MYSIRIUS CALIBRATION USER GUIDE

Revision 5.0

MySirius

JRI, Société par actions simplifiée au capital de 4 000 000 €
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CONTENTS

I. DESCRIPTION & LEVELS

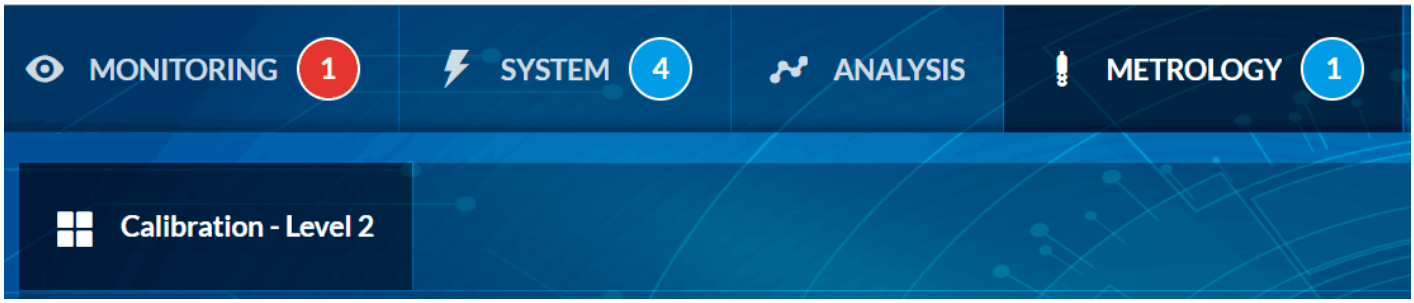
The MySirius Calibration module is a chargeable option.

1. Main features

- Calibrate / check one or more measurement chains
- Adjust one or more measurement chains (modelization)
- Keep traceability of metrological operations of one or more measurement chains
- Send notifications to anticipate the renewal of metrological operations
- Drift analysis
- Calibration periodicity optimization

2. Levels

The level 1 or 2 of your MySirius Calibration module is indicated at the top of your Metrology dashboard.



Below are the functionalities available with each level:

	Functions	Level 1	Level 2
4.0 VERSION	*Calibration module available in Cloud solution*		
	Calibration in 2 points	✓	✓
	Use of the JRI 's MPE	✓	✓
	Reports customization	✓	✓
	Calibration in x points with automatic search of the best stability	-	✓
	Use of MPE's and customized uncertainties	-	✓
	Access to the audit trail (with Advanced subscription)	✓	✓
	Calibration of all Nano SPY & LoRa SPY recorders (except JRI digital probes and the Nano SPY TH High accuracy sensor)	✓	✓
	Use of Nano SPY and LoRa SPY Reference as standard devices	✓	✓
	Conformity validation	✓	✓
4.1 VERSION	Management of the calibration bench for JRI Digital probes	✓	✓
	Calibration of new digital JRI probes (Digital Sensor X^2)	✓	✓
	Compatibility with previous probes generation (Digital Sensor Evolution)	✓	✓
	Calibration of other brands devices	-	✓
4.2 VERSION	*Calibration module available in Cloud and Server solutions*		
	Compatibility with Labguard 3D Ethernet devices	✓	✓
	Drift analysis between 2 calibrations	-	✓
4.3 VERSION	Test Uncertainty Ratio (TUR), standard average measurements, electronic signature in metrology reports generated	✓	✓
	Role to finalise a metrological operation	✓	✓
4.4 VERSION	Use of raw data for modeling purposes	✓	✓
	Choice of modeling application by a customer if COFRAC metrology is performed by JRI	✓	✓
TO COME	Management of calibration baths	-	✓
	Nano SPY TH High accuracy calibration	✓	✓

3. Definitions

- **Reference measuring system (Standard chain)**: Reference measurement chain (Example: Nano Reference)
- **Environment** : Equipment used to perform a metrological operation. Example: bath, oven, climatic chamber
- **Program**: Program of measurements of one or more points combining standards and adapted calibration mediums.

- **MPE**: Maximum Permissible Error
- **Uncertainty components**: Sources of measurement uncertainties
  - Calibration Medium:
  - Homogeneity
  - Stability
  - **Measurement chain**:
  - Uncertainty of the reference chain
  - Repeatability error
  - Resolution of the reference chain
  - Homogeneity of the reference chain

  - Annual drift of the reference chain
  - Stability of the reference chain
  - **Generic chains**: Measurement chains other than the NOVA, NANO and LORA SPY ranges from JRI or LABGUARD 3D from Biomérieux.
- **Calibration bench**: JRI device with 20 inputs allowing the calibration of JRI digital probes (Digital Sensor Evolution and Digital Sensor X²)
- **Drift Analysis**: Verification of the behavior of a measurement chain between two successive verifications or calibrations
- **Periodicity optimization**: optimization of the frequency of metrological operations on a measurement chain.
- **TUR**: Test Uncertainty Ratio. TUR = Acceptable Tolerance (TU [Upper Tolerance Limit] - TL [Lower Tolerance Limit]) / Calibration Uncertainty

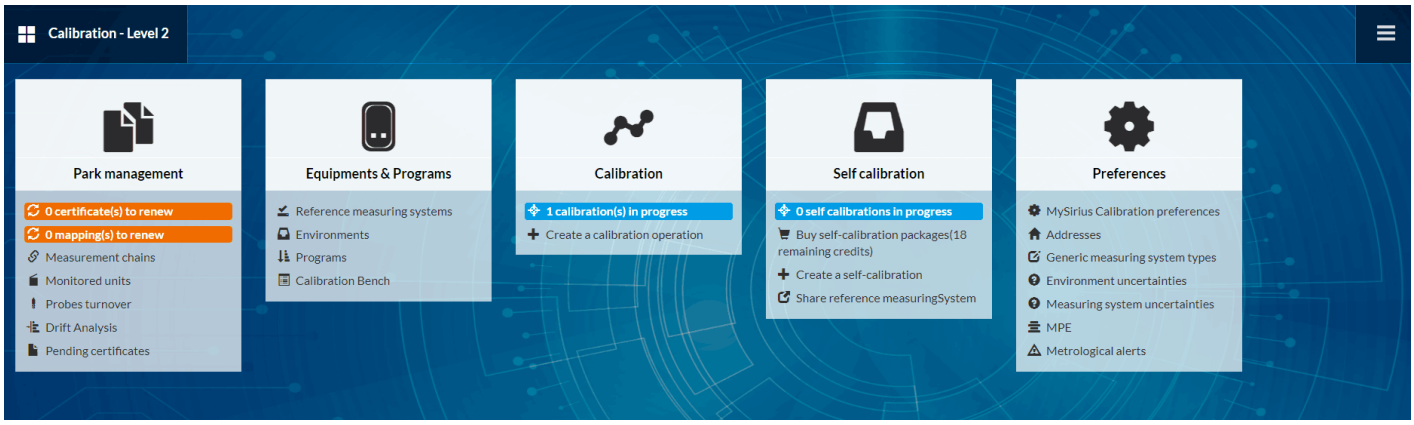
4. Profiles

There are 2 profiles with specific rights on the Metrology module. These profiles can be applied to a user's account (new or existing) from the ADMINISTRATION tab in the Profiles section.

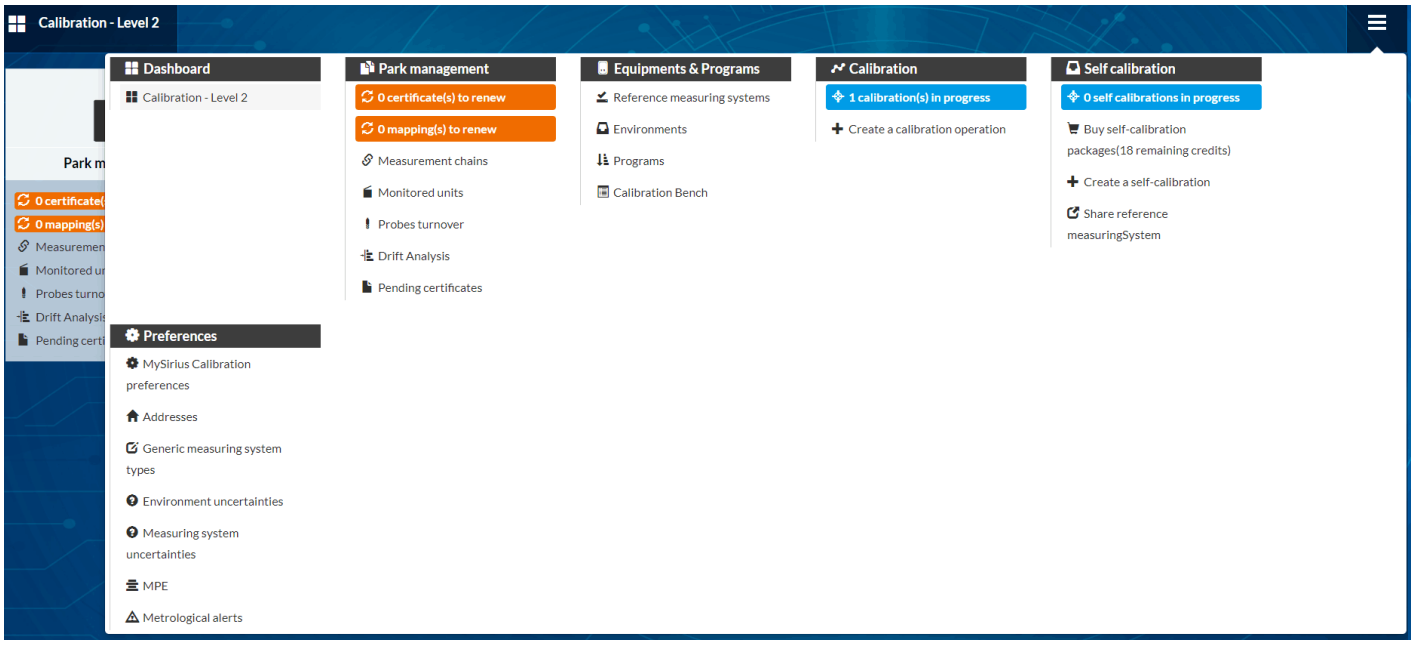
- **Metrologist Manager**: All rights
- **Metrologist**: All rights except,
  - Preferences management
  - Metrological means management
  - Deleting, Verifying and Signing metrological operations

II. DASHBOARD

The home screen of the MySirius CALIBRATION module contains all the functionalities divided into 4 sections.

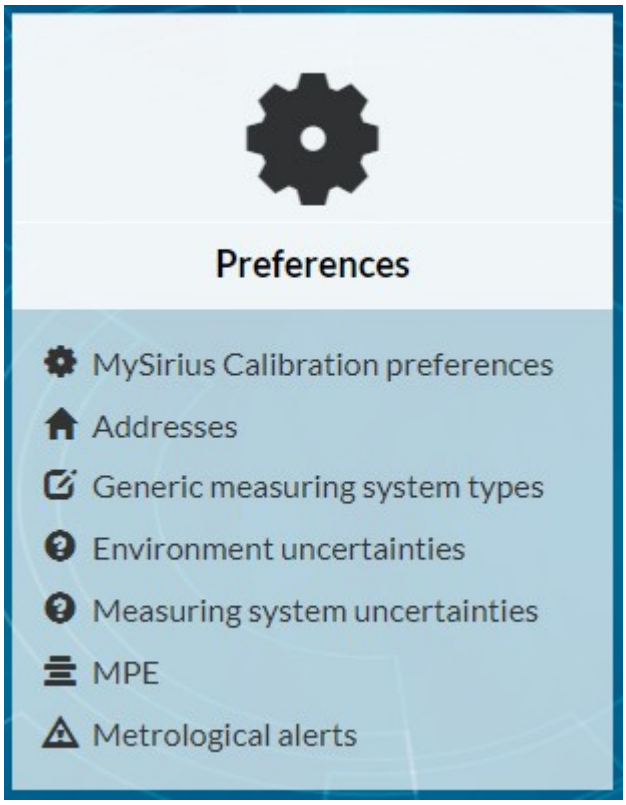


A quick access to the menu is possible by clicking on 



III. PREFERENCES

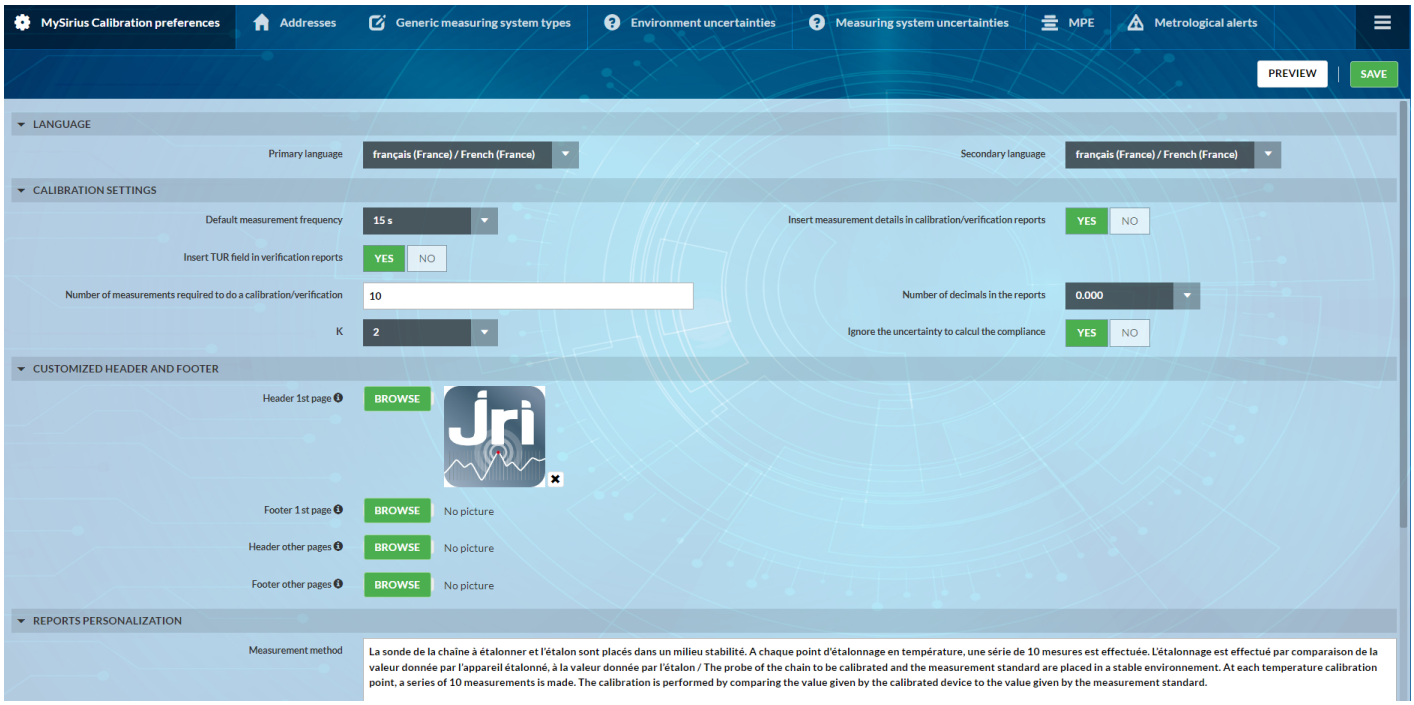
Preferences defined in this section are applied to all the users of the Calibration Module.



1. Mysirius Calibration Preferences

Customize your reports and set your language and calibration preferences. Use the “PREVIEW” button before saving your settings.

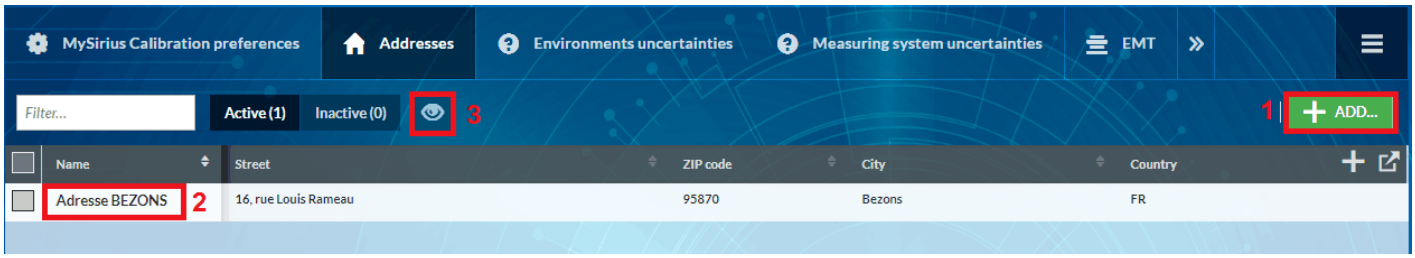
It is possible to ignore the uncertainty in the calculation of a compliance. The information will be mentioned in the report generated by two asterisks in the table next to the MPE.



The TUR (Test Uncertainty Ratio) is the MPE/Incertitude ratio. This calculation indicates the ability of the measurement chain to respond to measurement uncertainties.

2. Addresses

1. Click on the “ADD” button to create a new address to be included in your reports.



2. Click on an address to modify it.

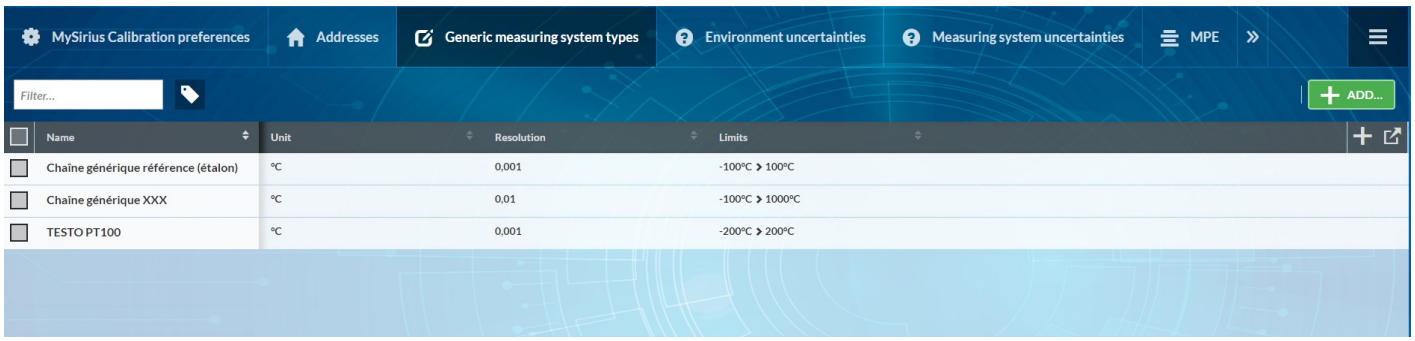
3. Use the  to hide a selected item, and the  to show a selected item.

3. Generic measuring systems Types

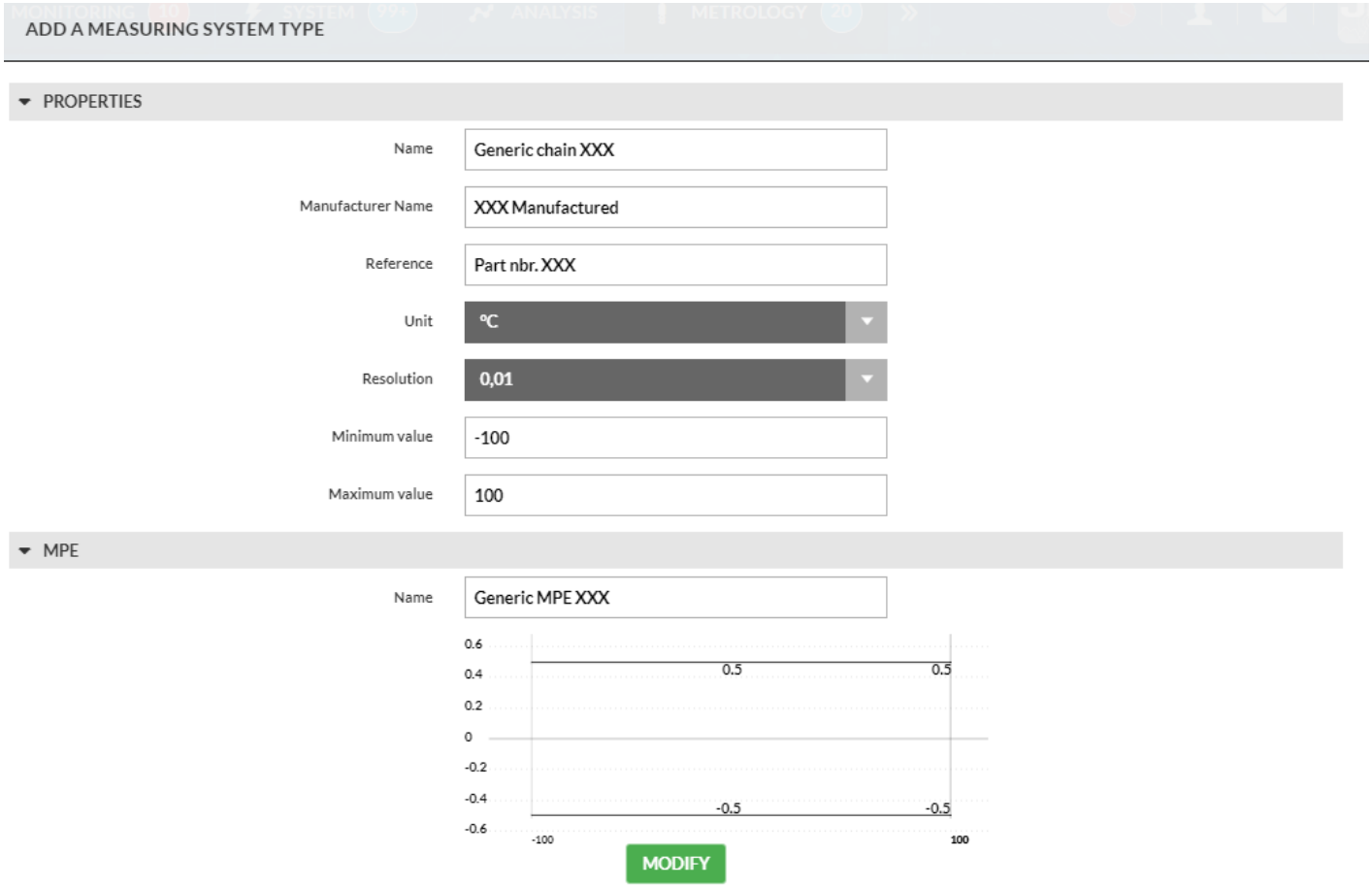
Since MySirius version 4.1, it is possible for the level 2 of the calibration module to perform metrological operations on generic measuring chains. The measurements must be imported into MySirius via a CSV file or entered manually.

Measurement chains other than the NOVA, NANO and LORA SPY ranges from JRI or LABGUARD 3D from Biomérieux.

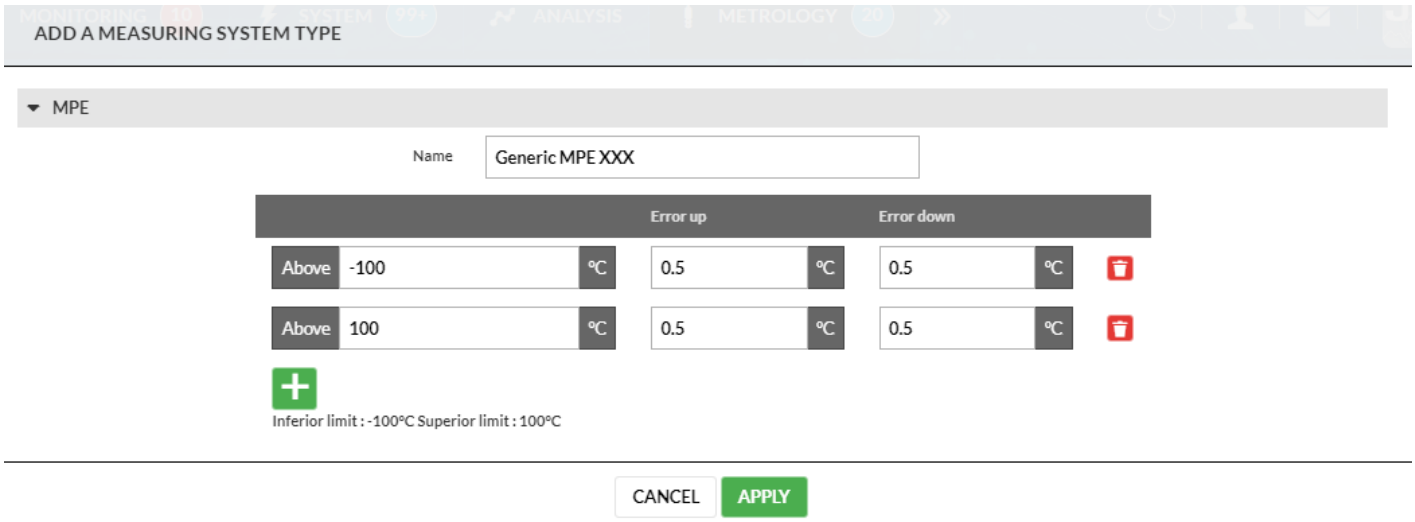
1- Click on add to create a new type or select an existing type to modify or archive it.



2- Fill in the various fields and click on SAVE

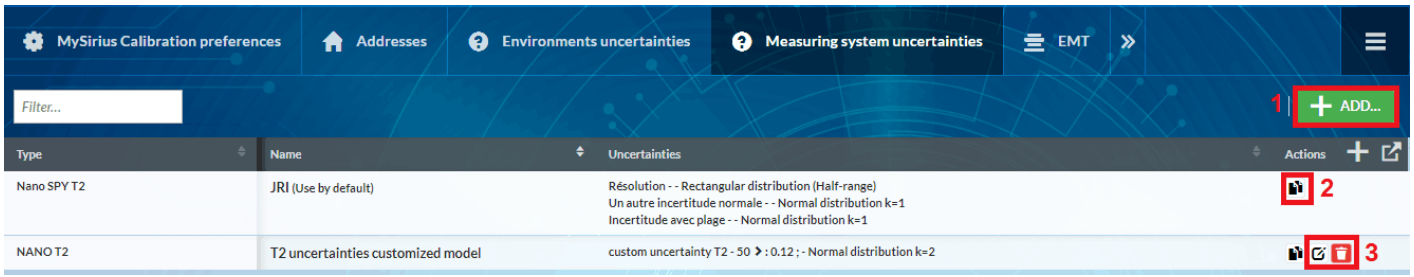


3- The MPE can be modified by clicking on the MODIFY button then SAVE



4. Uncertainty components (Environment and measurement chains)

1. Create your uncertainty models by clicking on the ADD button.
2. The uncertainty models used by default can be customized. Use the COPY button in ACTIONS to create a new model from existing ones.
3. Edit or delete the created models.



5. MPE (Maximum Permissible Error / EMT in french)

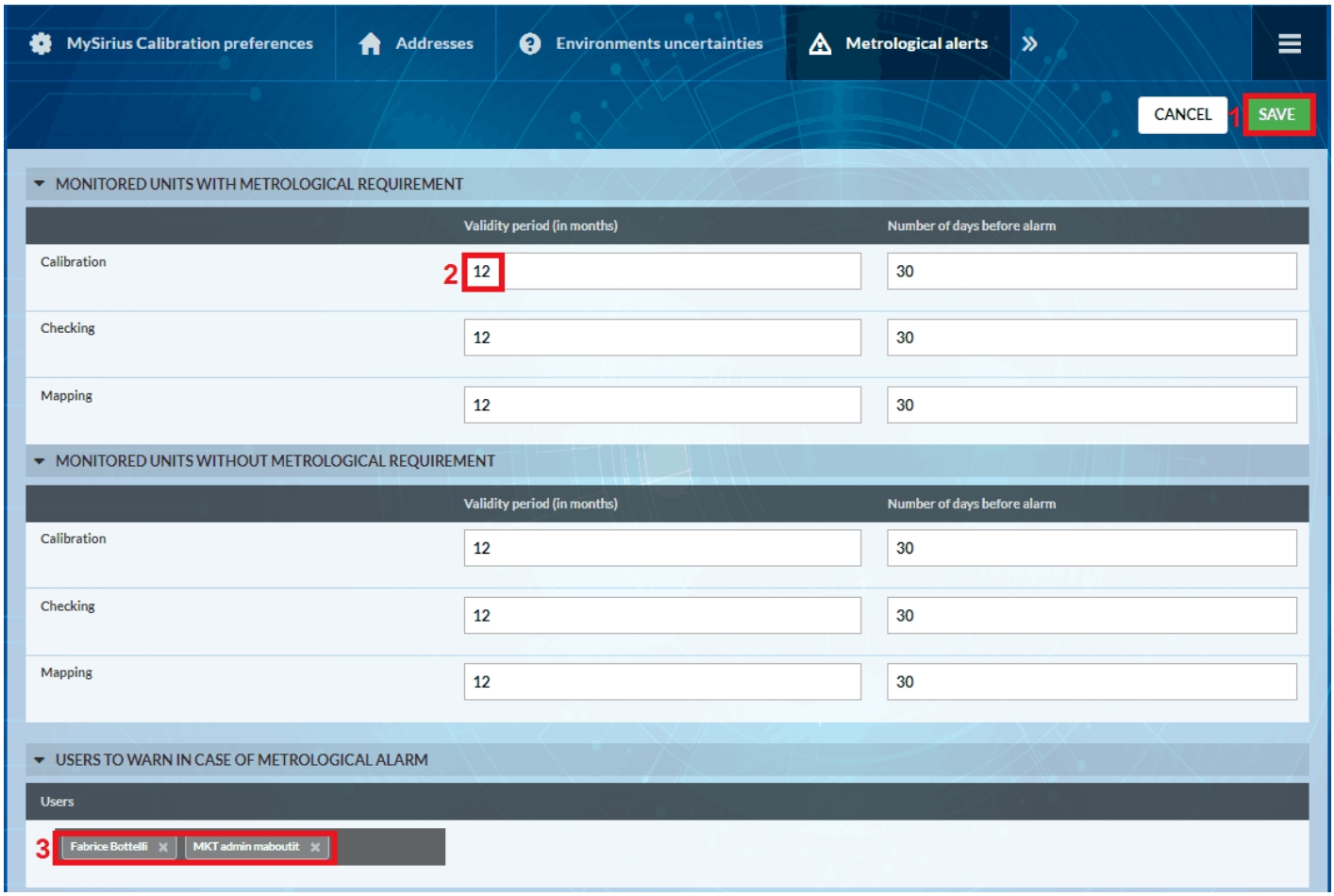
1. Create your MPE models by clicking on the ADD button.
2. Default JRI MPE models can be customized (Level 2). Use the COPY button in ACTIONS to create a new template from existing templates.
3. Edit or delete the created MPE.

6. Metrological alerts

Set reminders to anticipate your metrological operations before the end of validity of your certificates. Click on the MODIFY button

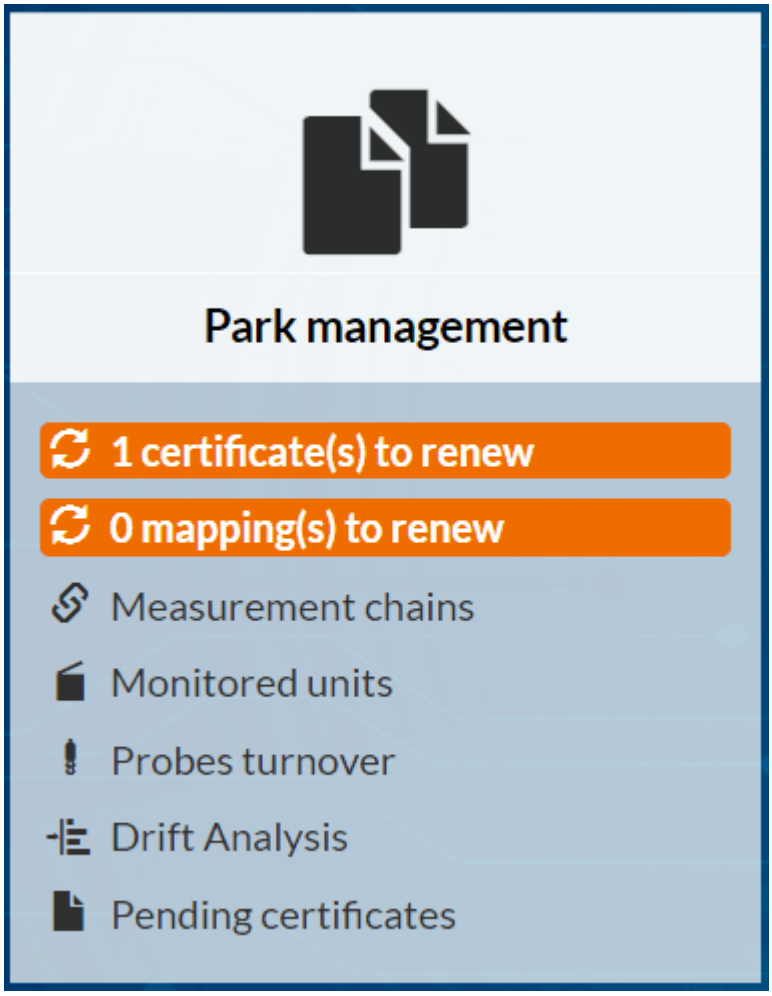
1. Use the SAVE button to save your changes.

2. Enter the desired values in the fields “Validity period” and “Number of days before alarm”.
3. Select the users to be notified in case of a metrological alert


MySirius Calibration preferences
Addresses
Environments uncertainties
Metrological alerts
CANCEL
1
SAVE
MONITORED UNITS WITH METROLOGICAL REQUIREMENT
Validity period (in months)
Number of days before alarm
Calibration
2
12
30
Checking
12
30
Mapping
12
30
MONITORED UNITS WITHOUT METROLOGICAL REQUIREMENT
Validity period (in months)
Number of days before alarm
Calibration
12
30
Checking
12
30
Mapping
12
30
USERS TO WARN IN CASE OF METROLOGICAL ALARM
Users
3
Fabrice Bottelli
MKT admin maboutit

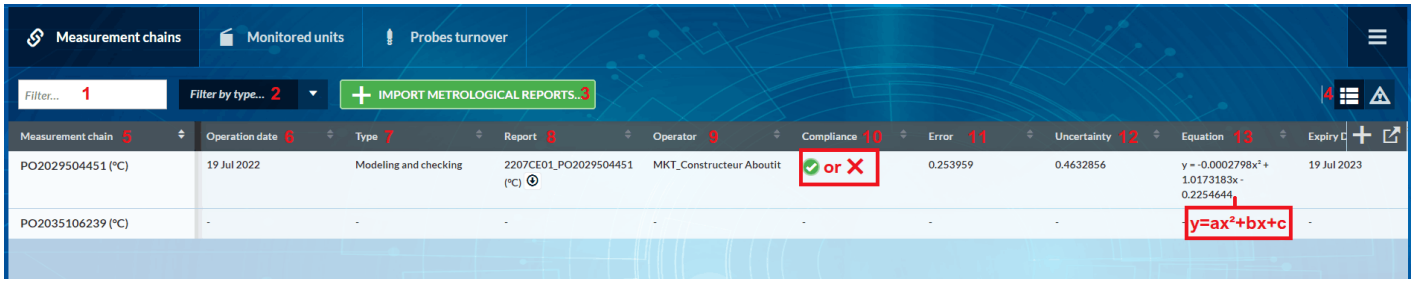
IV. PARK (FLEET) MANAGEMENT

Indicators of metrological operations to be renewed (certificates/maps) allow you to identify the metrological actions to do in priority.



1. Measurement chains

In this screen, you will find all the metrological information related to a measurement chain (device + sensor).



1. Search fields by serial number
2. Filter by type of operation: Calibration, verification, with or without modelization…
3. Import metrological reports: Possibility to import JRI metrological reports by using a drag/drop of files from your computer
4. Filter by compliant/non-compliant chains
5. Serial number of the measurement chain
6. Date of metrological operation
7. Type of metrological operation: Calibration, verification, with or without modelization…
8. Metrological certificate name: downloadable by clicking on the button
9. Name of the operator who performed the metrological operation

10. Conformity (compliance): can be modified by clicking on it
11. Error: Deviation from the standard
12. Uncertainty: Sum of the uncertainty components
13. Error modelization equation: Correction coefficients a, b, c
14. Expiry date of the certificate

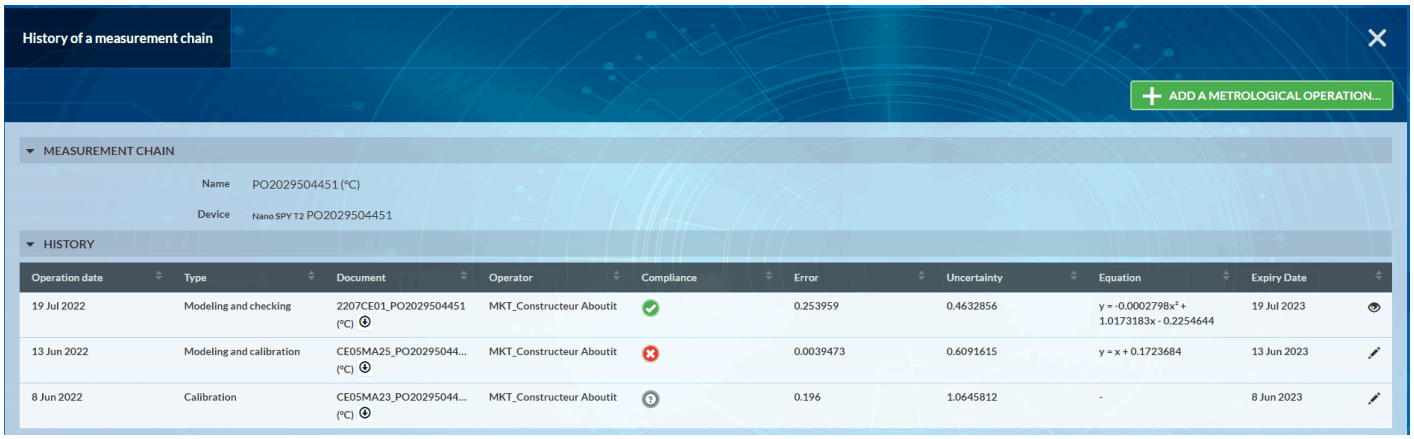
Click on the serial number of a measurement chain to view the details of the metrological history

a) Modelization application

When importing (manually or automatically) new COFRAC calibration certificates or verificationreports made by JRI with an error modelization, you can choose whether or not to apply this modelization in order to adjust your measuring chains.

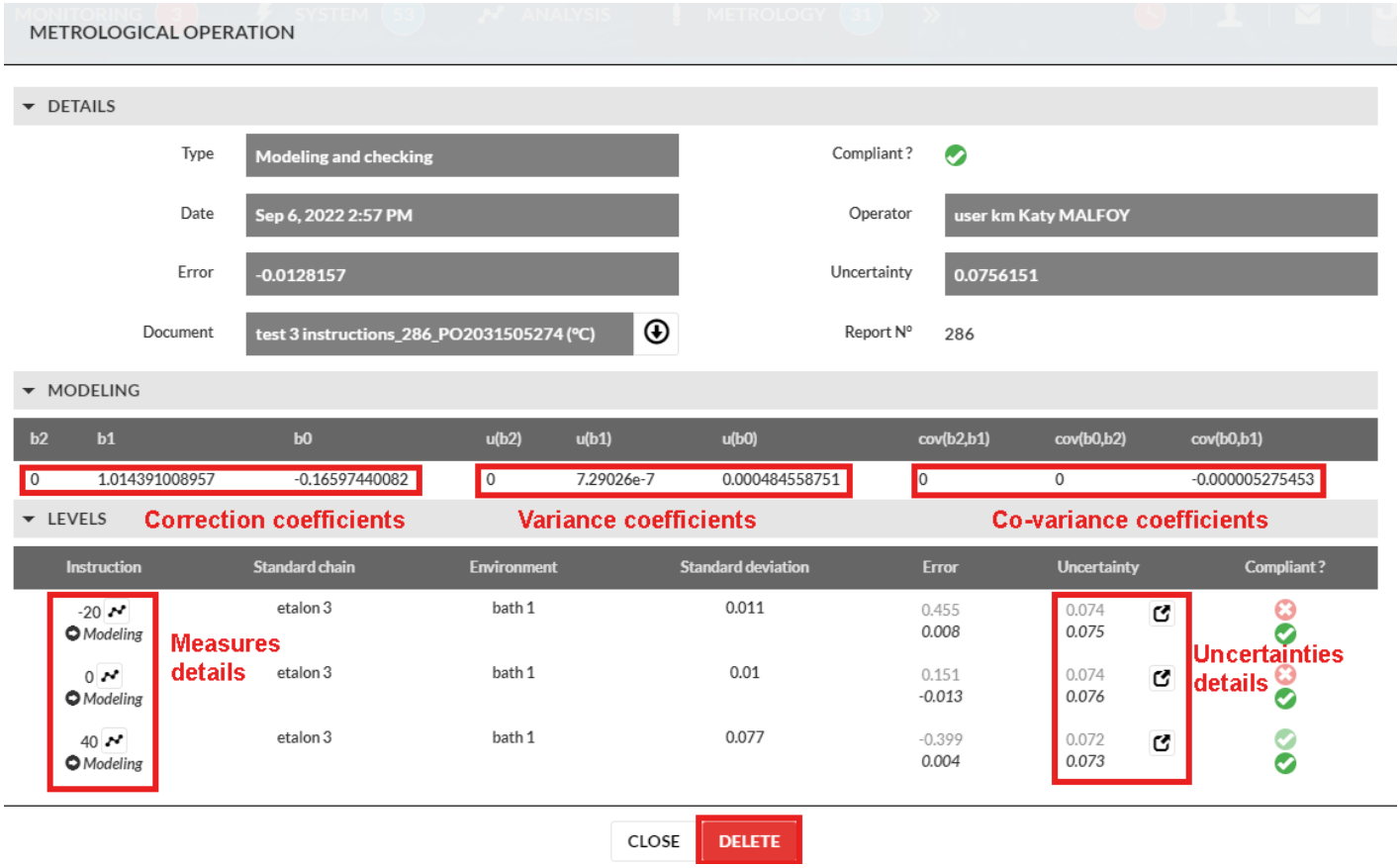
- **Following a drag'n'drop:** Select a measurement chain and click on "SEND".
- **Following automatic addition:** In the measurement chain list, a button opens a window. Select the measurement chain and click on "SEND".

In both cases, once the modelization has been sent, an adjustment is made on the measuring chains based on the correction parameters of the certificate.



Click on the button ⍰ to :

- see DETAILS of the metrological operation (Type, date, error, uncertainty, conformity, document, operator)
- see MODELIZATION: Correction coefficients, variance, and co-variance
- see LEVELS: The measurements used, as well as the results obtained (Standard deviation, error and uncertainties)
- DELETE: Metrological operations can be deleted, but only if the profile has "Delete a metrological operation" rights. The delete button leads to a screen where a reason must be entered. It is not possible to delete a metrological operation which has sent a command to the device in question, or if the device is a labguard (error message top right).



2. Monitored units

See details in Administation Guide in Metrology tasks to renew

3. Probe rotation

See details in Administation Guide in Metrology tasks to renew

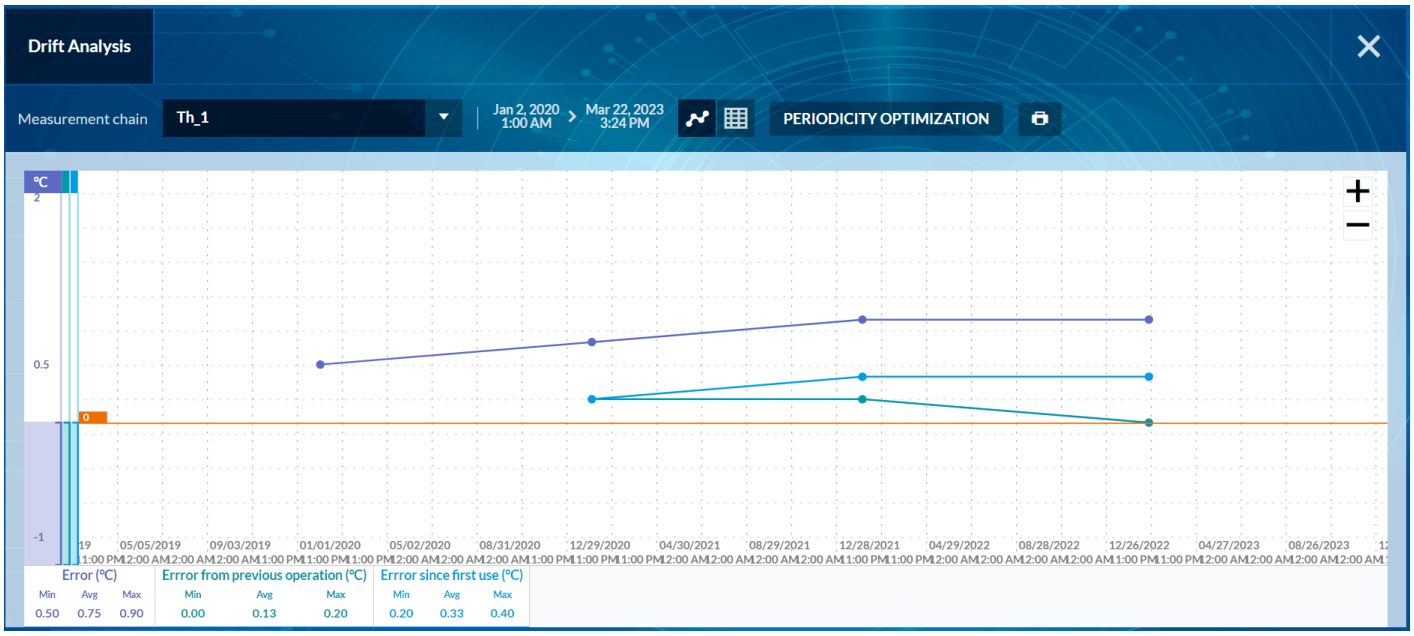
4. Drift analysis

A drift analysis can only be performed for measurement chains with at least 2 calibration or verification operations (two calibrations, two verifications, or one calibration and one verification) with at least one common step

a) Selection of the measurement chain:

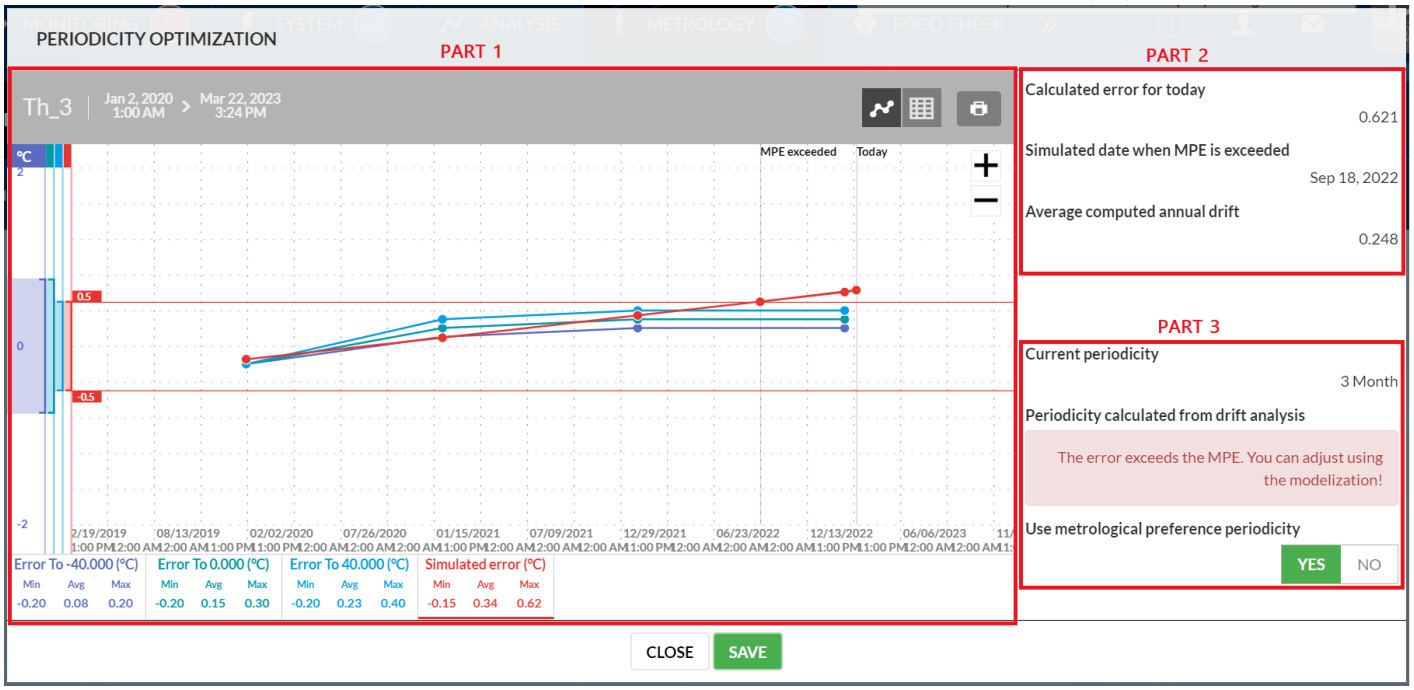
Choose a measuring chain in the list to start the drift analysis on a specified period. The following graph or table is displayed: - Error of each operation with respect to the standard - Error in relation to the previous calibration (drift) - Error in relation to the first use.

It is possible to print the graph or to switch to table display.



b) Periodicity Optimization

This feature allows to estimate when an adjustment (by modelling) will be necessary on a chain (If error >or< predefined MPE). This estimation is possible thanks to the drift analysis.



- Part 1: Errors Summary

The following elements are displayed:

- The name of the measurement chain and the period of the drift analysis
- The error graph for each calibration point (here -40°, 0° and +40° C)
- The simulated error graph obtained using the least squares method (in red)
- The MPEs in the form of thresholds which are displayed by clicking on each point (here +/- 0.5°C)

- Part 2: Estimation of the drift

- The simulated error today
- The expected date of exceedance of the MPE

- The calculated annual average drift

- Part 3: Periodicity management

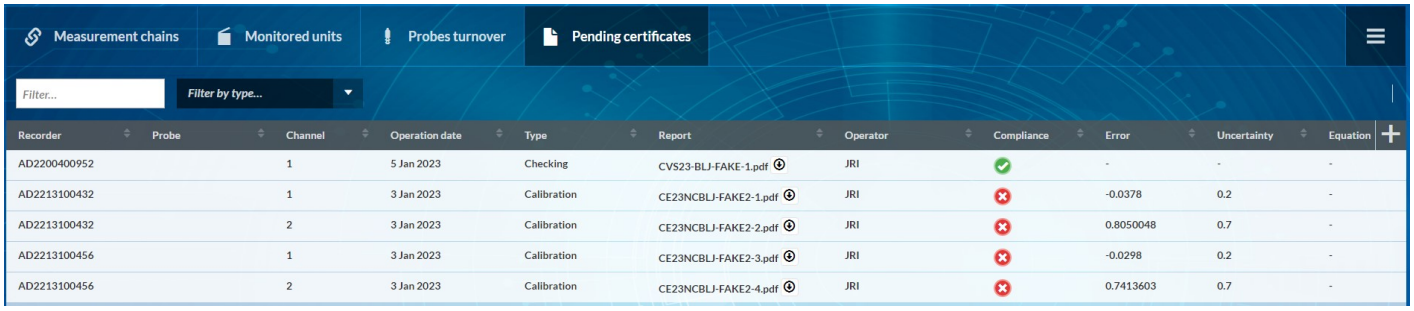
- The current periodicity calculated according to the last operation performed (calibration or verification)
- The periodicity deduced from the drift analysis with an invitation to perform an adjustment if the calibration error exceeds the MPE.
- The choice of whether or not to apply the new periodicity: At the end of the defined time (minus the number of days defined in the metrological alarms), the user will receive a metrological alert e-mail. And the oven will be in metrological alarm when the new period is exceeded.

The user can choose to use this optimal periodicity instead of the metrological options, to be warned when a calibration/verification has to be done on the measurement chain.

Precision: at any time, the user can reuse the general periodicity, or enter a manual periodicity different from the recommended one.

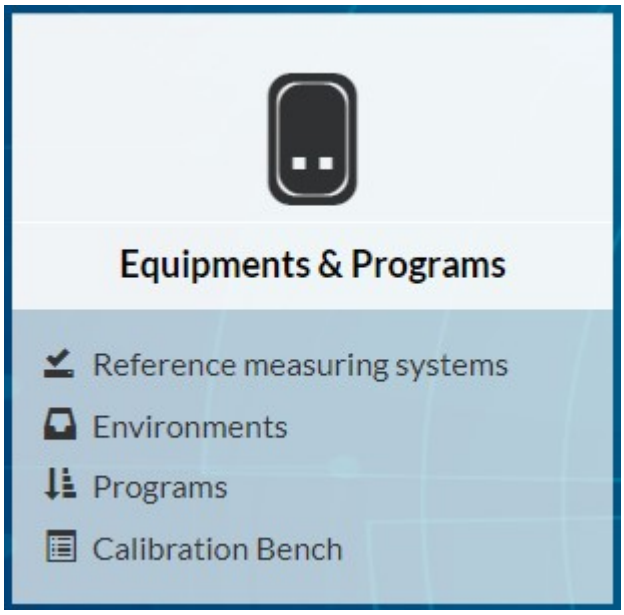
5. Pending Certificates

MySirius displays all metrological certificates issued by JRI if you order a new digital probe or measurement chain with a metrological certificate done by JRI. Until the equipment is installed and detected by MySirius, the certificates are visible and downloadable from this page. Once the equipment is installed, the associated certificates are displayed in the “measurement chains” page or in the metrological details of the monitored unit.



Recorder	Probe	Channel	Operation date	Type	Report	Operator	Compliance	Error	Uncertainty	Equation
AD2200400952		1	5 Jan 2023	Checking	CVS23-BLJ-FAKE-1.pdf	JRI	✓	-	-	-
AD2213100432		1	3 Jan 2023	Calibration	CE23NCBLJ-FAKE2-1.pdf	JRI	✗	-0.0378	0.2	-
AD2213100432		2	3 Jan 2023	Calibration	CE23NCBLJ-FAKE2-2.pdf	JRI	✗	0.8050048	0.7	-
AD2213100456		1	3 Jan 2023	Calibration	CE23NCBLJ-FAKE2-3.pdf	JRI	✗	-0.0298	0.2	-
AD2213100456		2	3 Jan 2023	Calibration	CE23NCBLJ-FAKE2-4.pdf	JRI	✗	0.7413603	0.7	-

V. EQUIPMENT & PROGRAMS



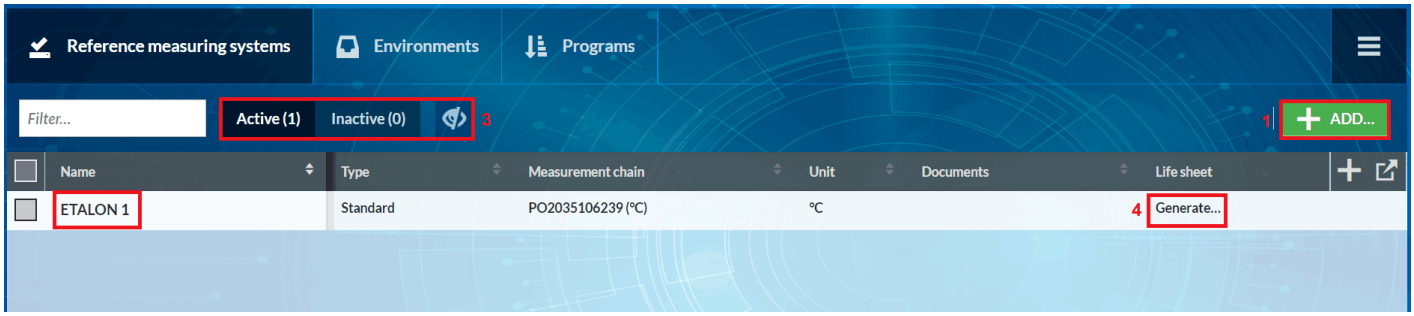
This section allows you to declare standards and environments and to use them to create single or multi-point calibration programs.

⚠ Deleting items is not possible in MySirius Calibration Module. Use the ENABLE/DISABLE buttons to hide and show selected items

1. Standards (reference measuring chains)

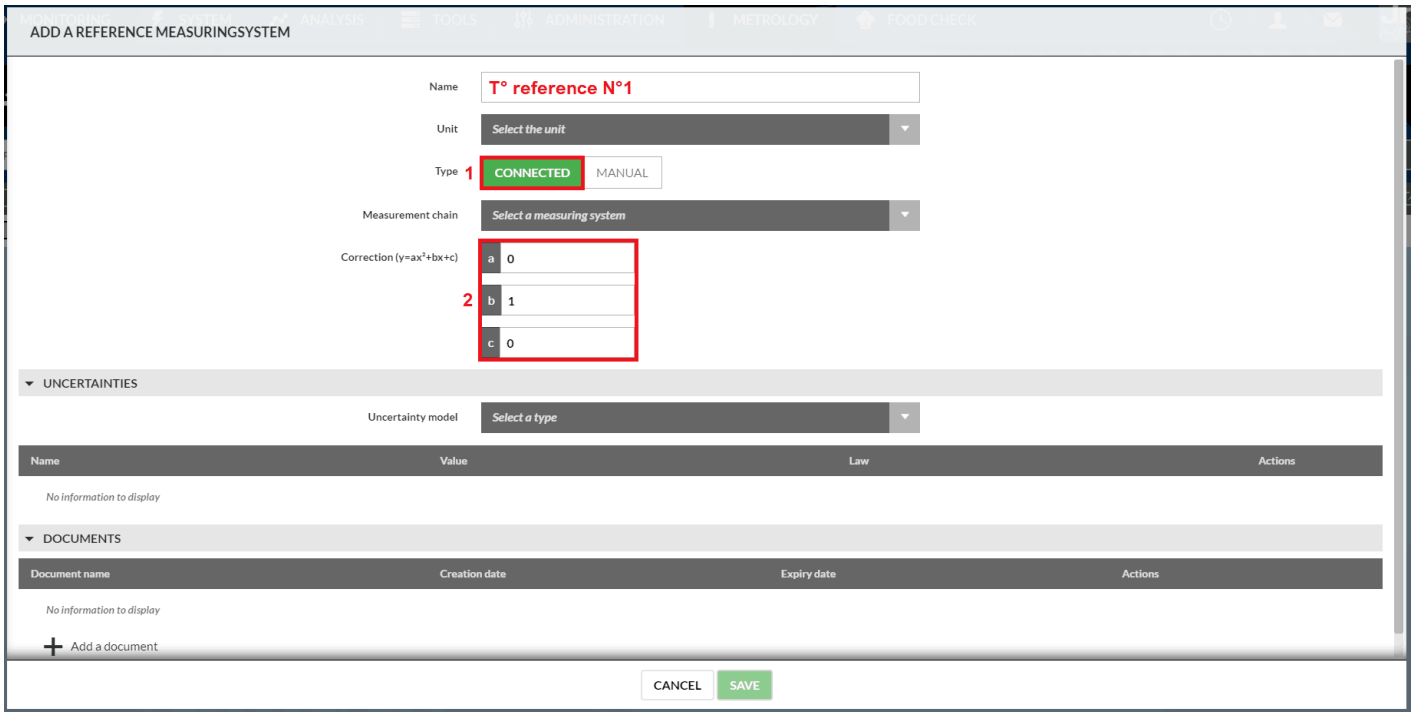
The JRI device used as a standard must be switched on and detected in the list of available measurement chains (See ADMINISRATION section). It must not be declared in a monitored unit.

1. Create a new standard chain by clicking on the ADD button.



- Select the CONNECTED type for the NOVA SPY, NANO SPY and LORA SPY standard chains then choose the corresponding serial number in the field “Measurement chain”.
- Select the MANNUAL type to declare a generic standard (except NOVA SPY, NANO SPY and LORA SPY range). It is imperative to declare the measurement chain to be used to display it in the list of measurement chains. Otherwise, use the button “Add a generic measurement chain” to create a new one. It is necessary to select type of chain CUSTOM.
- Refer to the calibration certificate of your standard to enter the correction coefficients a,b,c if necessary. If there’s no correction of the read value, put a=0,b=1,c=0

Complete the rest of the form (choice of uncertainty model + add document) and click on SAVE



2. Once the standard chain is added to the list, it can be modified by clicking on it.
3. Select a standard chain to hide (disable) it using the  . A new selection and then a click on  allows a standard to be reactivated.
4. Generate a life sheet for each standard. Each time a modification is made, the life sheet is updated.

2. Calibration environments

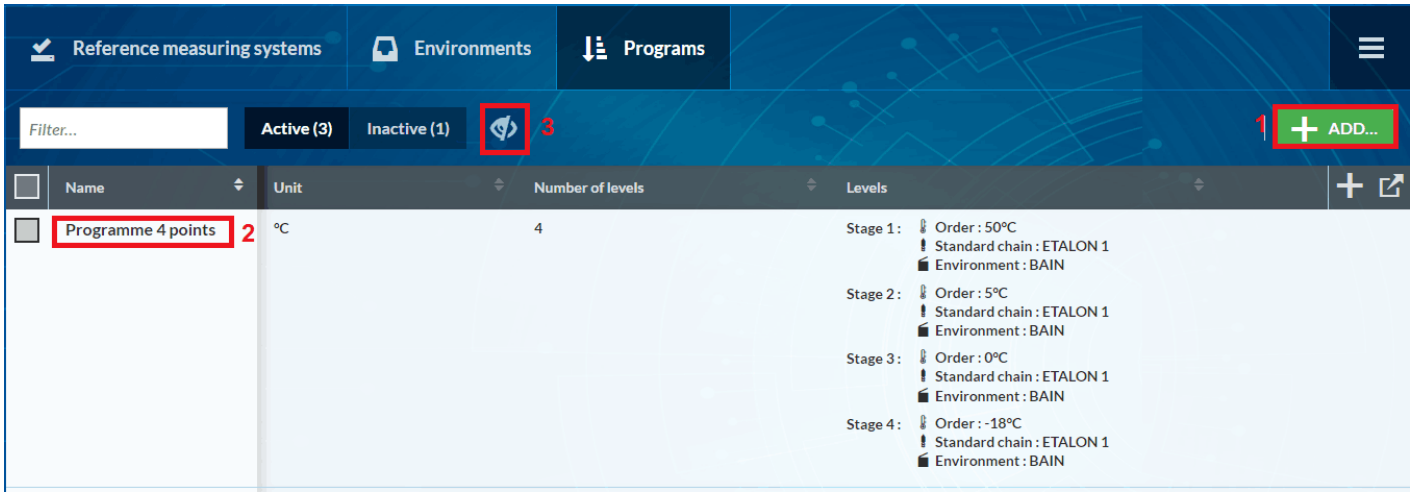
Declare your calibration baths, ovens and climatic or thermostatic chambers used to perform your calibrations.

Make sure you have metrological certificates for your environment that includes information related to homogeneity and stability.

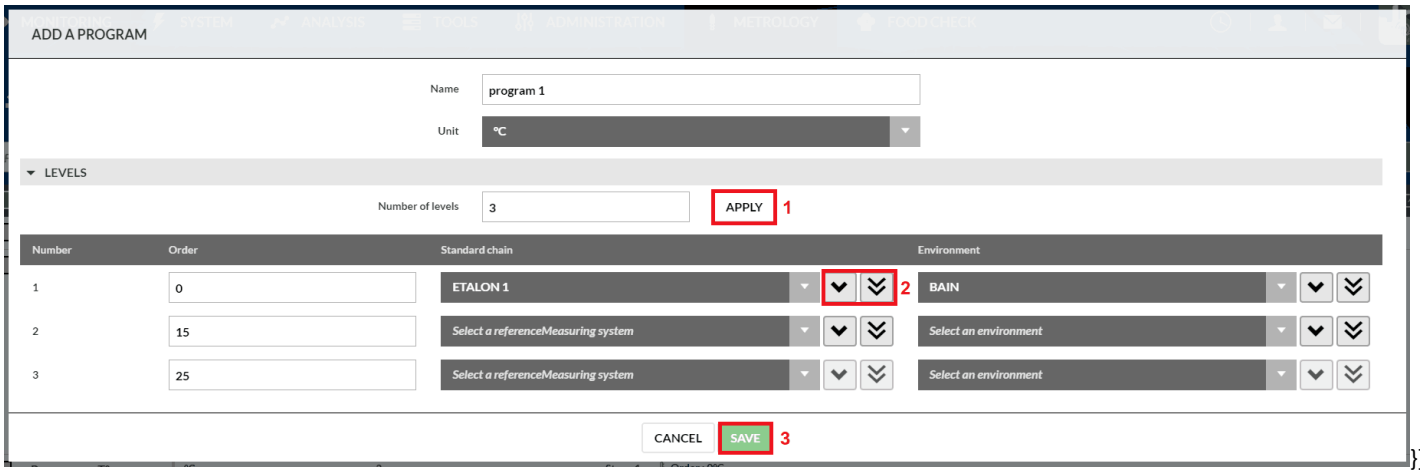
Same operating principle as for adding a standard (Add, click on the name to modify, select to activate/deactivate)

3. Programs

Once the standard chains and environments have been added, they can be combined to create single (Level1) or multi-point (Level 2) calibration programs (minimum 4 for modelization)



- Create a new program using the ADD button
- Enter the correct number of **LEVELS** (calibration points) and click on APPLY.
- Enter a standard chain and a calibration environment for each level.
- The arrows can be used to apply the selected items used from one level to another or select them for all levels.
- Click on SAVE



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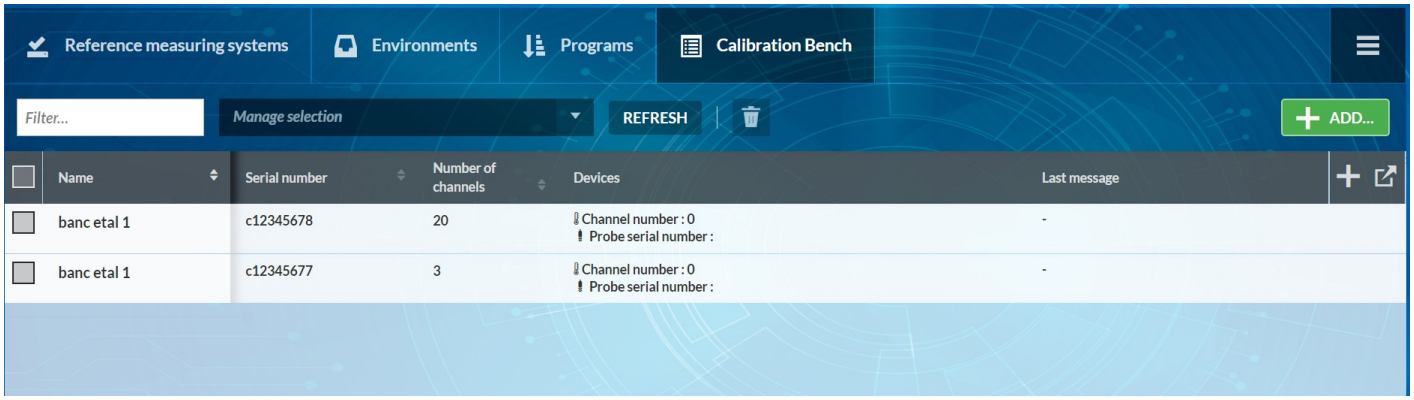
2. Click on an existing program to modify it
3. Select a program to activate it or hide it.

4. Calibration bench

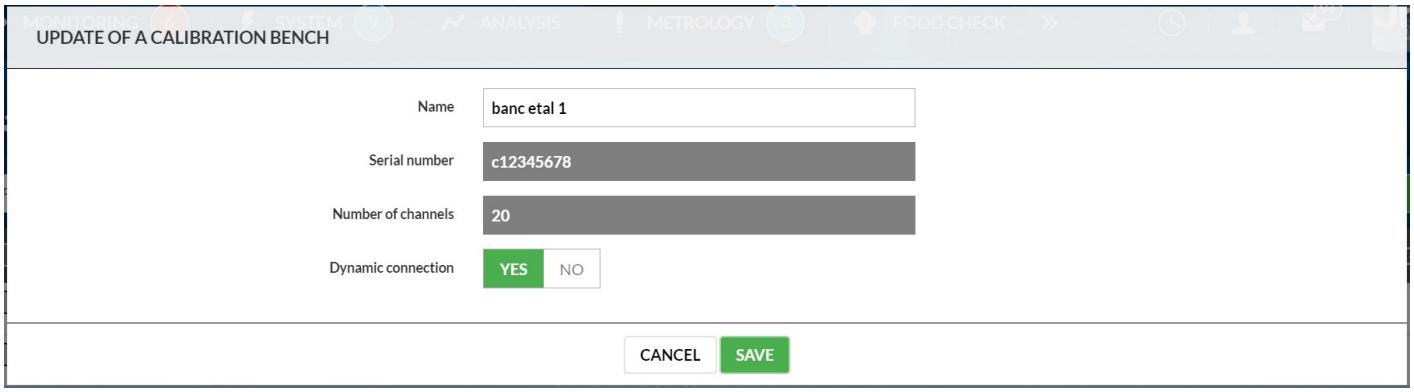
The JRI calibration bench uses 2.4 GHz communication with a Nano SPY LINK to send data to MySirius. See the operating instructions for assembly and powering up before use.

a) Add

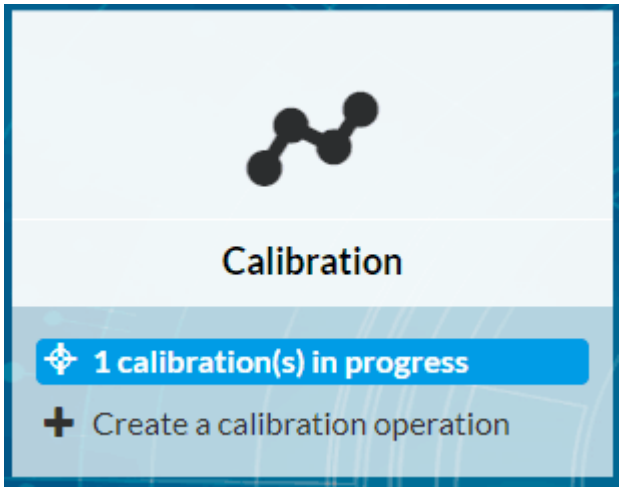
- Use the ADD button to declare a new calibration bench by entering its serial number and the number of channels used.



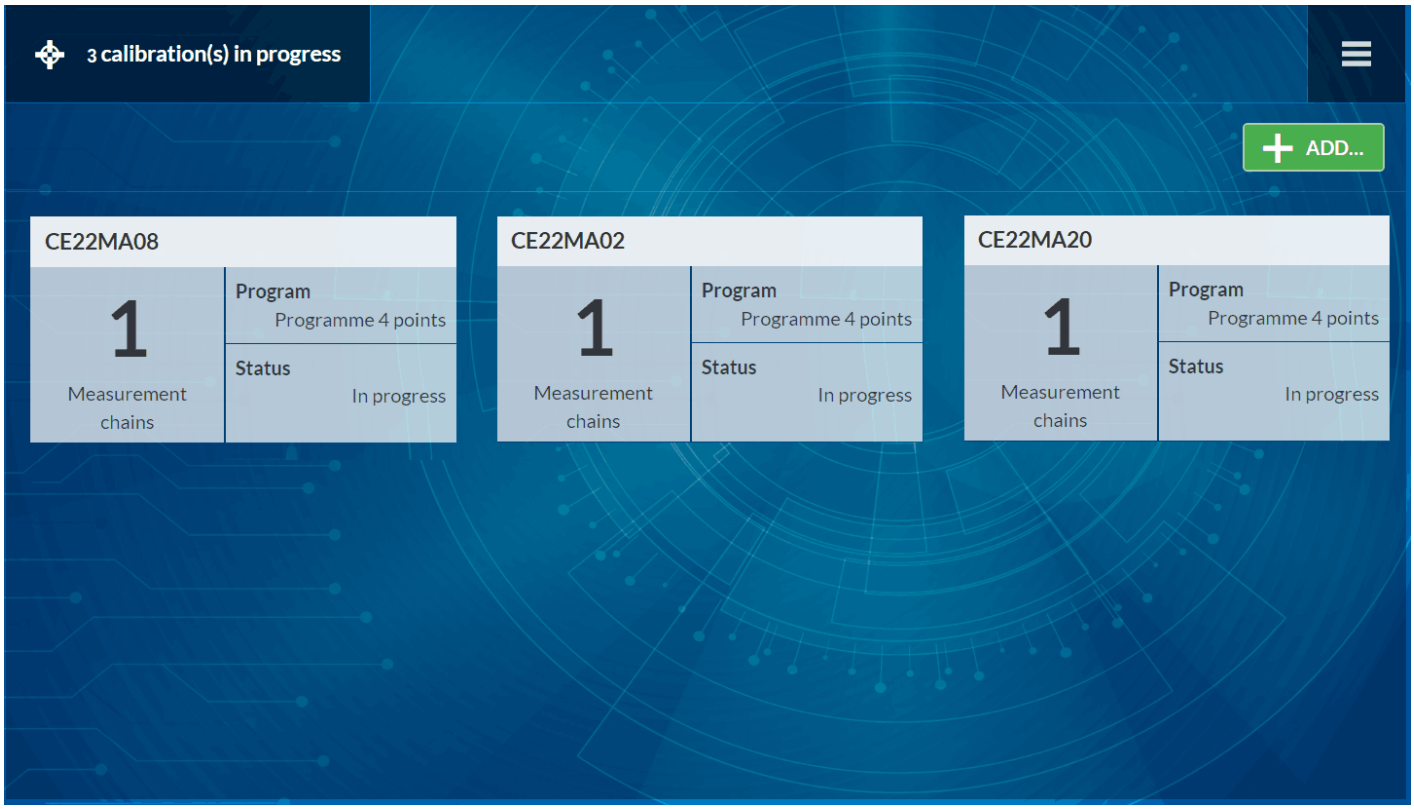
- Click on the name of an existing bench to edit it. The Dynamic communication mode can be enabled or disabled.



VI. CREATE CALIBRATION OPERATION



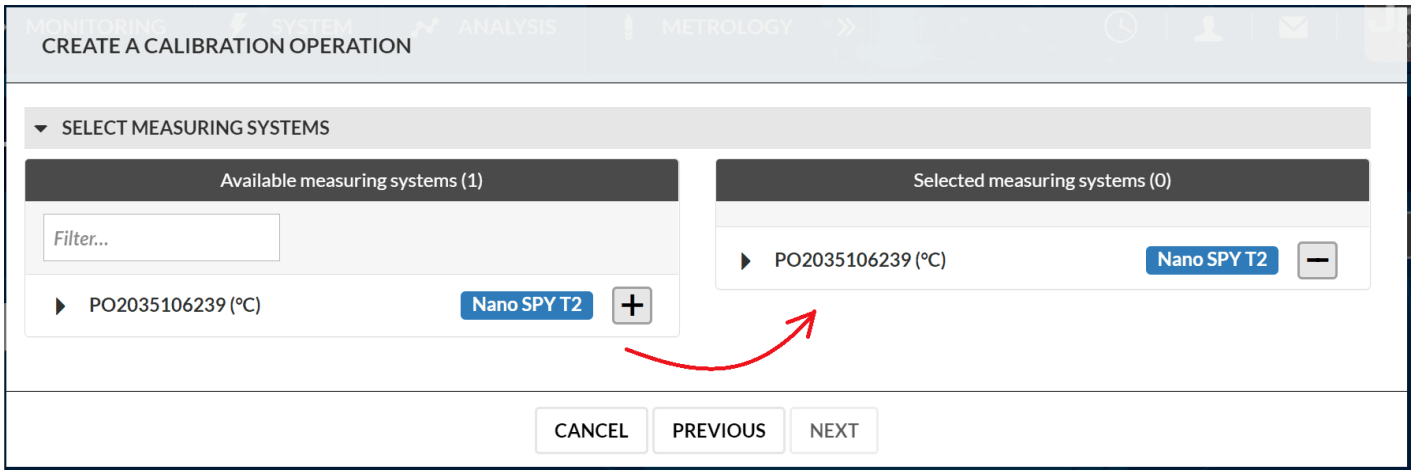
- Create a new calibration by clicking **ADD** from the CURRENT CALIBRATION(S) window, or directly from the **+ Create New Calibration** button from the dashboard.
- Find your ongoing calibrations by clicking on the indicator CURRENT CALIBRATION(S) .
- Continue your calibrations by clicking on ones of the tiles.



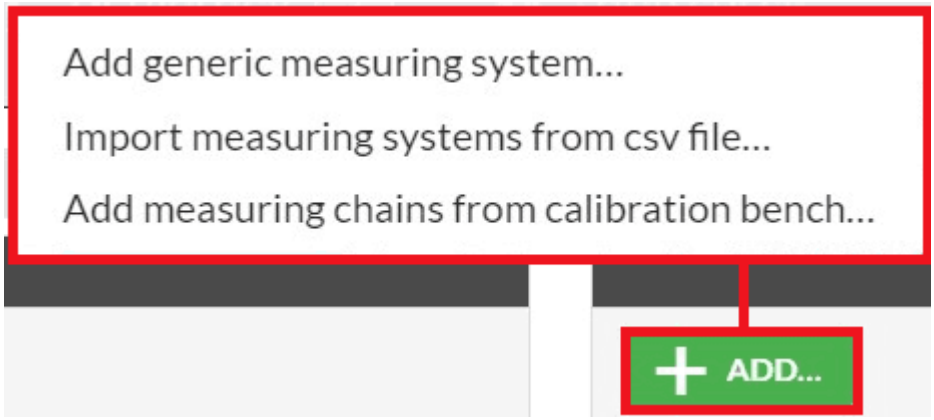
1. Configuration

1- Fill in the general information and the test conditions 2- Select the address or create a new one if no address has been entered in PREFERENCES 3- Select your program or create a new one 4- Select the measurement chains to be calibrated by clicking on the + button and then NEXT

List of measurement chain types available in the list: - Novas SPY - Nanos SPY - LoRa SPY - LAbGuard 3D transmitters - Generic chains

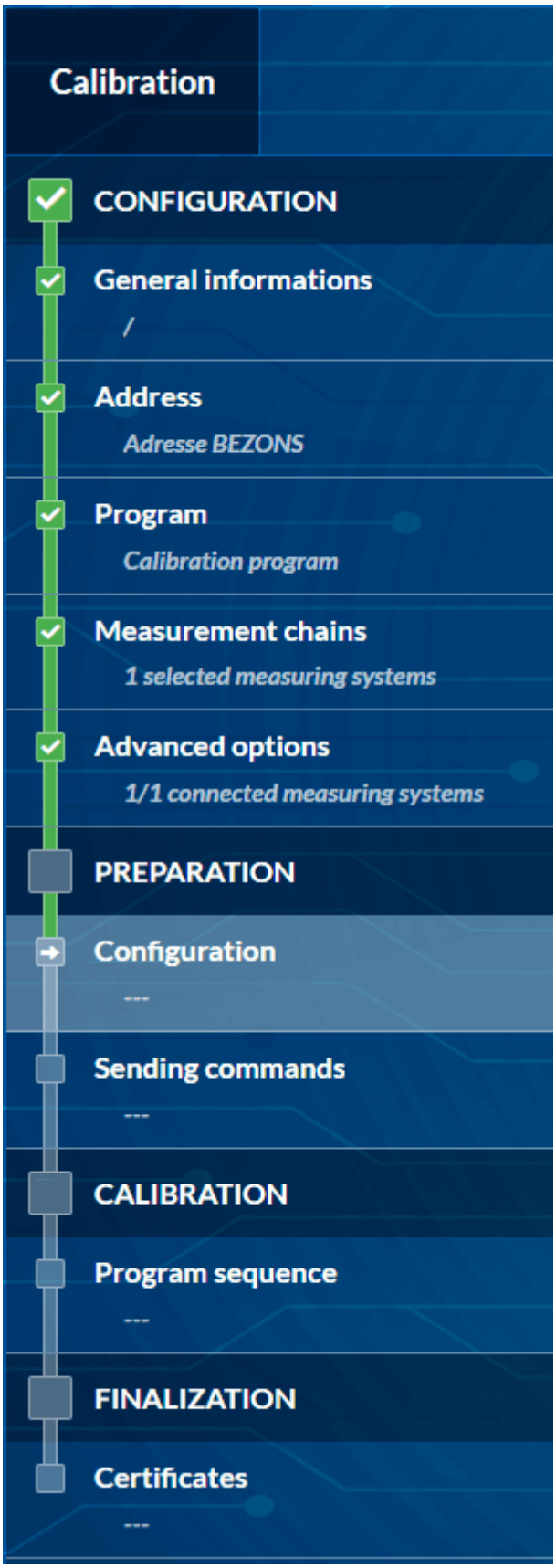


The ADD button allows to add other types of measuring chains :



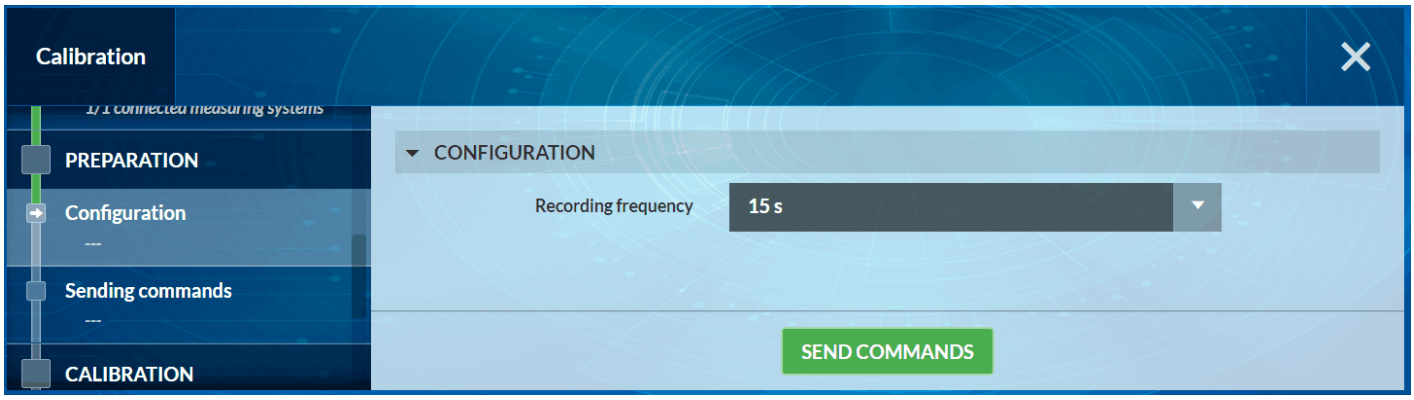
- Add generic measuring system : enter manually the information of a generic measuring chain
- Import measuring systems from CSV file: Add multiple generic measuring chains from a list
- Add measuring chains from calibration bench: Select the channels of the bench on which digital probes are connected.

5- Advanced options : Check the consistency of the proposed MPE for each type of measurement chain and then click on SAVE. 6- Your calibration is now created and is visible among the tiles in the current calibrations screen. 7- Clic on one of the tiles to display the calibration process which guides you step by step till the report generation.

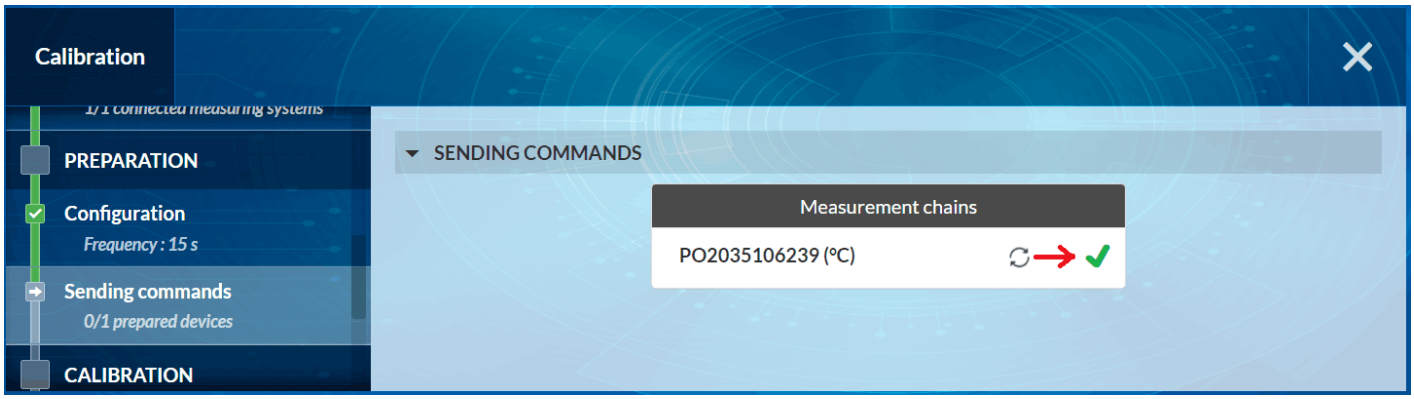


2. Preparation

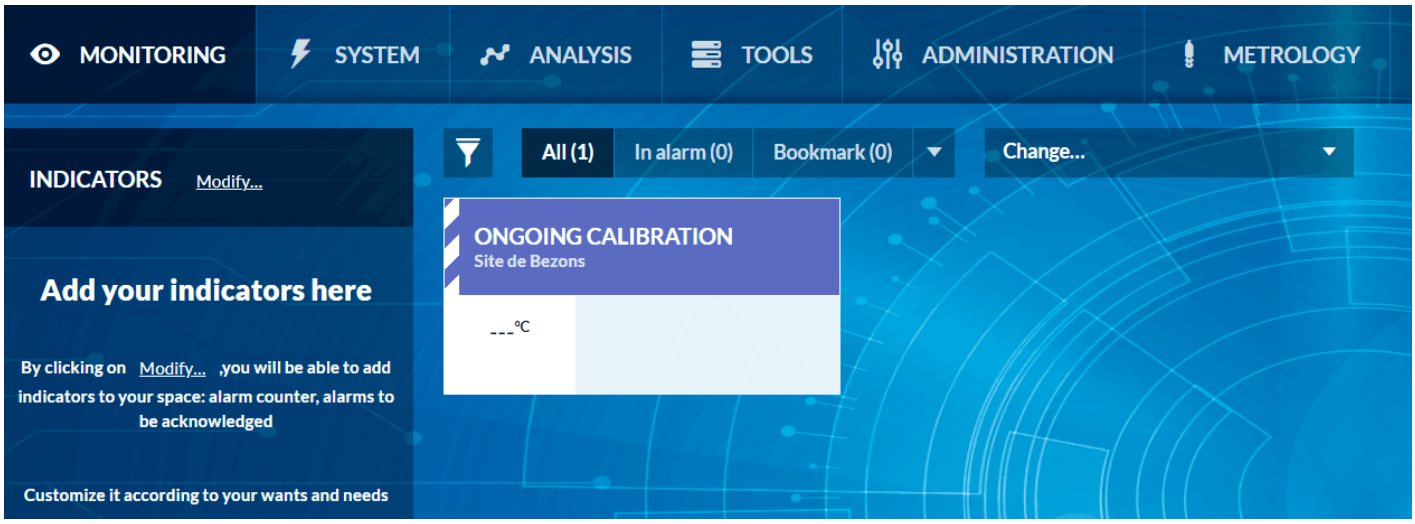
1. Select the desired measurement frequency and click SEND COMMAND. this is not applicable for generic measuring chains.



2. Wait for the command to be sent, SUCCESS.



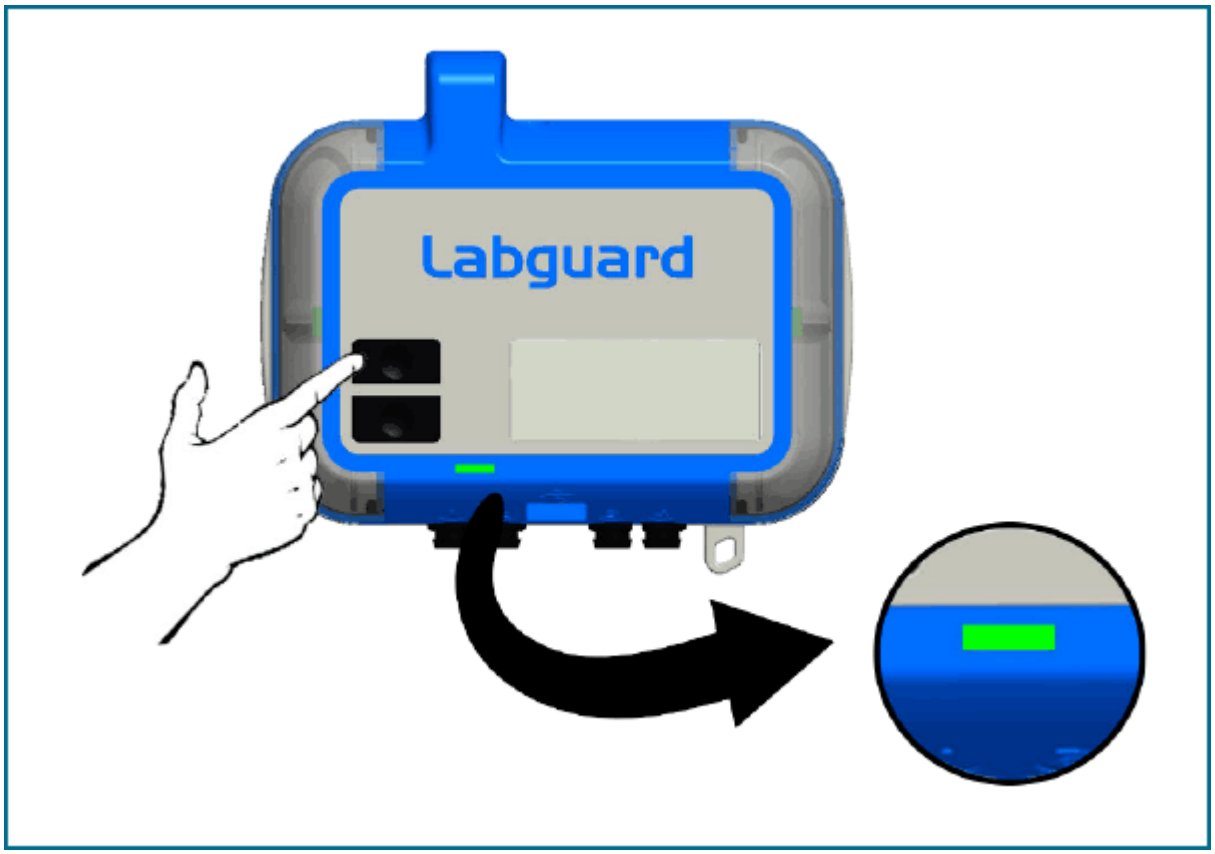
Warning: From this moment, all data recorded during the calibration process are no longer visible in the MONITORING tab of MySirius. The monitored units linked to the calibrated sensors go into METROLOGICAL MAINTENANCE mode. (Blue label)



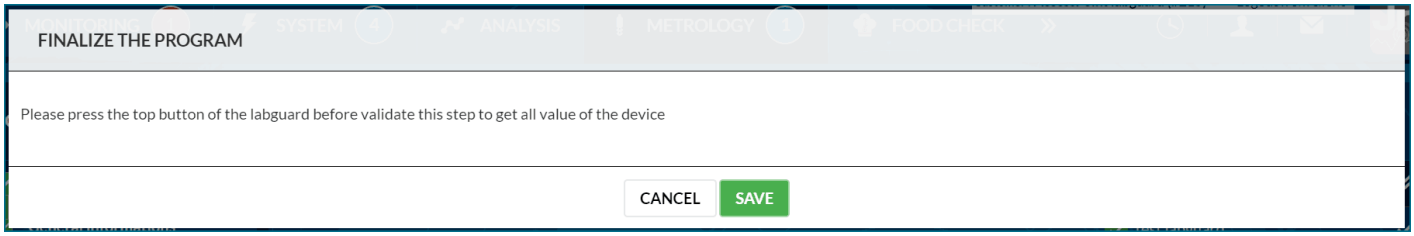
3. Program sequence

- Measurements of connected Nova SPY & Nano Spy chains are displayed at a minimum interval of 1 minute even if the measuring frequency selected is 15 sec fo example. Use the REFRESH button to update the graph of measurements.

- **Specific to LabGuard 3D devices**
- To refresh the displayed data, it is necessary to physically press the button on the LabGuard device. By default, the data is transmitted at the transmission frequency configured on the device (e.g. 15 minutes)
- A green indicator light confirms that the button has been pressed.



- A reminder message is displayed before completing the data acquisition, this allows all measurements to be retrieved from the device before moving on to the next step.



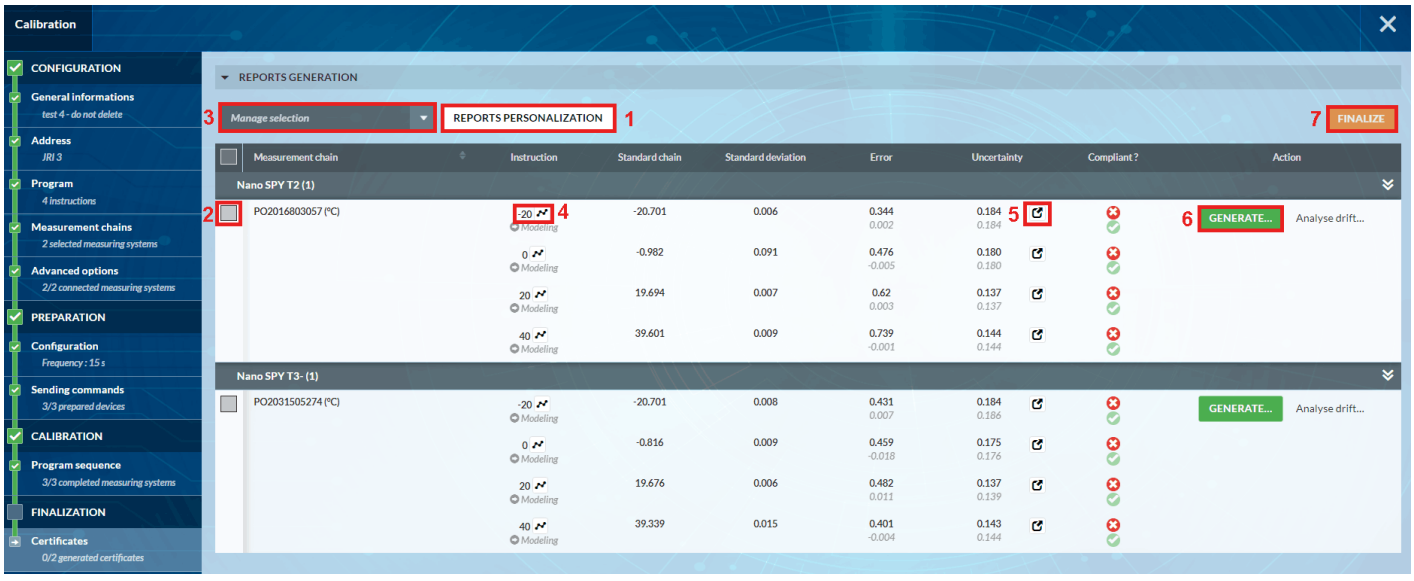
- Use the button ADD/IMPORT measures to enter manually data or import data from a CSV file for generic (or not connected) measuring chains.

- At the end of the last level of measurements, click on FINALIZE PROGRAM. For the connected measuring chains, a command is sent to recover all measurements (including measurements taken at a frequency lower than one minute).

- Check that you have enough measurements on each calibration point (level) before proceeding to the next step.

4. Finalization

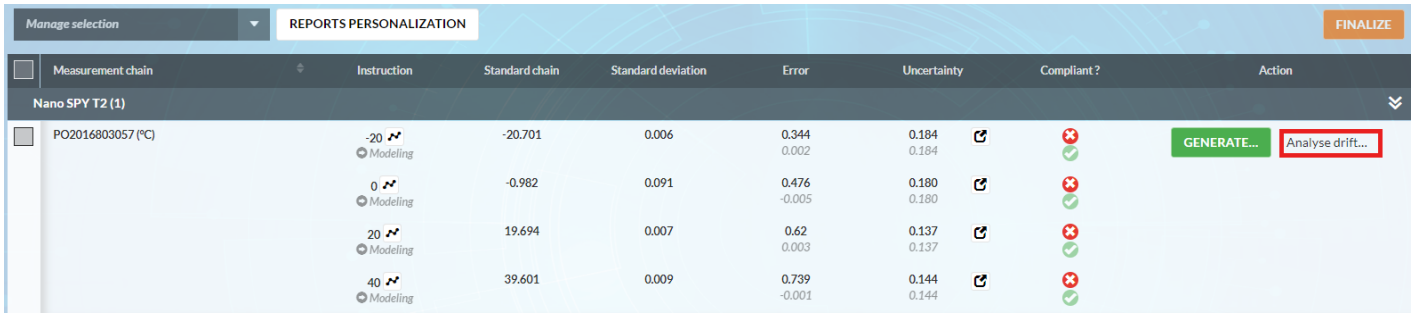
The results are calculated automatically and displayed in a summary table.



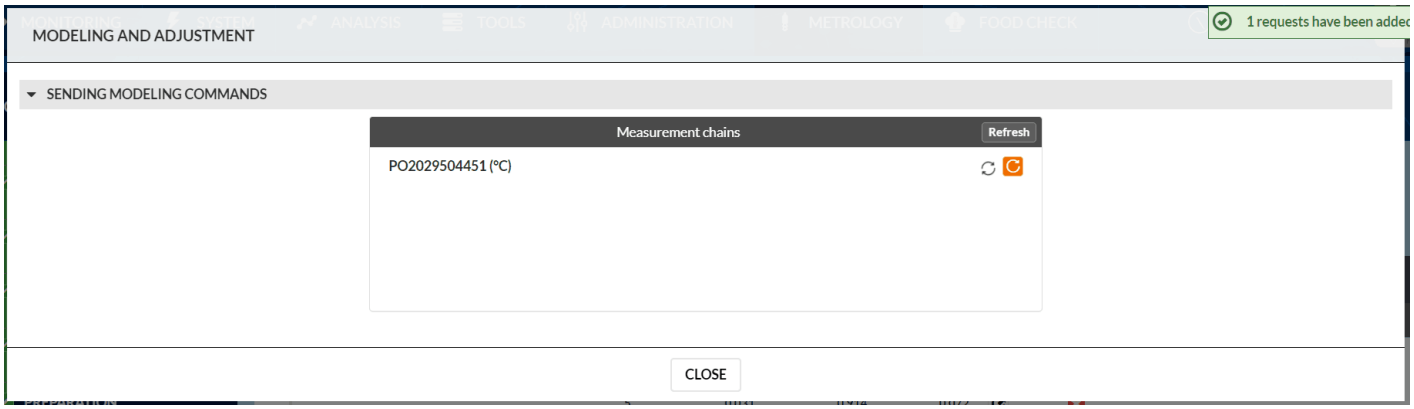
1- REPORT CUSTOMISATION (PERSONALIZATION): Modify the content of your certificates before edition. 2- Select the measurement chains

(check the box) 3- Select the actions to do on the selected measurement chains: * Generate a Calibration Certificate * Generate a Verification Report * Adjust + Generate a Calibration Certificate (modelization) * Adjust + Generate a Verification Report (modelization)

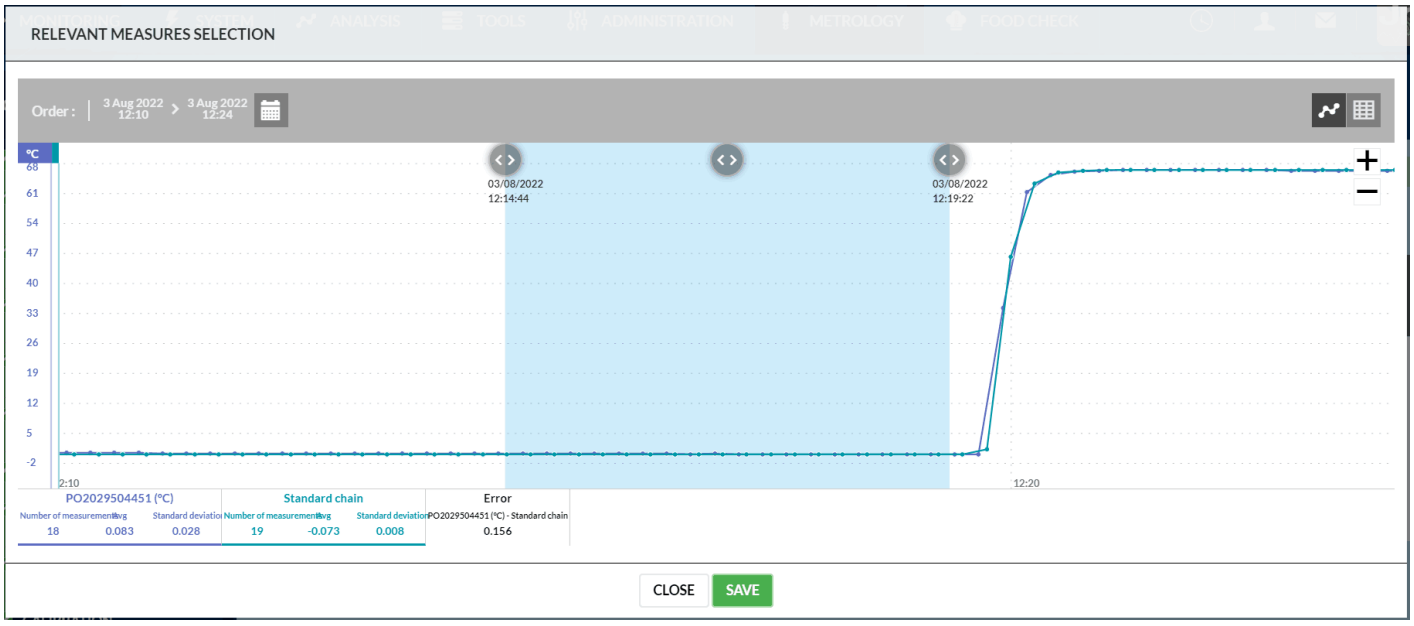
It is possible to access the drift analysis functionality before generating a report:



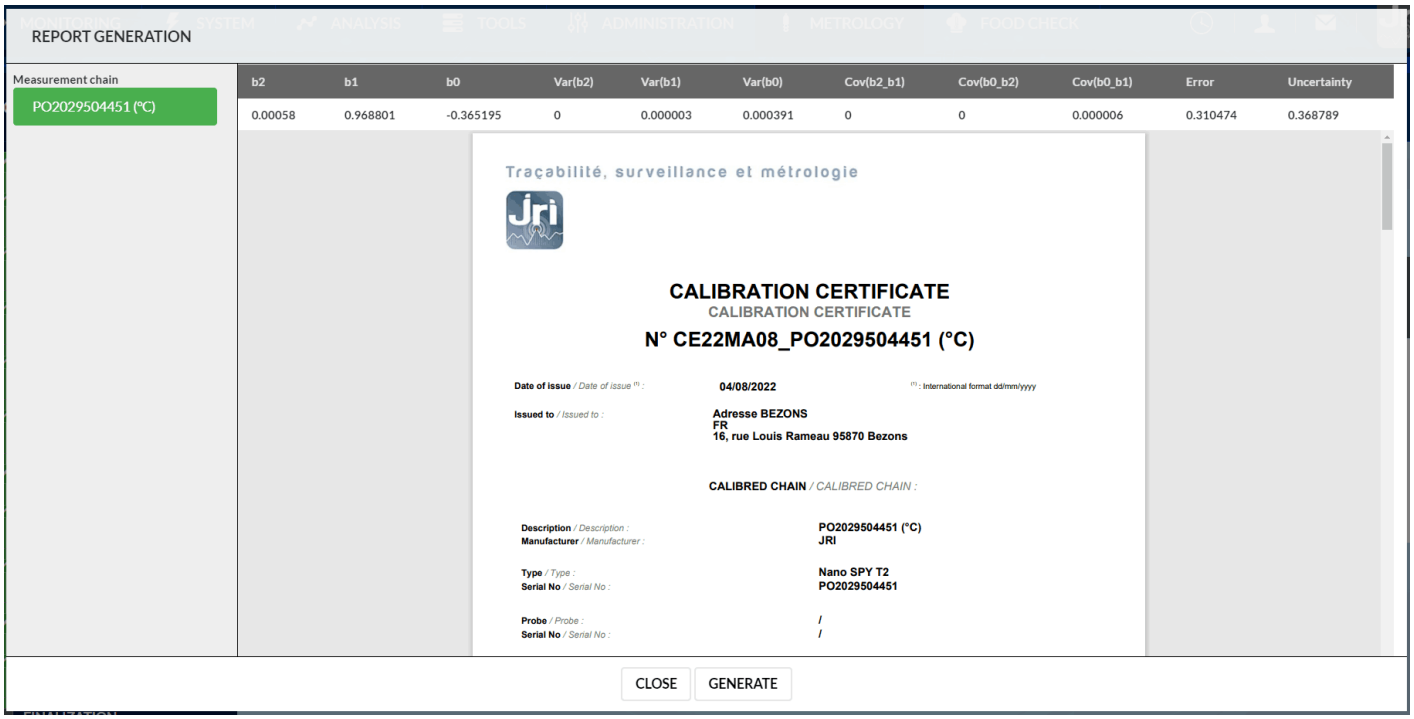
- Choosing an adjustment action following a calibration or verification sends a modelization command to the device. Only compatible connected devices can be adjusted. No adjustment is possible on generic measuring chains.



4- Check the measurements used for the calculations. The system positions itself on the best range with the smallest error. You can extend / move the range of measurements used with the arrows ↔



5- See the uncertainty report. It is possible to export it in CSV/PDF. 6- Generate your metrological report. It is automatically linked to the measurement chain and can be viewed or downloaded. If the operation done includes modelization, a summary of the correction coefficients, variance and co-variance is displayed for consultation. At the end of the first page, an electronic signature of the user generating the report.



7- The history and details of the metrological operation can be viewed in the METROLOGY section of the monitored unit data sheet.