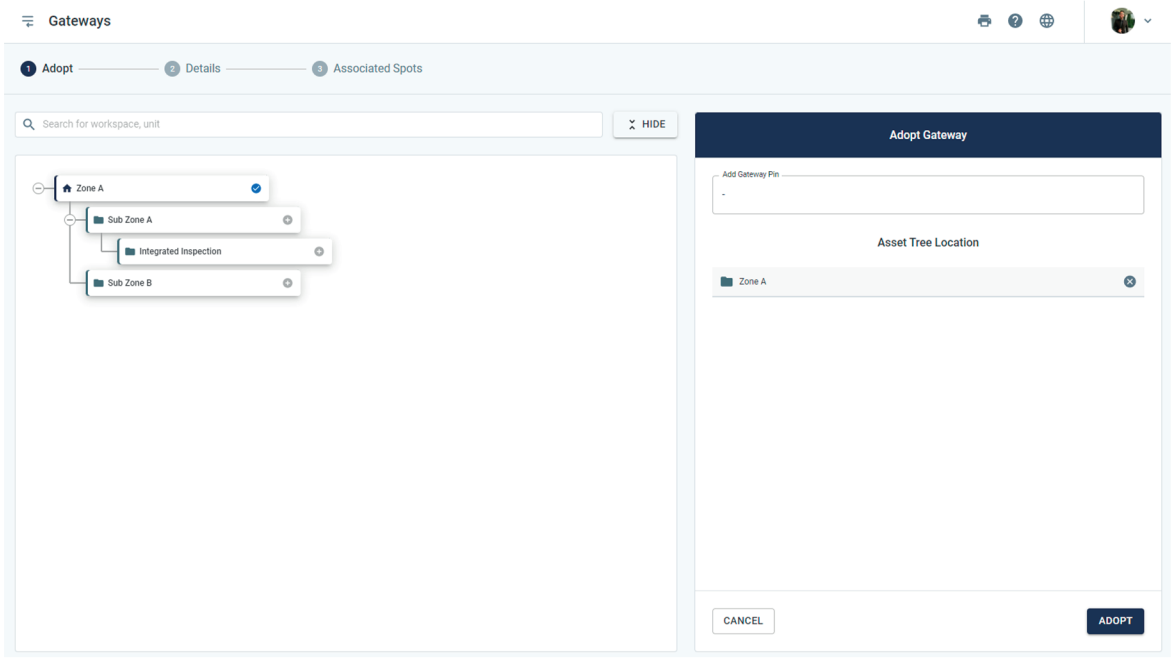


Image: Adopting a Gateway

On the right side of this screen the user must enter the PIN of the device, printed on its casing. Using the asset tree on the left, you must select in which sub-area the Gateway will be placed. This will influence the restriction of the group of sensors that can be associated with the gateway, 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 as levels below. When clicking on the Adopt option, the Details tab will be displayed to the user.

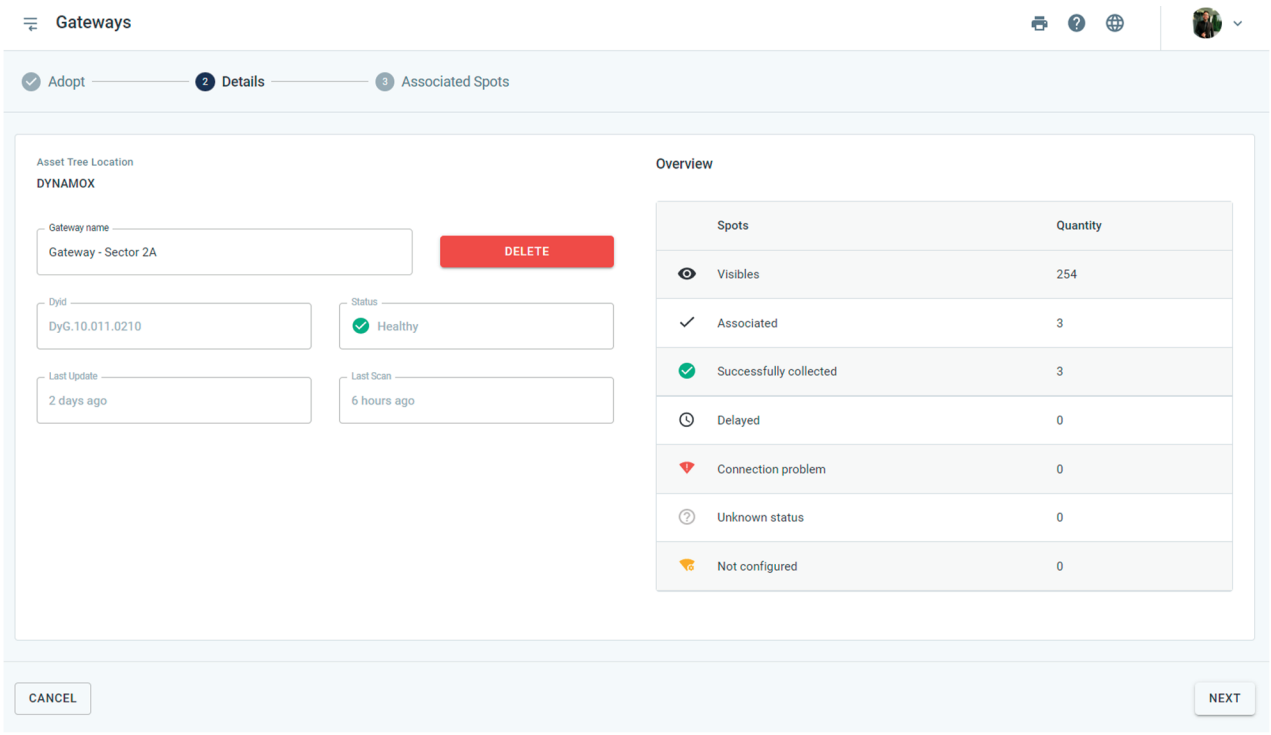


Image: DynaGateway configuration details

The left side of the screen displays general information about the gateway, such as the assigned name (which can be edited), the product serial number, the last edit made on the Web Platform, and the last visibility update.

On the right side, there is information related to the status of the Spots that are in range of the gateway and the spots associated with it. The status of each icon is detailed in section 6.1 - Connecting to Spots. Spots visible to the gateway are all those within range of the gateway, i.e. including sensors that are not associated with the gateway. This concept can help determine a better use for the device, ensuring that it is configured to collect data only from DynaLoggers that are actually within range.

By selecting the Next option, you can associate the Spots that should have their data collected by the gateway, either continuous (global) values or spectral analysis. To do this, select the option + SPOT to see the Spots available for association.

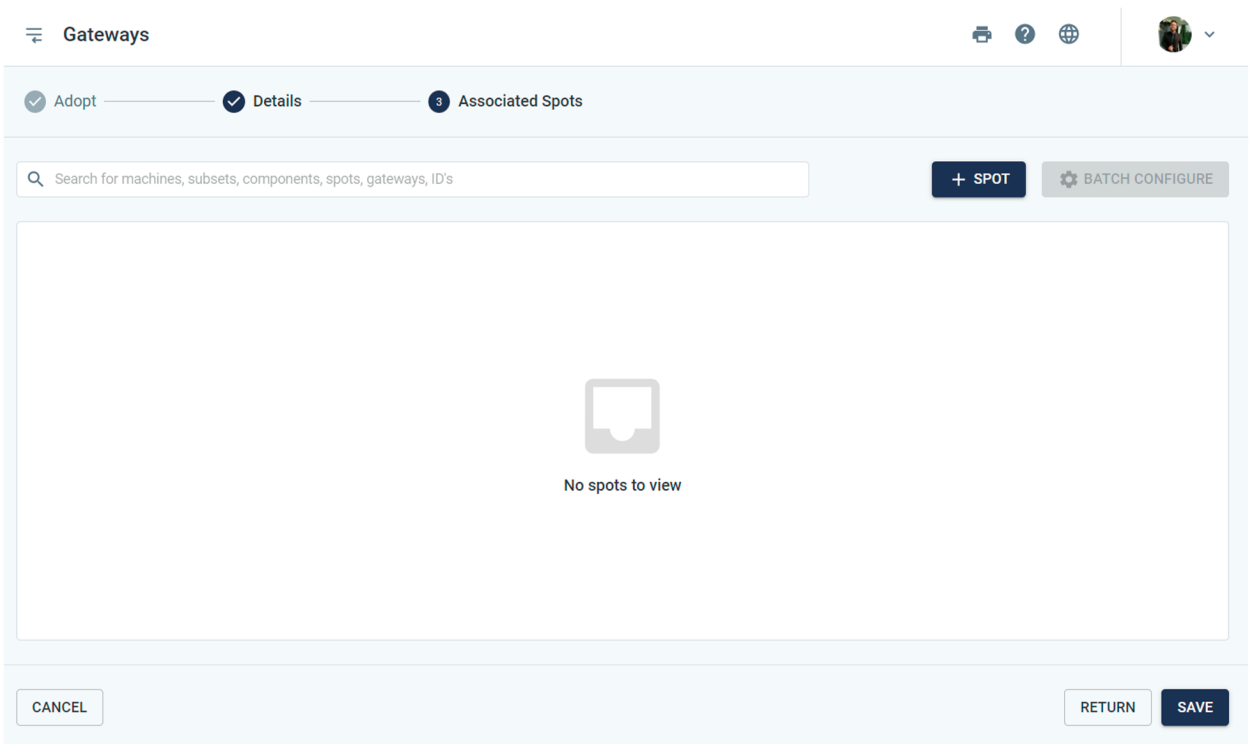


Image: Spots associated with the Gateway

The list of Spots below will be shown according to the desktop where the Gateway was previously configured. The option ONLY VISIBLE SPOTS allows you to filter 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 on and have recently had a visibility update. This update does not occur at the same instant that the gateway is connected to the network, meaning that this process may take some time to complete. It is still possible, in all cases, to uncheck the option ONLY VISIBLE SPOTS to associate the Spots, keeping in mind that the gateway does not yet have the information whether the sensor is within its communication range.

Likewise, it is important that the device is also already positioned in its installation location, since it will inform the user which Spots are visible to him for a future association.

To add a Spot, simply select the icon to the right of it and change it to " ". If the Spot in question is already associated with another gateway, the icon shown will be . In the left corner of the screen the signal strength of each Spot visible to the gateway will be shown, which can help in the process of positioning the device.

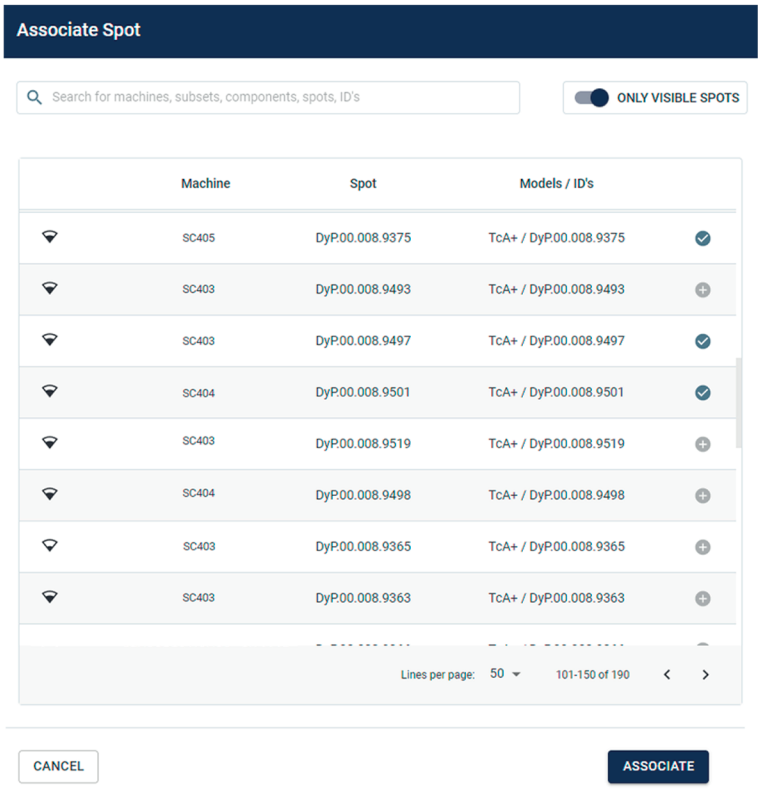


Image: Association of Spots

At the end of the process, select the Associate option to add 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, in order 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, it is necessary for the user 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.

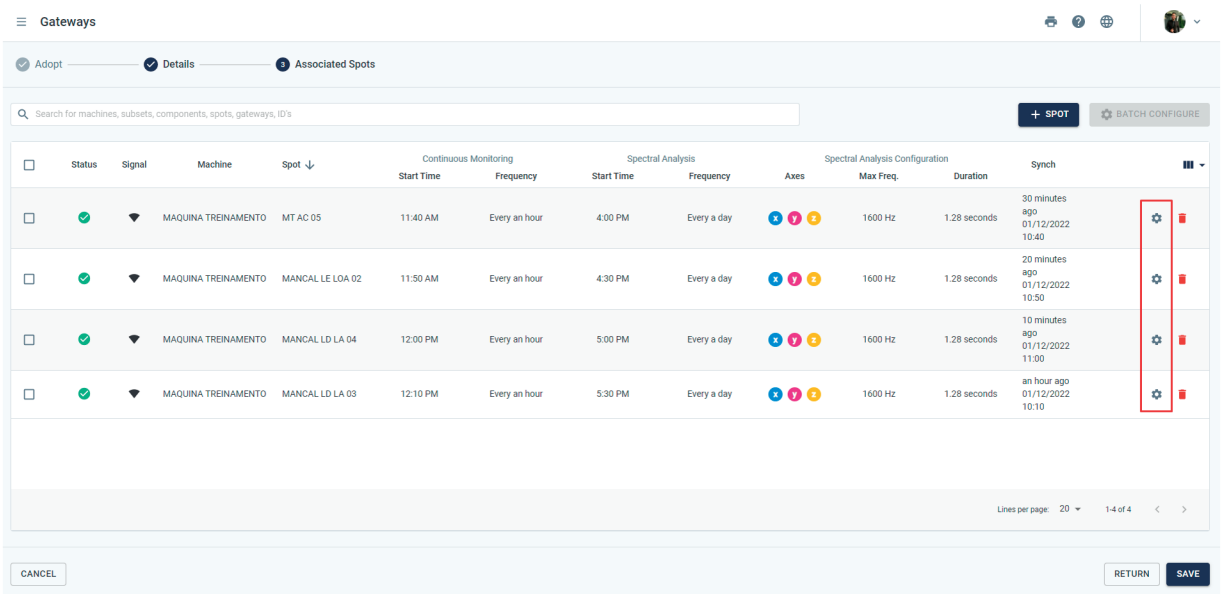


Image: Button for configuring the Spot's collection parameters

In cases where there are several DynaLoggers associated with the same gateway, it is important to configure all the Spots in a standardized way, generating a uniformity in the data posting and speeding up the parameterization process. This way, in the upper right corner, the user can select the option BATCH CONFIGURE , which becomes available for selection when more than one Spot is selected in the list.

To set which Spots will be configured simultaneously, select the check box to the left of the corresponding spots. To select all of them at once, check the checkbox above the Spot list.

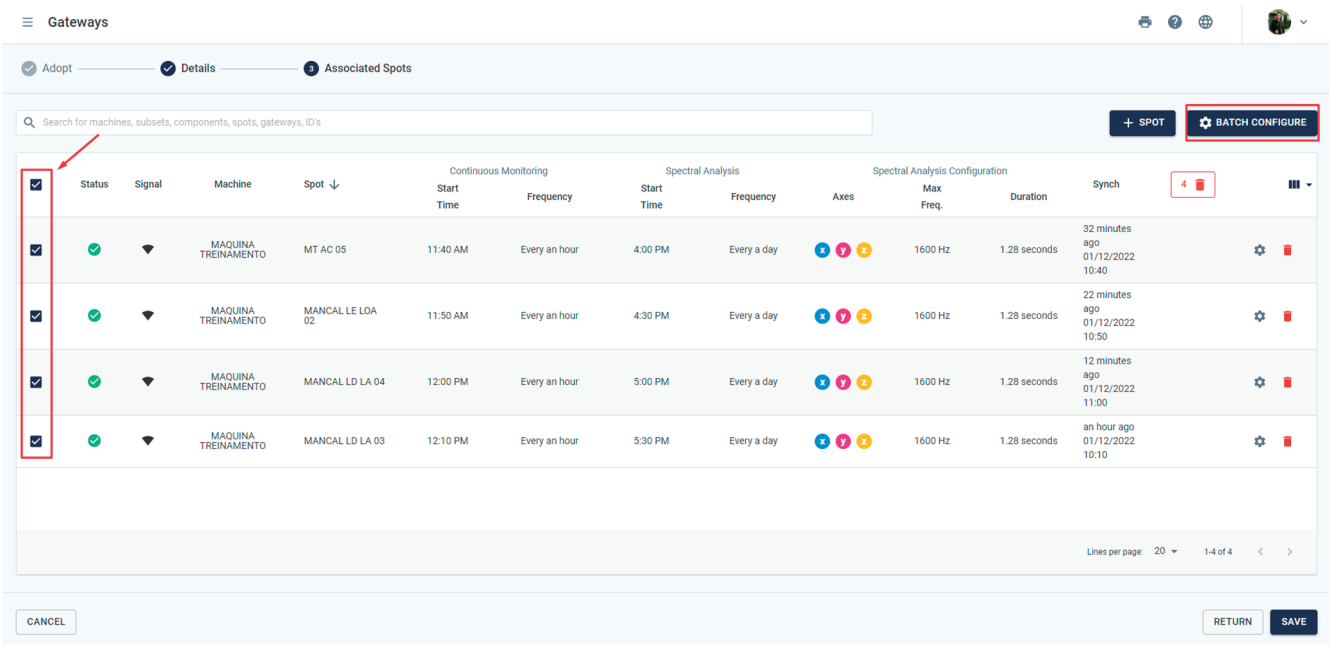


Image: Selecting Spots for Batch Configuration

The screen for configuring collection and spectral analysis schedules is the one that sets how often DynaGateway will communicate with sensors and send data to the Platform. This screen is composed of two monitoring options:

- **Collection:** for setting the times at which the gateway will communicate with DynaLogger to request the collection of the global data stored in its internal memory.

- **Spectral Analysis:** for setting the times at which the gateway will communicate with DynaLogger to request a spectral analysis on a given Spot.

In each type of monitoring, it is necessary to set the start time for the collections and the periodicity 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 set 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 Gateway transfers the data to the Platform and empties the sensor's memory.

Example: a DynaLogger with a sampling interval of 5 minutes generates vibration and temperature samples according to its sampling 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 the Batch Configuration, it is also necessary to inform the Interval of Actions between Spots, so that from the starting time of the collection of the first Spot on the list, the gateway sets the times of the other Spots. When selecting the option BATCH CONFIGURE , the configuration window will be displayed for the user to fill in the following fields:

Continuous Monitoring:

- **Start time:** start time of the schedule, i.e., time when the first Spot in the list will be collected.

- **Interval of actions between Spots:** time interval between Spot collections, starting from the point immediately before the one collected. In the second Spot in the list, for example, its collection time will be the start time of the first one added to the action interval between Spots and so on.

- **Interval:** interval of the complete collection cycle. Unlike the interval of actions between Spots, this value refers to the periodicity of the collection cycle, that is, every how many hours the monitoring point will have its data collected again. For example: a starting time at 09:00 with a 3 hour interval, resulting in collection cycles at 09:00, 12:00, 15:00, and so on.

Spectral Monitoring:

- **Start time:** start time of the scheduled programming, i.e., time when the first Spot in the list will have its spectral requested.

- **Interval of actions between Spots:** time interval between Spots' spectral requests, starting from the point immediately before the one collected. This field is analogous to continuous monitoring, except the type of gateway action will be different.

- **Interval:** Interval of the complete cycle of spectral collections. Unlike the interval of actions between Spots, this value refers to the periodicity of the collection cycle, that is, every how many hours the monitoring point will have its spectra requested again. For spectral monitoring, the minimum value of this field is 1 (one) day.

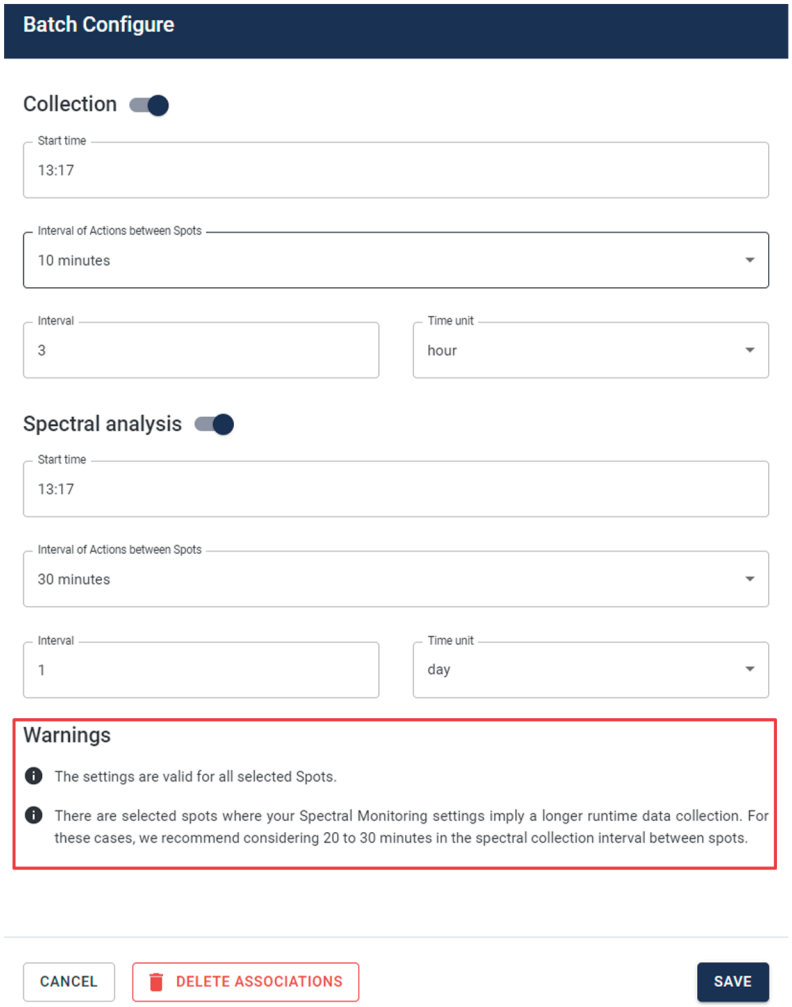


Image: Batch Parameterization of collection intervals and spectral analysis

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

If the icon appears, it means that the volume of actions associated with that gateway may be exceeding the time allowed to execute them. In this situation, the daily operations of continuous and spectral data collection together have an estimated time of more than 24h to be performed, and it is possible that this will result in a progressive delay of the gateway's processes. In this case, we recommend reconsidering the collection volume or spectral settings of the spots to avoid delays.

By clicking on the button, **SAVE** you will be redirected to the Spots screen to configure the rest of the monitoring points. When the configuration process is finished, the user must select the button **SAVE** again to finalize the gateway adoption.

5.2.1 Practical example of DynaGateway configuration

As commented earlier, the time taken for the gateway to perform a spectral analysis depends on the volume of analysis data and the stability of the internet. Generally, 30 minute intervals are considered for this action and 10 minutes for continuous data collections.

In this example, collections are alternated with spectral analysis in a schedule with 20 Spots, according to the configuration below:

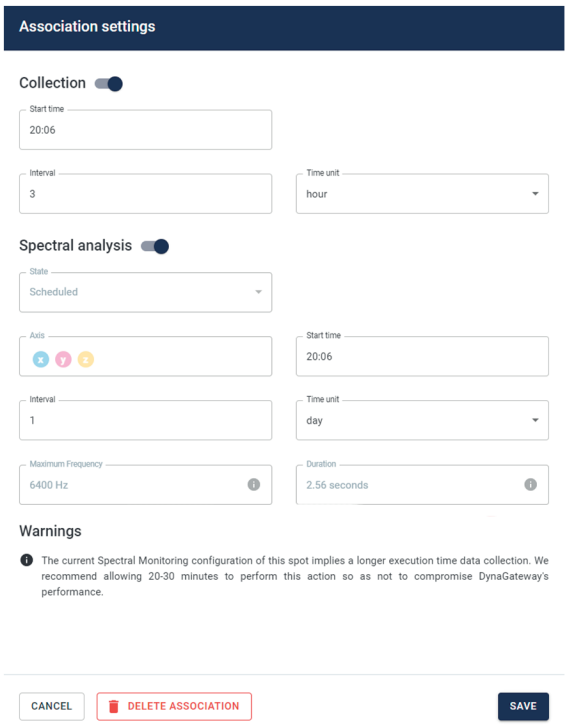


Image: Batch configuration of collection intervals

Thus, all continuous spot data will be collected within 4 hours (20 x 10 minutes ≅ 4 hours), and therefore this is a valid periodicity. Also, the intervals considered between actions respect the time allowed for the gateway to perform them.

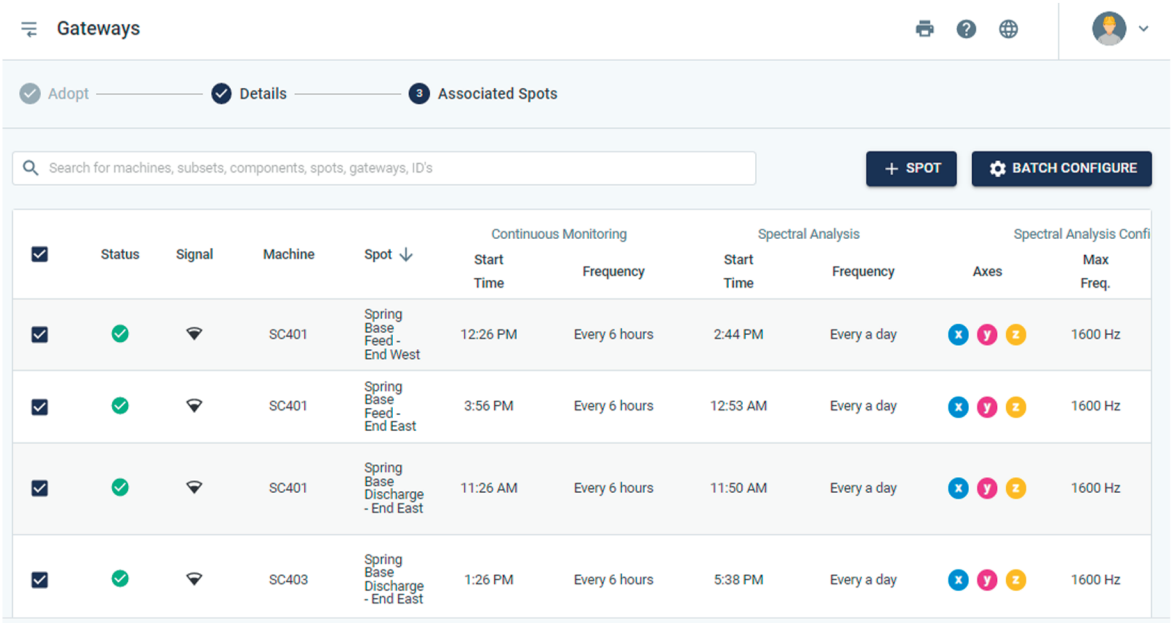


Image: Gateway Operations Schedule

Thus, the first Spot is collected at 00:00 and begins its spectral analysis at 03:05. The second Spot is collected at 00:10 and begins 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. Good gateway schedule configuration practices are those that ensure that actions are spaced out and that there is enough time for them to be processed before a cycle of actions is repeated.

5.3 Individual configuration of the Spots

In some cases, it may be important to configure Spots individually. To do so, the user must select the option ⚙ next to the desired Spot and a window similar to the batch configuration window will be displayed. The fields and functionalities follow the same pattern as described in the previous section, regarding the configuration of Spots of the same batch.

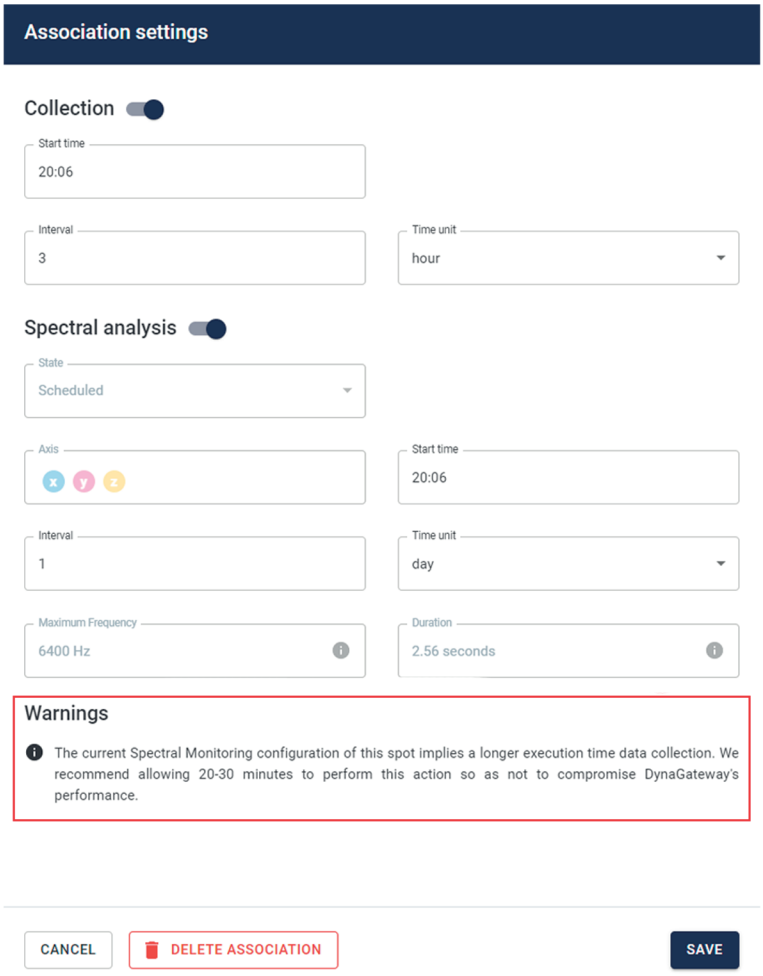


Image: Parameterization of collection intervals and spectral analysis

As in the batch configuration, if the selected spot is parameterized to perform triaxial spectral analysis with maximum frequency higher than 1600 Hz, a warning about the execution time of the action will be displayed.

By clicking on the button **SAVE** , the user will be returned to the Spots screen to configure the rest of the selected points.

6. Status

After the DynaGateway setup and adoption steps, you can track 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 gateway's connection attempts made at the times scheduled at the time of its configuration.

6.1 Connecting to Spots

When you access the gateways screen from the side menu, you can see the current status of the gateways associated with the desktop the user is on. The colored icons present in the left-hand corner of the list relate to the current status of the device. The main ones being:

Healthy: The gateway was able to collect data from all Spots associated with it on the last attempt.

Default configuration: The gateway PIN has already been entered, but there are no Spots associated with the device.

Delayed collection: The gateway is properly configured but has not sent the last collection of at least one Spot at the expected time.

Unhealthy: the gateway is properly configured but was not able to collect data from at least one of the associated Spots on the last attempt. It is recommended to access the screen of this gateway, as it is possible to check which Spots could not be collected.

Unknown: the Gateway has not yet sent collections to one or more Spots. If all Spots remain in this status, it is recommended to check the connection interface (Ethernet, Wi-Fi or LTE) and the power supply of the product. If there are isolated cases of Spots with this status, check the signal strength of the sensors. Each time the gateway schedule is updated, the status of all spots remains in “Unknown” status until the time set for their first collection. After the scheduled time, the status is updated to “Healthy”, “Unhealthy”, or Delayed status, depending on the Spot's collection performance.

The status icon is updated with each new collection, set in the gateway configuration.

6.2 Visibility Update

DynaGateway periodically scans the sensors that are within its Bluetooth range. So, by default, every 6 hours the device performs a visibility update if it is properly connected to the network. The information about how long since the last update is present in the last visibility field in the Web Platform:

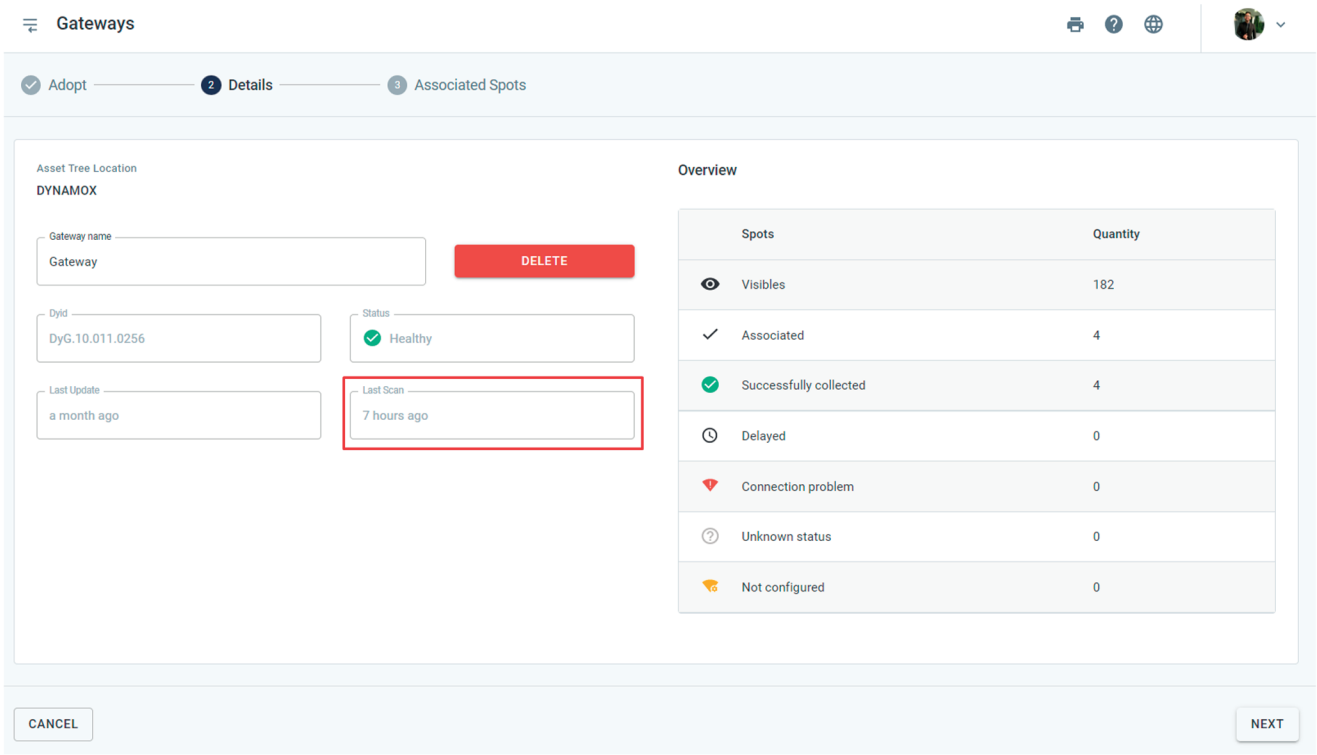


Image: Last visibility field

The visibility update procedure ensures that the states shown on the Platform reflect the reality of the last 6 hours, identifying which monitoring points need an individual check.

It is worth mentioning that the intensity of the sensor signal shown is directly related to the stability of the bluetooth connection between it and the gateway. This stability of the connection implies the success (or lack thereof) of the collections.

7. Additional Features

DynaGateway has several tools that can assist with troubleshooting and contribute to the usability of the device. These include: system reset, restoring factory defaults, firmware upgrade, and searching for sensors within range.

This section details the functionalities and procedures for using the device's tools. All the processes described are performed through the device's web interface, the same used to configure the communication interface (accessing **192.168.10.1** in the browser).

7.1 Restarting the system

It may be useful to reset the DynaGateway for cases in which the device is not performing as expected. To do so, the user must access the Maintenance tab from either the top or side menu of the device's web interface.

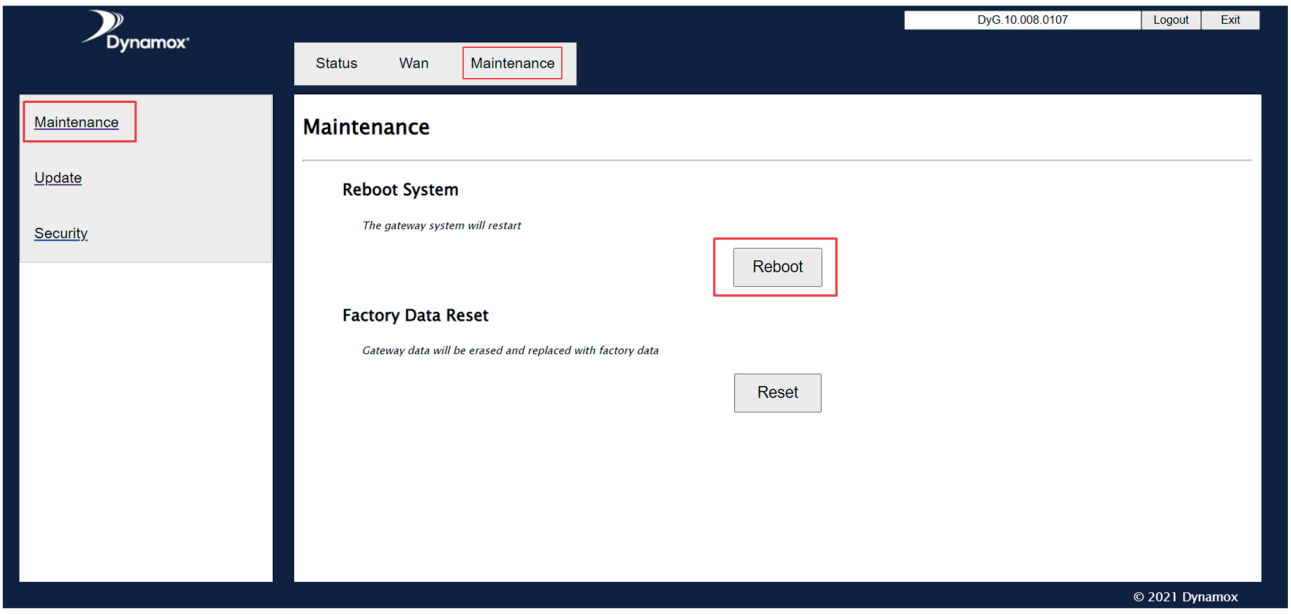


Image: System Reboot Tool

By selecting the Reboot button and confirming, the device will automatically start the reboot process. It is also possible to perform this procedure via the physical Reset Config button, requiring only a single touch for the gateway to restart. It is important to note that this process is not about the settings, but about the operating system that will be rebooted.

7.2 Restoring the Factory Defaults

Restoring the settings to factory defaults is a tool that should only be used in specific cases when the device is not performing its function properly. To perform the reset, the user must access the device's web interface, under the Maintenance tab from either the top or side menus, and then select the Reset button. The process will start automatically after confirmation.

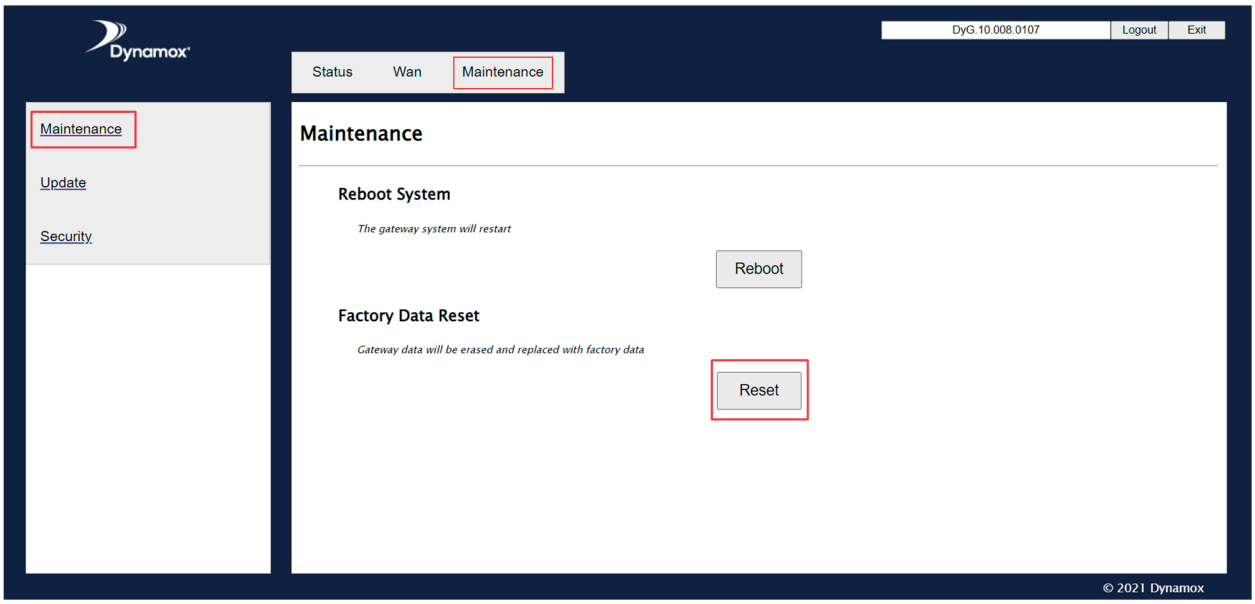


Image: Factory Defaults Restore Tool

It is important to note that this option restarts the device and erases all the settings already made, requiring a new configuration of the communication interface.

7.3 Firmware update

In order to always keep your devices up to date with the latest features, Dynamox provides automatic updates for gateways connected to the Internet. In some cases, however, it may be necessary to perform the firmware update locally.

In order to perform this process, the user must have the update files for both the Main Module and the COMM Module on hand. To obtain the latest file updates, contact Dynamox technical support at **support@dynamox.net.**

When you request file updates, you will receive one file for each device module (Main and Comm). It is worth paying attention to the name of each to differentiate which module it refers to.

By accessing Maintenance from the top menu and Update from the side menu, you will access information about the firmware already installed and the fields to perform the update. In the Select Path field, you must select the “Choose file” option and upload the file (already saved on your computer) with a .bin extension. Below you must indicate which of the two DynaGateway modules the previously selected file refers to. The process must be carried out first in the COMM module and, once completed, in the Main module.

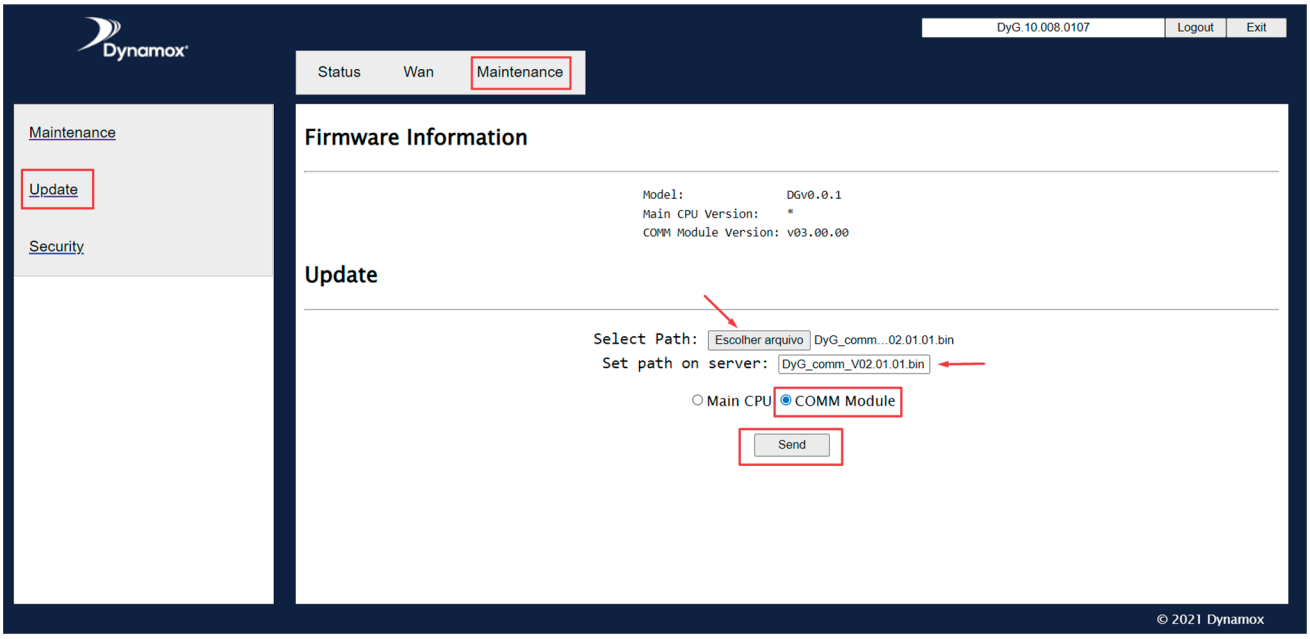


Image: Firmware update

When selecting the "Send" option, a confirmation window will appear to complete the process. When completed, the user will be notified with a window indicating the success of the operation and the blue-colored LED Status light will turn off. Finished for this module, the process as a whole must be repeated for the COMM module.

7.4 Search for sensors not in bluetooth range

In addition to the automatic update of the sensor visibility information that the gateway sends to the Web Platform every 6 hours, it is possible at any time for the user to request a scan of all the sensors within the DynaGateway's bluetooth range.

The option can be found in the top menu "Status" and in the side menu, "Sensors Visibility". By selecting the option, the device will start searching for all sensors within the bluetooth range. When finished, a table will be displayed containing relevant information such as: number of sensors, identification, MAC address and signal strength at the instant the visibility was performed.

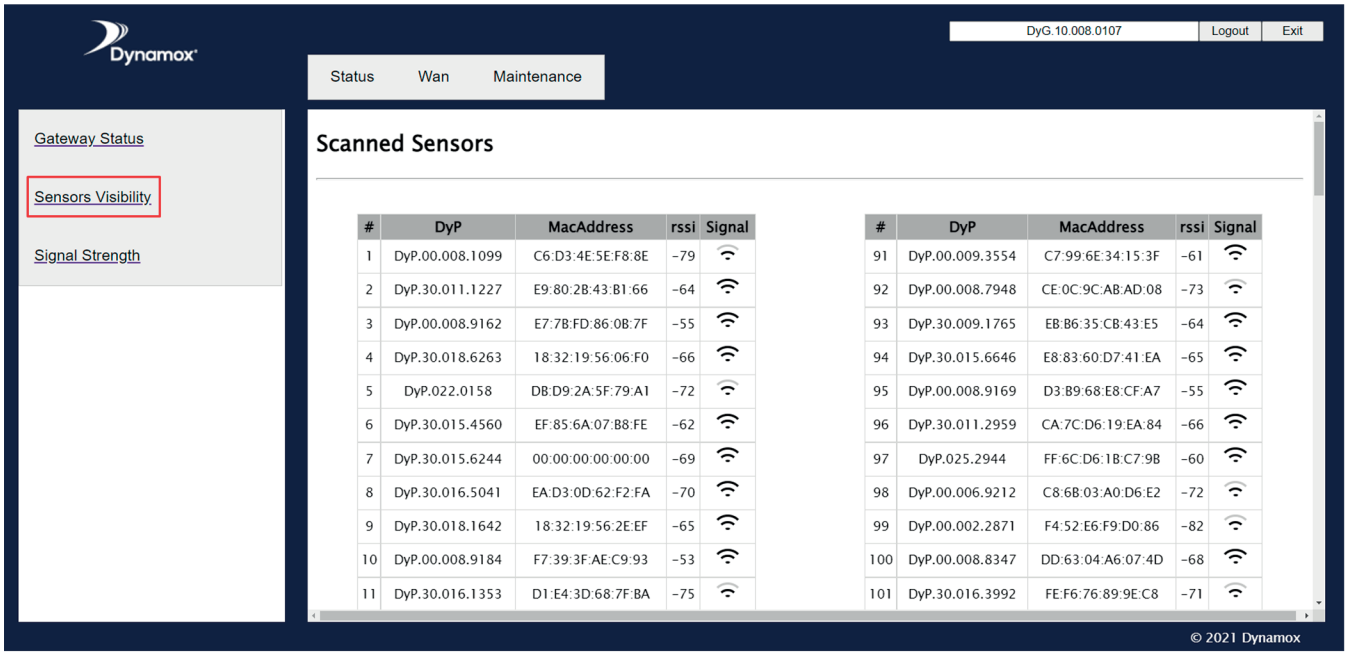


Image: Search tool for sensors within bluetooth range

This mapping does not update the "Last Visible" field in the Web Platform. The process only shows the sensors within the bluetooth range of the Gateway and can be used to help set the best location for the device.

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We are experts in delivering customized solutions for the specific needs of our clients. Discover our products and services and learn how they can be used in your industrial plant, including software integration and use and analysis of the data generated by the sensors.

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