Dynamox

USER MANUAL

Dynamox Lens



Dynamox_s.a | Dynamox | Dynamox.net

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1 First steps

This document covers the configuration, usage, and operation processes of Dynamox Lens, a thermographic sensor designed for monitoring the health of industrial assets through thermography.

The primary purpose of Dynamox Lens is to periodically collect temperature data, thermograms, and optical images of the monitored region, according to a specified interval. To enable this, the device must have its data collected by a DynaGateway using the Bluetooth protocol.

The following chapters present product installation recommendations, a step-by-step configuration guide, and its main features. It is essential to follow the information provided in this document to ensure proper operation of the solution.

2 Product description

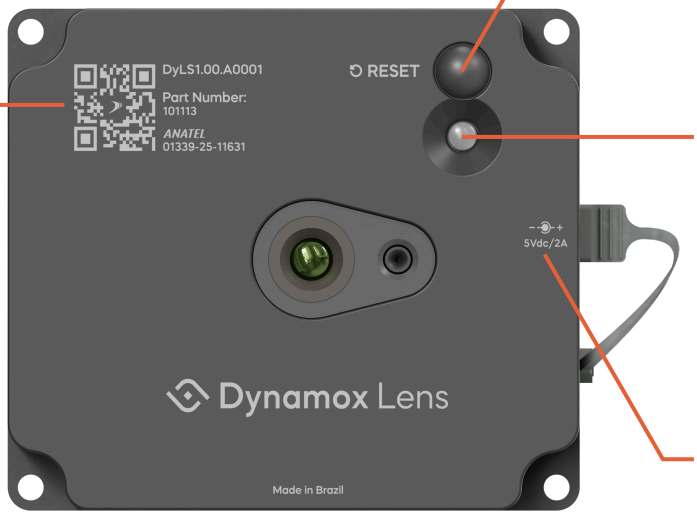
Dynamox Lens is designed to collect thermograms, optical images, and maintain a historical record of the maximum temperature values of monitored regions, enabling asset analysis.

2.1 Product structure

On the front of Dynamox Lens, you will find the main product-user interaction components. These are used during installation and configuration processes:

Device information

- **DyLS:** serial number of Dynamox Lens, used for connection with Dynamox Platform.
- **PN (Part Number):** product model identification code.



Reset Config Button

Activates an Access Point (AP), allowing the user to access a configuration interface, and provides reset functionality.

LED

Light indicator for operational status. In low-light conditions, such as nighttime or indoor environments, the LED also serves as a light source to assist in capturing visible light images.

Power Input

– Direct Current Voltage

USB-C type connection for 5Vdc power supply.

2.2 Operation and handling

This section provides essential instructions for the safe and efficient use of the equipment, including specific care for the thermal (infrared) and visible light lens.

2.2.1 General handling instructions

- always transport the equipment in a hard case or padded bag.
- avoid exposure to dust or excessive moisture, intense vibration, or direct heat.
- store the device in a dry place, protected from direct sunlight and sudden temperature changes.
- use only accessories and components recommended by the manufacturer.

2.2.2 Thermal lenses (infrared)

- do not touch the lens surface directly.
- for cleaning, it is recommended to use degreased cotton swabs or lint-free special cloths to avoid leaving residues on the surface. To help remove impurities, apply anhydrous alcohol (isopropyl), which ensures quick evaporation without compromising the lens coating. Cleaning should be done gently and controlled, avoiding excessive pressure that could cause scratches or marks.
- avoid exposing the lens to direct sunlight or intense heat sources.

2.2.3 Visible light lenses

- handle it like a photographic lens: avoid scratches and direct contact.
- clean it with a microfiber cloth and neutral solution for optical lenses.

2.2.4 Operational recommendations

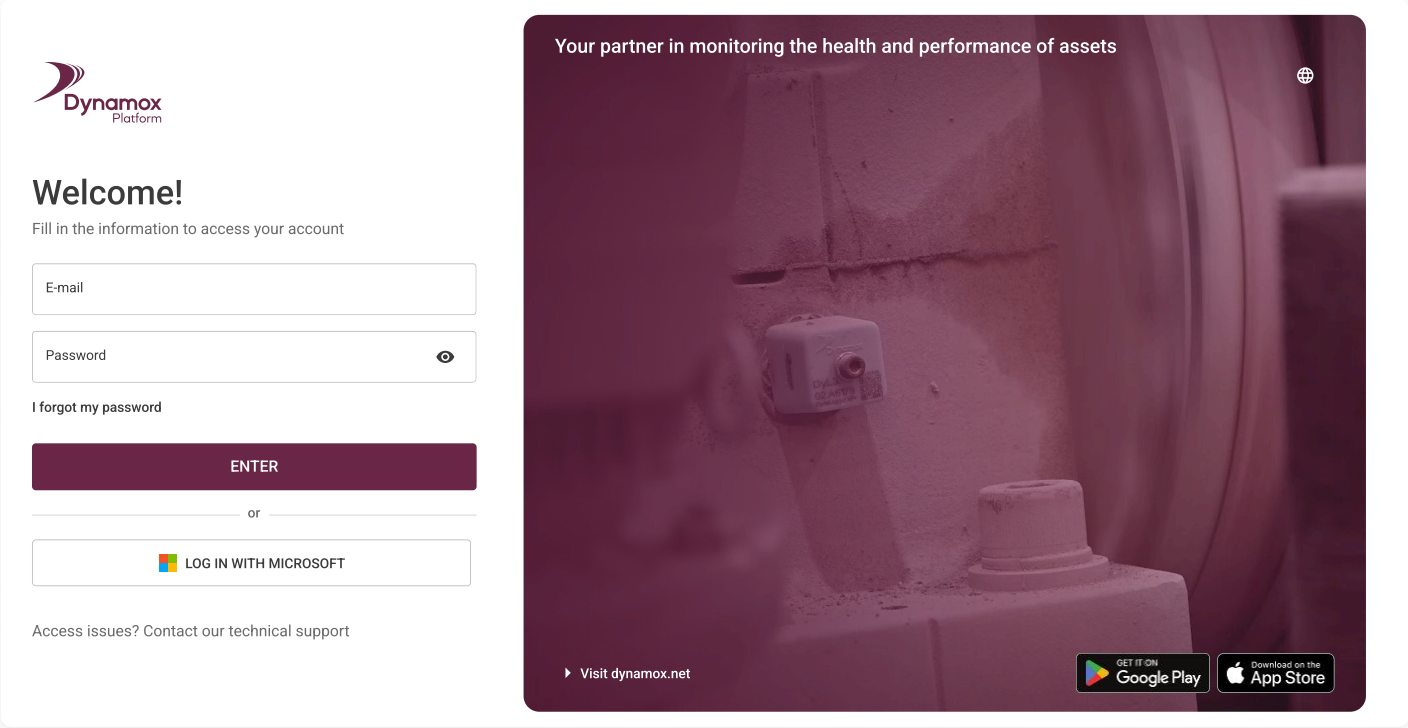
- **Firmware update:** keep the system always updated (section 7.3).
- **Safety:** do not open the equipment or attempt repairs without technical authorization, as this may void the warranty.

3 Pre-installation

To create the hierarchical structure for sensor installation and access the full history of vibration and temperature measurements, users have access to a comprehensive web platform and mobile application.

If you have already purchased our products and do not yet have login credentials, please contact us via email at **support@dynamox.net** or by phone at **+55 48 3024-5858**, and we will provide your access details.

Once you have your credentials, you can access Dynamox Platform and view data from all registered sensors. Simply visit **https://dyp.dynamox.solutions** and log in using your credentials.



To learn more about the platform's features and functionality, consult our **Support Site**.

3.1 Creating a hierarchical structure

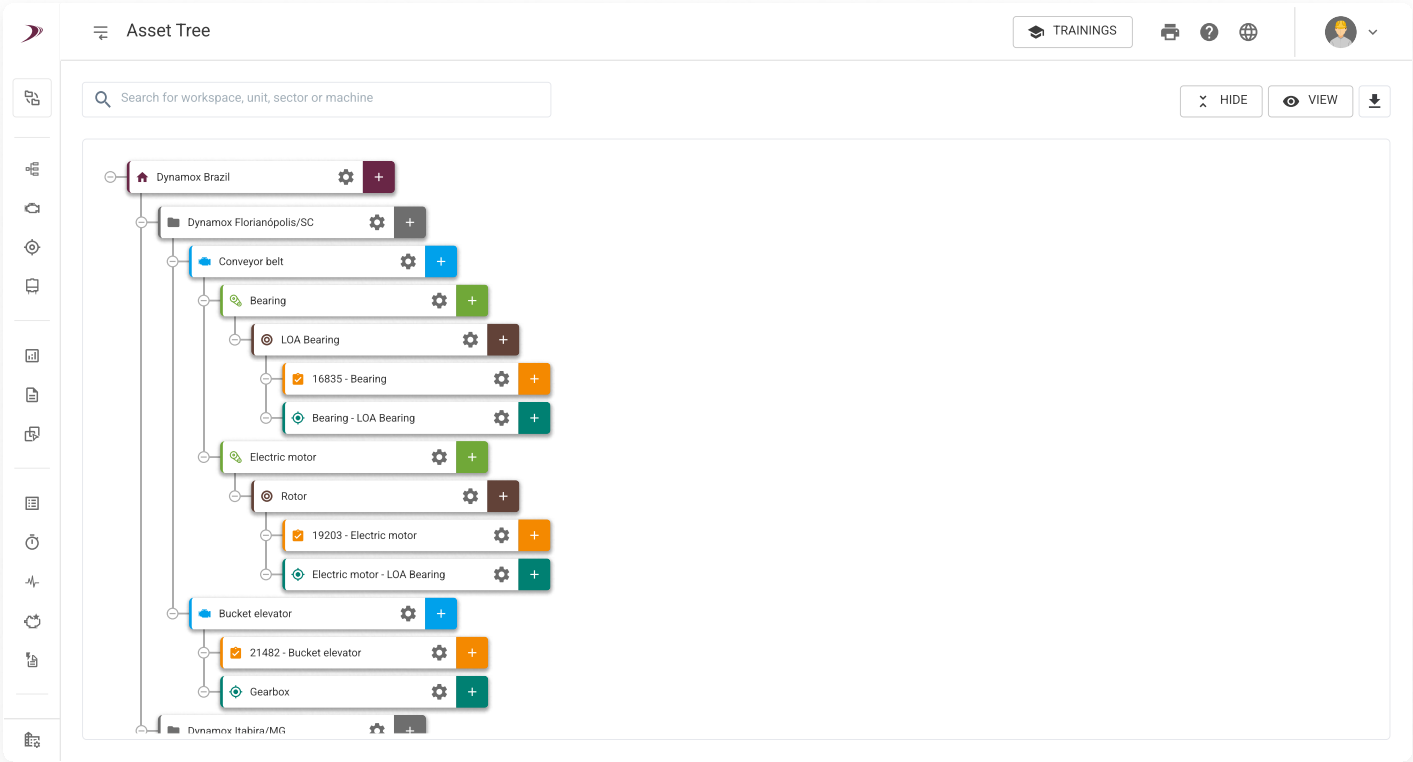
Before positioning the sensors in the field, it is recommended to ensure that the asset tree (hierarchical structure) has been properly created, with monitoring points standardized and ready to receive the sensor to be associated.

For full details and guidance on how to structure the asset tree, consult our **Support Site**↗. This helps streamline fieldwork and ensures that monitoring points are registered in the correct structure.

The asset tree structure should be defined by the client and, preferably, follow the standard already used by the company in ERP systems (such as SAP).

After creating the asset tree via Dynamox Platform, the user should ideally register the monitoring point (called a Spot) within the tree structure before going to the field to physically install the sensors.

The figure below shows an example of an asset tree:



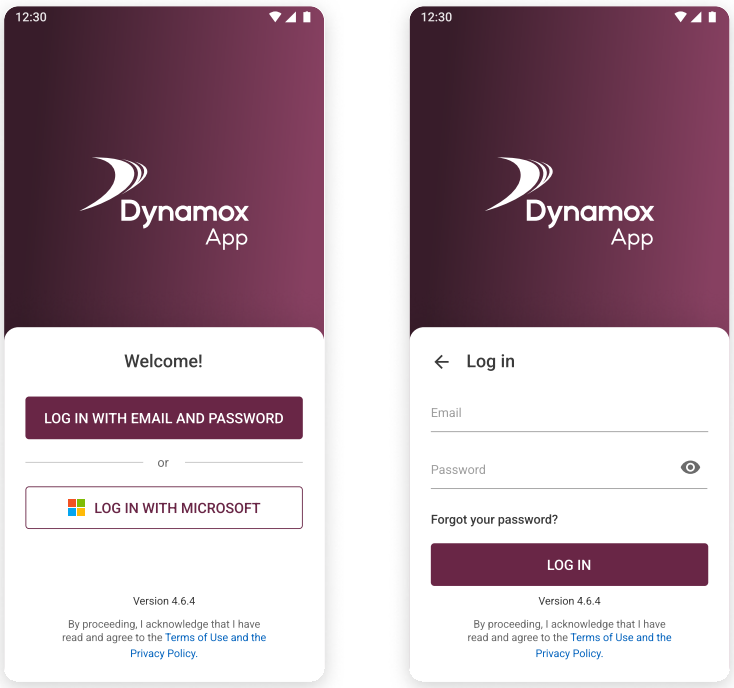
Once these procedures are completed, the user can proceed to the field to physically install the sensors on the machines and components registered in the asset tree. In the **Spot Creation and Configuration** section, you'll find details on how to create each Spot within Dynamox Platform. In the **User Management** section, you'll find information on creating and assigning permissions to different users.

3.2 Dynamox App

To configure sensors, Spots, and machines, you must download the **Dynamox App**. The app requires Bluetooth technology and is available for download on Android (version 8.1 or higher) via the Google Play Store, and on iOS (version 14.0 or higher) via the App Store. It is compatible with smartphones and tablets.

You can also download the Android version via a computer by accessing the Google Play Store. To do this, log in with your Google account (the same one registered on your Android device's Play Store).

Once installed, you'll be able to interact with the sensors and configure them. Simply log in using your access credentials – the same ones used on Dynamox Platform.



To learn more about the app's functionality and features, refer to the **Dynamox App Manual**↗.

4 Installation

For asset monitoring, we recommend installing Dynamox Lens in a fixed position, ensuring the camera is directly pointed at the desired monitoring location. The device has an autonomy of up to 4 hours, so the installation site must provide a power source capable of keeping it active 24/7. Follow the installation steps below for proper monitoring setup.

4.1 Power supply

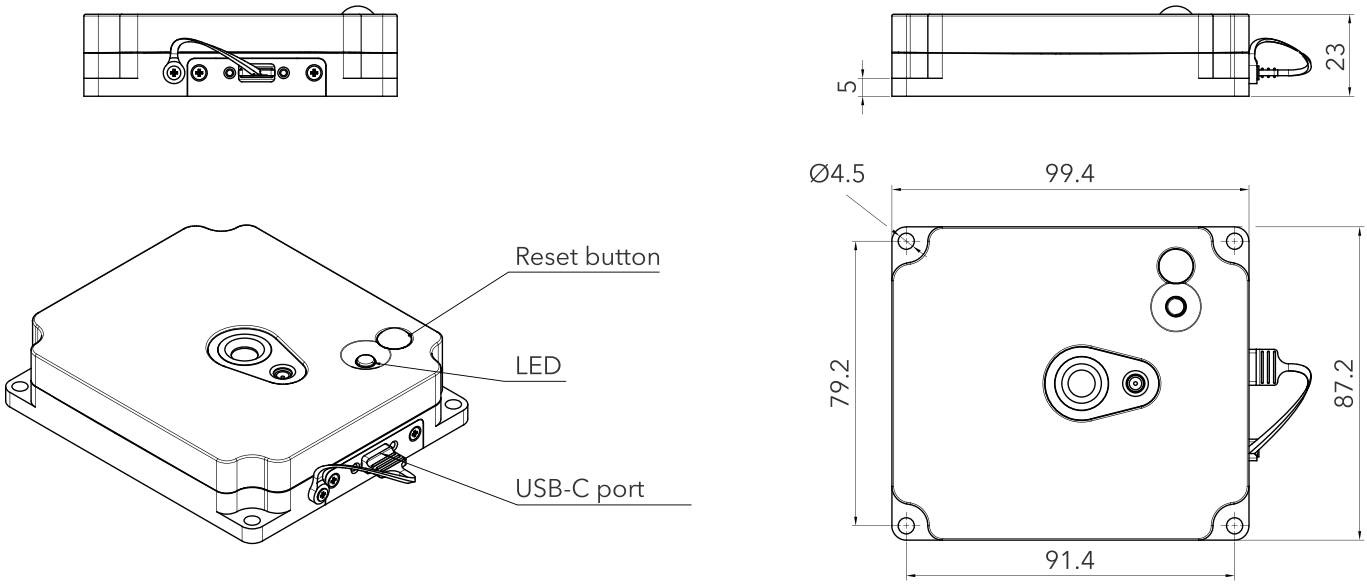
To charge the batteries or use the device in fixed mode, a power source with a 5Vdc USB-A output must be available. Connect the USB-C cable to the device and the other end to the provided power source.

> ⓘ The power source is not included with the device.



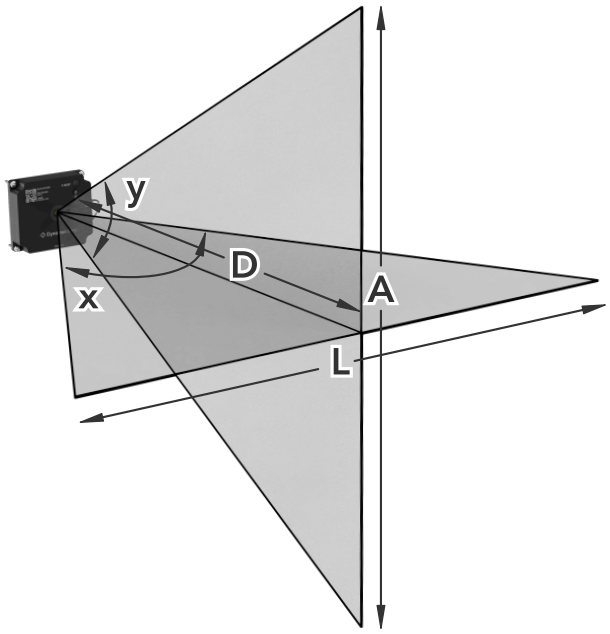
4.2 Mounting

During the mounting process, it is important to consider the product dimensions and follow the drilling standards, as shown below (measurements in millimeters):



Dimensions in millimeters

Select the asset to be monitored and determine a provisional mounting point for the device, ensuring the camera is directly pointed at it. In locations with metallic structures, use the provided magnets.



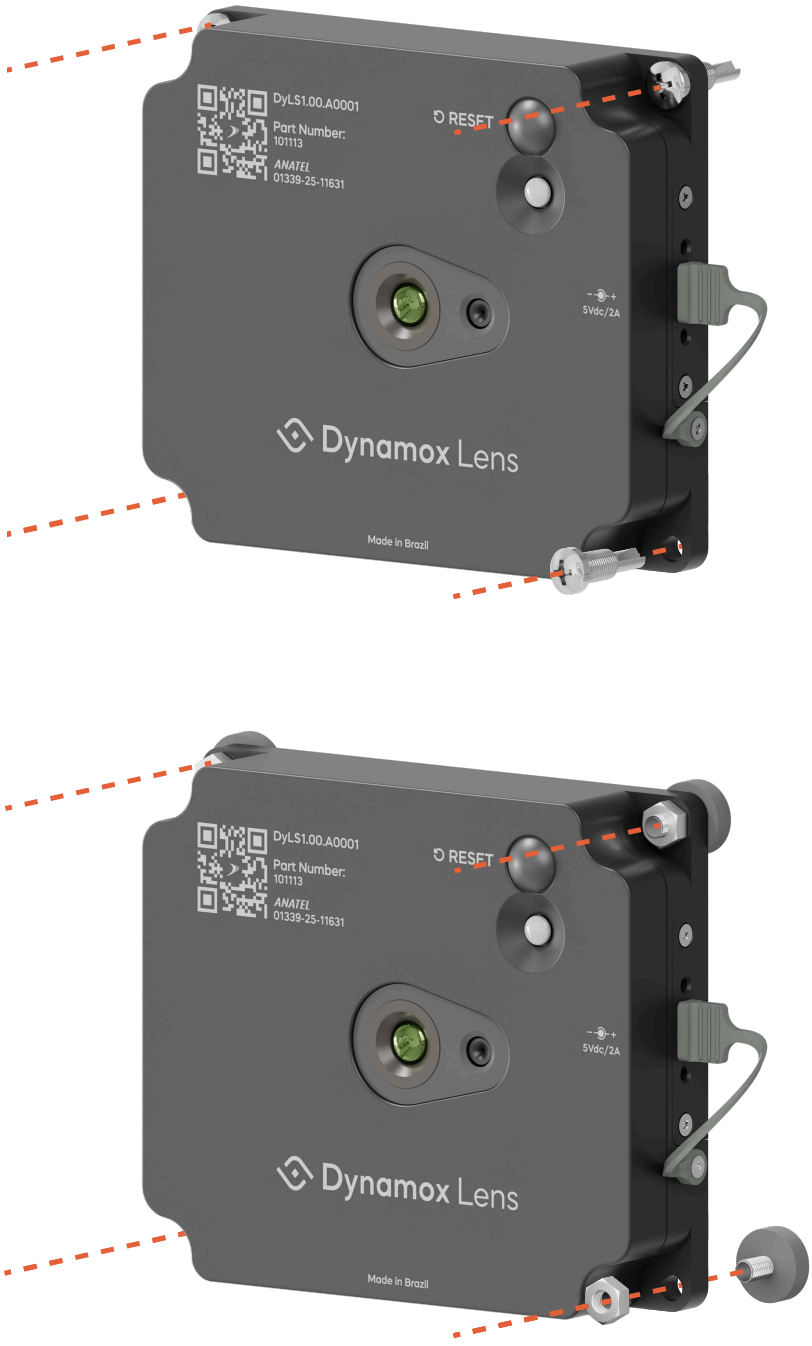
Key:

- **x:** horizontal aperture
- **y:** vertical aperture
- **D:** measurement distance
- **L:** width
- **A:** height

MEASUREMENT DISTANCE (m)	WIDTH (m)	HEIGHT (m)
0.3	0.6	0.45
0.5	1	0.75
0.8	1.6	1.2
1	2	1.5
1.5	3	2.25
2	4	3
2.5	5	3.75
3	6	4.5
3.5	7	5.25

Keep in mind that the distance between the device and the object directly affects the camera's field of view, as illustrated above. To ensure optimal positioning, access the camera configuration mode as described in section 3.3.

Finally, use the mounting screws to secure the device at the desired location. The provided screws can be used for drilling and fastening, eliminating the need for wall plugs and drill bits.



4.3 Device configuration

To validate the camera positioning and configure parameters related to Dynamox Lens infrared imaging, it is necessary to initiate the device's configuration mode.

4.3.1 Configuration mode

Access to configuration mode can be done physically via the button or remotely via the app.

4.3.1.1 Access via button

Press the **Reset** button located on the front of the device for approximately 10 seconds or until the LED starts blinking yellow. You may use a non-sharp object to press the button.

1 Hold the **Reset button** for 10 seconds



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

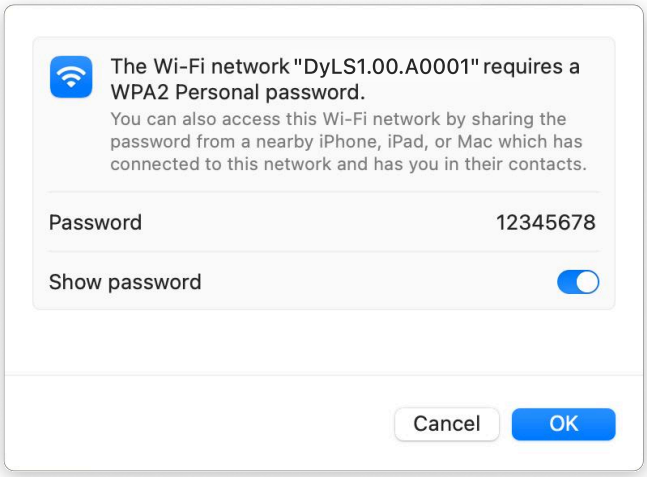


3 Releasing the button will change the **LED** to a steady yellow



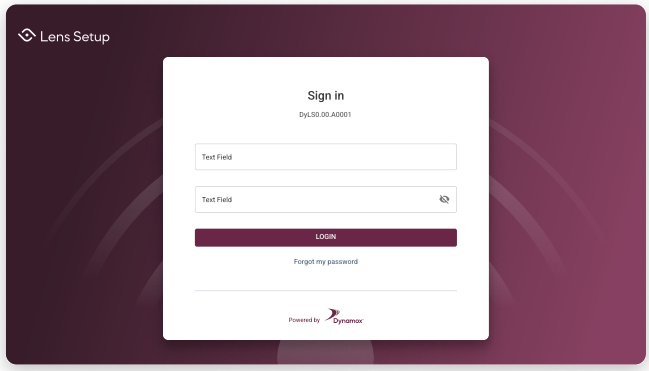
4 Connect to the Wi-Fi network generated by the device using a nearby computer or mobile device. The network generated by the Lens has the following credentials:

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



5 Once connected, access the Dynamox Lens configuration mode by typing 192.168.10.1 in the browser. Use the following credentials:

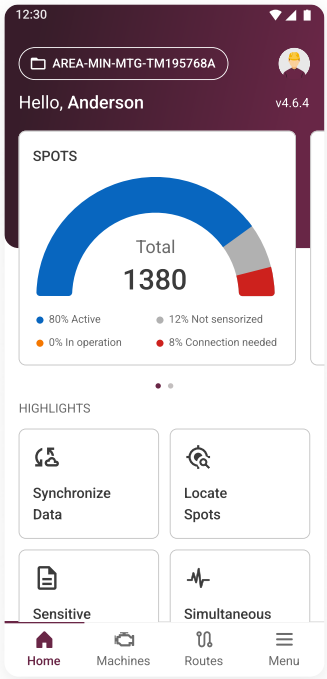
- **User:** admin
- **Password:** admin

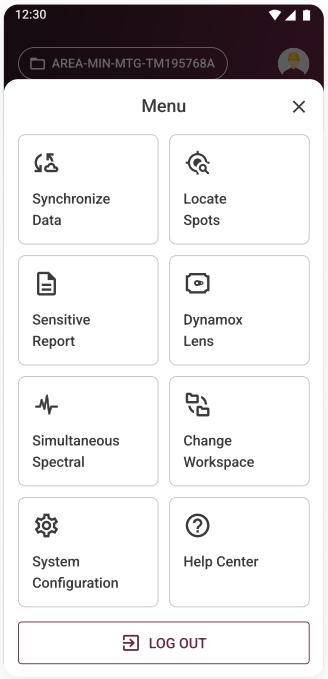


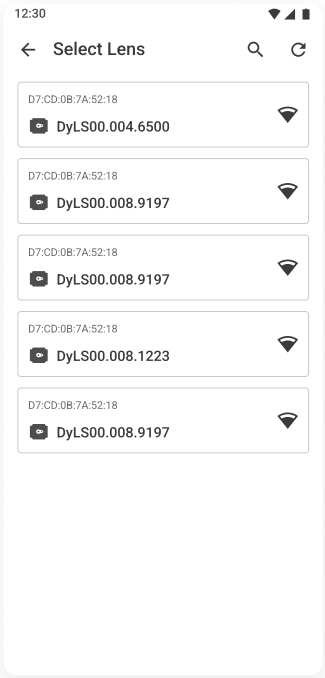
4.3.1.2 Access via Dynamox App

Log into **Dynamox App** (see section 3.2).

On the home screen after login, go to the **Menu** at the bottom corner and select **Lens** to begin scanning nearby devices. Once the desired device is found, select it by clicking its identifier. You will then be directed to the configuration pages (see section 4.3.2).





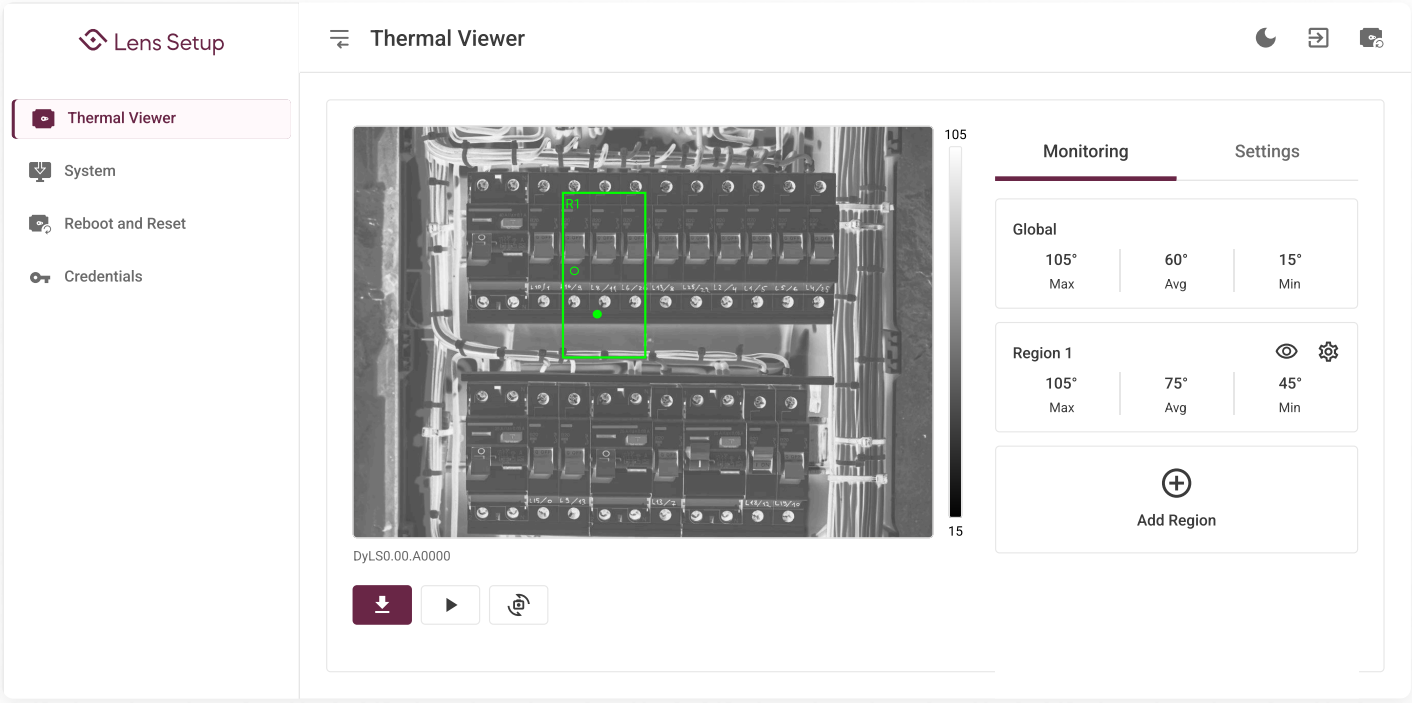


For more information about the app and its features, refer to the Dynamox App Manual↗.

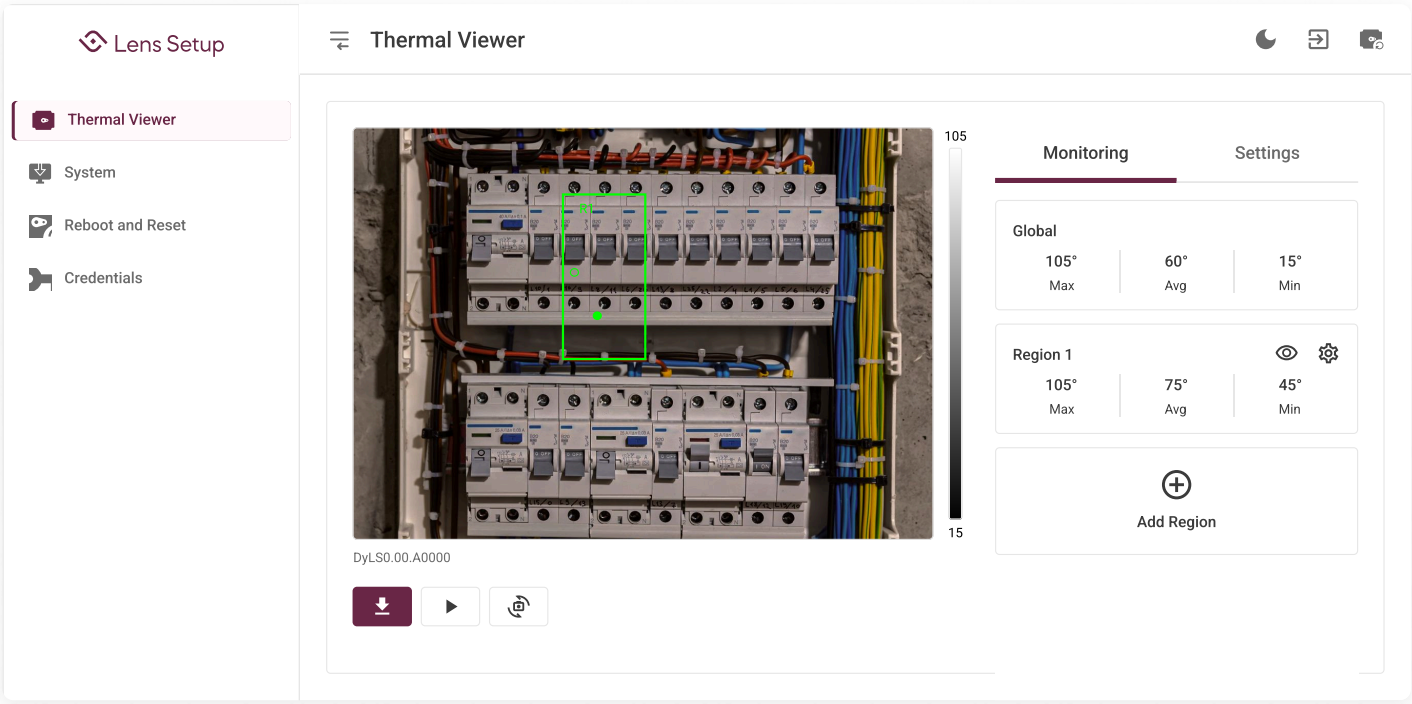
4.3.2 Configuration pages

After logging in, the user will access the **Thermal Viewer**, which allows navigation between two other tabs: **Monitoring** and **Settings**. These tabs can also be accessed via the side menu.

In the **Thermal Viewer**, the user can view the area being monitored by the infrared camera. To start the visualization, click the ▶ . In the **Monitoring** tab, it is possible to check the maximum, average, and minimum temperatures of the full image and of the defined regions.



In addition to the infrared image, the visible light image can also be viewed by clicking the .

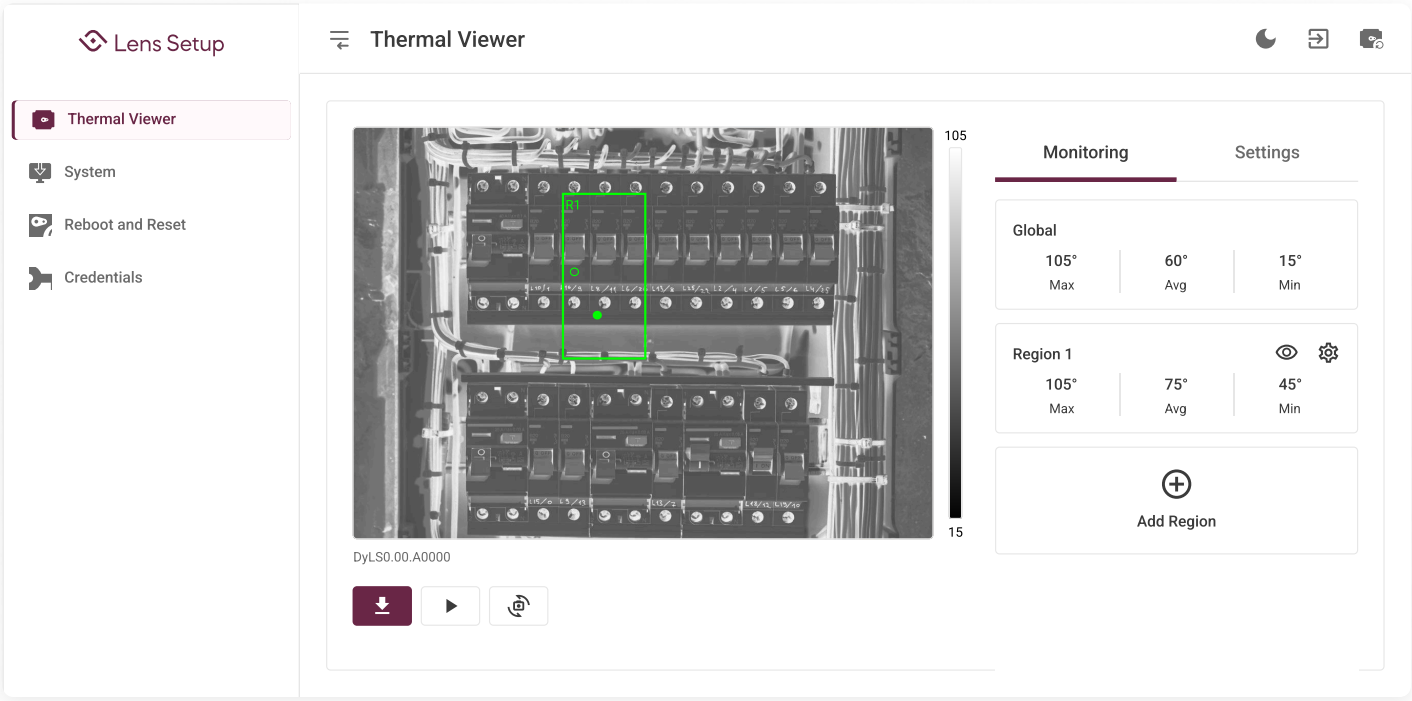


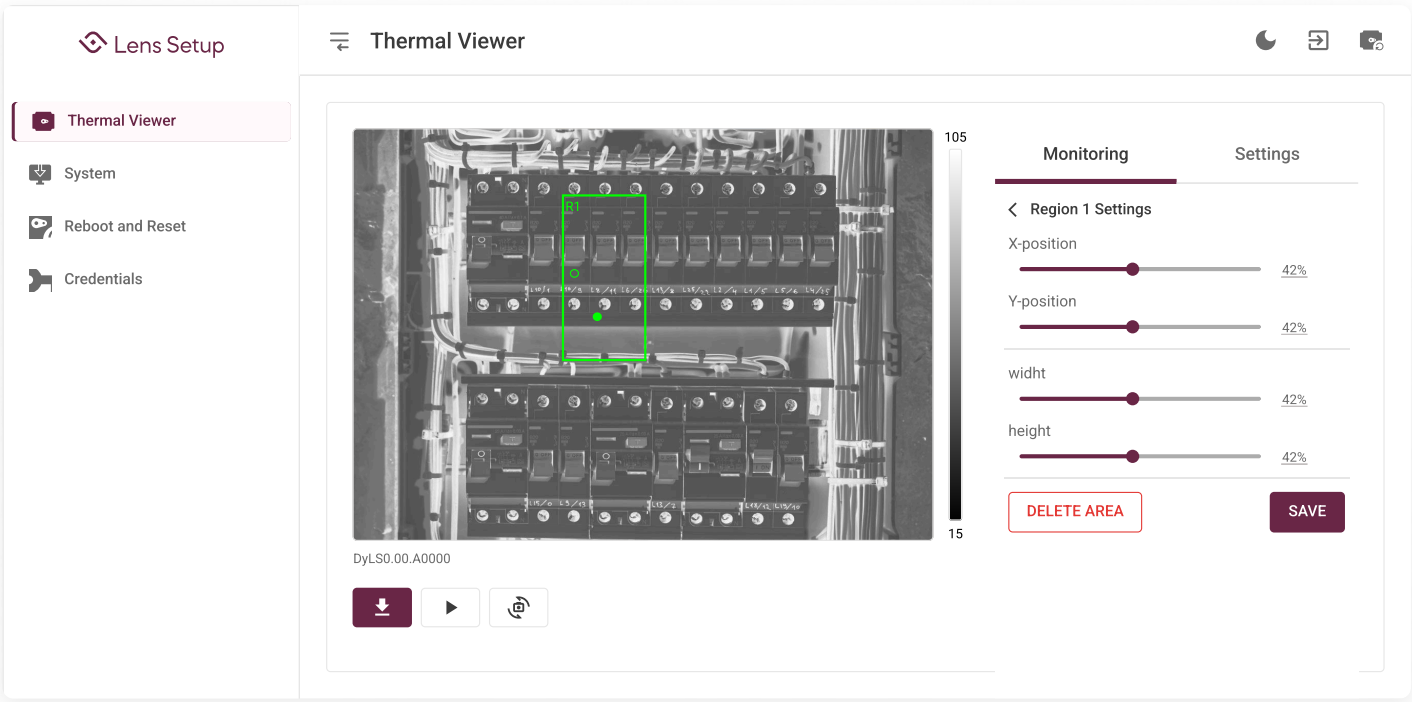
4.3.2.1 Creating monitoring regions

Up to 3 monitoring regions can be created within the image. To add a region, click **Add Region**. Then configure the desired region's position (X-position e Y-position) and dimensions (width and height). To finalize, click **Save**.

Region settings can also be accessed when editing a region via the button ⚙ .

Regions are displayed by default in the **Thermal Viewer**. To disable the visualization of a region, click the icon 👁 associated with it.





4.3.2.2 Configuring object parameters

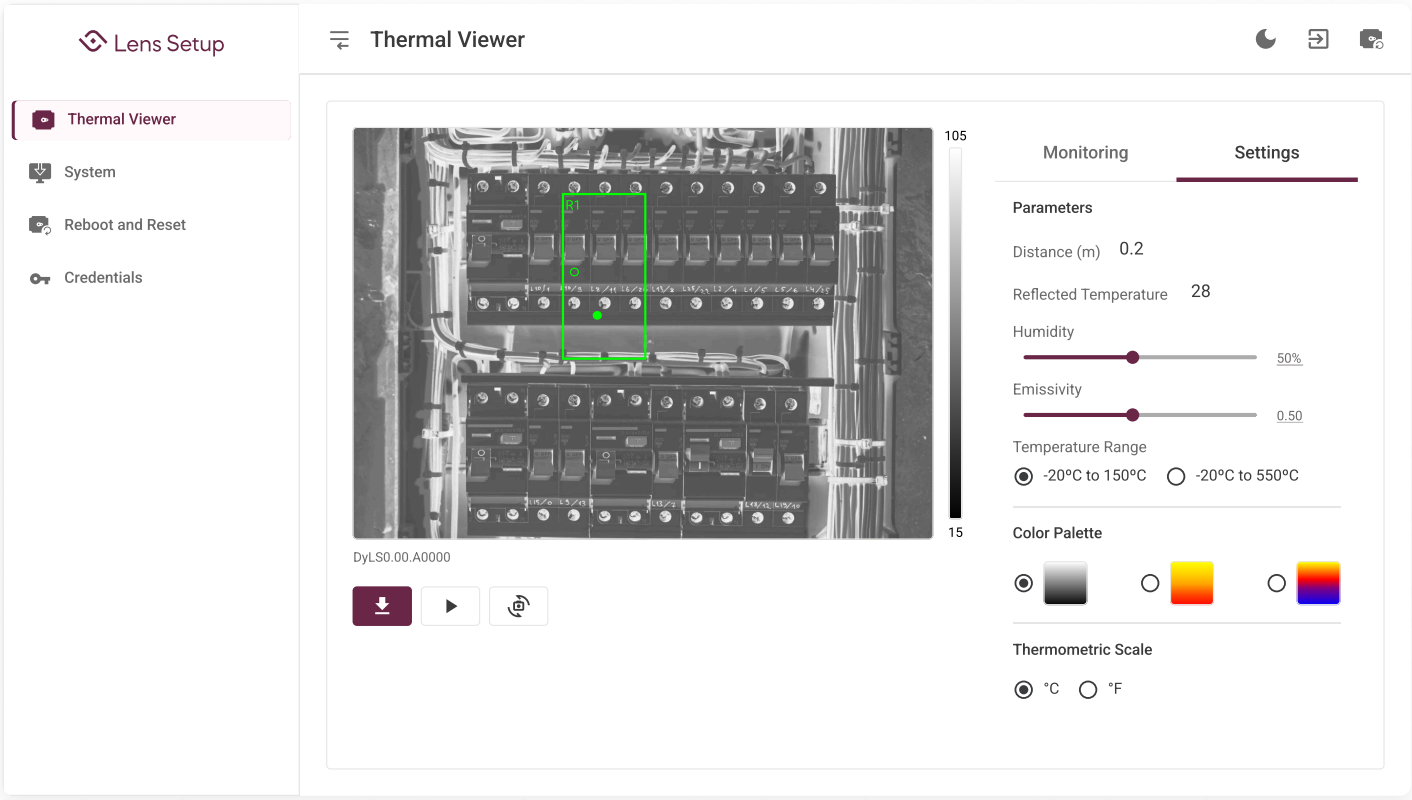
In the **Settings** tab, the infrared camera can be configured according to the asset and/or location being monitored to ensure more accurate measurements.

The adjustable parameters include:

- **Emissivity:** represents the material's ability to emit thermal radiation. Correct configuration ensures accurate temperature readings.
- **Reflected Temperature:** an estimate of infrared radiation reflected by monitored objects, rather than emitted by them.
- **Humidity:** percentage of water vapor in the air. Must be configured to correct thermal radiation attenuation.
- **Distance:** distance between the camera and the object. It helps compensate for infrared radiation losses due to air absorption.
- **Temperature Range:** defines the minimum and maximum temperature limits the infrared camera can measure. Selecting the correct range improves accuracy and thermal contrast, avoiding saturation and distortion.

Additional settings to assist in visualization and object identification:

- **Color Palette:** defines the color scheme for displaying the thermal image. Different palettes highlight temperature variations.
- **Thermometric Scale:** sets the temperature unit used for thermographic analysis.



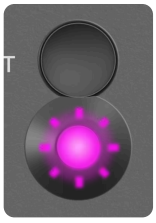
4.4 LED signaling

Dynamox Lens casing includes a light indicator showing the device status.

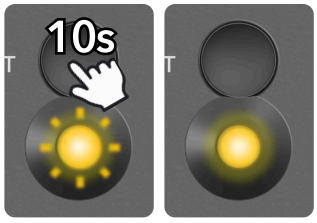


LED color and behavior vary depending on the current activity or device state:

All blinking:
device initialization



Yellow blinking:
initialize Lens Setup mode[1]



1- Pressing the button for 10 seconds causes the LED to blink yellow. Upon release, the device initiates a Wi-Fi network and the LED stays yellow.

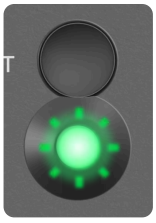
Red blinking:
restart the Dynamox Lens[2]/
restore to factory settings[3]



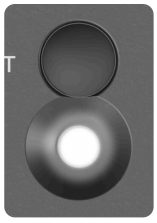
2- Pressing the button once causes the LED to blink red. Releasing the button during this interval will restart the sensor.

3 - Press and hold the button for 30 seconds until the LED starts blinking red. Release the button, then press it once to restore the sensor to factory settings. The device will automatically restart.

Green blinking:
active temperature monitoring



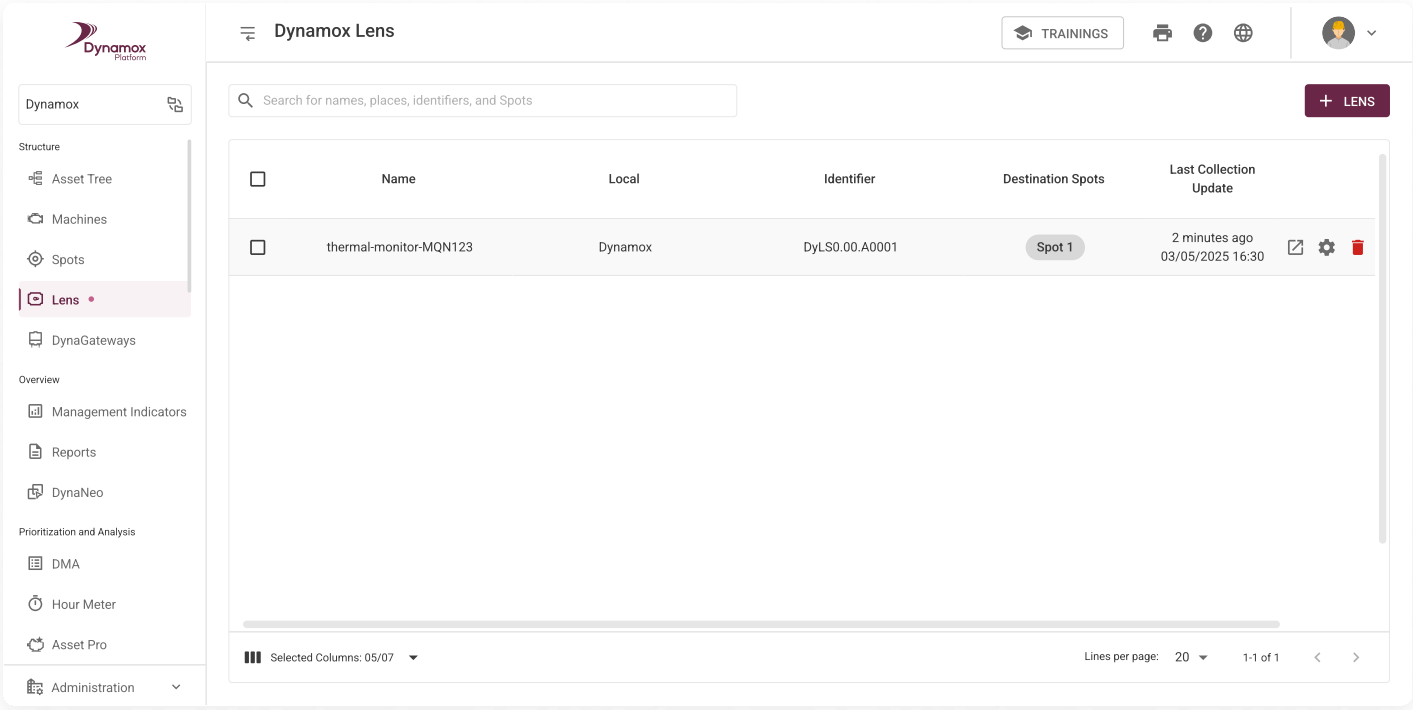
White steady:
visible light image requested in Lens Setup



5 Configuration on Dynamox Platform

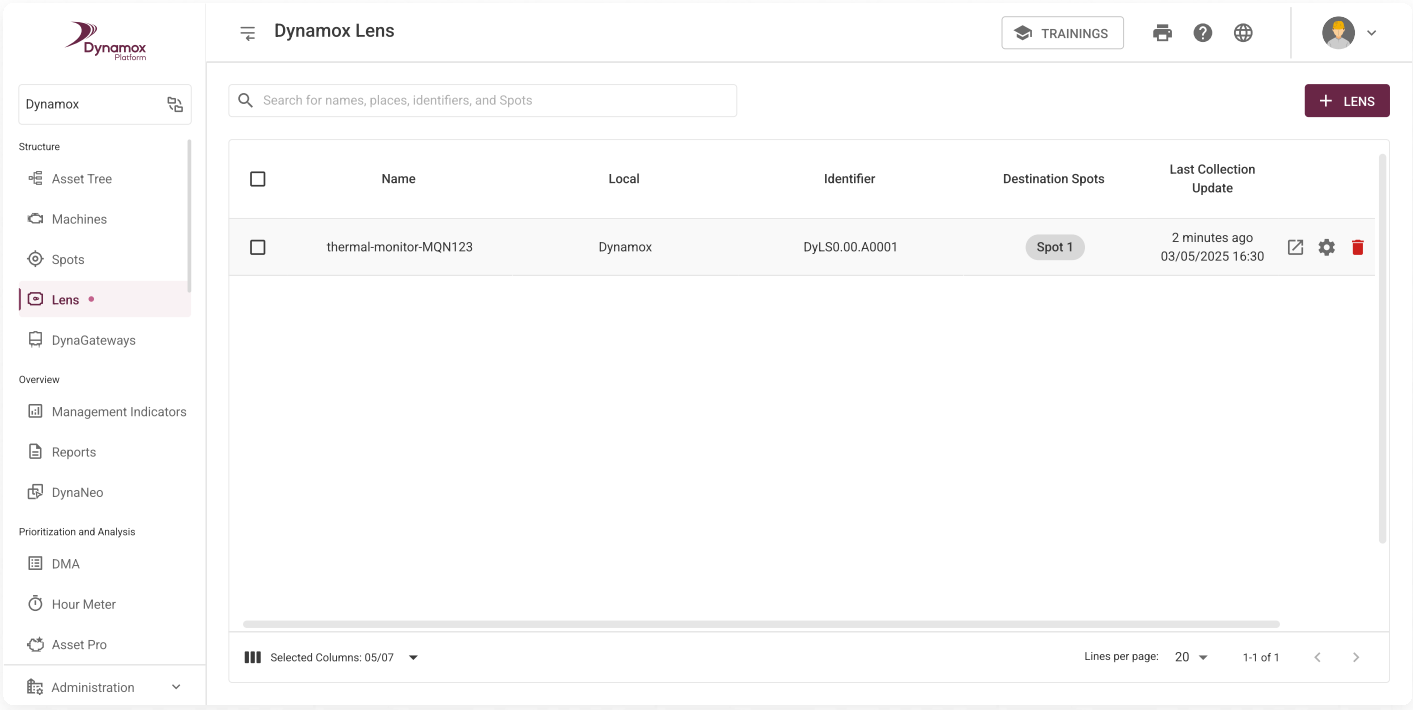
After configuring the device, access Dynamox Platform to create it within a workspace and define operational parameters such as telemetry collection interval and association with DynaGateway.

To do this, go to **https://dyp.dynamox.solutions/** and, from the side menu, access the **Lens** tab. A table listing all devices registered in the current workspace will be displayed.

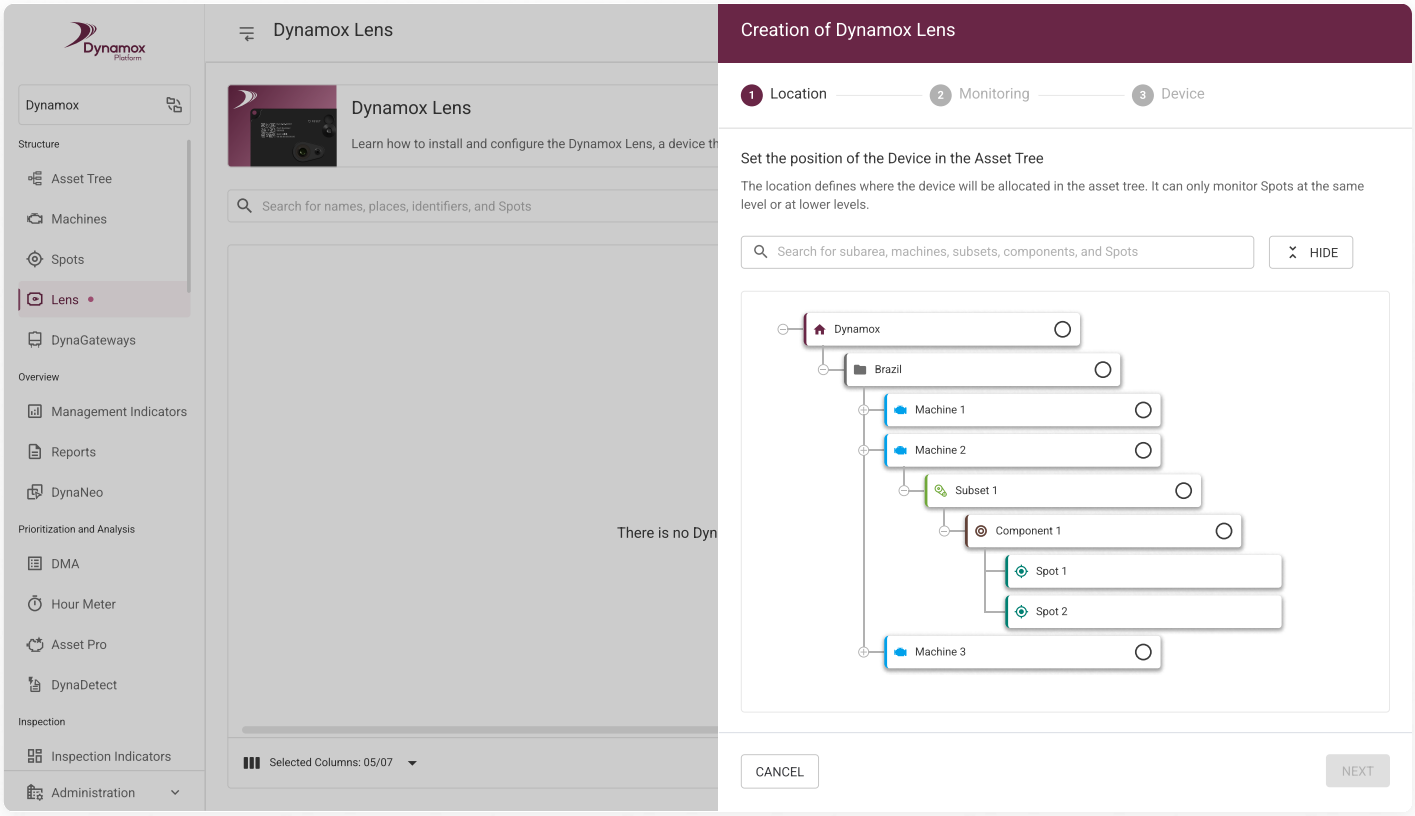


5.1 Creating a Dynamox Lens

To add a profile for Dynamox Lens, go to the **Lens** tab and click **+ Lens** in the upper right corner.



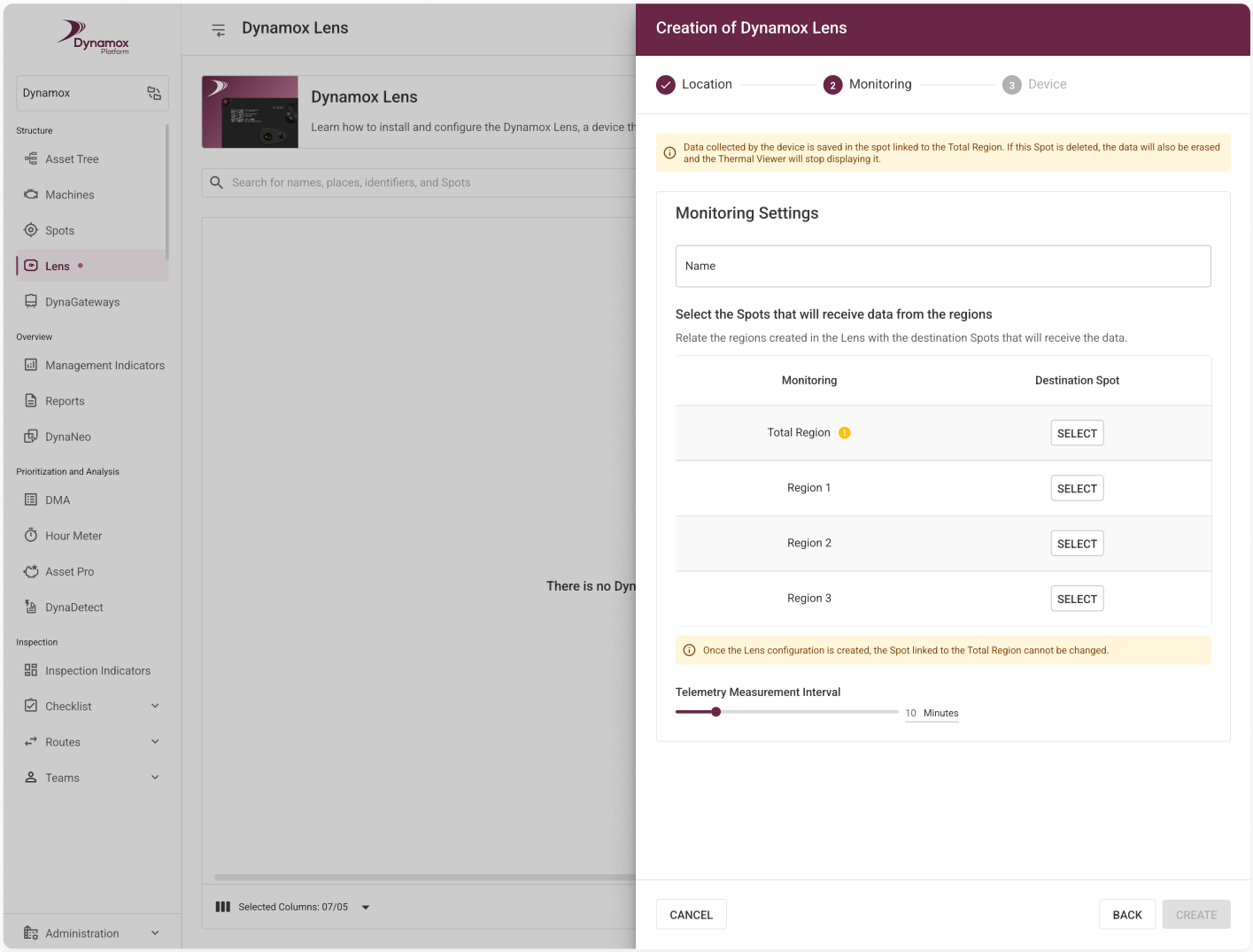
Using the Asset Tree, the user must select the area or subarea where Dynamox Lens will be positioned. This selection will restrict which monitoring points or machines can be monitored, as well as which users will be able to edit the settings.



The selection follows the same structure as the company's Asset Tree, where higher-level nodes inherit the same benefits for lower levels. By clicking the **Next** option, the Lens Configuration page will be displayed to the user.

In the device settings, the user must enter the device identifier printed on its casing.

> Ensure that the entered number matches the Lens being installed, as mismatches will prevent data collection by the DynaGateway or app.

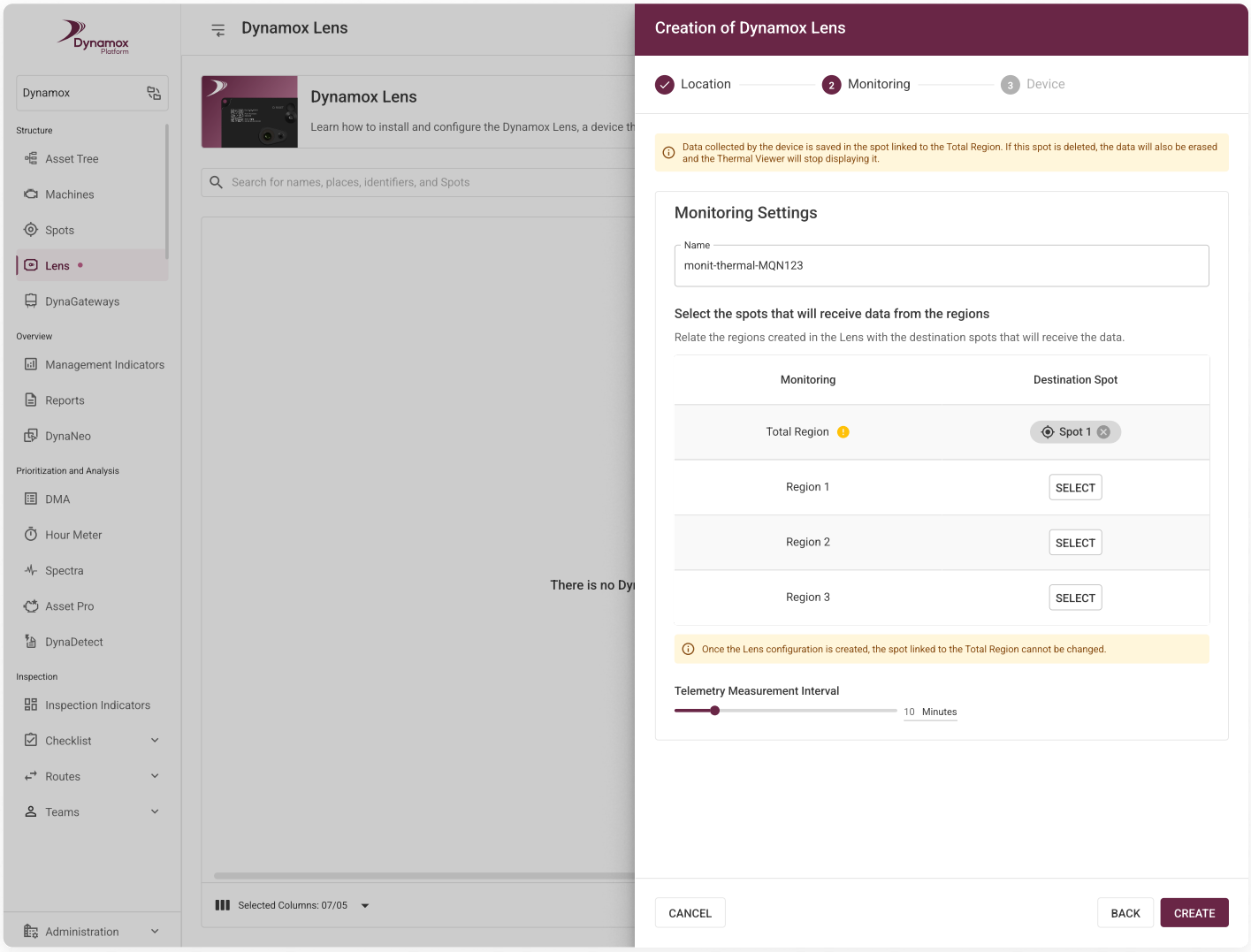


In the monitoring settings, the user must name the settings being created and define the monitoring points to which the device will be associated. These points are responsible for maintaining the historical data of the monitored asset. To define the monitoring point, click **Select**. This will open a tab to choose the spot within the Asset Tree.

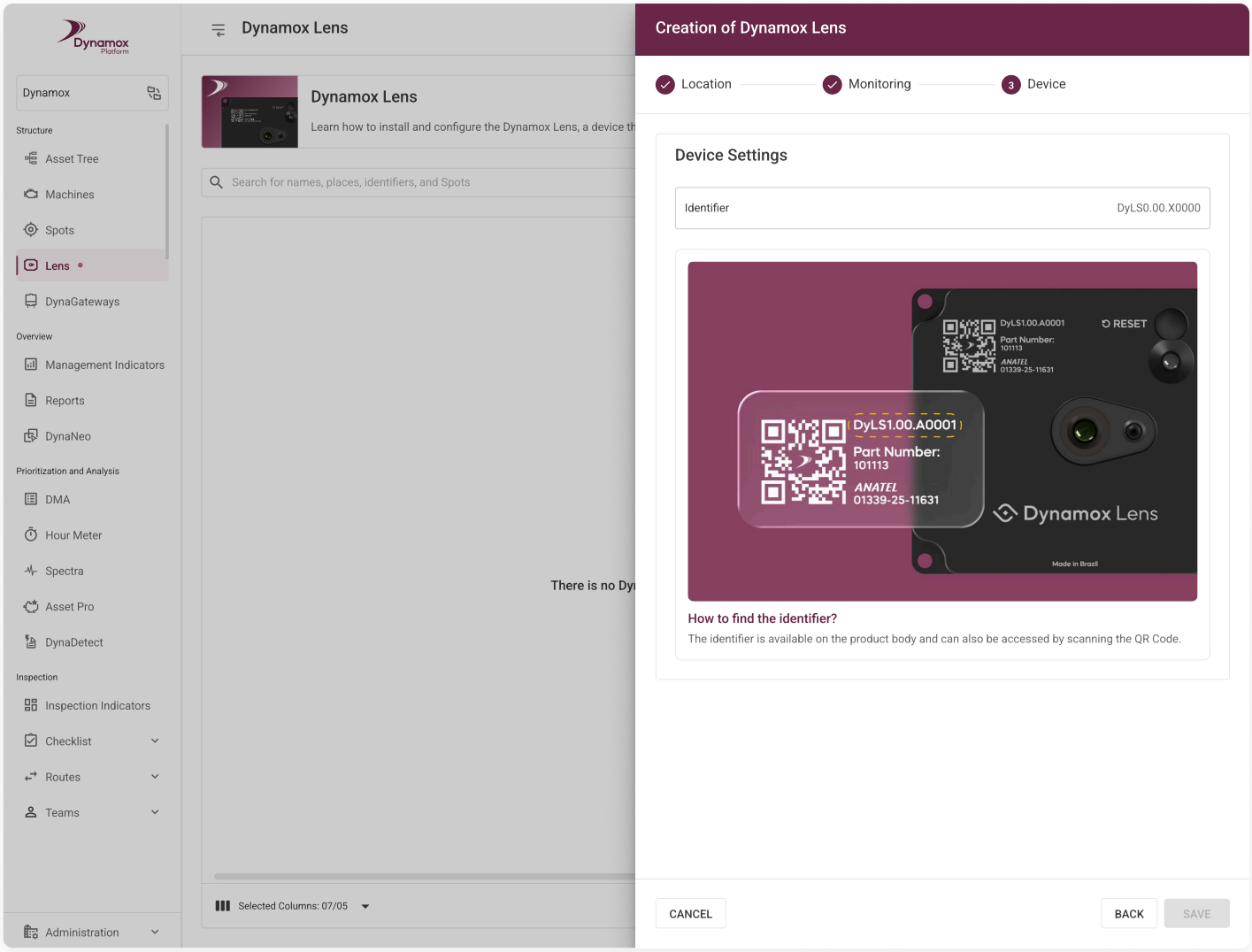
> The Destination Spot for the Total Region is mandatory and, once configured, cannot be changed.

It is mandatory to define at least the monitoring point for the total region. Other regions must be configured only if they were previously created in the device configuration pages (see section 4.3.2.1).

Finally, the user must enter the telemetry collection interval for the maximum temperature(s) of the configured region(s) and click CREATE , completing the creation of a Dynamox Lens.



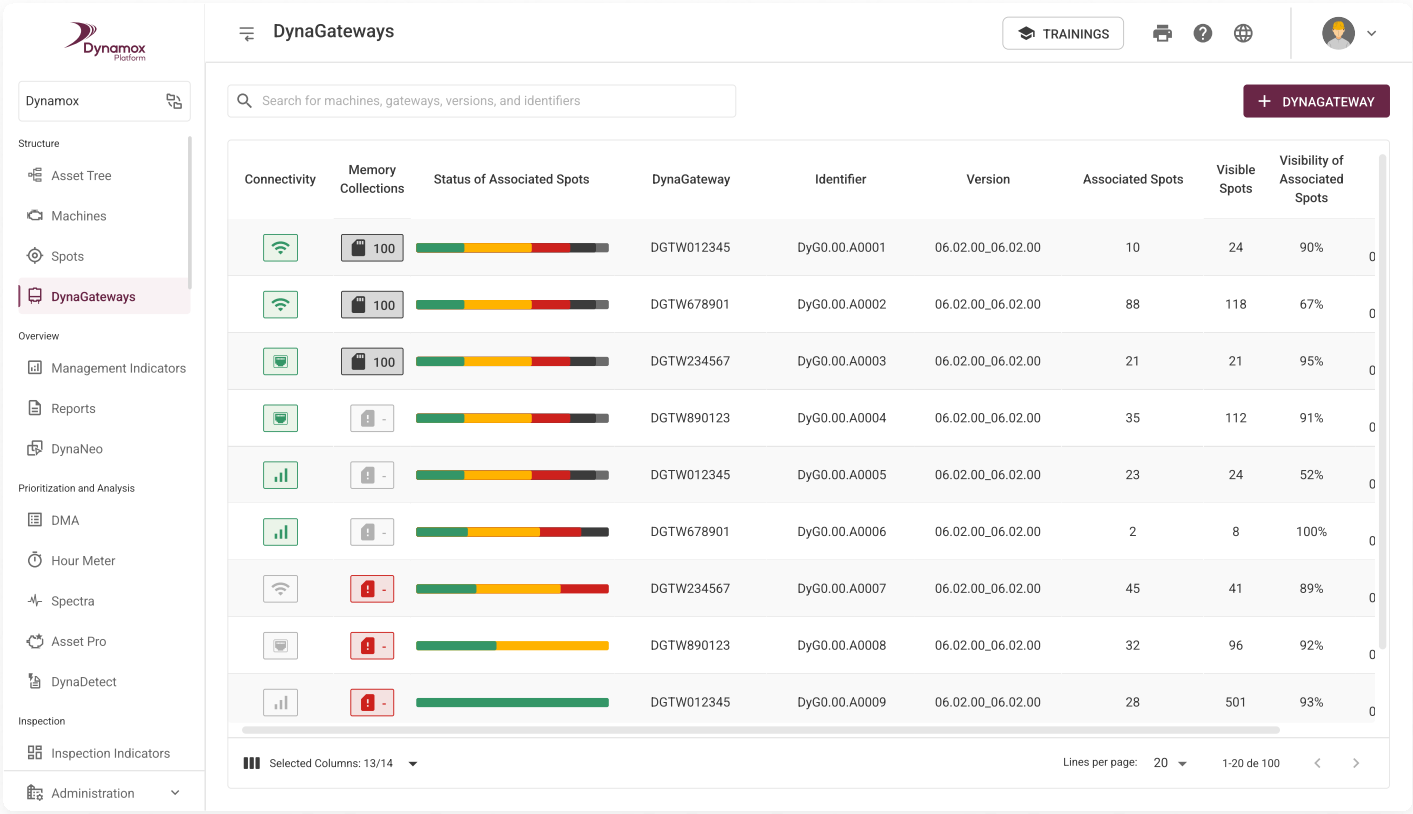
Enter the device identifier number, see section 2.1.



5.2 Associating Dynamox Lens with DynaGateway

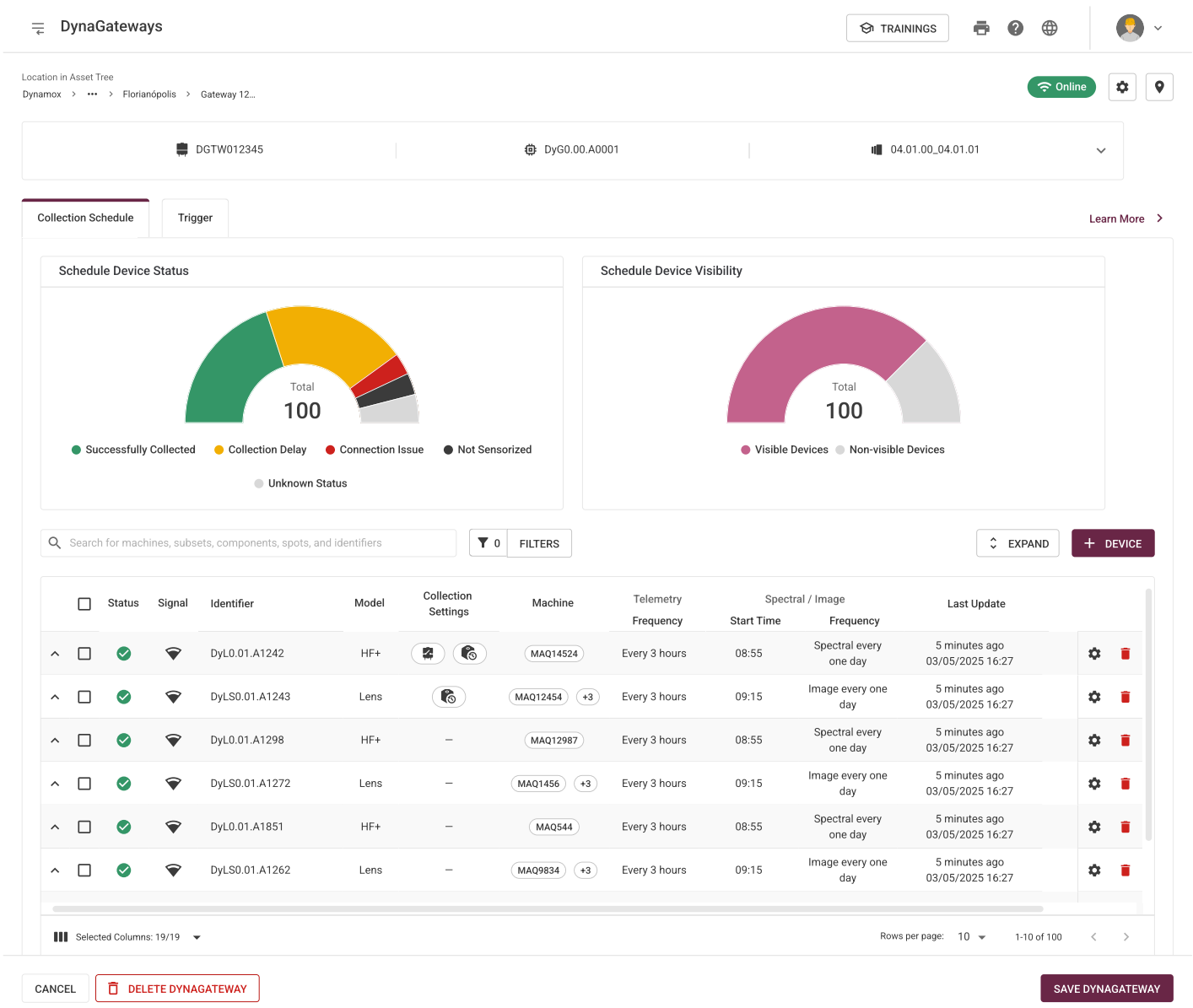
After configuring Dynamox Lens, it must be associated with a DynaGateway LTE or DynaGateway IoT, ensuring image and telemetry collection. To do this, access the platform at https://dyp.dynamox.solutions and, from the side menu, go to **DynaGateways** tab. A table listing all DynaGateways registered in the current workspace will be displayed.

> The DynaGateway assigned to collect data from Dynamox Lens can also collect data from DynaLoggers.



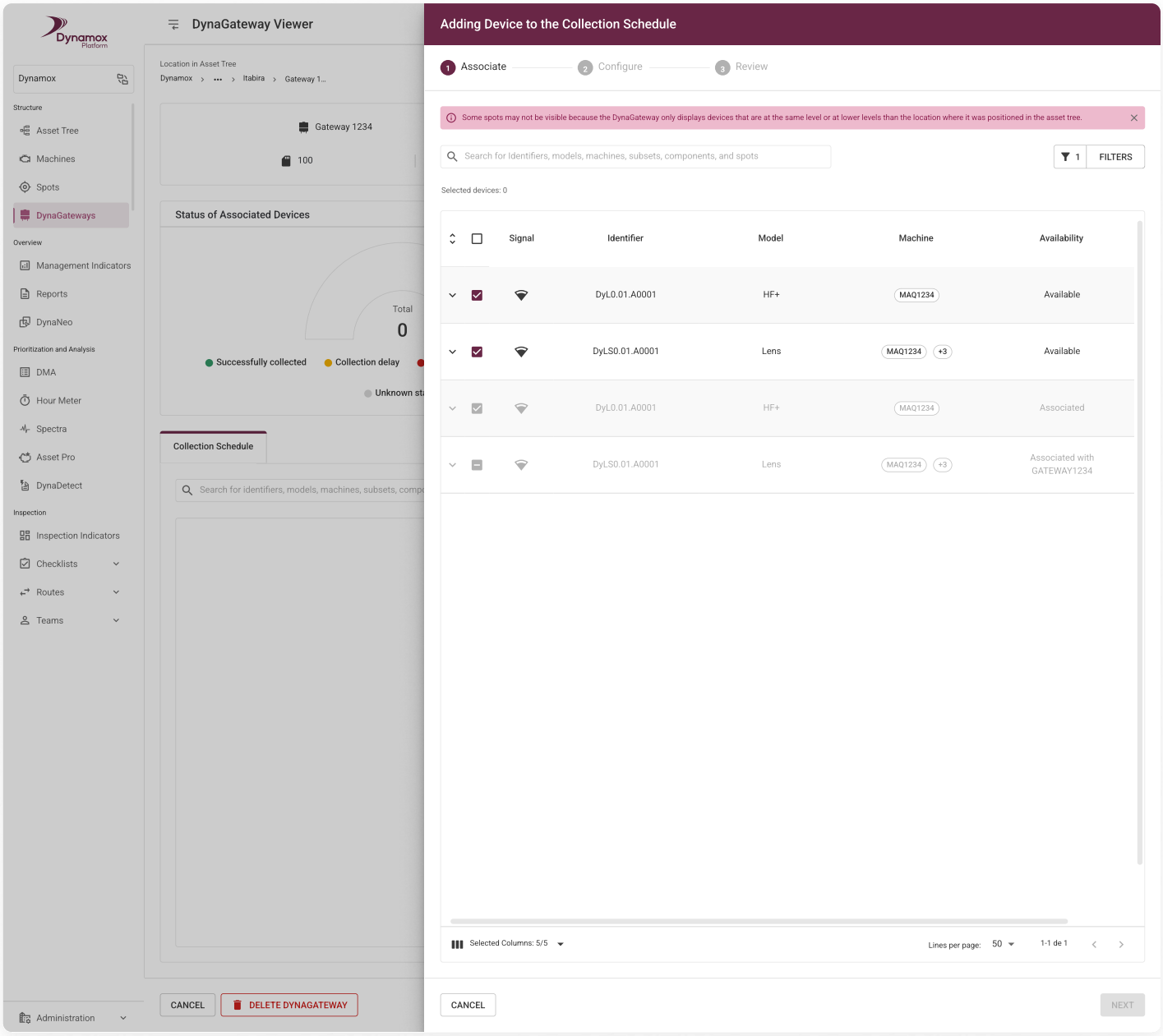
When selecting a DynaGateway (LTE/IoT) from the list, general information about the selected device will be displayed, along with the status of devices within its range and those associated with it. Visible devices include all sensors within the gateway's range, even if not yet associated. This concept helps optimize the use of DynaGateway, ensuring it is configured to collect data only from devices truly within its reach.

By selecting the **+ Device** option, sensors to be collected by DynaGateway can be associated. The list will include both DynaLoggers and Dynamox Lens devices.



To add a Dynamox Lens, simply check the box to its left. If the device is already associated with another DynaGateway, the checkbox will appear grayed out. Next to the checkbox, the signal strength of each visible device is displayed, which can assist in positioning decisions.

Once the process is complete, click **Next** to proceed to the data collection schedule configuration screen on DynaGateway. It is important to correctly configure the collection intervals for each sensor to avoid overloading the device.



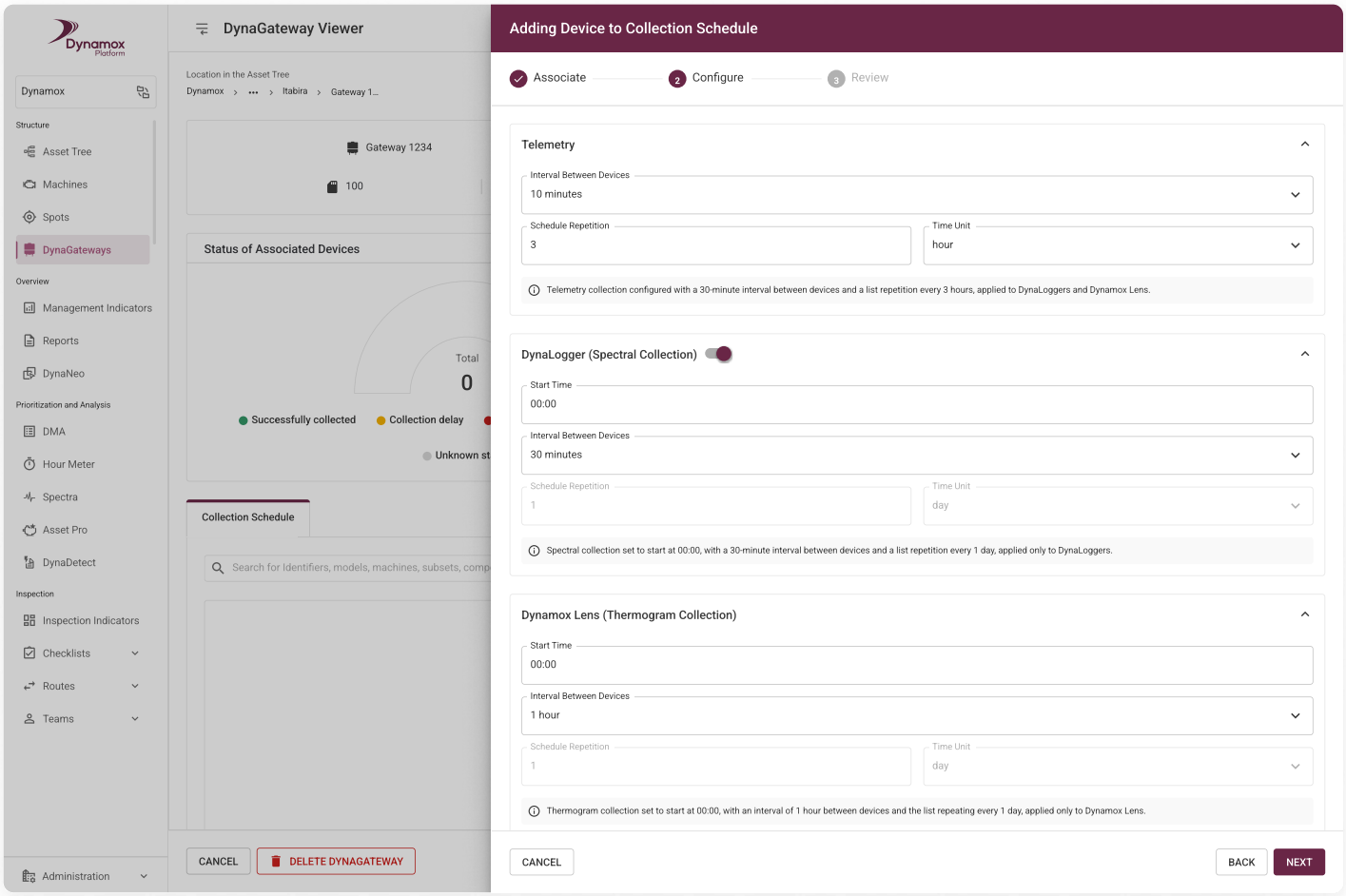
The data collection schedule configuration screen defines how often DynaGateway communicates with sensors and sends data to the platform. This screen includes two monitoring options:

- **Telemetry:** defines the times when DynaGateway will communicate with sensors to request stored data.
- **Image collection:** defines the times when DynaGateway will communicate with Dynamox Lens to request image capture.

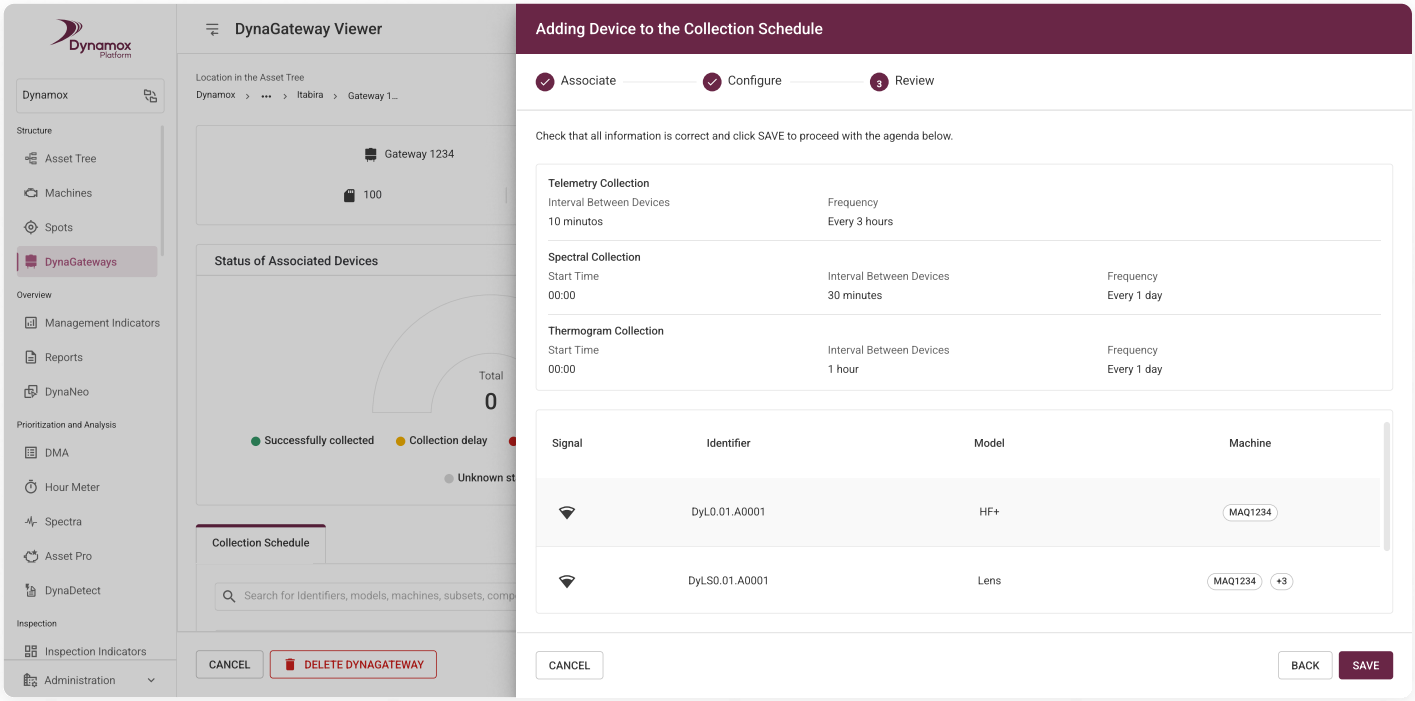
For each monitoring type, the user must define the interval between sensor collections and the frequency with which the DynaGateway repeats the schedule. Only for image collection is it necessary to specify the start time.

> It is important to distinguish between collection interval and sampling interval. The collection interval refers to the DynaGateway, while the sampling interval is configured during the creation of the Dynamox Lens. The sensor performs measurements according to its sampling interval and stores them in internal memory until DynaGateway collects the data based on the collection interval, transferring it to the platform and clearing the sensor's memory.

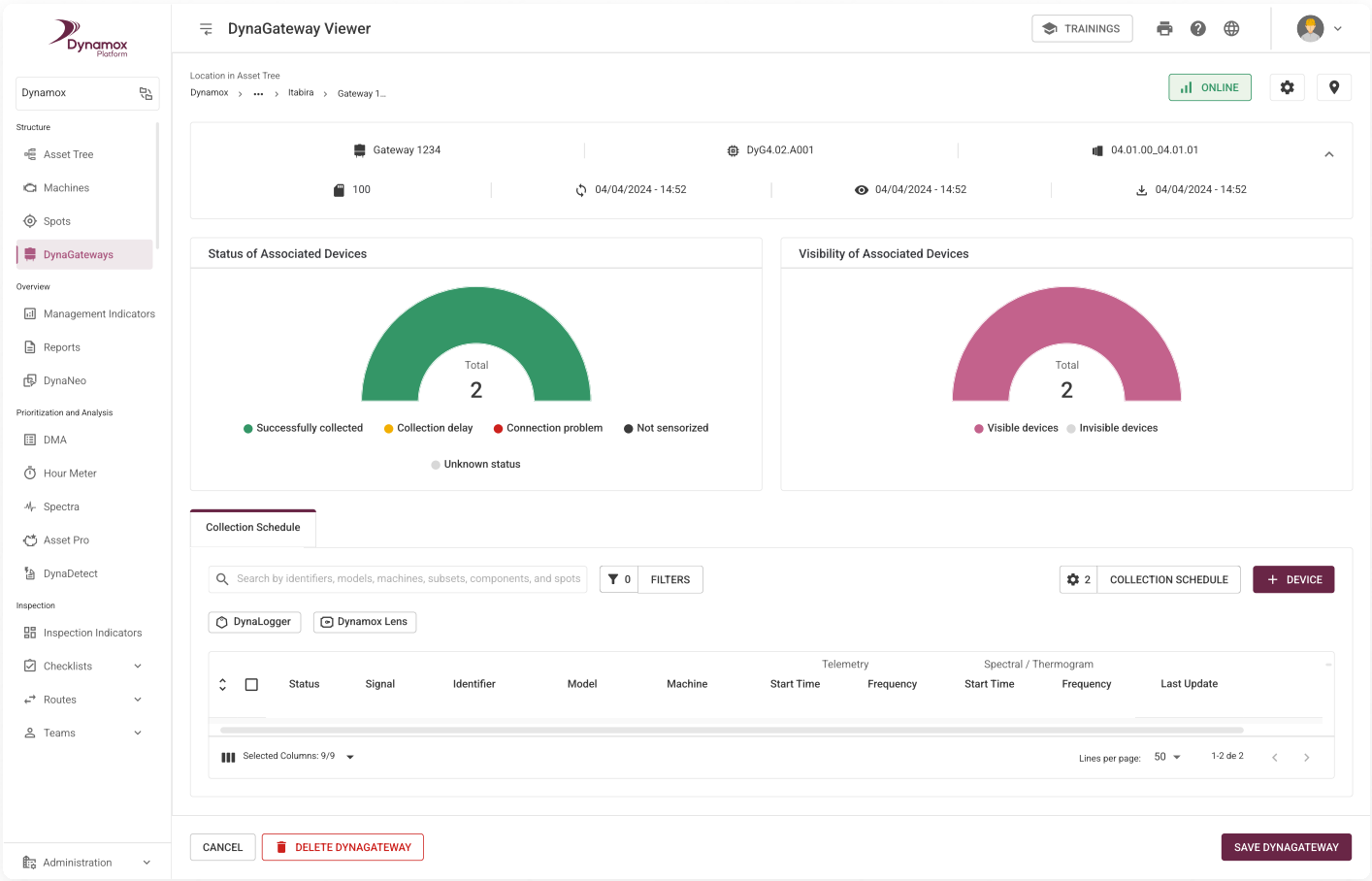
After completing the configuration, click **Next** to review the changes.



Finally, to save the Gateway settings, click **Save**. Dynamox Lens will now be collected by DynaGateway at the defined times and will appear in its collection schedule.

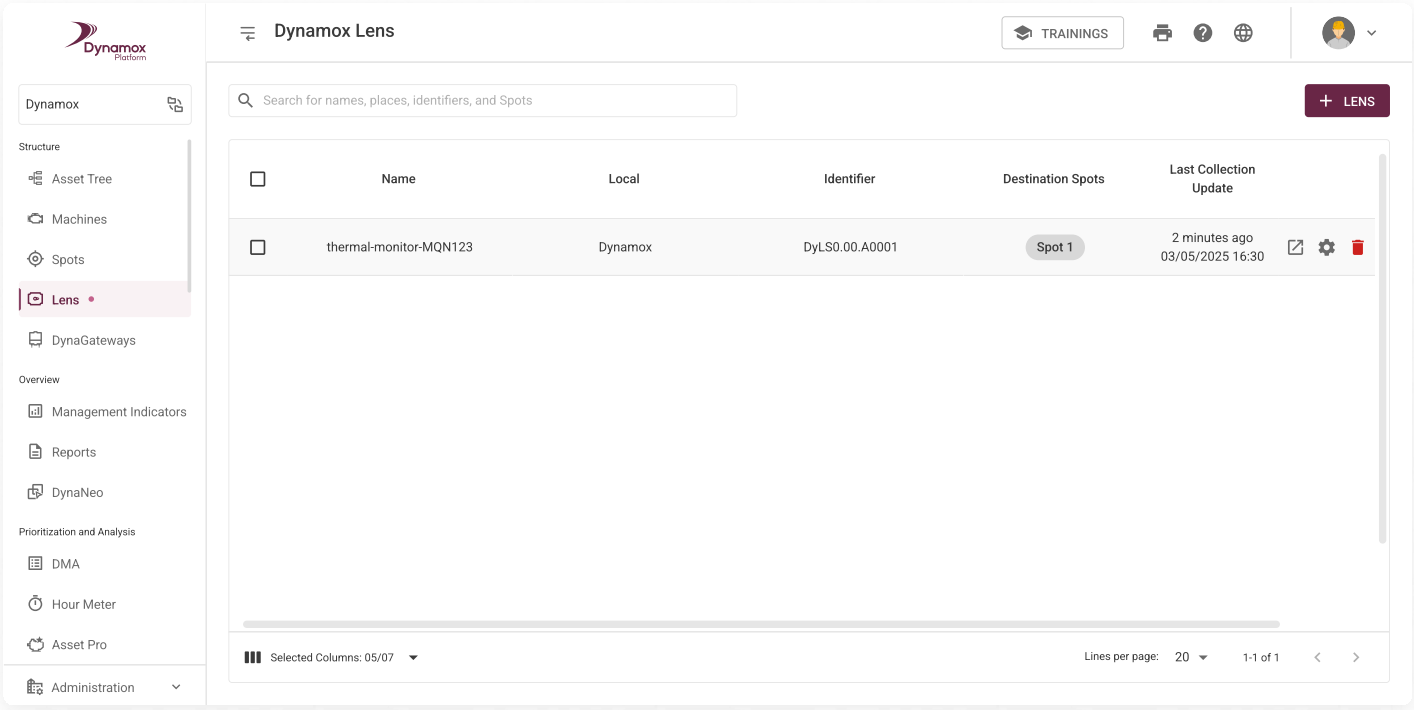


For more information on how to configure a DynaGateway on Dynamox Platform, consult our [Support Site](#)↗.



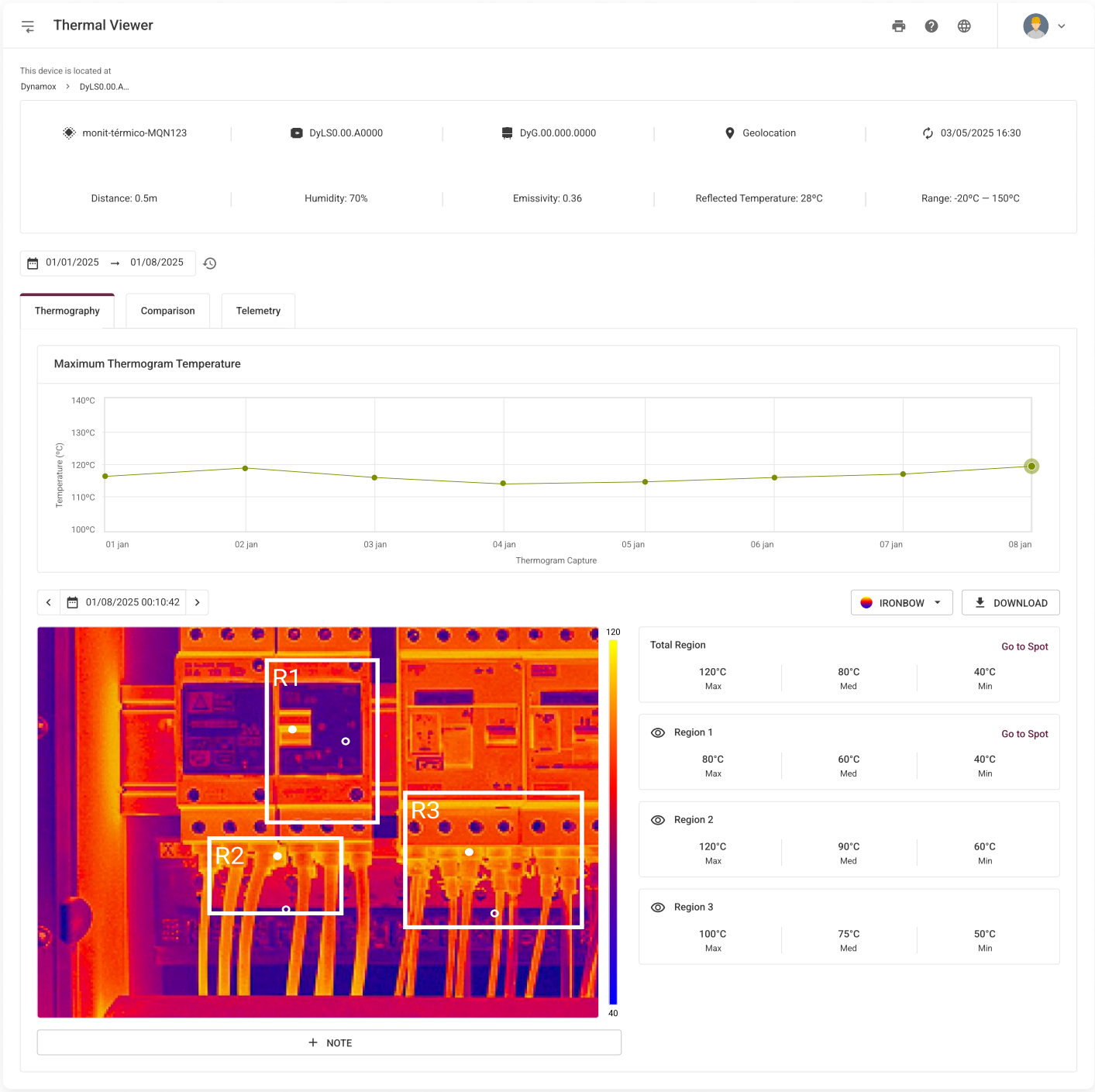
6 Thermographic anlysis

After configuring Dynamox Lens and associating it with a DynaGateway, data can be analyzed via Dynamox Platform. To do this, access **https://dyp.dynamox.solutions/** and go to the **Lens** tab in the side menu. A table listing all devices registered in the current workspace will be displayed.

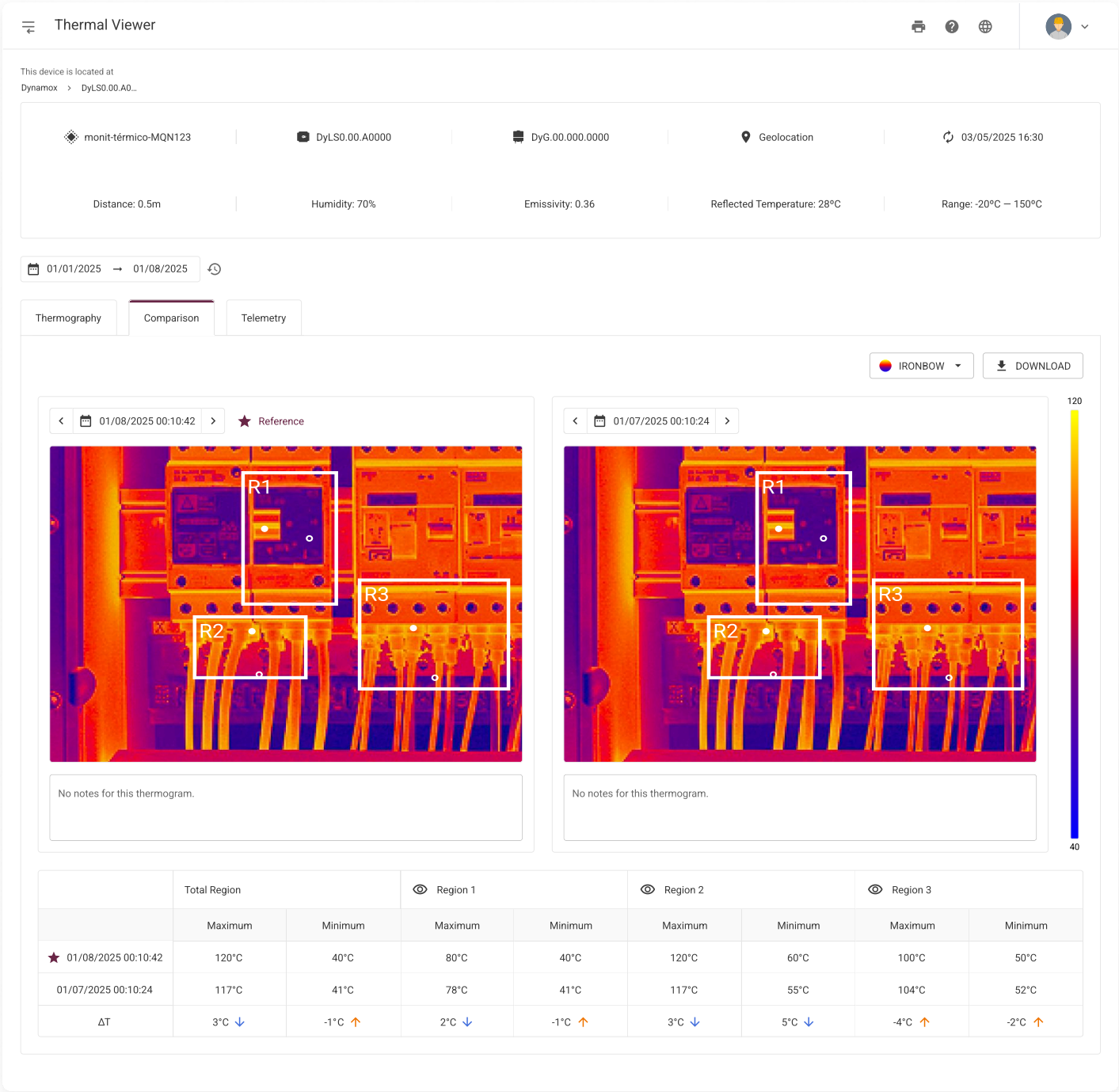


By clicking on a device, the user will be redirected to the **Thermal Viewer**, which displays all device information, including profile name, identifier, associated DynaGateway, geolocation, device settings. Additionally, three analysis tabs are available: Thermography, Comparison, and Telemetry.

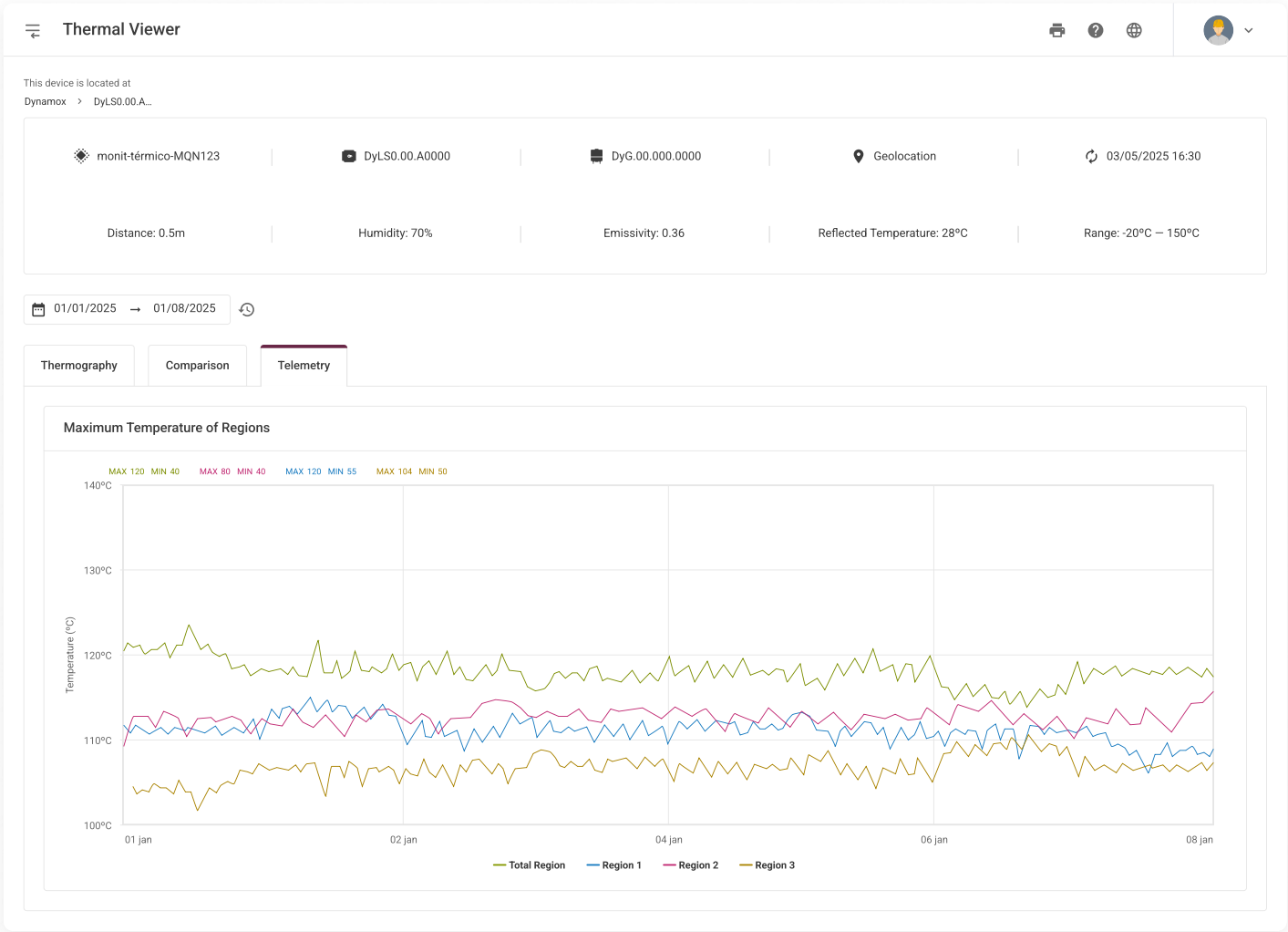
In the **Thermography** tab, users can browse images collected by the device, change the color palette, add annotations and view maximum, average, and minimum temperatures of the regions.



In the **Comparison** tab, users can select two images to compare asset evolution. A table is also available showing the temperature difference between regions.



Finally, in the **Telemetry** tab, users can view the historical maximum temperature values of the monitored regions. This history can also be accessed individually by entering each spot associated with Dynamox Lens profile.



7 Additional resources

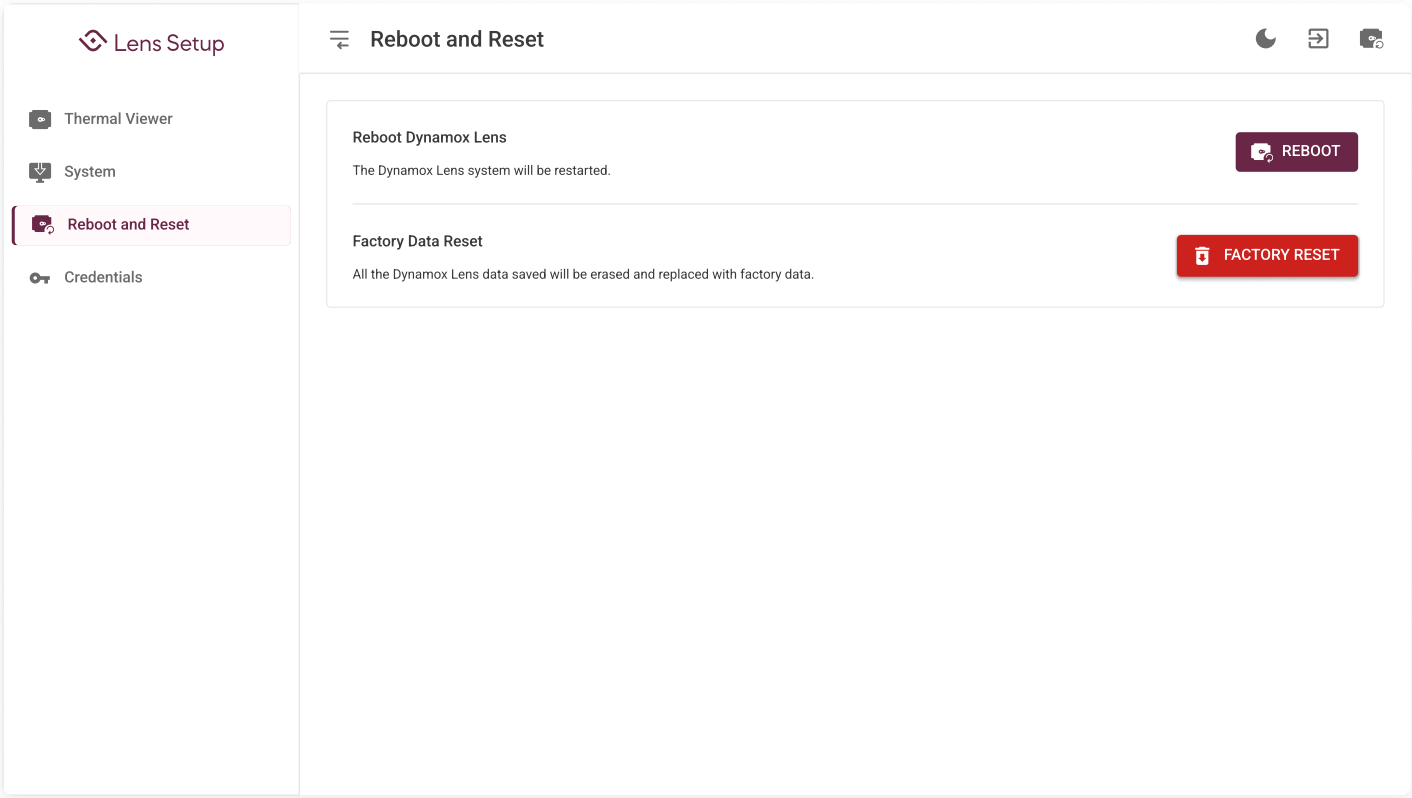
Dynamox Lens offers several tools that assist in troubleshooting and enhance device usability. Among these tools are system reboot, factory reset, and firmware update functionalities.

This section details the features and procedures for using the device's tools. All processes described are performed via the device's Web interface, the same used for device configuration (see section 4.3).

7.1 System reset

To reboot the system, the user must access the **Reboot and Reset** tab in the device's configuration interface, located in the side menu.

By selecting the **Reboot** button and confirming, the device will automatically begin the reboot process, disabling configuration mode.

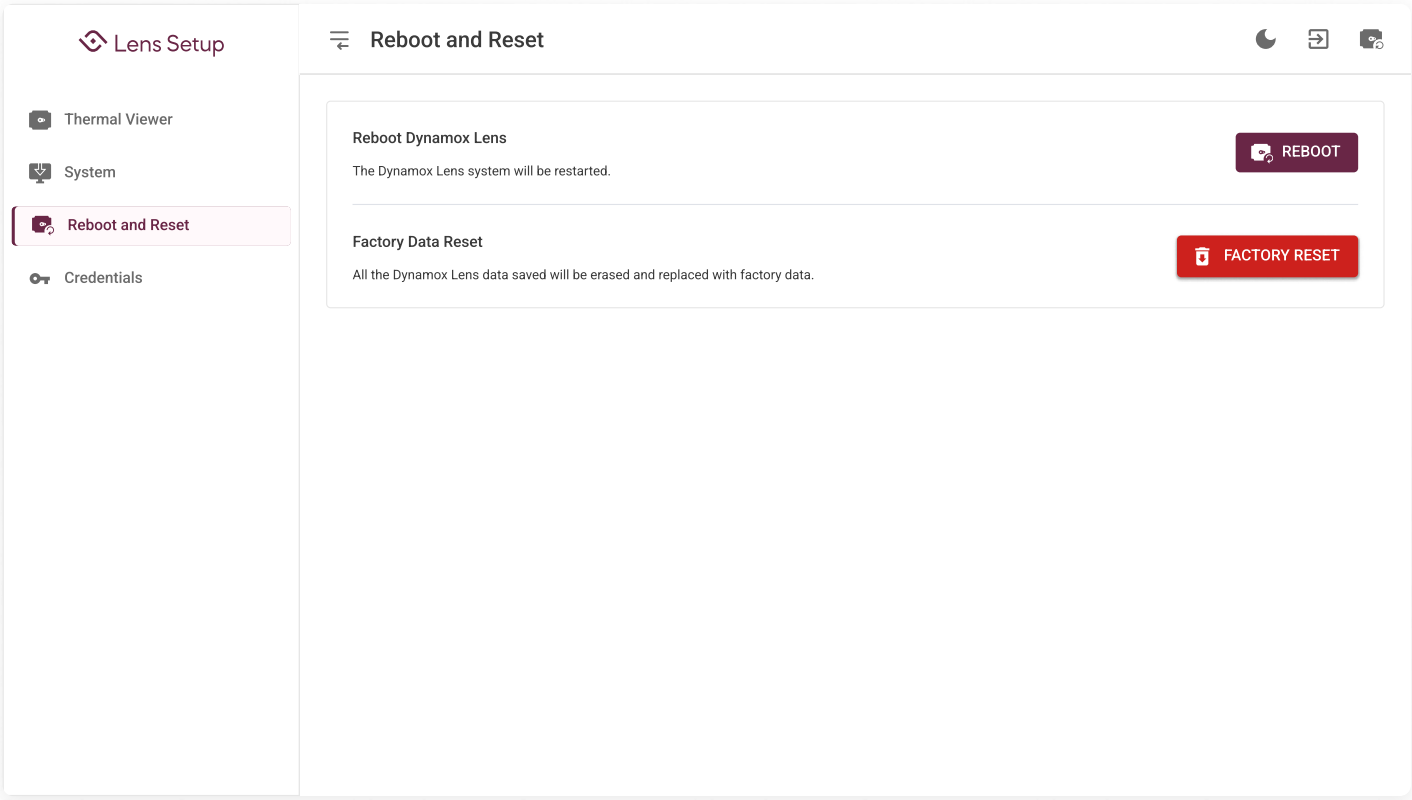


This procedure can also be performed using the physical **Reset** button. A single press is sufficient to restart the device. It is important to note that this process does not affect configuration settings, but rather restarts the operating system.

7.2 Restore factory configuration defaults

Restoring factory settings resets the device and deletes all previously configured settings, including registered users and access passwords, which will need to be reconfigured.

To perform the reset, the user must access the device's Web interface, go to the **Reboot and Reset** tab in the side menu, and then select the **Factory Reset** button. The process will begin automatically upon confirmation.



The restoring can also be performed by pressing the physical **Reset** button on the Dynamox Lens for 30 seconds.

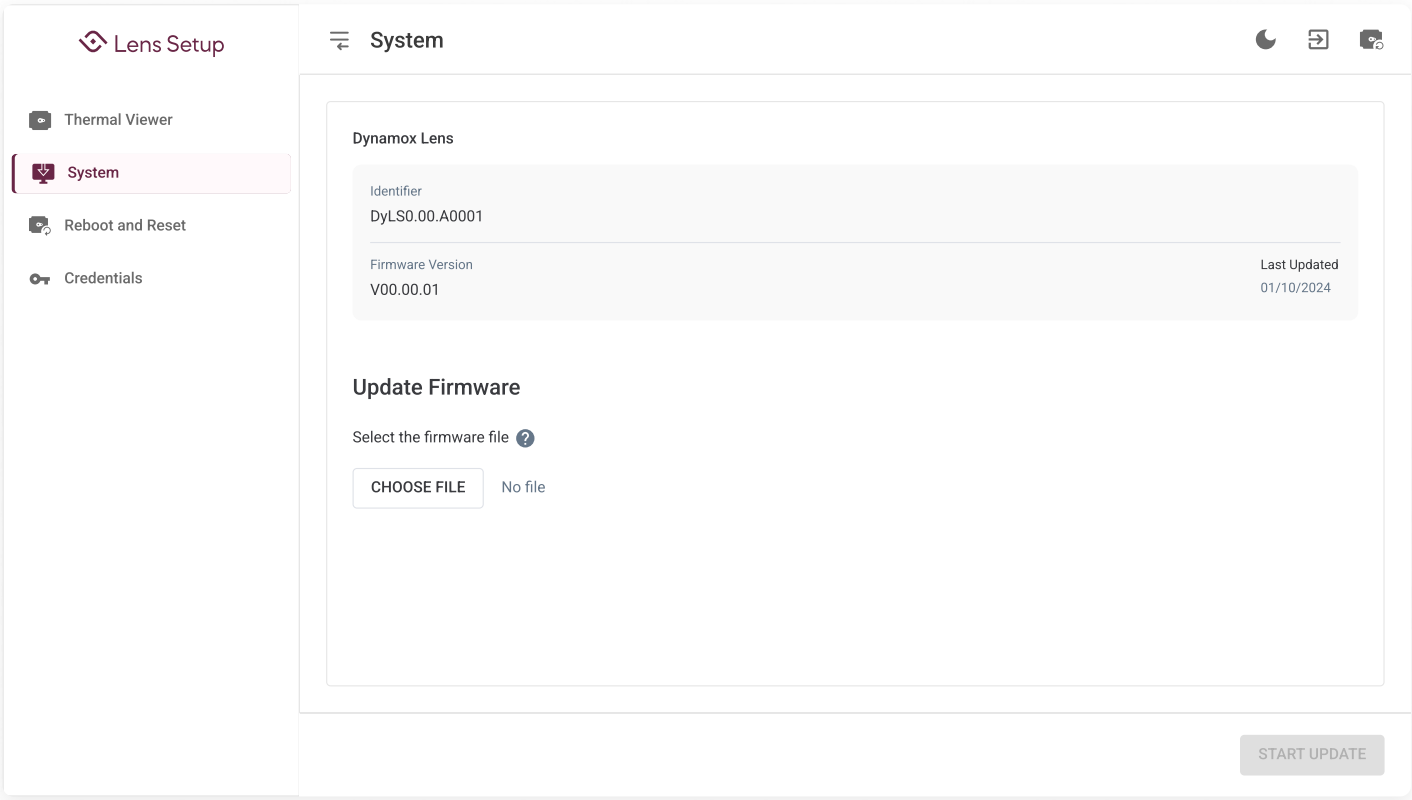


7.3 Firmware update

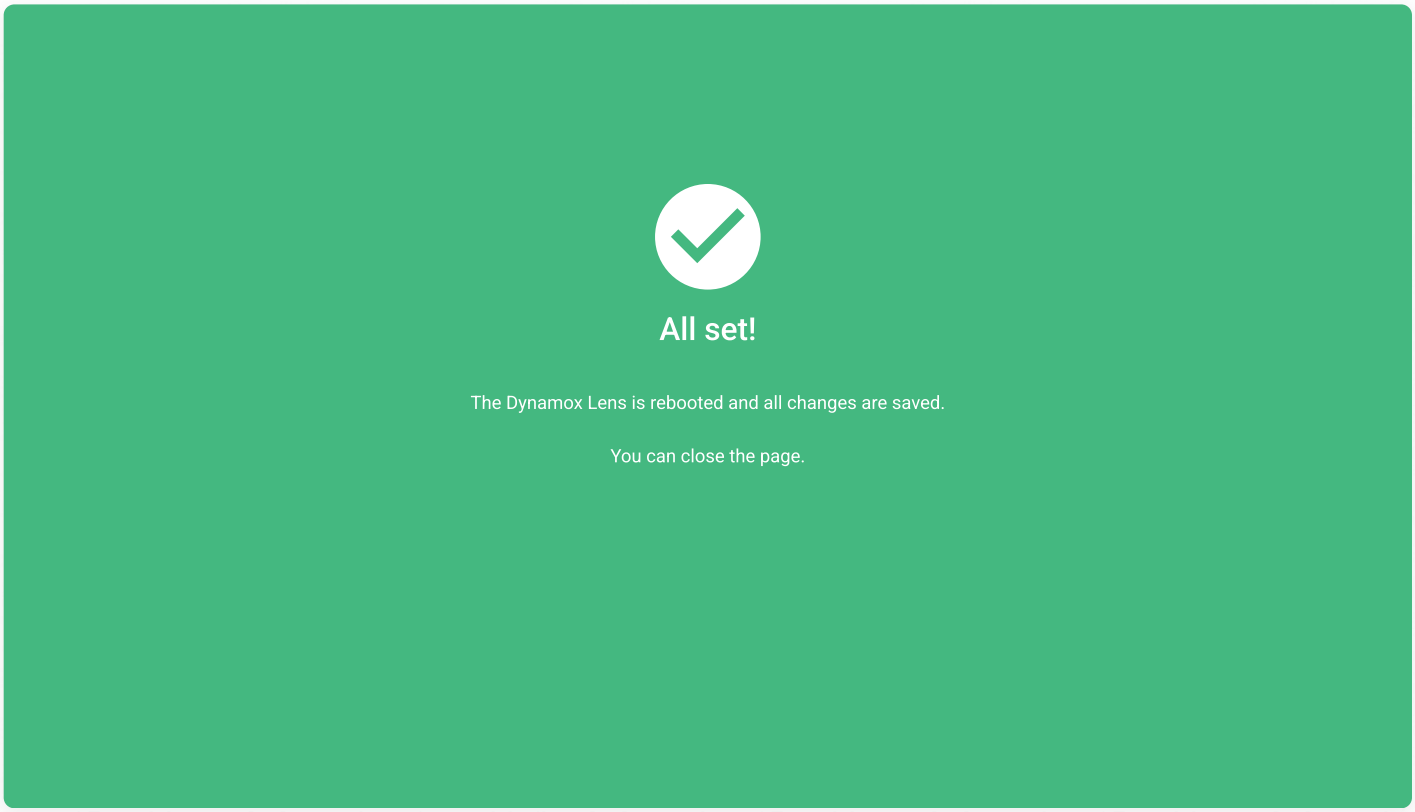
To ensure devices are always up to date with the latest features, Dynamox provides automatic updates for Dynamox Lens. However, in some cases, a local firmware update may be required.

To perform this process, the user must have the firmware update file for the Dynamox Lens module. To obtain the latest update file, contact Dynamox technical support at support@dynamox.net↗.

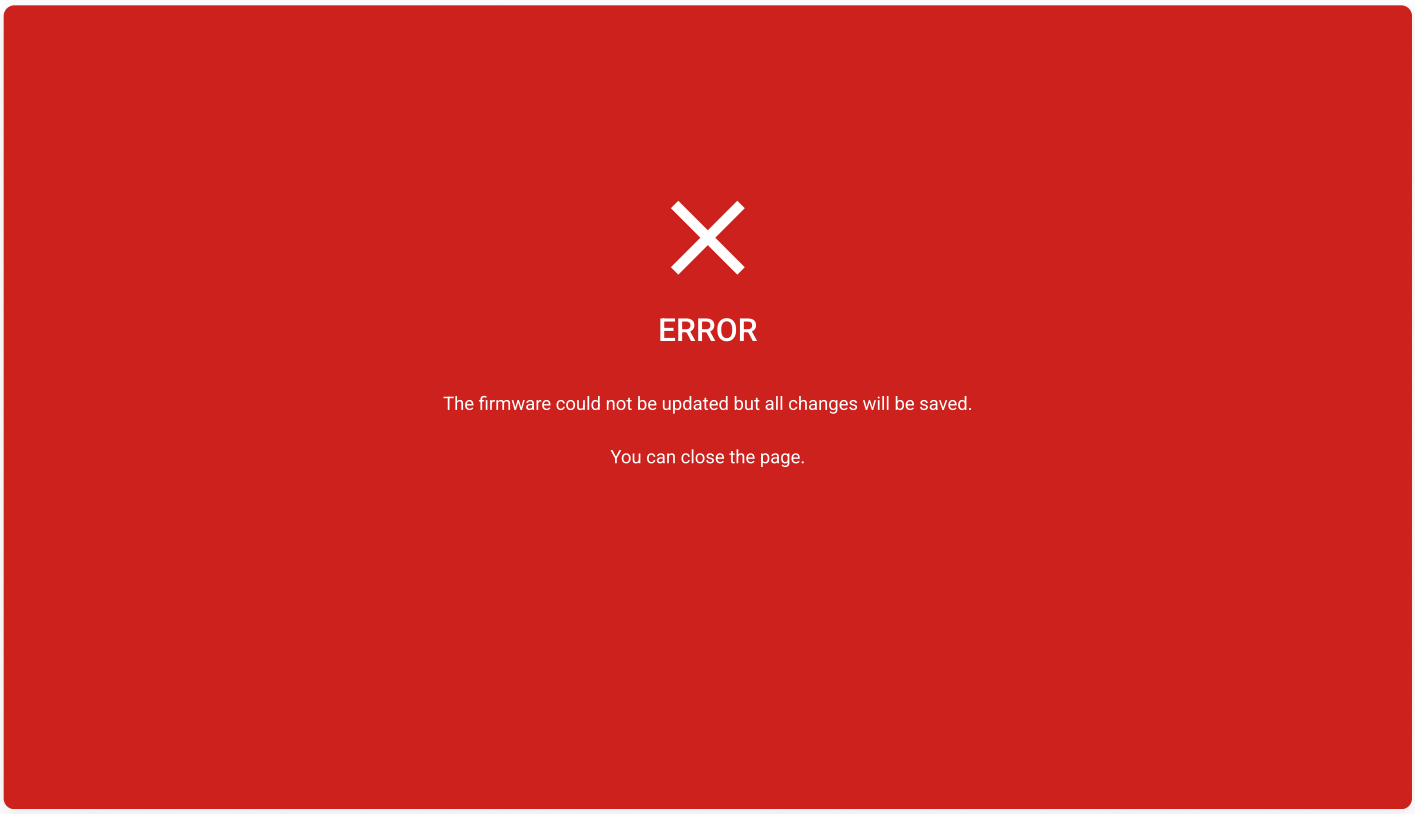
Access the **Tools** tab in the side menu and select **System**. The user will see information about the currently installed firmware and fields for performing the update. In the **Select the firmware file** field, click **Choose file** and upload the file (previously saved on your computer) with the .bin extension.



After selecting **Start update**, a confirmation window will appear to complete the process. Once completed, the user will be notified with a success message, and the device will reboot. The LED indicators will display the startup behavior.



If the following window appears, check if the Wi-Fi connection is stable or if the sent file is correct and try again.



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

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

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Get in touch:
www.dynamox.net/contact-us