CNC Monitoring Dashboard – Full Documentation (Figma Build)

Design Documentation • Architecture • Decisions

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1. Project Overview

This project consists of designing a **professional, interactive CNC monitoring dashboard** dedicated to factory operators and supervisors.

Goals of the dashboard:

- Provide **real-time visibility** on machine activity
- Simplify monitoring of **programs, energy, timelines, and alerts**
- Offer a **clean, modular UI** adaptable to web implementation
- Remain intuitive and operational in an industrial environment

The design includes many screens:
➡ Dashboard
➡ Machines
➡ Machine Details
➡ Energy
➡ Alerts

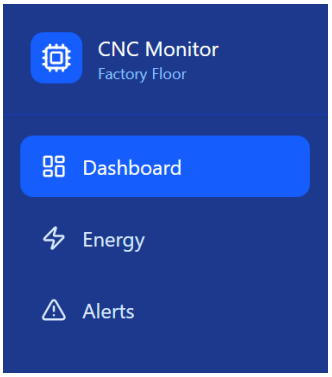
We have created a first draft then another one more professional and related to the needs of our client. We continue to update every draft in order to correspond to the frontend/backend capacity in coding but also to match to the type of data the data analyst gets.

2. Overall Structure & Pages

2.1. Main Pages

As seen on the image:

- Dashboard
- Energy
- Alerts



2.2. Removed

2.2.1. Removed pages

- **Reports** → removed for simplicity
- **Settings** → removed to avoid unnecessary complexity
- **Machines Overview** → too much information about each machine that we haven't access to, major information have been grouped on the page Dashboard
- **Machine Detail View** → too much information about each machine that we haven't access to, major information have been grouped on the page Dashboard

2.3. Removed Profile

We have taken the decision with the frontend/backend team to remove the profile so the dashboard will be an open interface. Our decision was based on the time and technical development that require the creation of a user with his password. In our opinion the Dashboard will be mostly opened by the Production Leader of each shift to show the factory worker what is the state of the production and also each person who needs information on the state of the production.

3. General UI Decisions

3.1. Sidebar

As seen on 2.1. Kept pages:

- Color updated from **slate-900 → blue-900.**
- Border **blue-800.**
- Text colors adjusted accordingly.

This features could be adapted by the frontend team, if necessary.

- Navigation items:
    - Dashboard
    - Energy
    - Alerts

3.2. Top Bar

As seen on the image, some features were removed for simplicity:

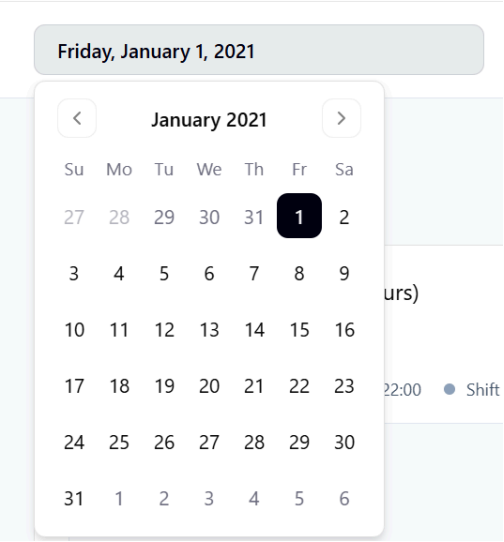
- Shift selector removed.
- Live indicator removed.
- Clock/time removed.
- **Actual version only contains:**
    - **Date selector:** by clicking on the data selector, an interactive calendar should appear.

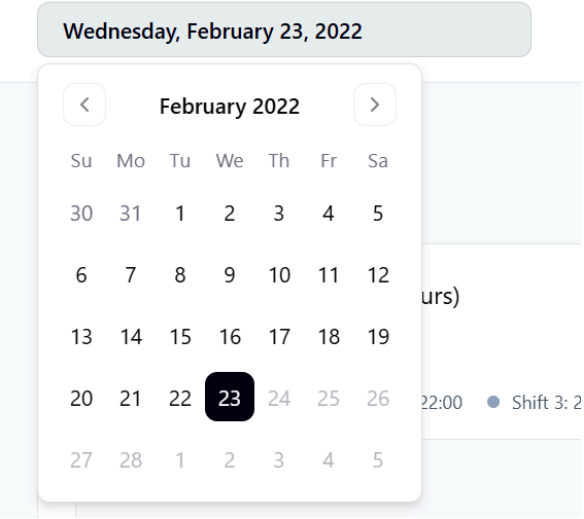
3.3. Date Selector

- Replaced real-time date with a dropdown.

- Contains all dates between **28/12/2020** → **23/02/2022** (in order to be relevant for the data we have)

- Time removed completely → because our graph are following the evolution of the data of the machine





4. Dashboard Page

4.1. Machine Status Timeline

4.1.1. What was removed

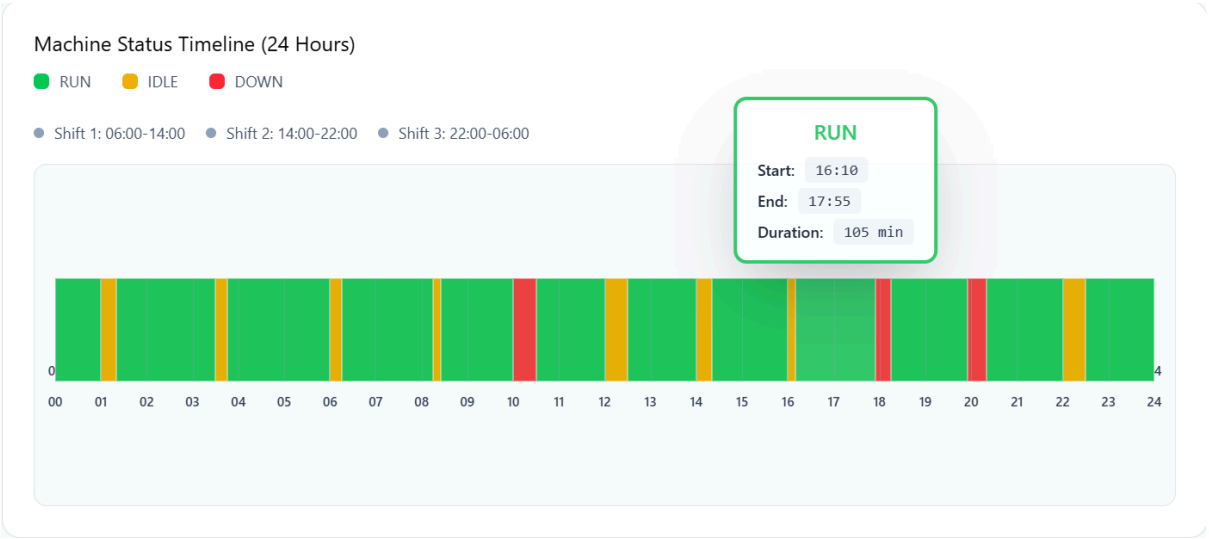
- Machine status card:
    - Current program
    - Emergency/Error/Alert counts
    - RUN status badge

4.1.2. What was improved

Machine status card

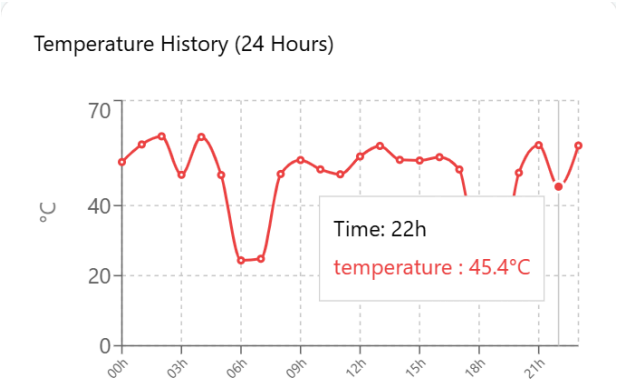
As seen on image:

- Timeline now shows:
    - **Datetime** directly inside all IDLE, DOWN and RUN bars for Start, End **(hours, minutes, seconds as HH:MM)** and Duration **(minutes as MM)**
- **Numerical time axis added**:
    - All hours from **00–24** displayed
    - Clean minimal text (no boxes, no borders)
    - Top and bottom axes
    - Vertical grid lines every hour
- Bars resized to allow text readability



4.2.Temperature history card

We haven't changed the graph of the evolution of the temperature because it was clear and visual.

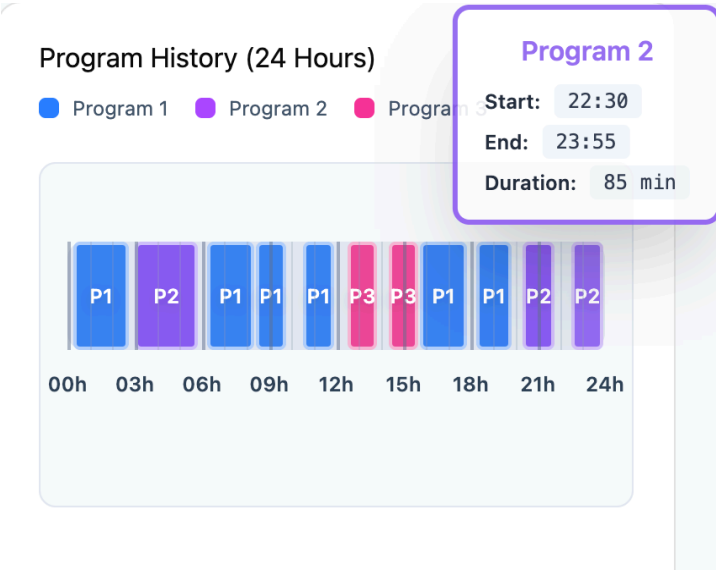


4.3. Program Timeline Graph

Replaced "Current Program" with a **24-hour program history chart**:

- Each hour shows program 1–3
- Hours with no program displayed in **light grey**
- 3 program colors standardized
- Each machine has a unique daily program pattern

We have changed it to be more precise. At first it was a histogram showing what was the program running at each hour. And now we can follow each program with its beginning, end (hours and minutes as HH:MM) and duration (minutes as MM).



4.4. Machine Utilization

4.4.1. Our decisions

We created KPI for each type of period :

- Running
- IDLE
- Down

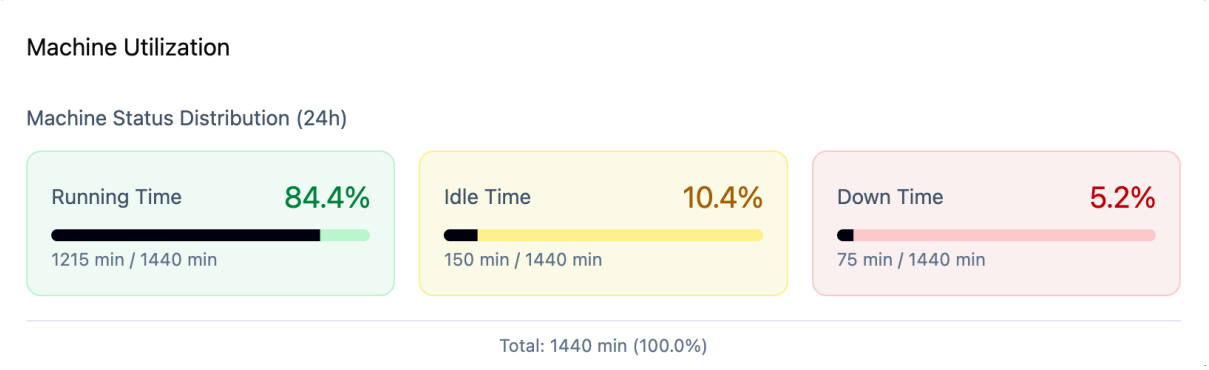
We wanted to show every day the time allocation for each type of period. So we decided to show it in :

- % of the day
- Minutes of the day compared to the 1440 min (= 24h)

4.4.2. What was improved

We added “Total: 1440 min (100.0%)” for the user to understand that there is no time left; each minute of the day is allocated to either Running, IDLE and Down.

For a more true to draft of the dashboard we selected data that could be possible and with a sum that is equal to 100 % or 1440 min.



5. Energy Page

5.1. Removed elements

- Daily Cost KPI → No information on the cost of the energy of the factory
- Energy vs Machine Load Correlation chart
- Energy Optimization Insights chart

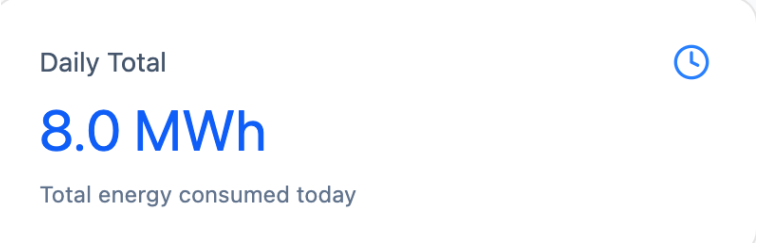
5.2. New Additions

machine now displays:

- **Current Power (kW)** – real-time energy consumption

5.3. KPI Change

Replaced “Time for using the program once (h)” with Daily Total (MWh)



5.4. Data Model Redesign

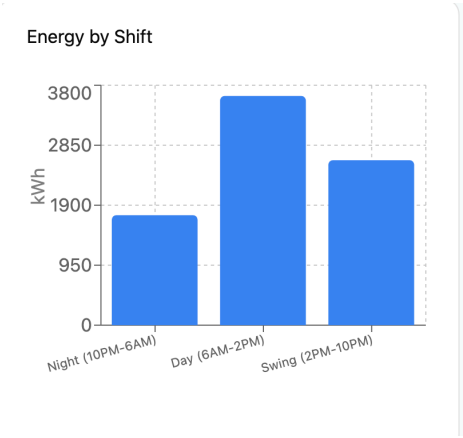
Energy by shift is now calculated as:

```
energy_kWh = usage_count × program_time(h) × power(kW)
```

5.5. Graph Modification: Energy by Shift

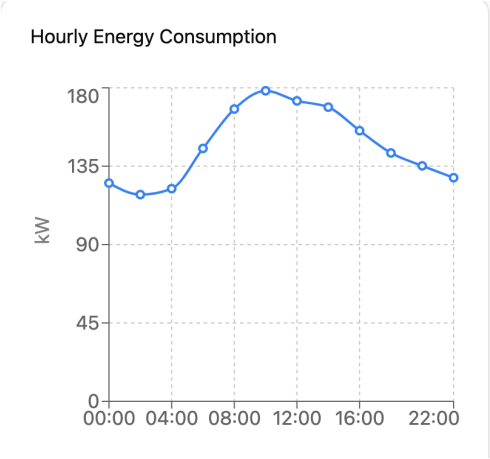
- Removed the second Y-axis
- Removed the second bar

- Usage count is now shown **only inside the tooltip**
- Graph now displays **kWh bars only**
- Cleaner, more industrial UI



5.6. Kept elements

We have kept the graph showing the evolution of the hourly consumption at every hour (in kW)



6. Alerts Page

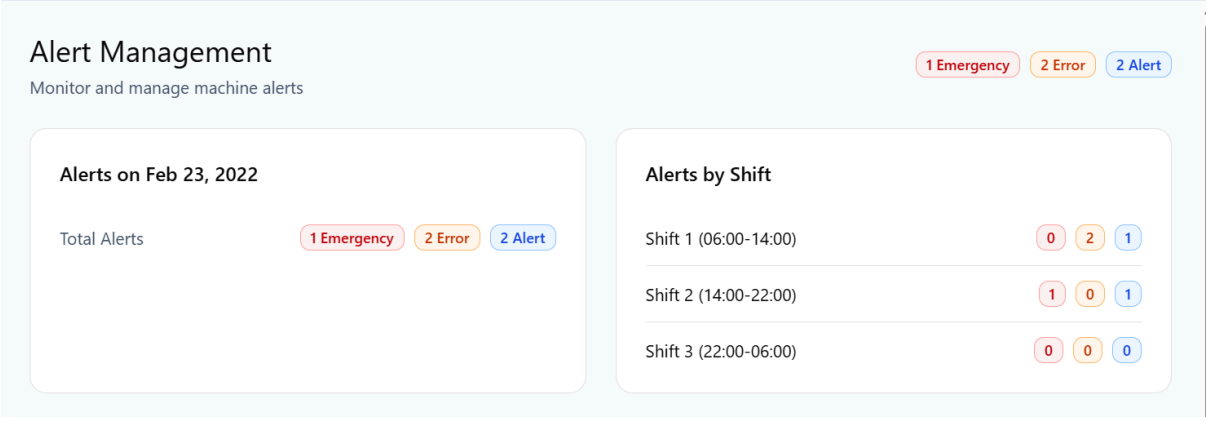
6.1. Simplified Alert Types

Only two severities now exist:

- **Critical** (red)
- **Normal** alert (blue)
- **Error** (orange)

6.3. Alert management

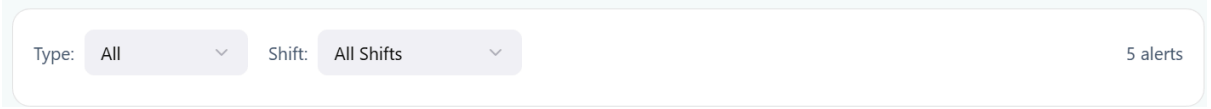
The alert management card should show the number of alerts on a selected date (selected on the top bar), also indicating the number of alerts of each type on that day. In addition, it could be possible to see the number of alerts by shift, as seen on the image:



6.3.1. Simplified filters

Now only:

- Shift
- Type
- Number of alerts



6.3.2. Alert details

Removed from alert details:

- Message
- Acknowledge button
- Assign to technician
- Recent history panel

Now, as seen on the image, an alert should show the following when selected:

- Type
- Date
- Shift
- Timestamp