



Manual

Dashboards functionalities

Industrial IoT solution for
industrial machines



CONTENT

Table of contents

1. Introduction.....	3
2. Access to the application.....	3
3. Production data exploitation dashboards	5
3.1. Analytical Current Production.....	5
3.2. Analytics Production Recipe.....	6
3.3. Analytics Failures By Recipe	7
3.4. Shift Analytics	8
4. Dashboards of additional functionalities	10
4.1. Preventive Maintenance	10
4.2. Production Predictive	11
4.3. Datalogger i Datalogger Captures	12
4.4. Alarm Log.....	14
4.5. Settings.....	14

1. Introduction

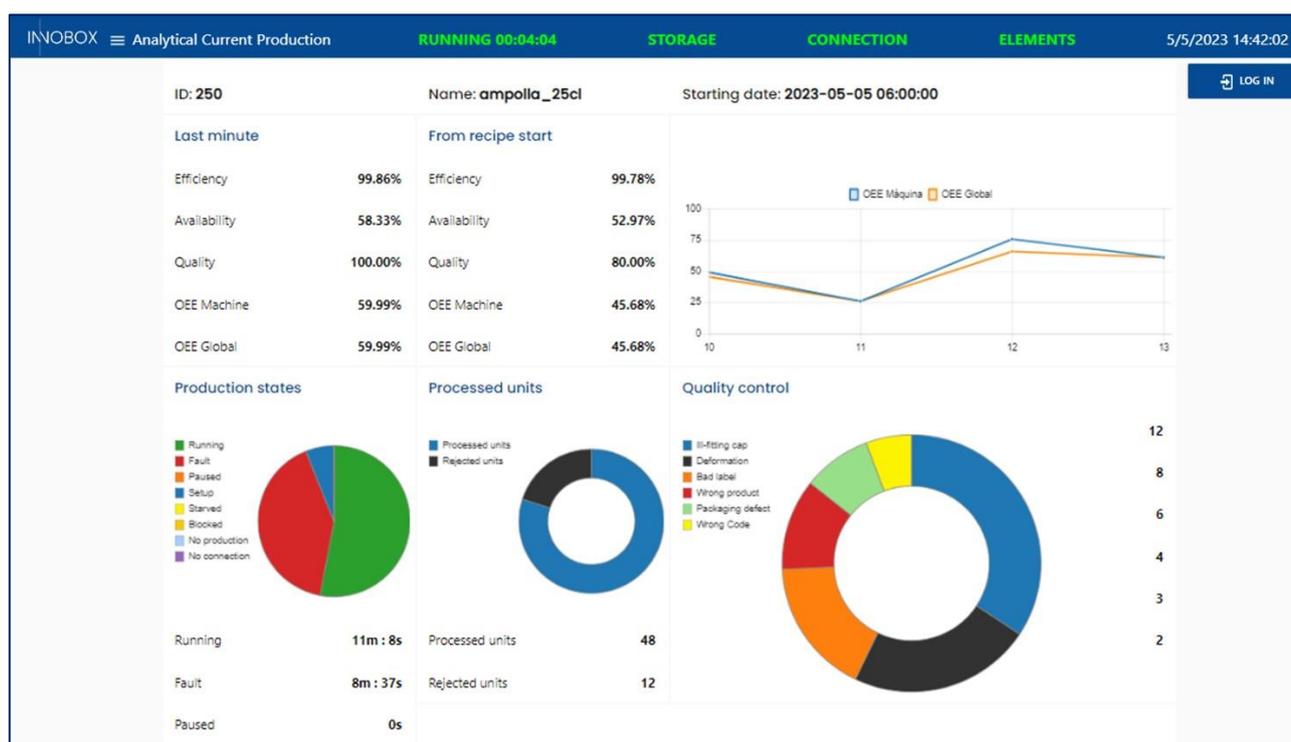
This manual is complementary to the Innobox Operation and Configuration Manual. With the device configured and connected to the PLC, it will start to record timers, general operation calculations, alarms, etc. that can be consulted through the different panels implemented.

2. Access to the application

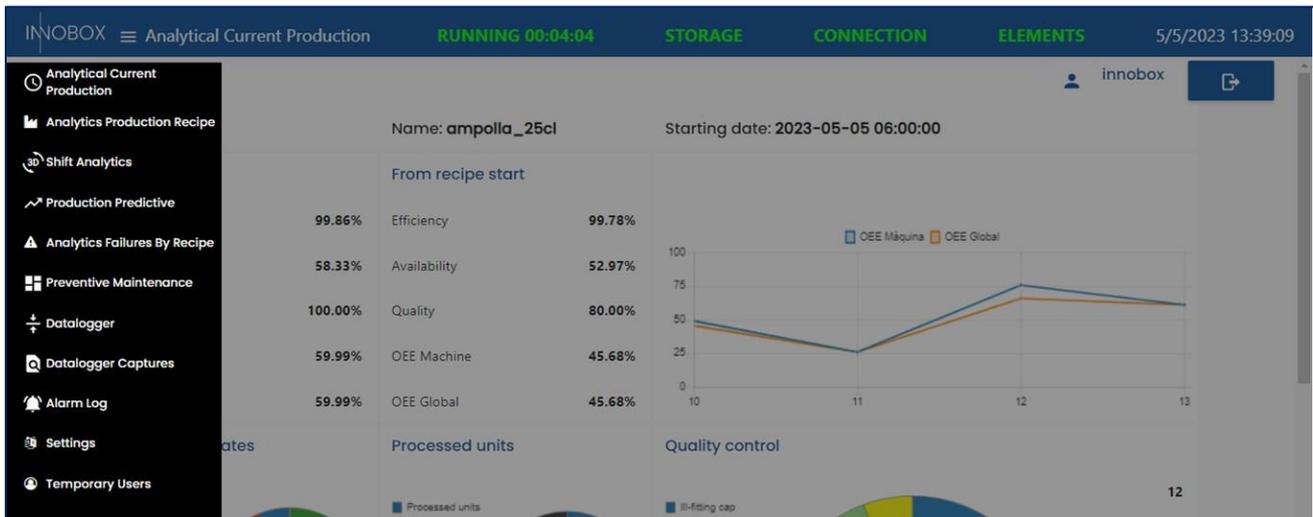
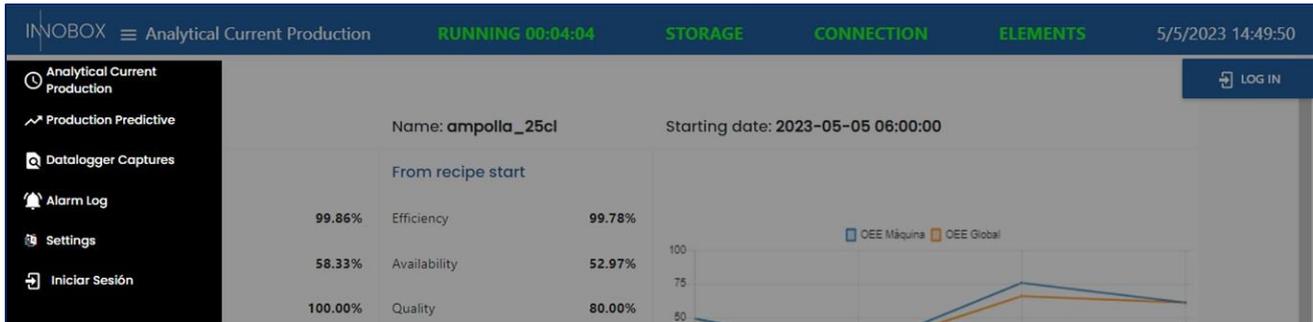
To access the data monitoring it is only necessary to go to any browser, on a computer configured on the same network as the device, and enter the IP previously configured when starting the device. By default, the URL would be the following:

<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:

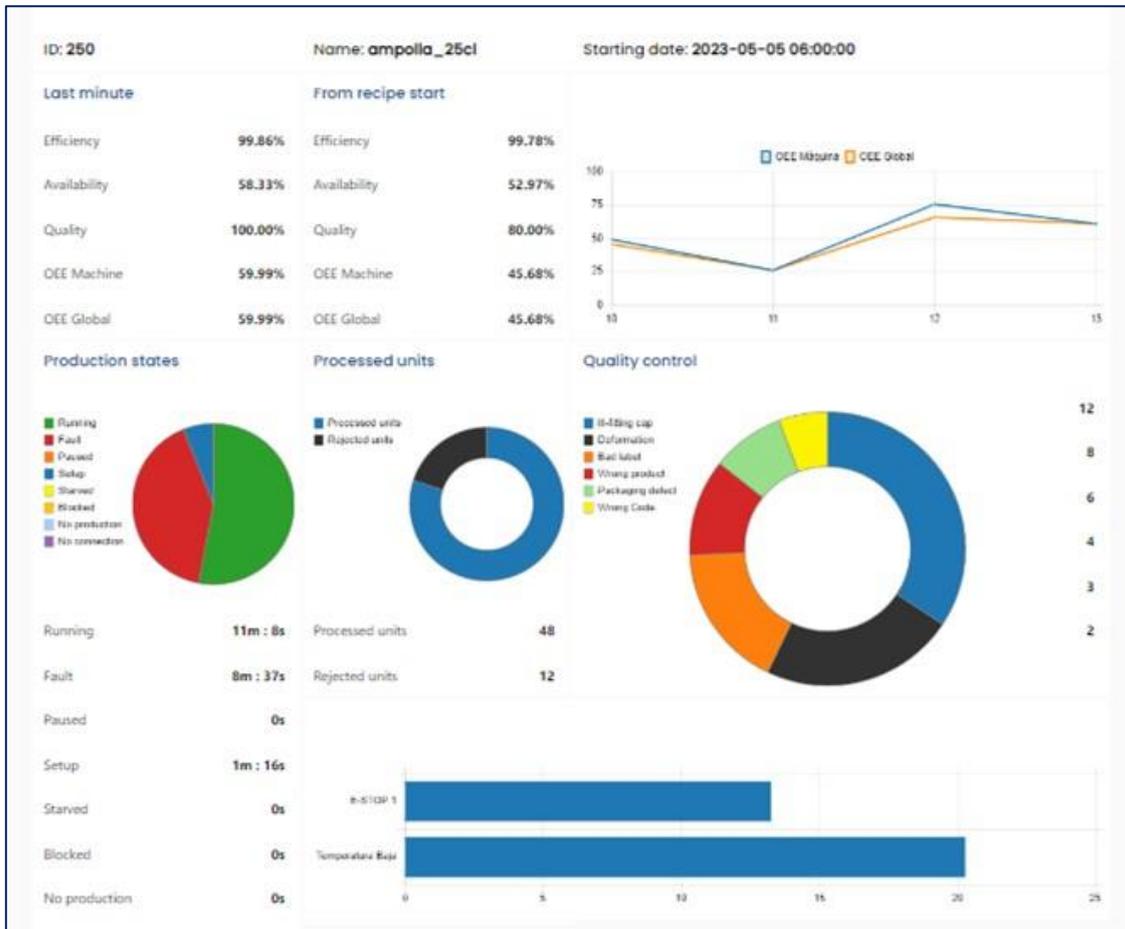


Likewise, common to all the screens, we will have the header with quick information about the machine, such as the current status and the continuous time in this status, the availability of the device's memory, the status of the connection with the PLC and if there is any maintenance task to be carried 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:

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

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

3.2. Analytics Production Recipe

Recipes

Start date: 01/04/2023

End date: 04/05/2023

ID	Recipe	Name	OEE Machine	OEE Global	Start	End	Running (s)	Fault (s)	Setup (s)	Pause (s)	Faults	Process
2137	250	ampolles_50cl	105.11	105.11	2023/04/28 17:10:22	2023/05/01 12:47:21	4523.6069	0	60.021	50.015	0	138
2136	420	llaunes_50cl	35.89	35.89	2023/04/28 14:10:22	2023/04/28 17:10:22	6781.8271	3898.385	120.03	0	17	323
2135	128	llaunes_33cl	58.06	50	2023/04/28 11:10:22	2023/04/28 14:10:22	8959.8818	0	240.067	100.024	0	1500
2134	360	ampolles_100cl	25.66	25.66	2023/04/28 08:10:21	2023/04/28 11:10:22	6560.9419	999.975	240.063	2999.8979	8	385
2133	250	ampolles_50cl	91.47	90.2	2023/04/28 05:10:22	2023/04/28 08:10:21	10499.2109	40.022	60.073	50.025	1	276
2132	420	llaunes_50cl	35.89	35.89	2023/04/28 02:10:22	2023/04/28 05:10:22	6778.3188	3901.7859	120.032	0	17	323
2131	128	llaunes_33cl	58.06	50	2023/04/27 23:10:22	2023/04/28 02:10:22	8960.5332	0	240.067	100.032	0	1500
2130	360	ampolles_100cl	44.07	44.07	2023/04/27 20:10:22	2023/04/27 23:10:22	6558.416	1000.823	240.107	3000.603	8	661
2129	250	ampolles_50cl	91.47	90.2	2023/04/27 17:10:22	2023/04/27 20:10:22	10500.248	40.004	60.012	49.137	1	276
2128	420	llaunes_50cl	35.89	35.89	2023/04/27 14:10:22	2023/04/27 17:10:22	6780.1929	3899.8501	120.063	0	17	323

Registered recipes table

Selected recipe: Start: 2023/04/01 00:00:00 End: 2023/05/04 00:00:00

Name: ID: Elapsed Time:

Timeline

1/4/2023

State: Start: End: Elapsed time:

Production states

Running	20d : 12h : 13m : 59s
Fault	3d : 1h : 58m : 2s
Paused	1d : 23h : 15m : 53s
Setup	10h : 1m : 29s
Starved	1h : 29m : 57s
Blocked	23h : 14m : 57s
No production	0s
No connection	2d : 18h : 20m : 6s

OEE Accumulated

OEE Machine	57.09%
OEE Global	54.79%

Units production counters

U.Processed	148490	U.Rejected	35715	U.total	184205	Quality	80.61%
-------------	---------------	------------	--------------	---------	---------------	---------	---------------

Quality control

Ill-fitting cap	7269	Deformation	11328
Bad label	4958	Wrong product	3691
Packaging defect	7500	Wrong Code	969

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.

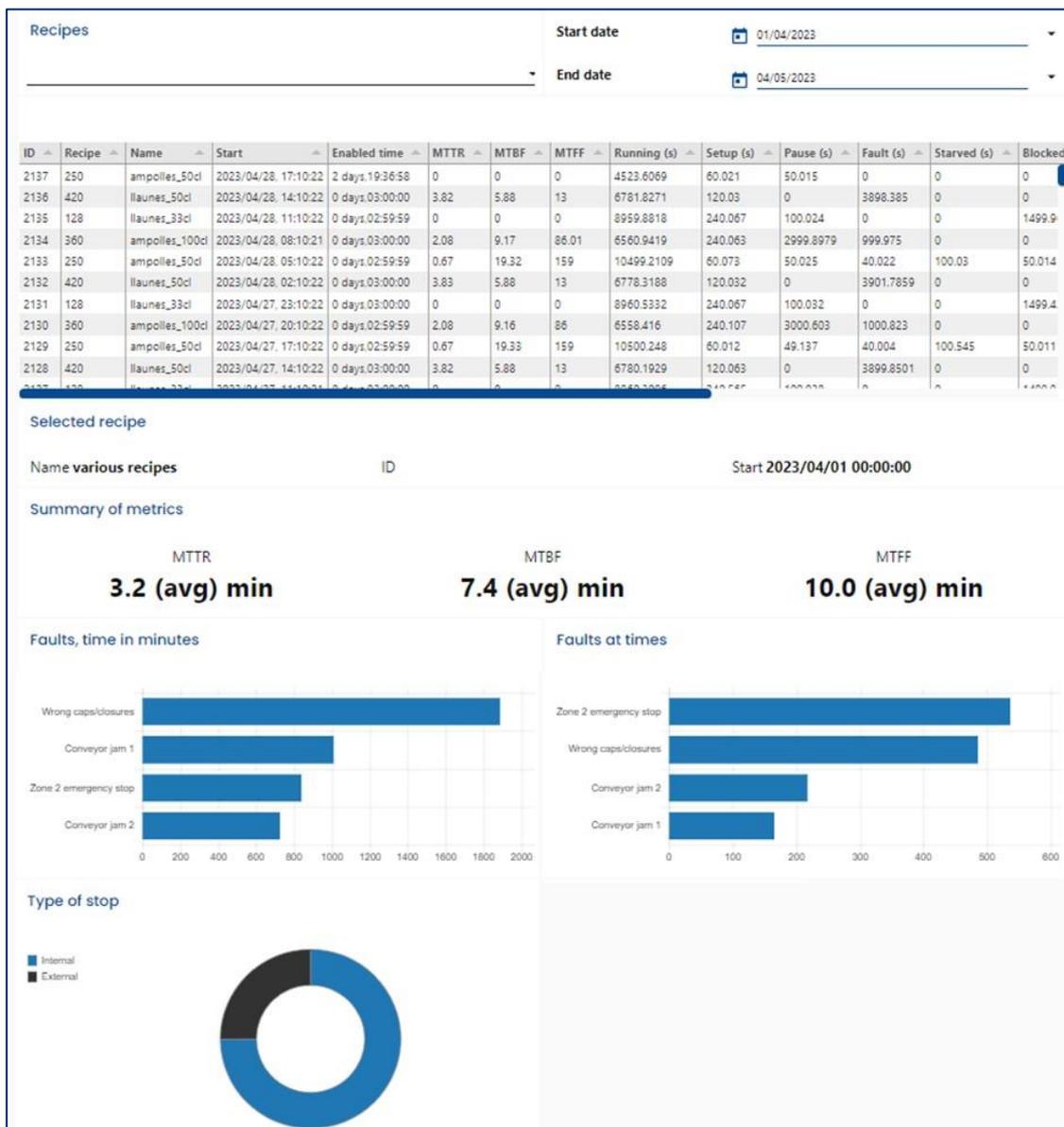
Dashboards functionalities manual

Página 6 de 16

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 MTFE).

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

Elements									
Name	Variable	Time Type	Active	Elapsed Time	Remaining	Life Time	task		
Motobomba_E500	CF_SOT	time	0	11213781	TIMEOUT	1440000	engrase		
Cilindro SQ45	QS_BGD	flanc	1	13484750	<div style="width: 80%;"></div>	60000000	limpieza		
Motor C123	CE_ENT	time	1	2601538.5	<div style="width: 40%;"></div>	36000000	engrase		
Cilindro_SX45	CF_SOT	flanc	0	2264239	<div style="width: 20%;"></div>	25000000	limpieza		
Motobomba E1235	CD_ADR	flanc	1	450350	<div style="width: 10%;"></div>	50000000	engrase		
Correa D33	CD_ADR	flanc	1	450359	<div style="width: 10%;"></div>	2000000	limpieza		
Motobomba E1231	RW_PLM	flanc	1	1609253	<div style="width: 45%;"></div>	50000000	engrase		
Correa D555	RW_PLM	flanc	1	1802546	<div style="width: 35%;"></div>	4000000	limpieza		
Correa E3	QS_BGD	flanc	1	4467043	<div style="width: 75%;"></div>	10800000	limpieza		
Motor C129	QS_BGD	flanc	1	15678965	TIMEOUT	5000000	engrase		
Cilindro E411	CF_SOT	flanc	0	0	<div style="width: 0%;"></div>	15000000	limpieza		

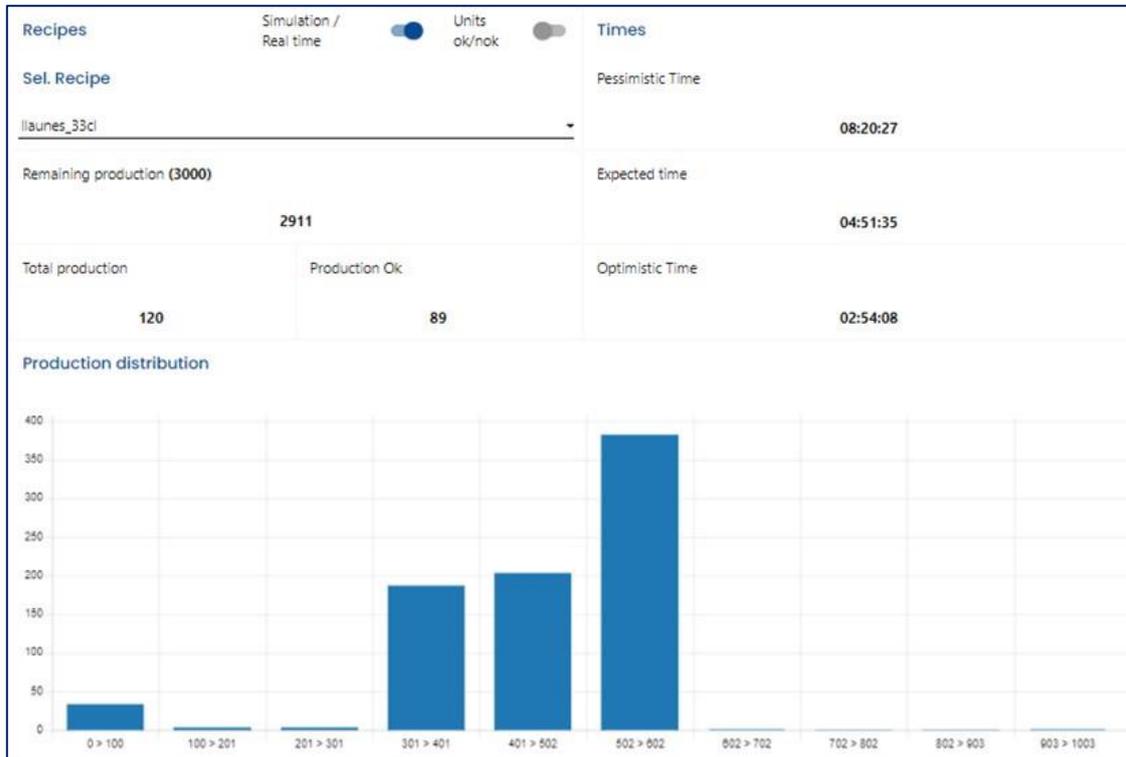
Name:	<input type="text"/>	<input type="button" value="ACTIVAR"/>	Elapsed value:	<input type="text"/>	<input type="button" value="RESET"/>	New life value 100	<input type="button" value="UPDATE"/>
-------	----------------------	--	----------------	----------------------	--------------------------------------	-----------------------	---------------------------------------

Register									
ID	Date	Action	Name	Active	Counter type	Elapsed value	Life value	User	
99	2023/04/17, 14:23:37	activate	Motobomba E1231	1	cycles	0	50000000	USER	
98	2023/04/17, 14:23:20	activate	Correa D33	1	cycles	0	20000000	USER	
97	2023/03/27, 11:58:32	reset	Cilindro SQ45	1	cycles	0	60000000	innobox	
96	2023/03/24, 11:58:03	reset	Motobomba_E123	1	cycles	0	14400000	Eros	
95	2023/03/24, 11:53:41	update	Motor C123	1	cycles	0	36000000	Eros	
94	2023/03/24, 11:53:20	reset	Motor C123	1	cycles	0	3600000	Eros	
93	2023/03/22, 11:48:53	update	Motor C129	1	cycles	356563	50000000	innobox	
92	2023/03/21, 16:01:11	reset	Motobomba_E123	1	cycles	0	14400000	innobox	
91	2023/03/21, 15:57:38	reset	Motor C123	1	cycles	0	3600000	innobox	
90	2023/03/21, 15:55:25	update	Motor C123	1	cycles	0	3600000	innobox	
89	2023/03/21, 15:54:25	reset	Motor C123	1	cycles	0	3600000	innobox	

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.

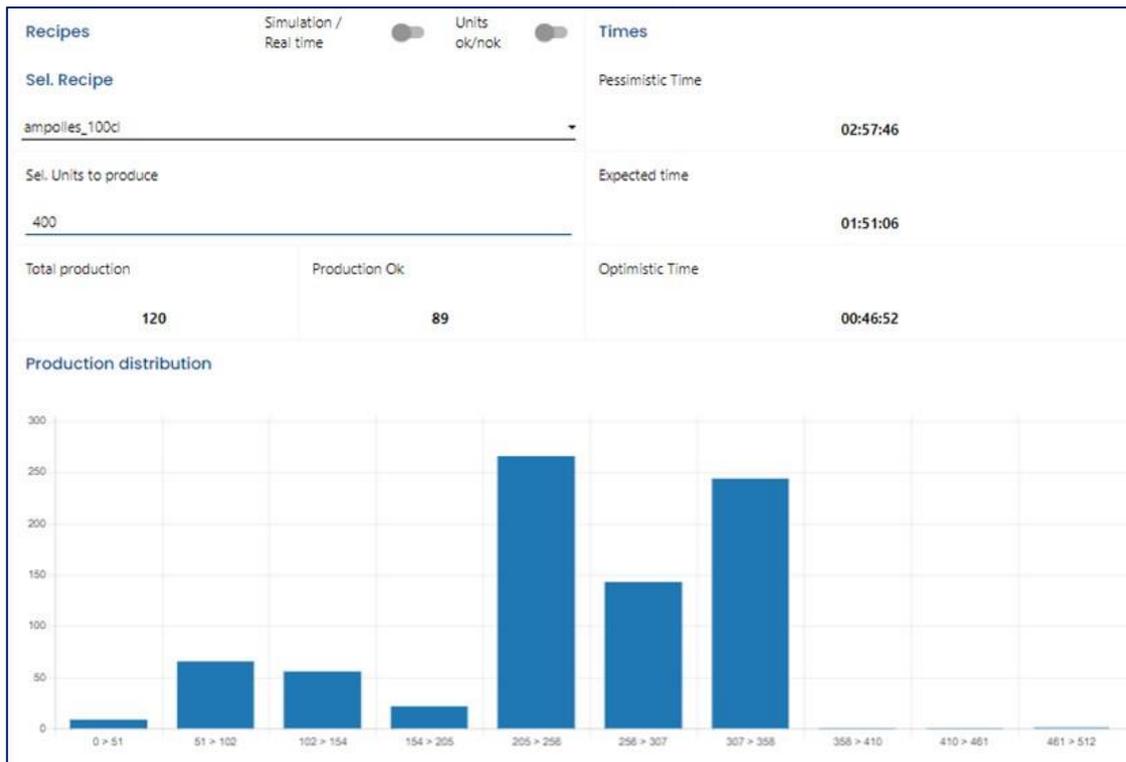
From this screen, you can activate or deactivate an element, edit the maximum life time or reset the working time after the specific task has been performed. The system will register which user is performing which action, in order to be able to keep a correct supervision of the management of the machine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

Configuration interface for the datalogger. It includes a 'RESET' button, a 'CAPTURE' button, and the following settings:

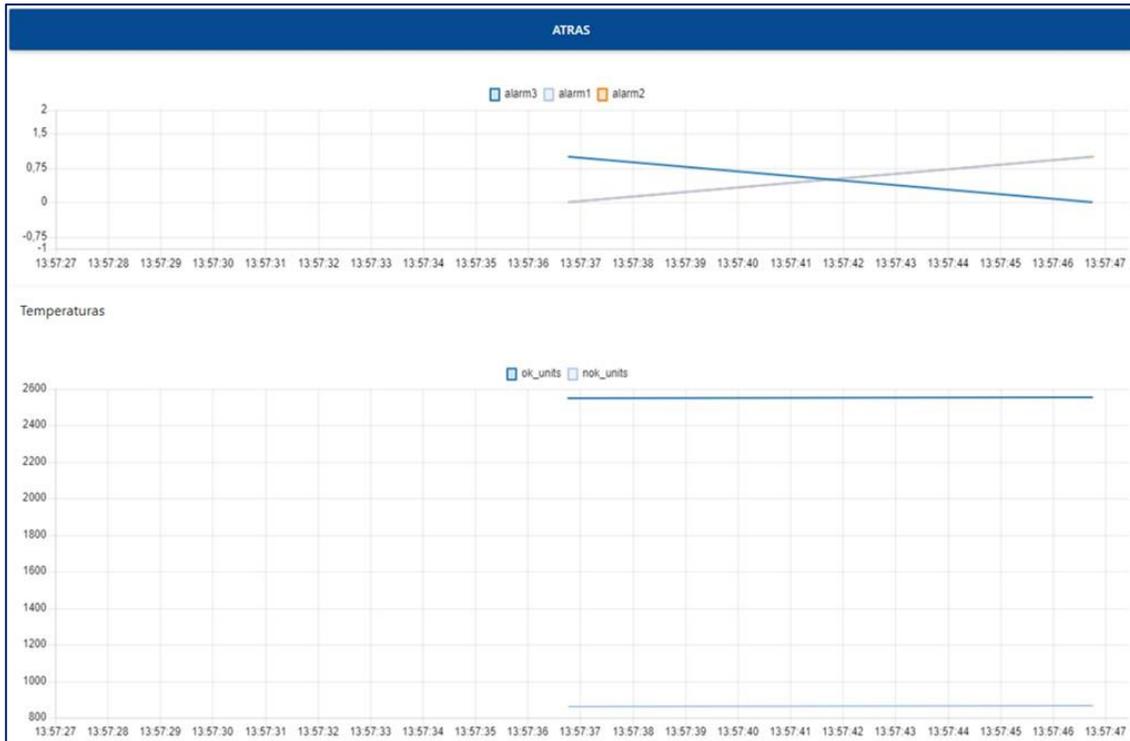
- Trigger: Per Interval
- Interval[s]: 10
- Variables: setup
- End Mode: Automatic

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).

Table showing current values of monitored variables:

param	val	param	val	param	val	param	val	param	val
alarm1	true	alarm2	true	alarm3	true	ok_units	2547	nok_units	862

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

At the bottom of the table, there is a 'REFRESH' button, the name of the selected file 'TestReset', and 'DOWNLOAD' and 'DELETE' buttons.

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.

Start date		01/04/2023	End date		04/05/2023	
Preventive maintenance alarm log						
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
Machine fault log						
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	
10466	420	2	2023/04/28, 16:17:22	00:01:40	Zone 2 emergency stop	

4.5. Settings

Language	Edit counter names	ALARM EDITOR
English	Ill-fitting cap	RECIPE EDITOR
	Deformation	SHIFT EDITOR
	Bad label	ELEMENT EDITOR
	Wrong product	
	Packaging defect	
	Wrong Code	

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.

Recipe literals

ID	Recipe	Name	P Theoretical (Pcs/h)	Description
1	250	ampolles_50ci	102	Ampolles petites
2	360	ampolles_100ci	500	Ampolles normals
3	128	llaunes_33ci	1000	Llaunes normals
4	420	llaunes_50ci	300	LLaunes grans
5	0	no_production	0	Sin producción

DOWNLOAD

Update Recipe

Recipe

Name

P Theoretical (Pcs/h)

Description

UPDATE

DELETE

New Recipe

Recipe

Name

P Theoretical (Pcs/h)

Description

SAVE

BACK



INNOBOX

INNOVA IT, SL

C/ Llauder, 22. 08302 Mataró (España)

Tel: +34 902 109 963

comercial@innovait.cat

<https://innobox.innovait.cat/>