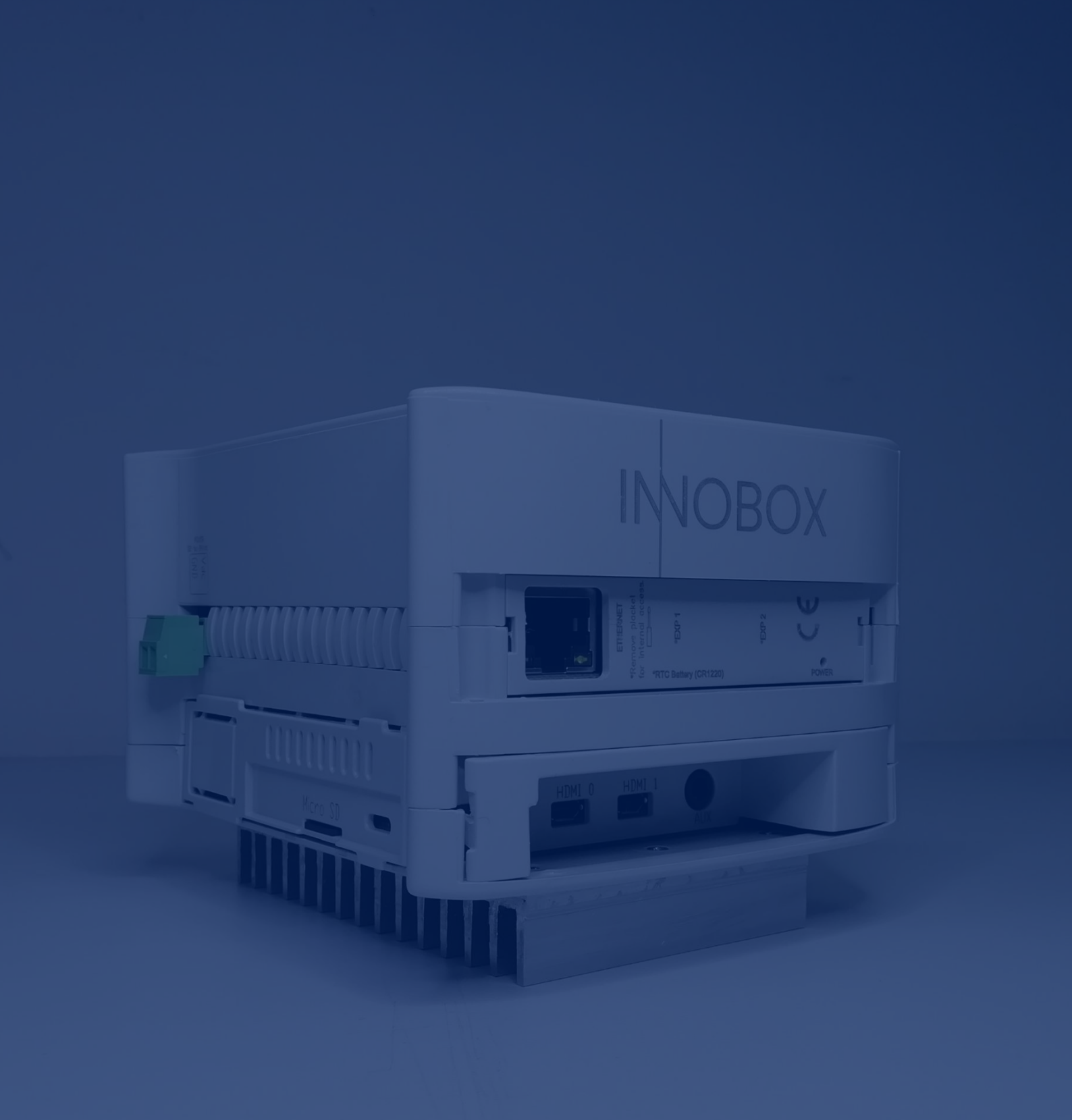


Manual

Dashboards functionalities

Industrial IoT solution for
industrial machines

INNOBOX

CONTENT

Table of contents

1. Introduction

This manual is complementary to the Innobox Operation and Configuration Manual. With the device configured and connected to the PLC, it will start to record timers, general operation calculations, alarms, etc. that can be consulted through the different panels implemented.

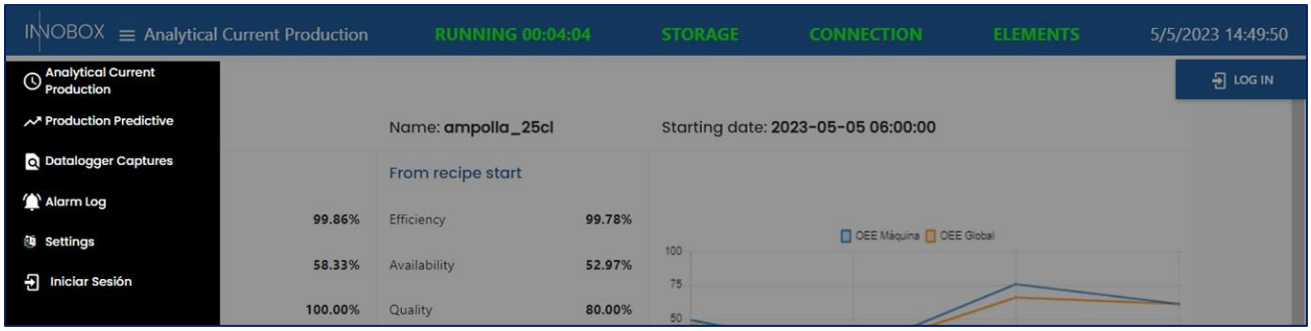
2. Access to the application

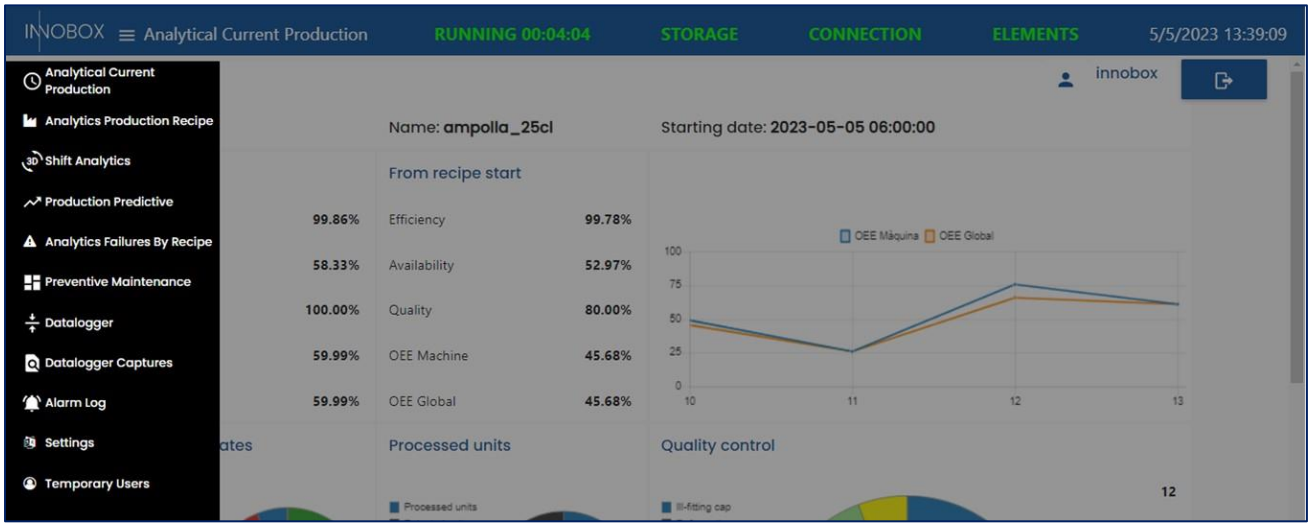
To access the data monitoring it is only necessary to go to any browser, on a computer configured on the same network as the device, and enter the IP previously configured when starting the device. By default, the URL would be the following:

http://10.10.10.20/innobox

The initial view is the current Production Analytics view, accessible without the need to log in:

At the top left, next to the previously loaded logo, we will find the icon that will open the drop-down navigation menu. The accessible views will change depending on the user's access level, with initial access to the 4 most useful views for the operator. At the top right, below the date, we will find the button to log in:



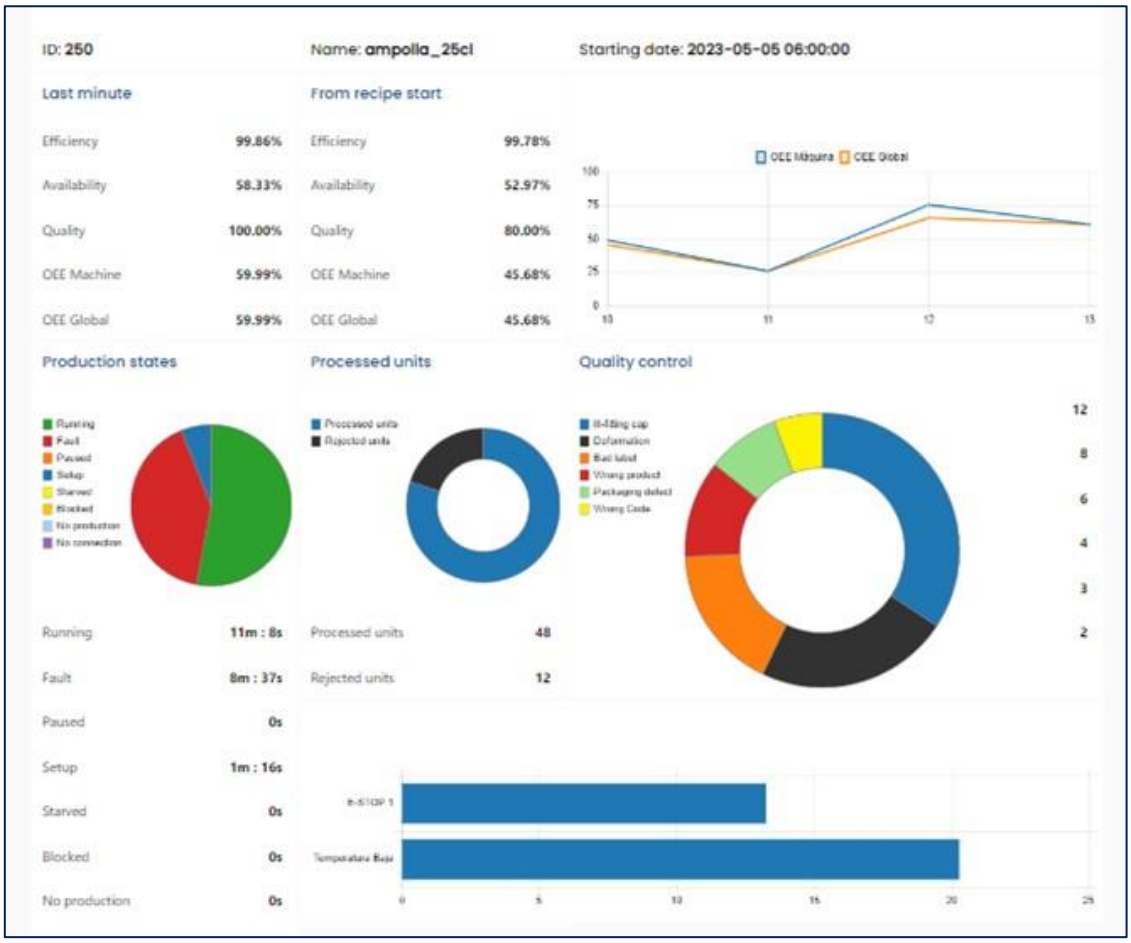


Likewise, common to all the screens, we will have the header with quick information about the machine, such as the current status and the continuous time in this status, the availability of the device's memory, the status of the connection with the PLC and if there is any maintenance task to be carried out. The latter will be explained in detail in its own section, but all the indicators follow the premise of green -> good, red -> bad.

We will now go on to explain in detail each of the screens available on the device.

3. Production data exploitation dashboards

3.1. Analytical Current Production



In the default screen of the device we find the monitoring of the current production. Here we can find the following information:

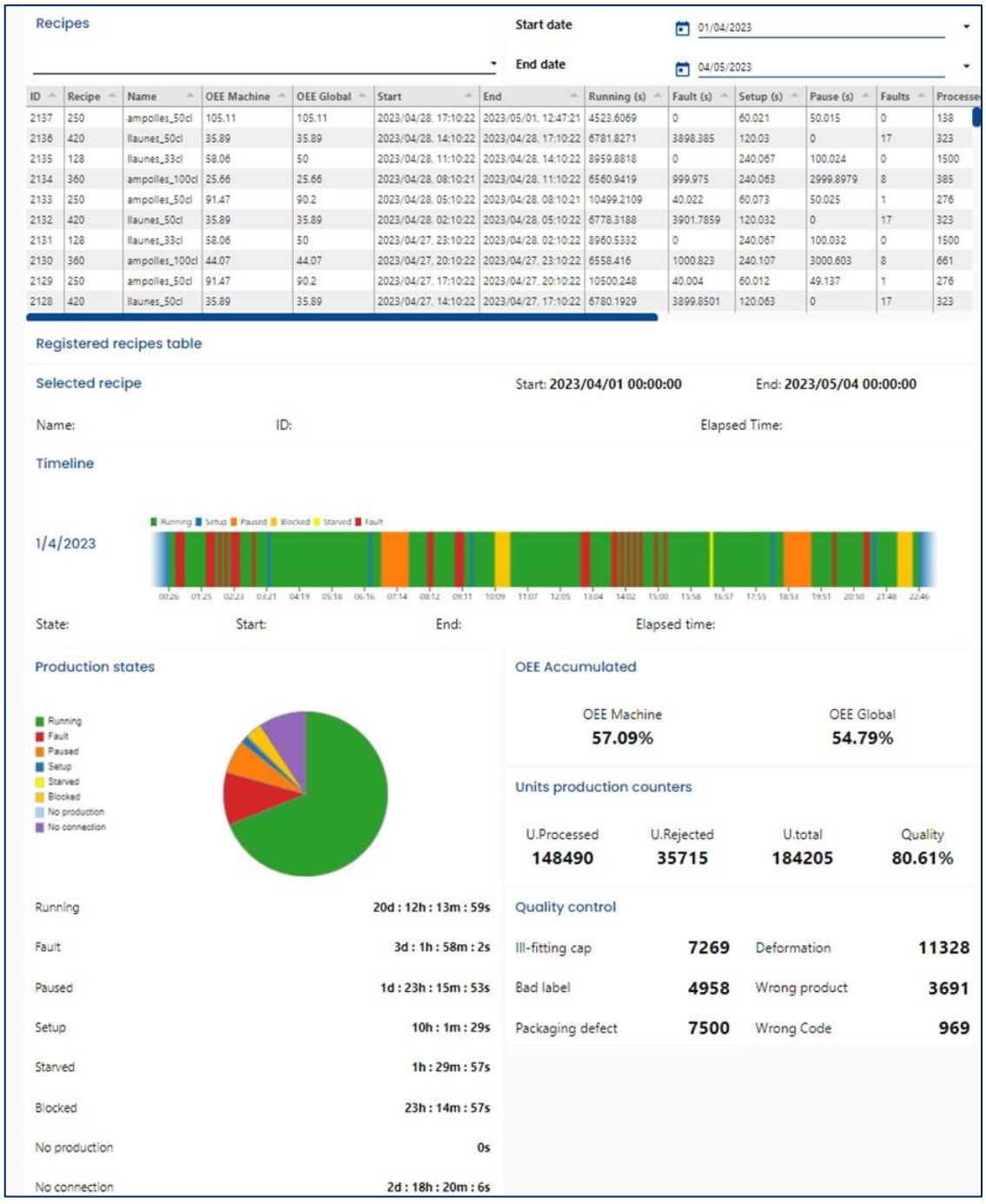
a. Start date, name and code of the current recipe.

b. Summary of OEE metrics for the last minute, the OEE generated since the start of the recipe and a progression of this over the hours.

NOTE: If additional information on the calculation or meaning of OEE is needed, it can be found in the introduction of the operating manual of the device.

c. Piechart with the time of each machine state.
d. Doughnut charts with the comparison between good and rejected products, as well as the status of the additional counters.
e. Horizontal bar chart with the detected machine alarms.

3.2. Analytics Production Recipe

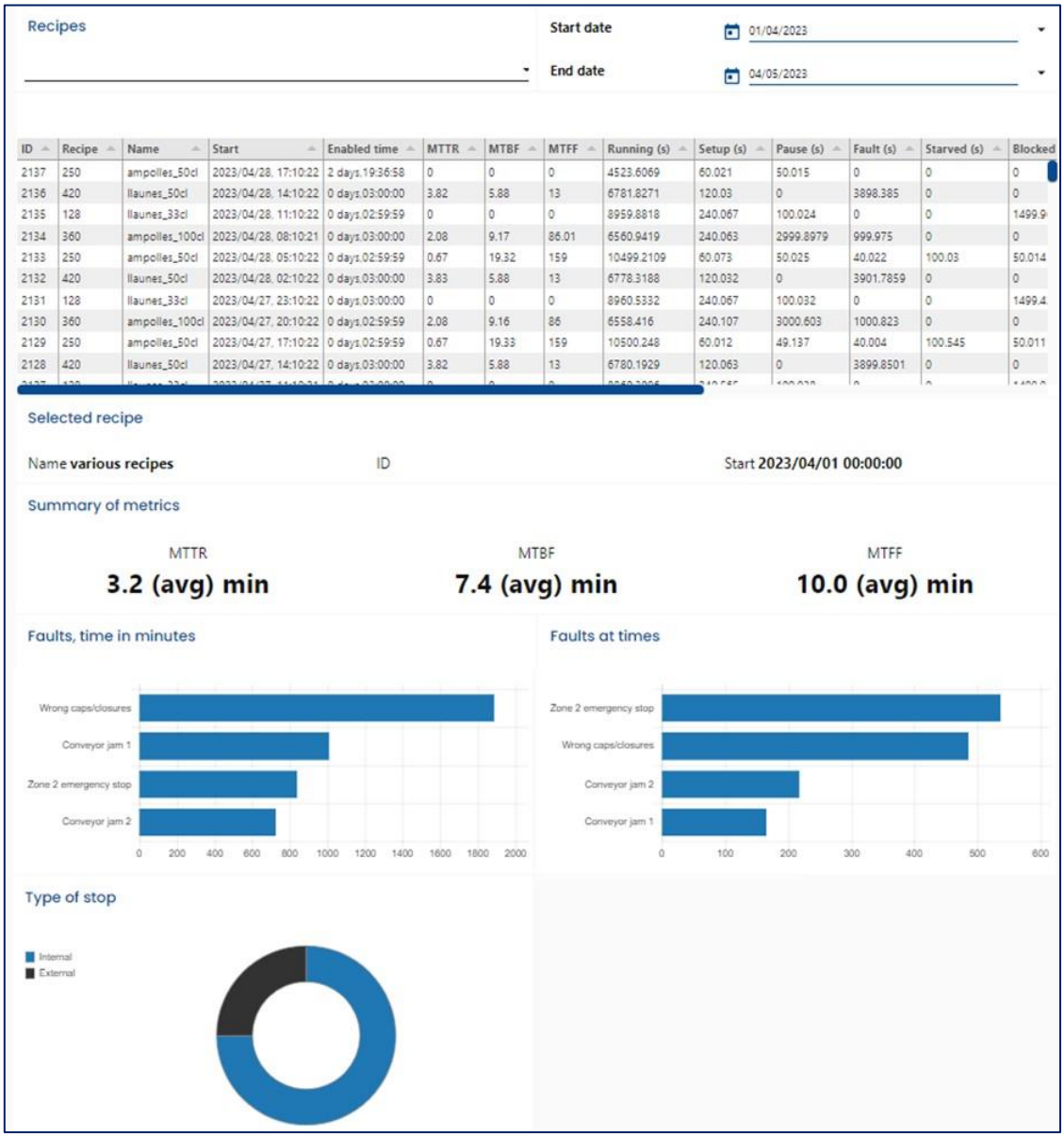


The following screen is designed especially for production managers, where we can consult the data of the finished productions. It has a filter by dates and by recipes, to choose the productions we want to see in the central table. When a specific production is not selected, the information in the widgets below will be the sum of all the productions in the table.

Below the table we find the start and end dates of the recipe, its name and the ID of the record to be able to locate it. In addition, we have a timeline where we can see the different status changes during the production, being able to see the exact time of the change.

The rest of the information would be the same as we have been able to see in the current production screen: machine status pie chart, final OEEs, total production and its quality and the values of the additional counters.

3.3. Analytics Failures By Recipe

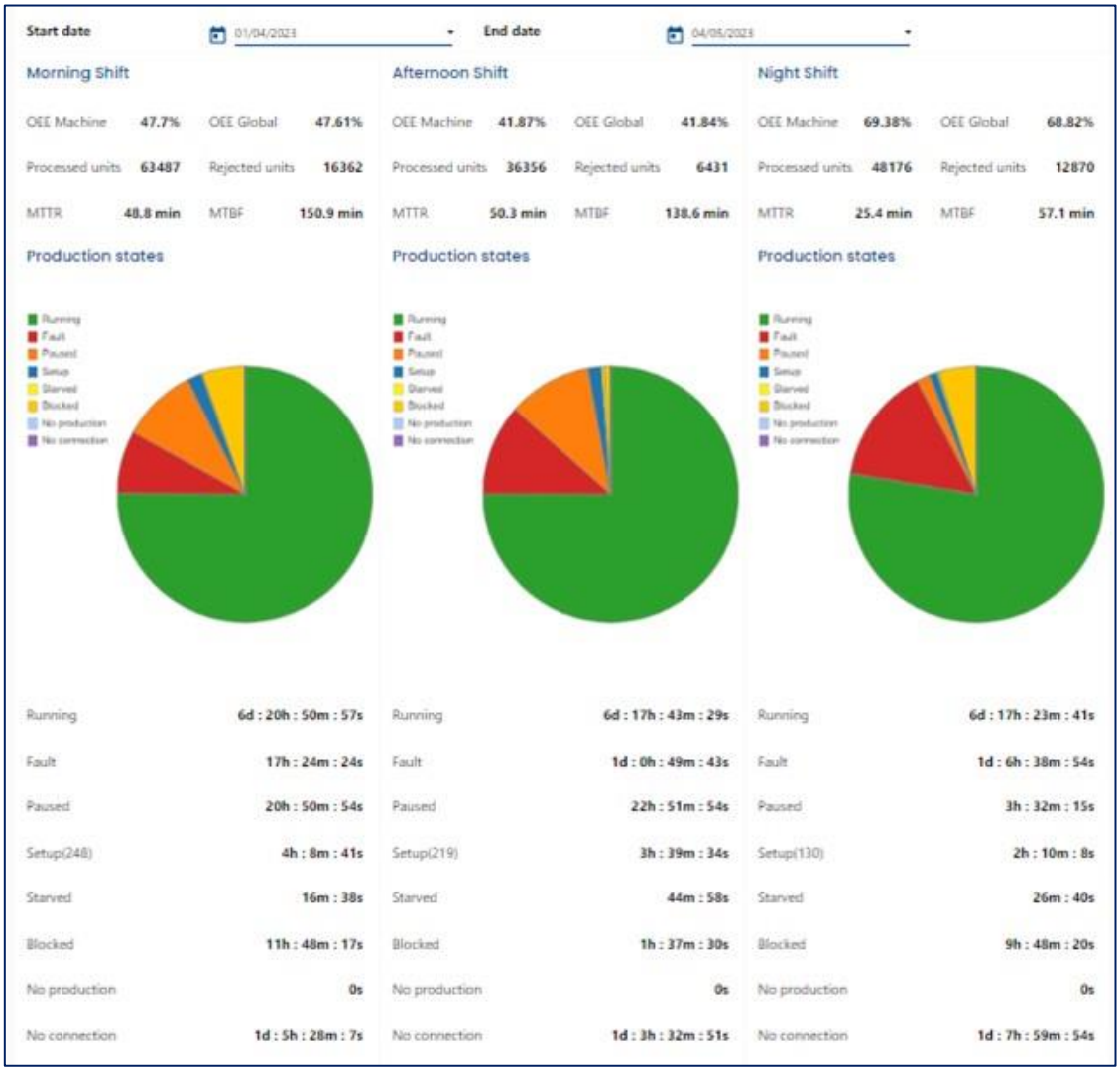


The following screen is designed especially for maintenance managers, where in the same way that we can consult the production information in the previous screen, in this one we find the specific information of errors and stoppages. We have the same filter and

query table, where immediately below we find the final calculation of the maintenance KPI metrics (MTTR, MTBF and MTFF).

Next, we have two horizontal bar charts with the errors and alarms raised by the PLC for the selected production. These graphs differentiate between the number of times a fault is raised and the amount of time taken to clear the fault, ordered from top to bottom in order from highest to lowest. Finally, we have another pie chart to know, of the total number of stoppages, how many were due to internal factors of the machine and how many were due to external factors.

3.4. Shift Analytics



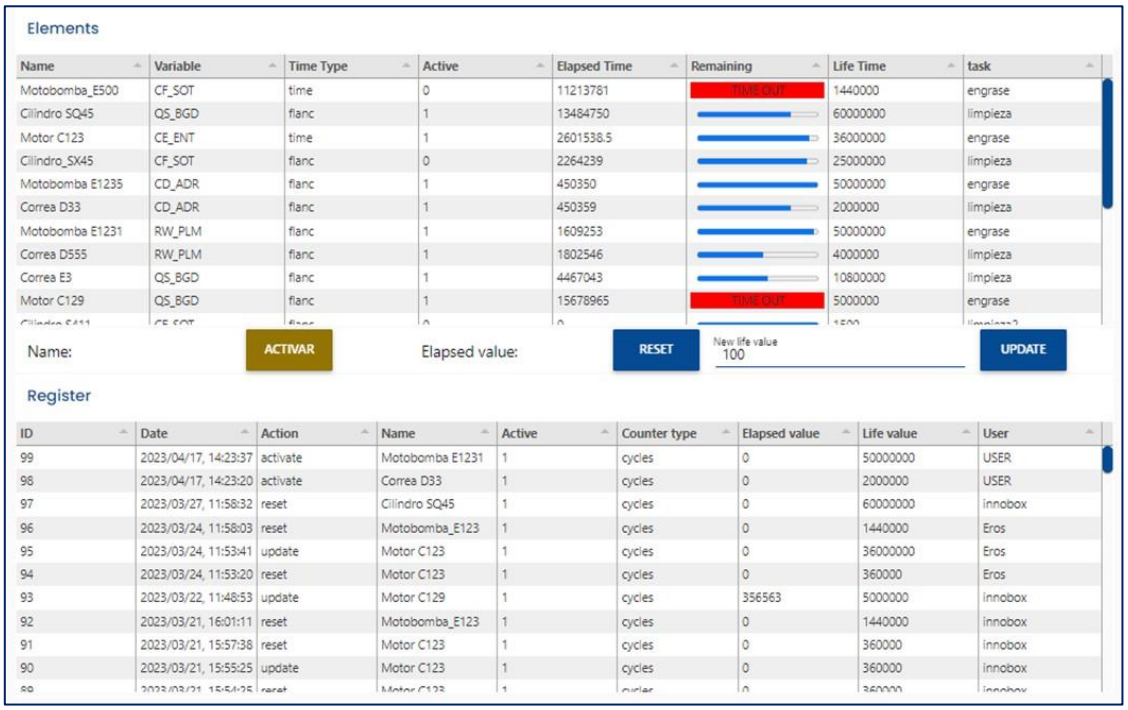
Here we find the last production data screen, where we can find the same graphs and data as the two previous screens, but in this case separated by work shifts.

At the top we find the date filter we want to consult, which will load three columns (morning, afternoon and night) with the data and weighted averages generated during that work shift. This view is designed for production supervisors, to analyse the differences in the quality of work of the different shifts.

4. Dashboards of additional functionalities

In addition to the four screens for the operation of the machine's production data, the system provides the user with additional functionalities that make it possible to anticipate serious mechanical faults, to monitor critical data on demand or to know in advance how long it will take to finish a typical recipe.

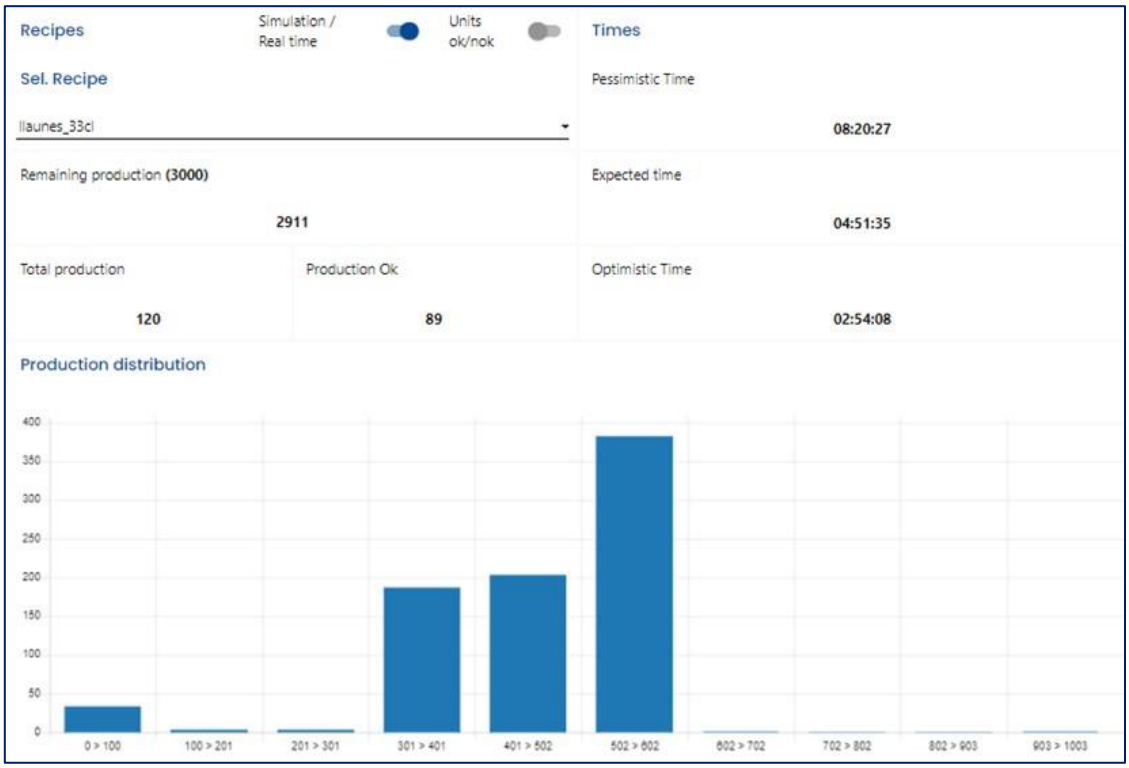
4.1. Preventive Maintenance



This is a functionality that will allow the operator to know when a particular mechanical element needs maintenance or a spare part before it breaks and causes a major problem. The system accepts the definition of up to 20 different elements, indicating which of the Boolean variables previously defined in its module indicates that the element is working, whether to monitor by time the variable is active (e.g. the variable that indicates whether a drive belt is rotating) or by operating cycles (e.g. a variable that manages a piston), how long the element has a manufacturer-defined lifetime and the descriptions of the tasks to be performed when the working time approaches the maximum lifetime. There is a field to indicate whether a defined element is active or not, being able to define all the elements used in the machine, but monitor only those working for the current production recipe. When any of the defined elements reaches 70% of its life time, the system will raise a pre-alarm and the corresponding sign in the header will turn red. This will be the indicator to go to this dashboard to find out which element needs attention. When it reaches 100% of the life time, the system will register an alarm and a more visual TIMEOUT sign will appear on the element.

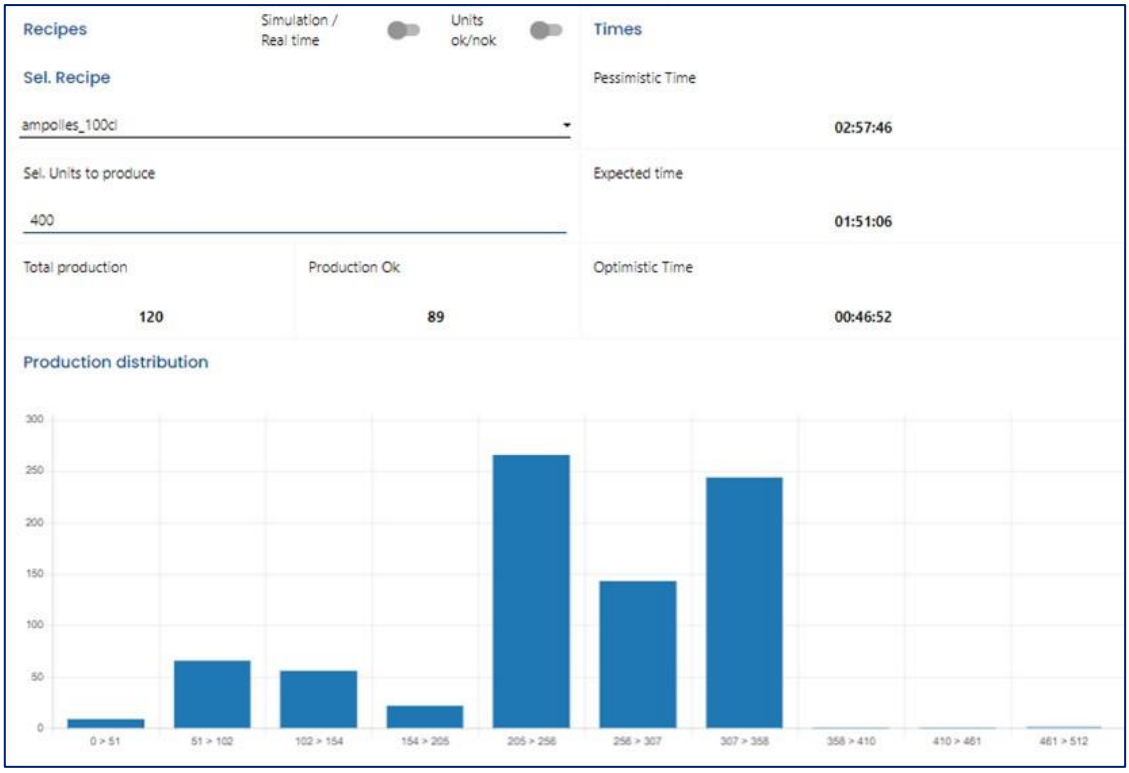
From this screen, you can activate or deactivate an element, edit the maximum life time or reset the working time after the specific task has been performed. The system will register which user is performing which action, in order to be able to keep a correct supervision of the management of the machine elements.

4.2. Production Predictive



In this screen we find the functionality that will allow us to have an approximate idea of when it will take to finish the production in progress or to carry out a simulation.

The system will have a better prediction accuracy as it has more historical data of the machine. On machines that are very stable in terms of production, the three values (optimistic, expected and pessimistic) will be similar. On machines that have a dispersion of production from day to day, the values will differ greatly. This also gives us an idea of how robust the machine is.

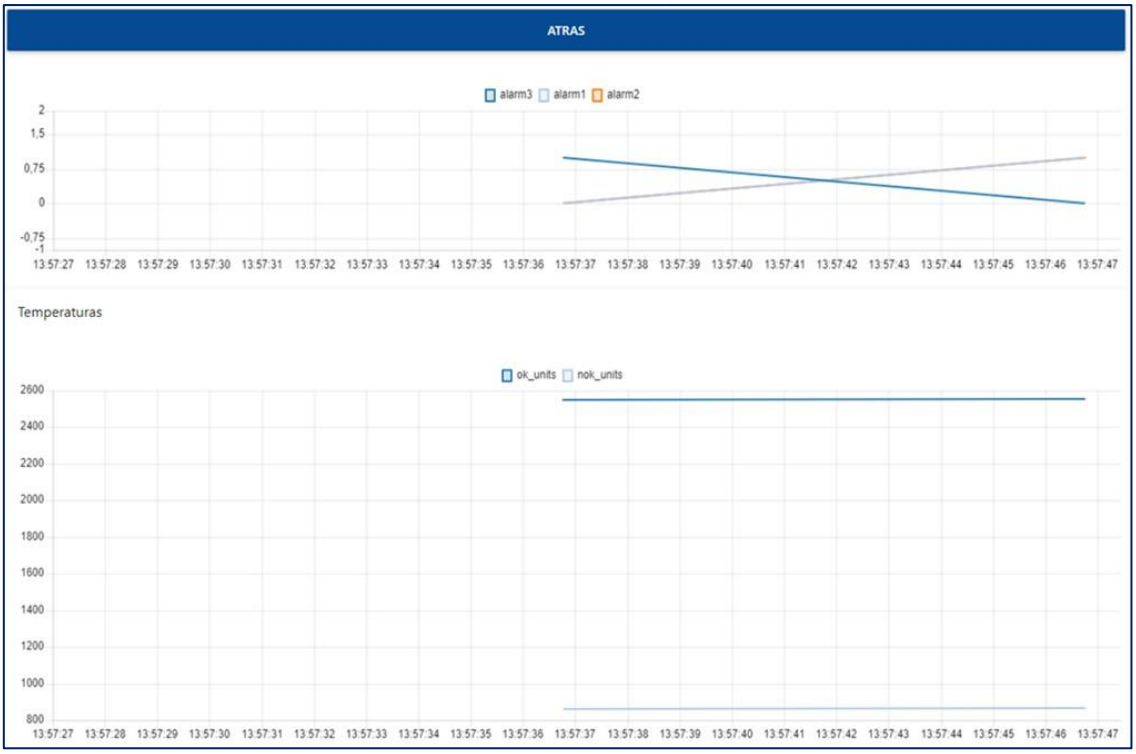


4.3. Datalogger i Datalogger Captures

The datalogger functionality is the one with the simplest operating premise, but which can provide the most personalised information: monitoring the values or states that variables acquire over time.

To start monitoring, we indicate whether we want to record the values every X time or when a variable changes state, which of the variables indicated in its specific module we want to monitor and whether we want to take a specific number of samples or let the system stop on its own (at 10,000 samples).

Once monitoring has started, we will see a table with the current values of the variables indicated. With the button to visualise we will access some graphics in real time with the evolution of these and with the button to finish we will generate a .csv file with the name specified at the start of the frame capture.



From the Datalogger Captures screen we can view the generated files, delete them or download them to be exploited with any other software that works with this format.

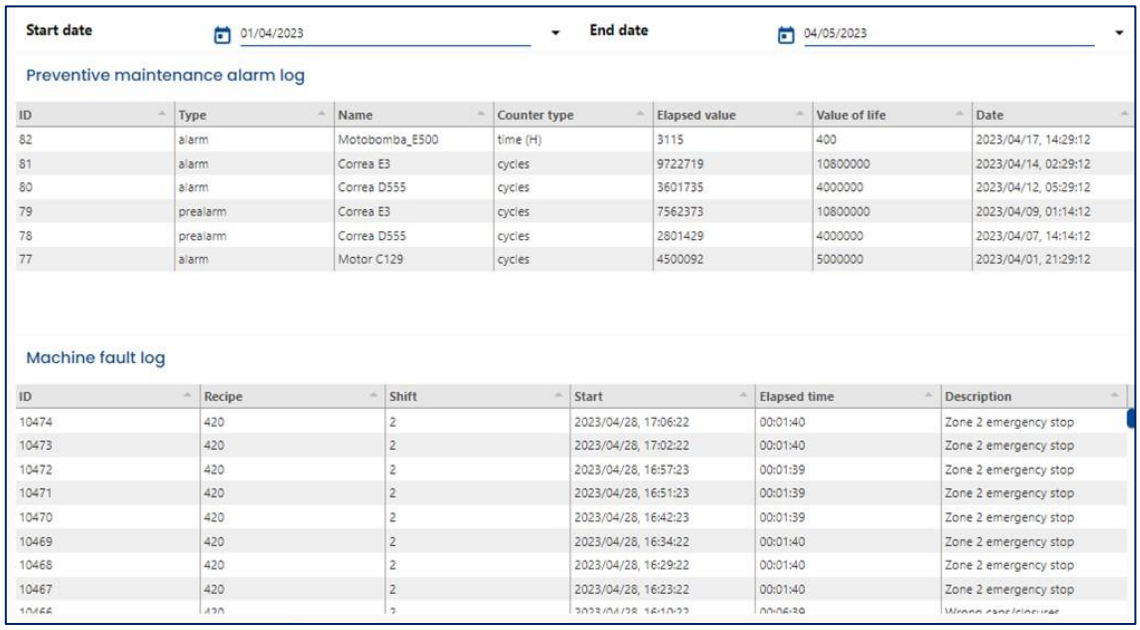
Id	File Name	Number of Captures	Count	Date Update
20	capture_alarm2_forTest	alarm	15	2023-02-09T12:29:31.000Z
22	TestFlanc	alarm	4	2023-03-23T10:42:57.000Z
23	testInterval	interval	236	2023-03-23T10:43:51.000Z
27	TestReset	alarm	7	2023-03-23T11:06:23.000Z
29	test	interval	7	2023-03-24T12:42:01.000Z
30	testCapturas	interval	3	2023-04-12T11:49:54.000Z
31	testCapt	interval	370	2023-04-12T11:50:40.000Z
32	aewga	interval	6061	2023-04-12T11:57:26.000Z
33	testDev-Demo	interval	10	2023-05-03T07:11:24.000Z
34	Alarma 1	interval	5	2023-05-05T09:51:57.000Z
35	Alarma 2	interval	8	2023-05-05T10:24:36.000Z
36	Alarm 1	interval	29	2023-05-05T13:43:08.000Z

REFRESH TestReset DOWNLOAD DELETE

4.4. Alarm Log

The alarm log screen, as its name indicates, is a screen in which there are two tables:

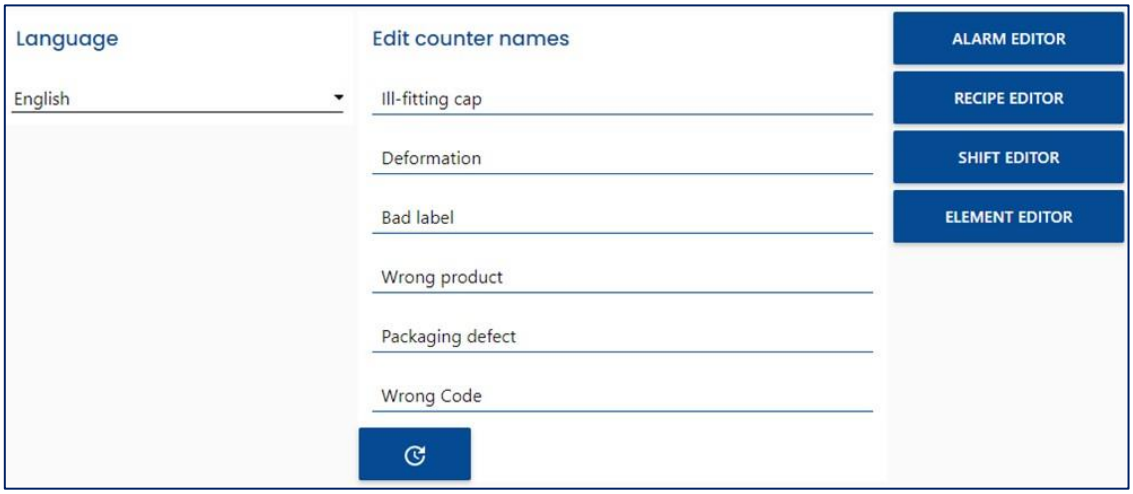
The upper table is the log of alarms generated by the preventive maintenance functionality, being able to check the date and time when an element has reached its life time. In the lower table, we find the record of alarms generated by the PLC of the monitored machine, with date and time, error code and description.



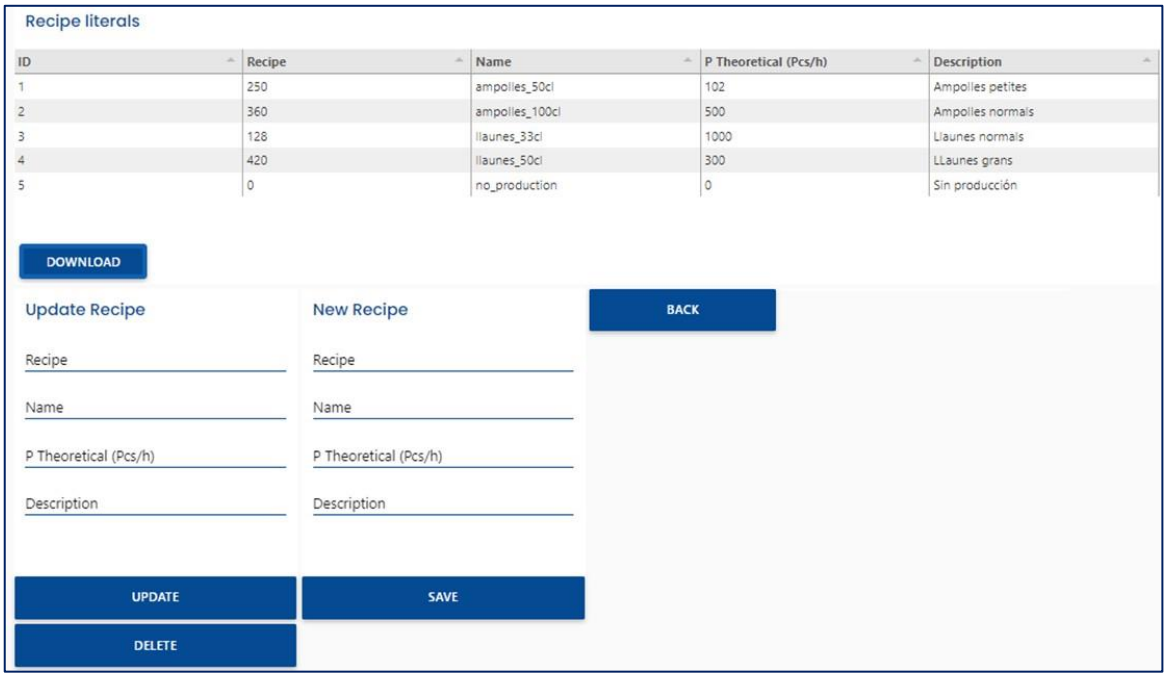
ID	Type	Name	Counter type	Elapsed value	Value of life	Date
82	alarm	Motobomba_E500	time (H)	3115	400	2023/04/17, 14:29:12
81	alarm	Correa E3	cycles	9722719	10800000	2023/04/14, 02:29:12
80	alarm	Correa D555	cycles	3601735	4000000	2023/04/12, 05:29:12
79	prealarm	Correa E3	cycles	7562373	10800000	2023/04/09, 01:14:12
78	prealarm	Correa D555	cycles	2801429	4000000	2023/04/07, 14:14:12
77	alarm	Motor C129	cycles	4500092	5000000	2023/04/01, 21:29:12

ID	Recipe	Shift	Start	Elapsed time	Description
10474	420	2	2023/04/28, 17:06:22	00:01:40	Zone 2 emergency stop
10473	420	2	2023/04/28, 17:02:22	00:01:40	Zone 2 emergency stop
10472	420	2	2023/04/28, 16:57:23	00:01:39	Zone 2 emergency stop
10471	420	2	2023/04/28, 16:51:23	00:01:39	Zone 2 emergency stop
10470	420	2	2023/04/28, 16:42:23	00:01:39	Zone 2 emergency stop
10469	420	2	2023/04/28, 16:34:22	00:01:40	Zone 2 emergency stop
10468	420	2	2023/04/28, 16:29:22	00:01:40	Zone 2 emergency stop
10467	420	2	2023/04/28, 16:23:22	00:01:40	Zone 2 emergency stop

4.5. Settings



Finally, we reach the configuration screen, where we can choose the language of the application (Catalan, Spanish or English), the names to be displayed in the additional counters and edit the definition tables loaded with the initial configurator. This quick editing allows us to quickly change, for example, the name or code of a recipe, the task to be carried out for a specific mechanical element or the description of one of the PLC alarms, without having to access the initial configurator again and reload a .csv file that updates the entire database table. It must be taken into account that these modifications will be seen in the registers after the change; the alarms and productions already carried out will be seen with the data defined at the moment of the historisation.



INNOBOX

INNOVA IT, SL
C/ Llauder, 22. 08302 Mataró (España)
Tel: +34 902 109 963
comercial@innovait.cat
https://innobox.innovait.cat/