
# Power-Cloud

## The monitoring platform for rotating electrical machines

## User manual

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**Eco-Adapt**

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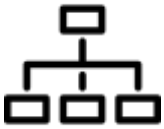
# Contents

# 1. Introduction

Power-Cloud is a comprehensive platform for analyzing the health and operation of rotating electrical machines. This document highlights the platform's various functionalities, how to configure them and how to use them. It will enable you to:

**Configure** User and Admin access rights, e-mail distribution lists, as well as Sites and Areas belonging to your Organization.



**Organize** grouping objects to recreate the architecture of your installation and **set** the attributes of the Equipments.

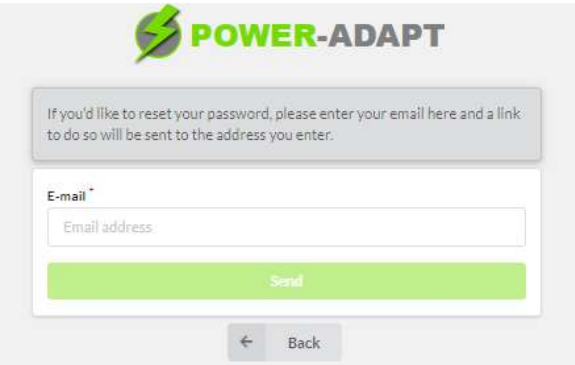
**Analyze** Predict-Adapt Sensor data to build a predictive maintenance strategy and optimize machine utilization.

## 1.1 Connection to the platform

### First connection

When your account is created by an administrator in your Organization, you will receive an e-mail from Eco-Adapt inviting you to join the platform. Click on the link to create your password.

If you do not receive this e-mail after creating your account, you can go directly to https://poweradapt.com/ and click on "*Forgotten password?".* Enter your e-mail address and click **Send** to receive a new link. If you are unable to make the forgotten password request, your account may not have been created correctly. In this case, please contact our team for support.


### Usual connections

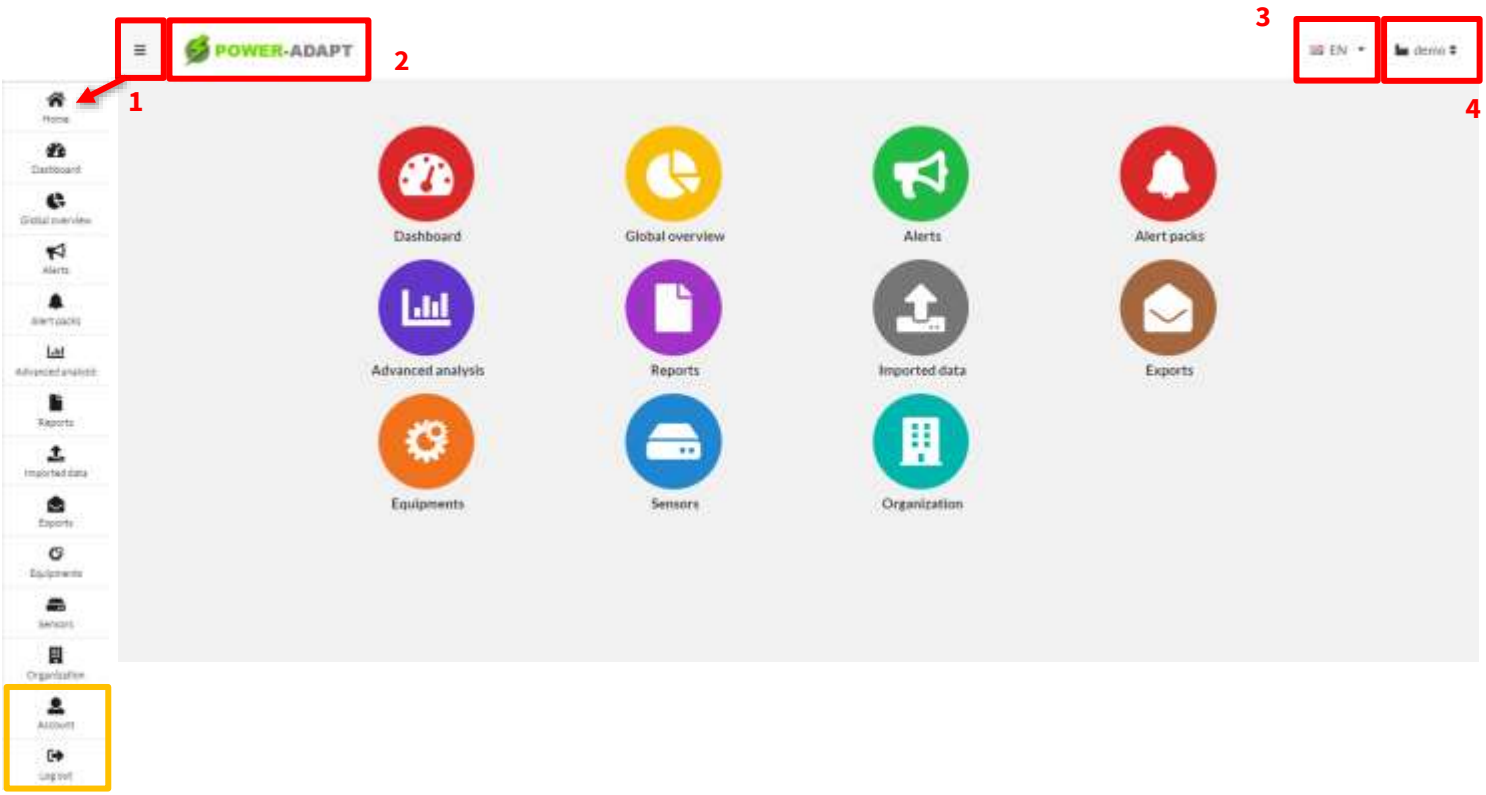
For usual connections, go directly to https://poweradapt.com/ and enter your login details. If you've forgotten or lost your password, use the "*Forgot your password?"* button.

## 1.2 Home page

The platform's home page is the gateway to all its functionalities.

Here, you'll find :

- **1.** A menu on the top left, which allows you to navigate through the tools without having to return to the home page, as well as to access **Account** or **Log out**.
- **2.** The Power-Adapt logo, which allows you to return to the home page from any page.
- **3.** A language selector at top right.
- **4.** Your Organization name in the top right-hand corner. If you are subscribed to more than one Organization, you can click on the Organization name to display a drop-down menu with all the Organizations you belong to.



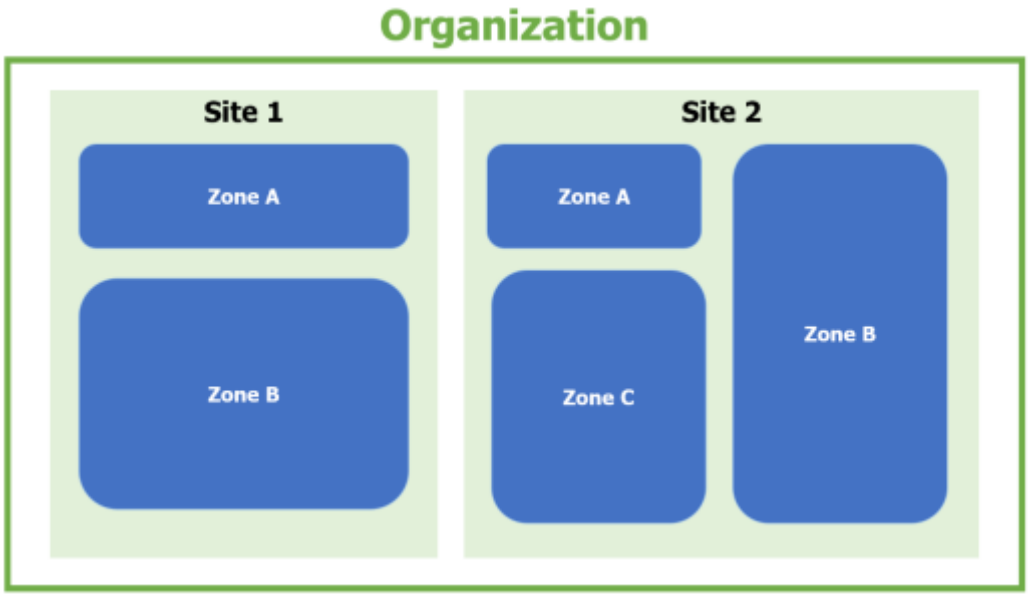
## 1.3 Tools presentation

The platform is organized around several objects and tools that enable Equipment to be organized as closely as possible to the real installation. These are described below.

### “Hierarchical” grouping tools

The **Organization** is the environment in which all your data is stored and displayed. The name of the Organization is usually that of the company, for example "Eco-Adapt". You'll find this name in the top left-hand corner of the screen. It is sometimes possible for a User to belong to more than one Organization. In this case, a drop-down menu allows you to navigate between Organizations.

**Sites** are subsets of an Organization. They usually correspond to the company's various geographical Sites, e.g. "Paris", "Toulouse". Within these Sites are **Areas**, which are subsets of the Sites, most often corresponding to a building, part of a building, a production line, a floor, etc. e.g., Building A, Hot Rolling Mill, etc.

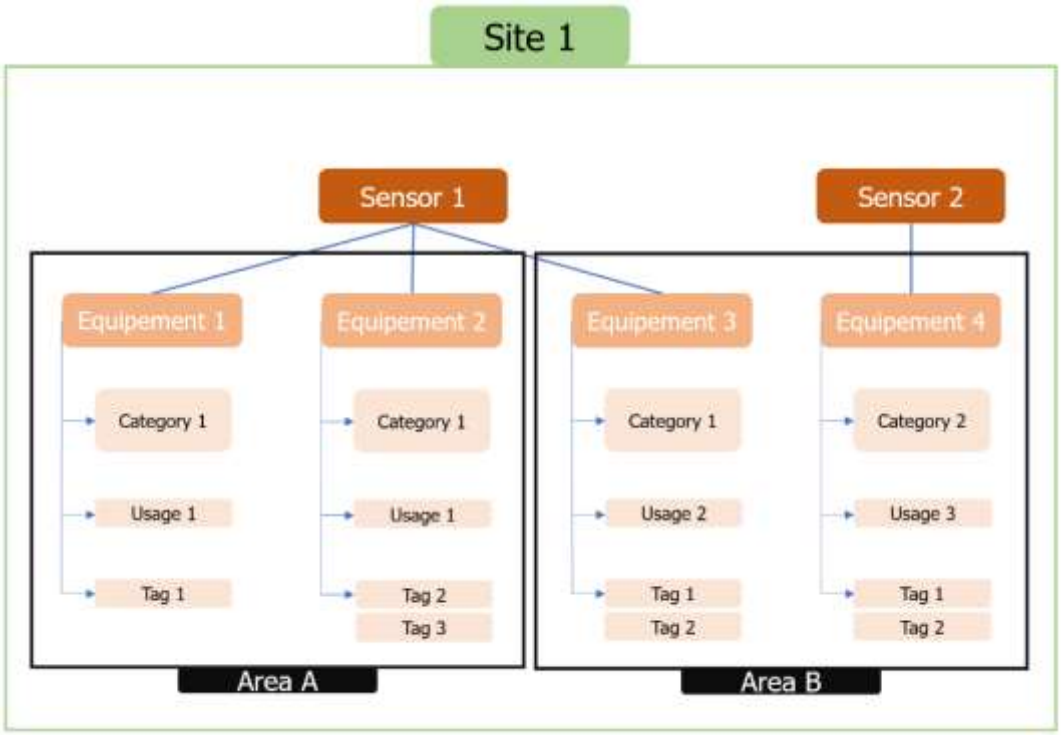


"Functional" grouping tools

A Sensor is only associated with an Organization and a Site. An Equipment, on the other hand, can have several other attributes:

- **Usage**: represents the type of Equipment use. Ex: Industrial process, HVAC, Filtration, Compressed air, General, Lighting, etc. These usages can be customized.
- **Tags**: completely personalized, tags can be used to group any Equipment together. Tags can also be customized.
- Equipment measurements belong to a **Category**, determined by the type of Sensor from which they originate. The measurement Category for Equipment from a Predict-Adapt Sensor is "Machine health".

The architecture of grouping tools can be represented as follows:



# 2. Organizations configuration

This section describes how the **Organization** tool works. This tool's purpose is to create Users and Mailing lists, manage rights and administrators and creating and managing Sites. The creation and management of Areas is also covered in this section.

On the **home page**, click on the **Organization** icon: 


## 2.1 Site configuration

To create or modify a Site, click on **Sites**. A page displaying the various Sites appears. You can modify a Site by clicking on its name or click on **Add Site** at top right.

*N.B.: a lot of data is associated with a Site, including User rights, Sensors, Alert Packs and certain analyses.*

The attributes of a **Site** are:

- The **Organization** attached to the Site, *i.e.* your Organization by default
- Site **name**
- **Description** and **Address** are optional fields for information purposes.
- Time Zone for managing export sending times, Alerts, etc.
- **Conversion table** for entering conversion factors from kWh, $m^3$ or $Nm^3$ to kgCO2eq or currency (€, $ etc.). This does not apply to Predict-Adapt data.
- **Weather station** to retrieve Unified Degree Day (UDD) information to create kWh/UDD analyses to qualify the energy efficiency of HVAC processes. This does not apply Predict-Adapt data.

## 2.2 Areas creation

An **Area** is a subset of a Site. If the Site groups together the Sensors, the Area groups together the Equipments. For Predict-Adapt sensors, there is only one Equipment per sensor, but other sensors from Eco-Adapt range (eg. The Power-Elec-6) can have several, which could belong to different Areas.

To create or modify an Area, go to the administration interface (see Appendix 1), then click on **Areas** in the **Platform management** section. Then click on one of the Areas to modify it, or on **Add Area** in the top right-hand corner to create one.

The attributes of an Area are as follows:

- **Site**: Site to which the Area belongs.
- **Name**: Area name
- **Description**: Area description
- **Surface:** surface of the Area, which subsequently determines the analysis per kWh/m².

An Area is also the group of Equipment on which analyses and imported data are based. It is a representation of a part of a building, a building, a production line, etc. It is therefore important to create several Areas in line with your installation.

## 2.3 User creation

To create or modify a User, click on **Users**. A page displaying the various Users appears. You can then edit a User by clicking on its e-mail address or click on **Add User** in the top right-hand corner. Modifying a User allows you to change their first name, last name or e-mail address.

When creating a User, enter his/her e-mail address. A confirmation and account creation e-mails are sent to the User, enabling them to log in for the first time and create a password. Once a User has been created, he or she can log in, but cannot yet view data. The User must be given specific rights.

*N.B.: Any changes made by a User only take effect the next time the User logs in. Users must log out and log back in if they wish to apply changes immediately. Otherwise, they must wait no longer than the 24-hour automatic logout period. This applies to Site rights as well as to administrator rights.*

## 2.4 User permissions configuration

To create or modify a Site right, click on **Site permissions**. A page displaying the different rights for each User appears. You can then modify a right by clicking on its Site name or click on **Add site** permission in the top right-hand corner.

*N.B.: Site rights do not include administrator rights. You can consult the definition of an administrator in the following section.*

**Site permissions** are associated with a User and a Site. To create a user permission, select a Site, a member (User) and then a right type. The types of rights are as follows:

- **“Visualisateur” (viewer)**: allows you to view all Site data but does not give you the right to modify or create any objects.
- **“Technicien” (technician)**: allows you to view all data and modify most elements, such as Equipment, Tags, Exports, etc. A technician cannot create or modify “Site-scale” elements, such as Alert Packs, Sensors or Sites. A technician cannot create or modify "Site-scale" elements, such as Alert Packs, Sensors or Sites.

## 2.5 Administrator account management

Apart from **viewer** and **technician** rights, **administrator** rights apply to all Sites within an Organization. This right is therefore not assigned in the **Site permission** tool. In addition to having the same rights as a technician, an administrator can:

- Modify/Create a Site and move Sensors between different Sites
- Modify/Create an Alert Pack
- Create Users and manage Site rights (including other administrators)
- Modify Usages

Administrator rights apply across all Sites, which means that it is impossible to appoint a User as administrator of a single Site.

To manage administrators, go to **Memberships.** A page is displayed containing the various Users and their status (administrator or not). To appoint a User as administrator, click on the User's e-mail address, then tick **Administrator** and click on **Save.**

## 2.6 Mailing lists management

**Mailing lists** are used to automatically send Alerts, Reports and data exports to a certain number of people. A Mailing list can contain as many e-mails as you wish, including recipients without an account on the platform.

To create or modify a list, go to **Mailing lists.** To modify a list, click on its name in the left-hand column. To create a list, click on **Add mailing list** in the top right-hand corner. Enter the list name and the recipient's e-mail addresses. Click on **Save** to create the Mailing list.

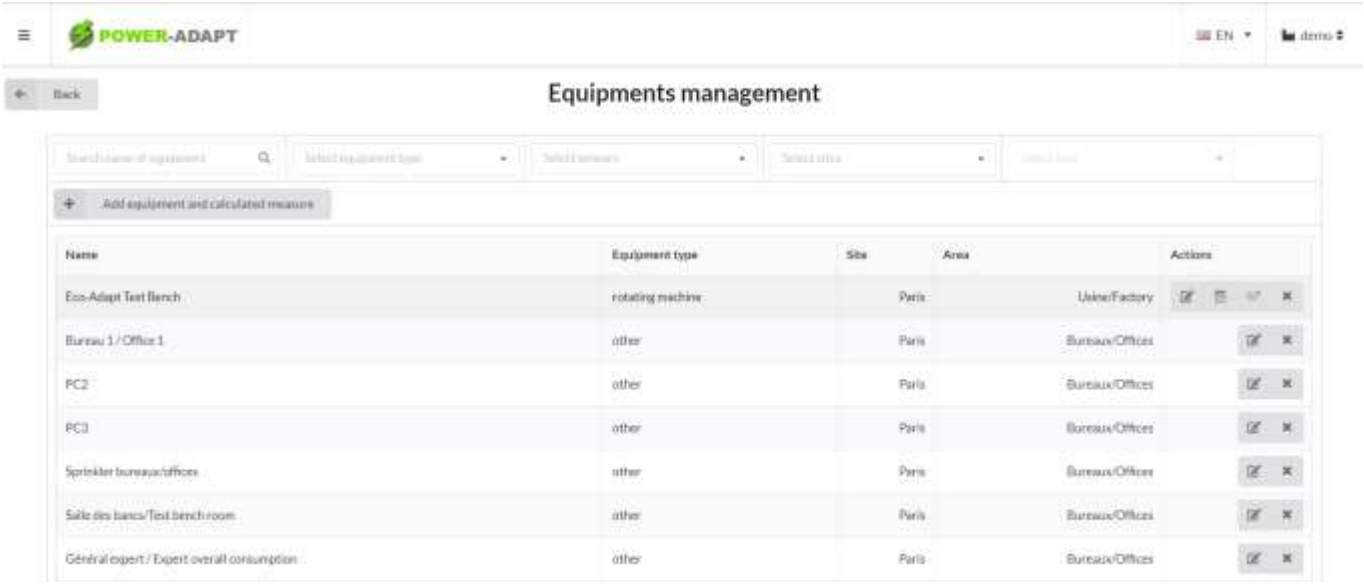
Once the Organization has been set up, you can move on to Equipment configuration.

# 3. Equipment configuration and kinematics input

## 3.1 Equipment configuration and modification

On the **home page**, click on the **Equipment** icon:

A list of your **Organization's Equipments** then appears.




You can search for an Equipment by its identifier (its name), type, Site, Area or by the Sensor from which the measurement originates. Click on the column name to change the sorting order (alphabetical by default).

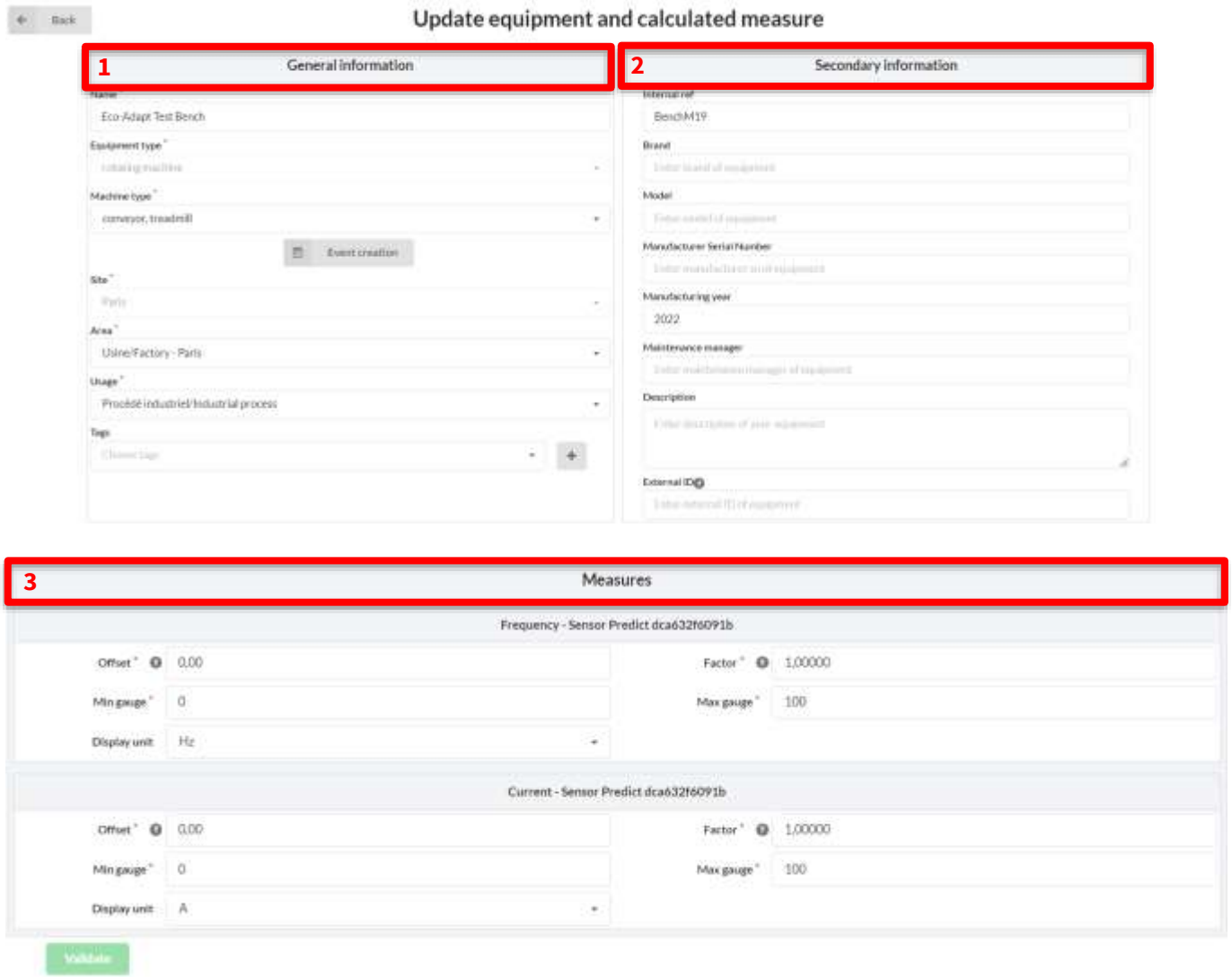
An Equipment can correspond to a machine monitored by a Predict-Adapt Sensor. The default Equipment name is:

Sensor: Serial_number|Channel :channel|Category :Category

*e.g.* Sensor: dca632f6091b|Channel :0|Category:elec_predict

To modify an Equipment, right-click on its edit icon:
A page containing all the Equipment's information is then displayed, in three parts:

1. **General information**: name, type of Equipment and configuration of grouping tools (usage, Area, Tag, etc.).
2. **Secondary information**: optional information that has no impact on the Equipment or its attributes.
3. **Measurements**: measurement configuration, *i.e.* type of measurement (electric, gas, fluids, etc.), meter offset, gauge bounds, etc.




Fields marked with a red asterisk * are mandatory.

Here's what the different fields correspond to:

- The **Equipment type** is "Rotating machine" and cannot be modified for Predict-Adapt Equipment.
- **Machine type**: allows you to specify the type of machine being monitored. Select "rotodynamic pump" if the instrumented Equipment is a centrifugal pump. This will enable you to benefit from the "Pump Monitoring" functions and analyze your pump's operation in depth.
- As the **Site** is associated with the Sensor and not with the Equipment, it is not possible to modify it on this page, but on the **Sensors** page.
- **Area, Usage** and **Tags**: select according to registered Areas, uses and Tags.

For the measure(s) :

- **Offset** corresponds to the counter's starting index. If metering has already been carried out or is in progress on the Equipment via another measurement system, enter the index of this meter to synchronize its Eco-Adapt measurements. This field does not concern Predict-Adapt measurements.
- The **factor** corresponds to a factor to be applied to the measurement to obtain the converted value (often due to a physical parameter of the installation). The display unit has no effect on this parameter or on the measurement.
- **Min gauge** and **Max gauge** - not applicable to Predict-Adapt Equipment
- **Display Unit** allows measurements to be displayed in a single unit, regardless of the value of that measurement. **Auto unit** adapts the unit to the measurement value.

Once the fields have been filled in, validate the changes and move on to the kinematics entry stage.

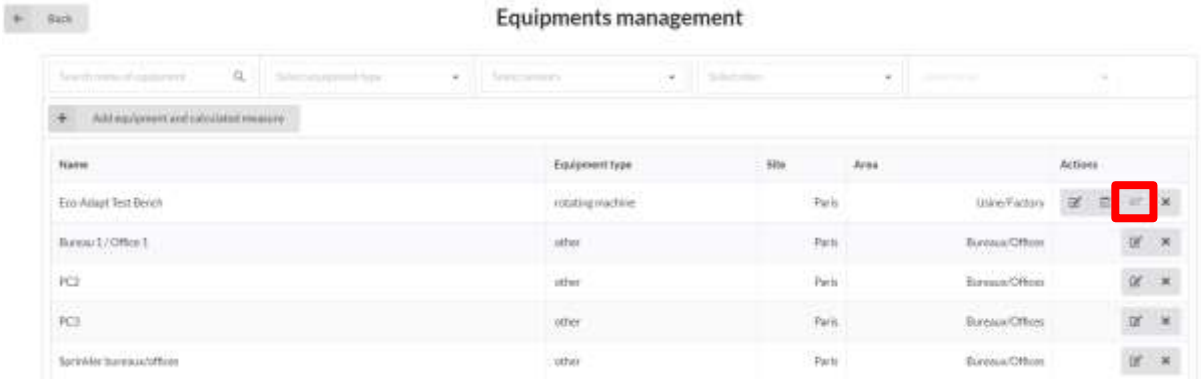
## 3.2 Kinematics form

**Predict-Adapt requires motor and kinematic data to calculate Health Scores.**

Some information is mandatory (power supply and motor nameplate) to start the learning period. Other information (bearings, mechanical transmission) is optional, and can be used to calculate Health Scores for these components.

To enter a new kinematics, go to the **Equipment** section:

For the machine you wish to parameterize, click on the **kinematics input** icon**:**




You then enter the machine's kinematic data entry form, divided into 4 parts:


- **Supply:** Variable frequency drive (VFD) / Direct-on-line (DOL) *
- **Motor :**
  - Nameplate *
  - Motor bearings (driver end [DE] and non-driver end [NDE])
- **Transmission :**
  - Pulley / Belt system
  - Mechanical gearbox
- **Additional bearings :**
  - Bearings located outside the motor, along the drive chain (pump casing, turbine, etc.).

* : Mandatory information

**It is necessary to go to the end of the form and to validate it for the information entered to be taken into account. After validation, a message is displayed to indicate whether the entry is valid or not.**

### 3.2.1 Motor nameplate information

From the motor nameplate, one must read the data corresponding to the electrical coupling and voltage supply of the actual motor installation. For example, if this motor is supplied with 400V, in Δ configuration:

| IP23 IK08 | I cl.F | 40°C | S1 | % | c/h |
|---|---|---|---|---|---|
| V | Hz | min-1 | kW | cos φ | A |
| Δ 380 | 50 | 2970 | 250 | 0.92 | 434 |
| Δ 400 | | 2974 | | 0.90 | 422 |
| Y 690 | | 2974 | | 0.90 | 244 |
| Δ 415 | | 2976 | | 0.88 | 415 |
| Δ 440 | 60 | 3568 | 288 | 0.92 | 418 |
| Δ 460 | | 3572 | | 0.91 | 417 |

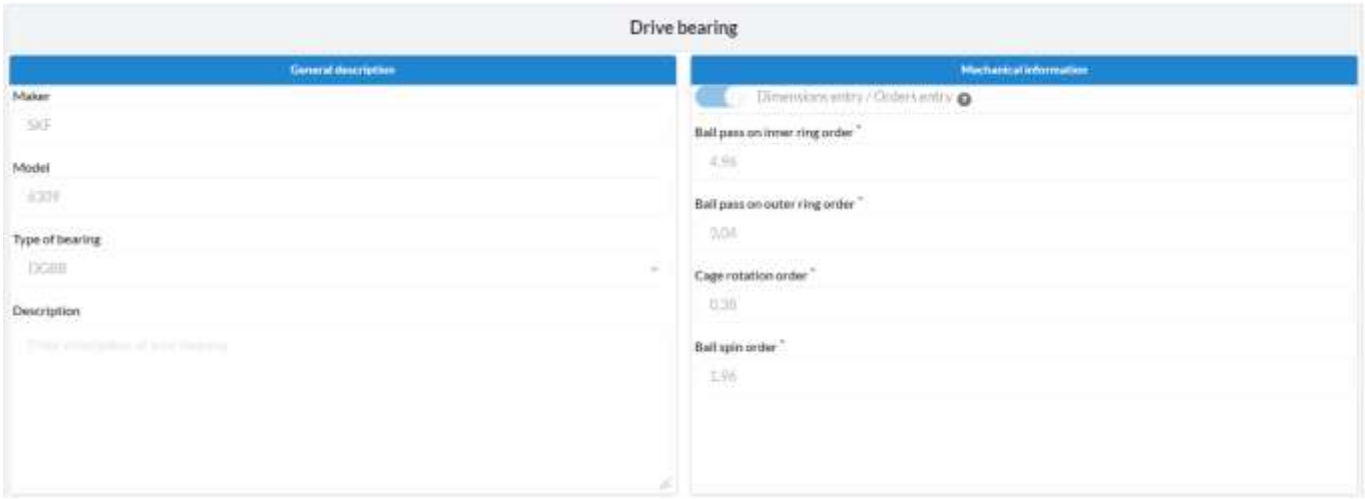
| | | | | |
|---|---|---|---|---|
| DE | 6316 C3 | 035 | g | ESSO UNIREX N3 |
| NDE | 6316 C3 | 2900 | h | |

The **Electric power** and motor **Efficiency** fields are automatically pre-filled according to the other fields.

### 3.2.2 Bearing parameters

Entering bearing information is necessary to calculate their Health Score. There are two options for entering the kinematics of a bearing:

- Dimensions entry (for specific bearings)
- Orders entry (more accessible for standard bearings)




## How do I find the orders for a standard bearing?

Bearing orders can be found on the websites of several manufacturers. The procedure using Schaeffler's website is described below:

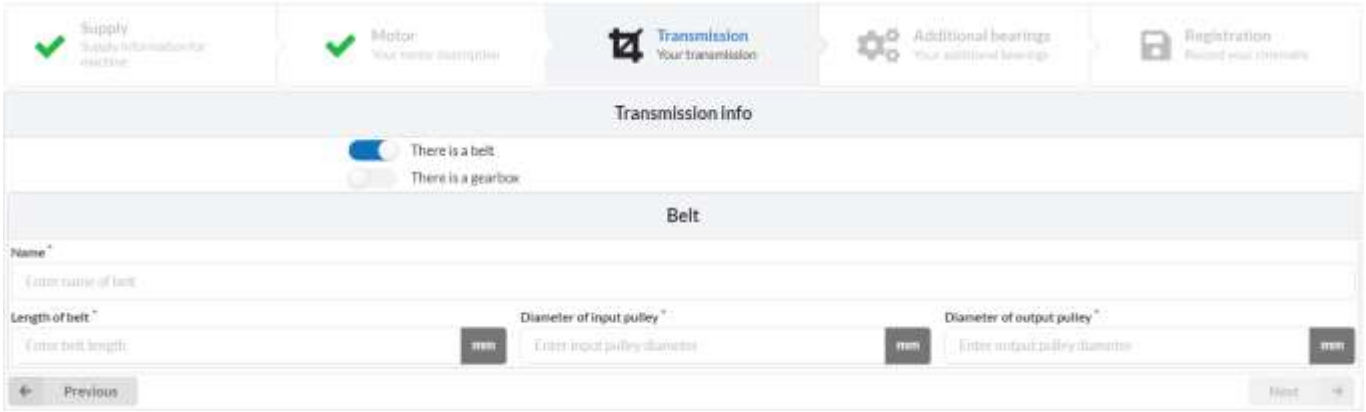
- Go to https://medias.schaeffler.de/en
- In **Search Term**, enter the bearing reference
- Scroll down in the results and click on the corresponding bearing
- On the product page, Click on the tab **Calculations**
- In the right menu, select only **SHOW BASIC FREQUENCIES**
- Select **BPFO**, **BPFI**, **BSF** and **FTF**

Schaeffler and Eco-Adapt nomenclature may differ for basic frequencies. Select the following fields on the Schaeffler website:

- BPFFO: BPFO
- BPFFI: BPFI
- BSFF: BSF
- FTFF_i: FTF

### 3.2.3 Mechanical transmission

#### *3.2.3.1 Belt pulley system*




To add a belt pulley system, enter:

- **Belt length**: the original length of the belt (Lp). This length is generally contained in the belt reference. For example, for a **340-MHP25** belt, the pitch length is 340mm.
- **Diameters** of driving and driven **pulleys:**

  <u>For a smooth belt pulley :</u>
  The reference usually contains the pitch diameter directly.
  For example, for an **SPZ140/1MA** pulley, the pitch diameter to be entered is **140mm.**

  <u>For a toothed belt pulley:</u>
  The reference generally contains the number of teeth as well as the pitch.
  For example, the **A9-20-5M25** pulley has 20 teeth (N), with a 5mm pitch (P). We can therefore deduce the pitch diameter using the formula:

$$D_p = P * \frac{N}{\pi}$$

  With the **A9-20-5M25** pulley**,** this gives $D_p = 5 * \frac{20}{\pi} = 83{,}85mm$

Note that all dimensions must be provided in the same length unit, typically mm.

*3.2.3.2 Adding a mechanical gearbox*

To add a mechanical gearbox, enter:

- The number of teeth on the drive wheel
- The number of teeth on the driven wheel

In the case of a multi-storey layout, intermediate shafts can be added.

Once the Equipment has been configured and the kinematics entered, you can move on to data visualization and analysis.

Note that the cloud platform also hosts energy monitoring tools from the Power-Adapt range. As a result, not all the tools on the home page relate to Predict-Adapt data, such as **Overview**, **Advanced Analysis**, **Reports** or **Imported Data**.

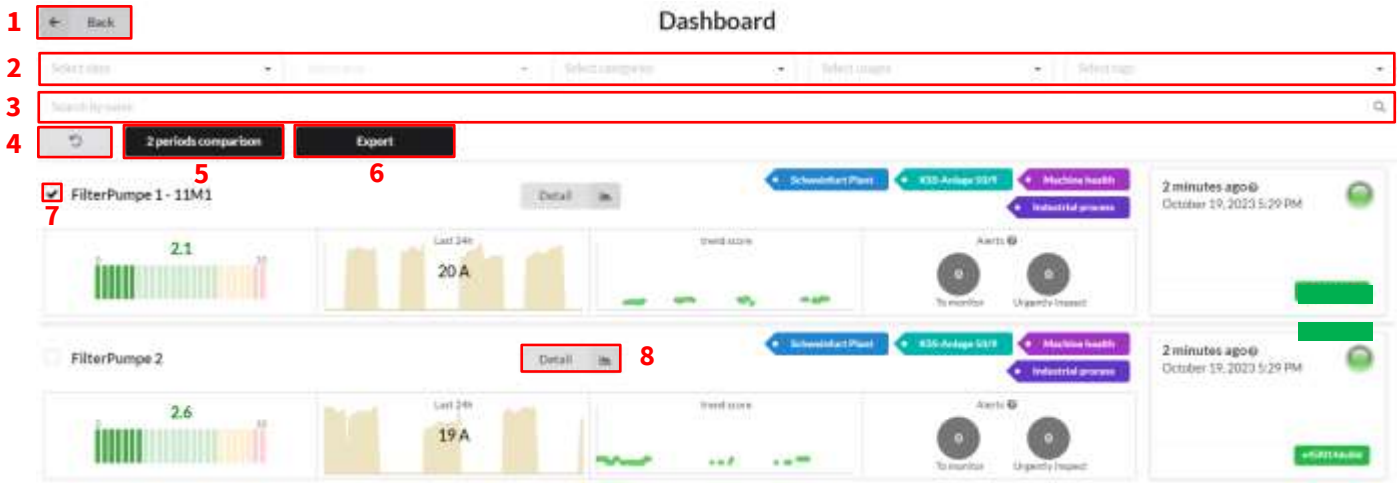
# 4. Data visualization: the dashboard

## 4.1 Dashboard introduction

The dashboard displays all Equipment data. It allows you to track the evolution of machine Health Scores over time.

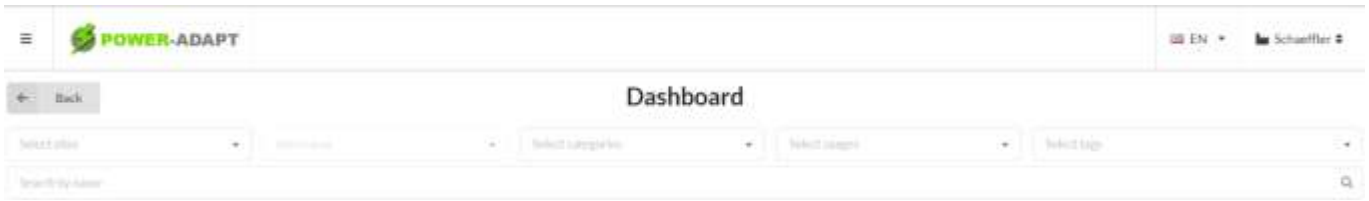
On the **home page**, click on the **Dashboard** icon**:**

A dashboard line corresponds to an Equipment. On this page you'll find:




- **1.** Back button leading to the home page.
- **2.** Equipment filter.
- **3.** Name search field.
- **4.** Item deselection button.
- **5.** Comparison of selected Equipment - displays the data for each Equipment over a given date range on the same graph.
- **6.** Export selected Equipment data.
- **7.** Equipment selection button.
- **8.** Button to view more details of the selected Equipment.

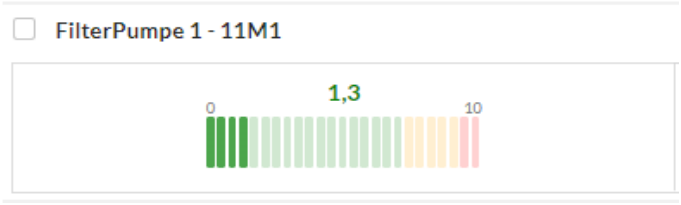
It is possible to filter the machines displayed according to the grouping tools described above: Sites, Areas, Categories, Usages, Tags.  It is also possible to filter by name, by entering the Equipment name directly in the "Search by name" bar.




Each line shows the data for one machine. The default number of machines per page is 10, but it can be changed at the bottom of the page:


The various widgets on each line are described in the following sections.

## 4.2 Health Score gauge




This gauge indicates the value of the highest Health Score calculated on the last value raised.

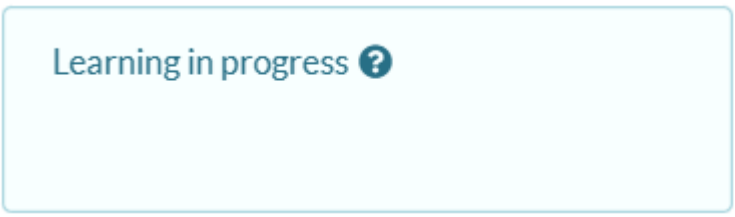
> **Example:** the last Health Scores calculated by this Sensor are:
>
> Shaft / Motor shaft / Eccentricity = 0.0
> Motor / FilterPumpe1 / rotor = 0.5
> Motor / FilterPumpe1 / stator = 1.3
>
> The score displayed on the gauge will be 1.3.

If the machine is still in its first 14 days of monitoring, the Predict-Adapt algorithm is still in its learning phase, and an "In learning" message replaces the gauge or is present below it (if a score has already been calculated).


**OR**


If a "kinematic data missing" message is displayed, it is necessary to enter the machine's kinematic data to initiate the Health Score calculation. To enter this information, please refer to section 3.2.


Finally, if the message "Learning in progress" is followed by a question mark, this means that the machine has not made enough compliant Acquisitions in the 14 days of training, and that the Health Scores have not been trained. A possible cause for this could be very intermittent operation, or operation without a sufficiently long stability range (the standard duration of a Predict Acquisition is 30 s).




## 4.3 Machine's current trend over the last 24 hours


This tool displays the machine's current trend over the last 24 hours. It can be used to quickly identify if there has been an anomaly in the machine's consumption or if it has had different operating ranges.

*N.B.: the message "No data over the last 24 hours" is displayed if no data has been transmitted over the last 24 hours, i.e. if a Sensor has been disconnected or powered off.*

## 4.4 Health Scores trend over the last 24 hours


This tool displays the Health Score trend of the most degraded component over the last 24 hours.

The message "No score for the last 24 hours" can mean several things:

- The machine has not been running
- Current machine operation is not stable enough to meet the validation criteria required to trigger Acquisitions. See "Power supply status (detailed)" for more information.
- The Predict-Adapt algorithms are still in the learning phase. (It should last max 14 days, a longer duration could indicate that there is not enough data to create an Operating Point on which the Health Score can be calculated)
- The Sensor is offline or powered off.

## 4.5 Alert summary


This widget summarizes the number of Alerts and their severity (based on the last Health Scores calculated). The number of Alerts depends on the number of components (bearings, rotor, etc.) that have exceeded Alert thresholds. For more information on Alert severity, please refer to the chapter on Health Scores.

## 4.6 Sensor connectivity


This tool displays information about the Sensor's last connection, *i.e.* the date of the last data transmission and the time elapsed since then. The Sensor's serial number is also shown at the bottom of the box. A colored dot indicates whether the date of last transmission corresponds to normal behavior (green), an unstable connection (orange) or whether a problem with the connection or Sensor is likely (red).

Finally, the dashboard is the gateway to the Equipment detailed view, on which all machine data (Health Scores, supply, etc.) is displayed and formatted. This will be presented in the next chapter.

# 5. Detail view

To access the Equipment detail view, go to the dashboard and click on the **Detail** button.


A new page containing several tabs appears. The following sections describe the various tabs.

## 5.1 Power supply state (aggregate)

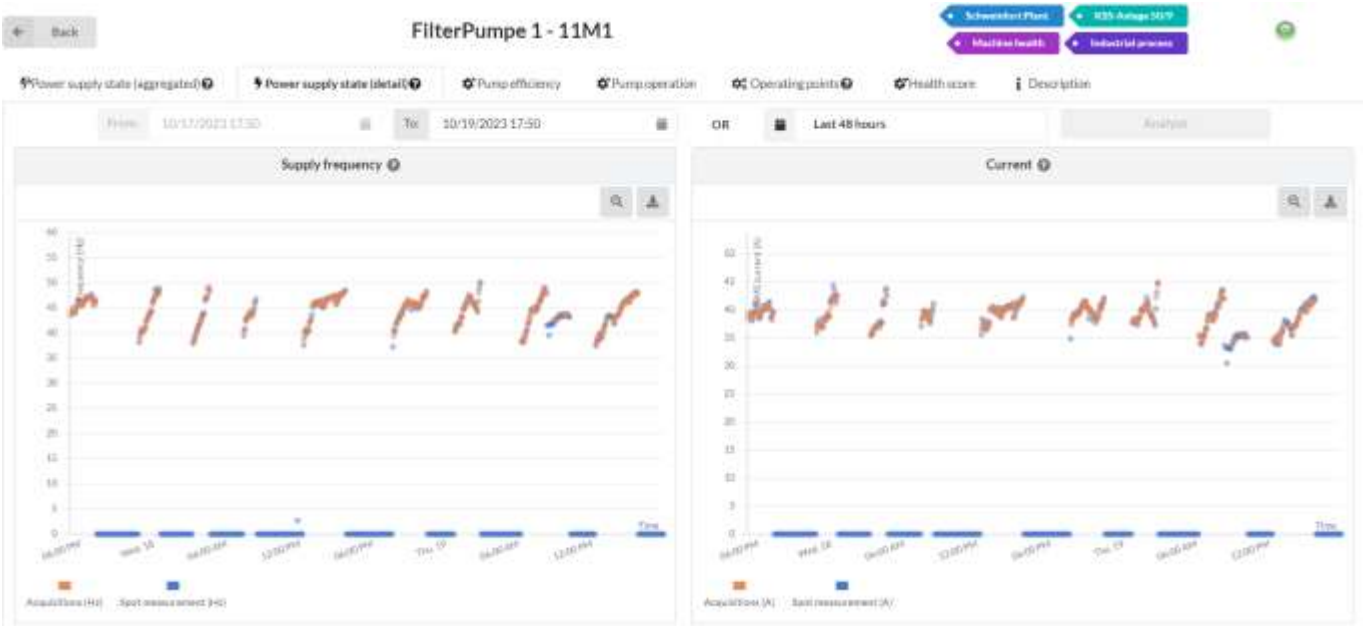

This page displays the aggregated motor power supply characteristics over long periods of time.

The first graph shows the machine's power frequency (Hz) as a function of time, in the form of a heatmap. The second shows the motor current (A), following the same principle as the frequency graph.

The principle of the heatmap shown is as follows: for a given day (on the horizontal axis), the shade of the box is an image of the number of Acquisitions made in the given frequency range, displayed in the vertical axis. The more points acquired in each frequency or current range, the darker the box.

This graph shows the machine's operating profile.

## 5.2 Power supply state (detail)




These two graphs show two types of measurement:

- **Acquisitions** (orange): These are points for which the electrical signal was stable in amplitude and frequency during the Acquisition period, and for which health scores can be calculated. The values measured are intensity (A) and frequency (Hz).
- **Spot measurements** (blue): these points are measured every 5 minutes, whether the signal is stable or not, to report on the state of the machine at any given moment. The values measured are current intensity (A) and frequency (Hz). These points are particularly useful for confirming that the machine has not consumed power over a certain period (in which case I = 0A), as signals are not acquired when the machine is off (operation not taken into account in Predict-Adapt algorithms).

As in the previous tab, there is a graph for frequency and one for current measurements.

## 5.3 Pump efficiency and Pump operation

This section is dedicated to centrifugal pumps only. The information displayed here is conditional on the pump characteristics provided by the manufacturer. This information is entered in the fifth tab of the kinematics form if the machine type declared in the Equipment form is **Centrifugal pump.** The relevant information regarding pump efficiency and operation are displayed in two separate tabs: **Pump efficiency** and **Pump operation**.

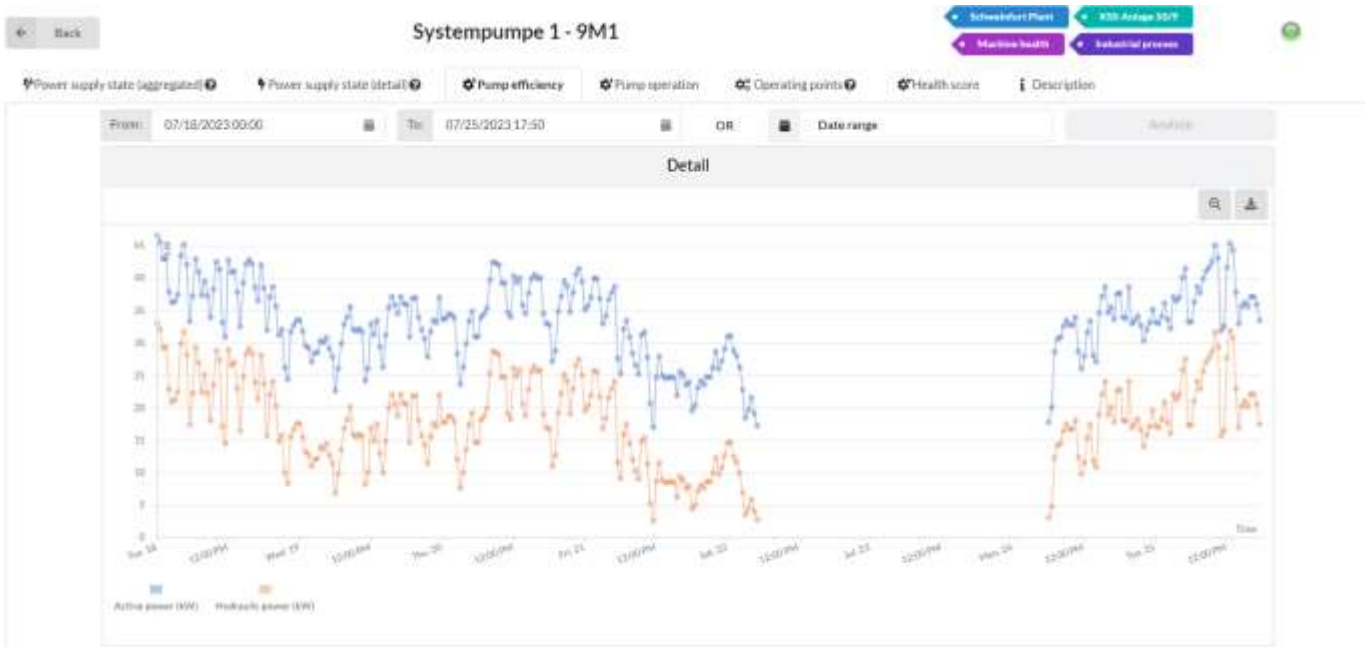
### 5.3.1 Introduction

To best interpret the information displayed in these sections, it is advisable to be familiar with pumps and their operation. The following link summarizes the basics of reading a pump curve https://www.northridgepumps.com/article-9_how-to-read-a-pump-curve?catid=184.

Based on pump characteristics and Predict-Adapt measurements, several variables and indicators can be calculated, such as hydraulic energy, flow rate and pump efficiency.

### 5.3.2 Pump efficiency

The first graph, the load curve, shows active power (kW) and hydraulic power (kW) as a function of time. In the same way as the other graphs, the time ranges can be changed to a pre-configured period or a customized time range.



The following elements give a visual indication of pump efficiency at the last measured point.

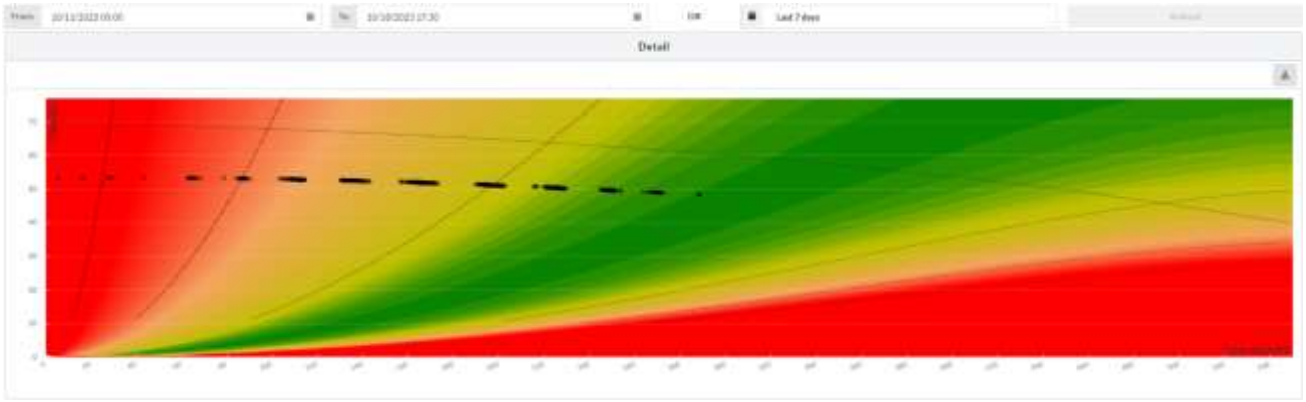
- **Pump efficiency**: This indicator represents the pump's hydraulic efficiency. The further away it is from the Best Efficiency Point (BEP) (the point of maximum efficiency), the less efficient the pump and the greater the power losses incurred.
- **Motor efficiency**: This indicator represents the motor's electrical efficiency. The further it deviates from the nominal efficiency (indicated on the motor nameplate), the greater the motor's power losses.
- **Energy consumption breakdown**: This pie chart shows the breakdown of total energy consumption, with the green and red sections representing pump and motor losses. The blue part represents the amount of energy transmitted to the pumped fluid.

Finally, two additional gauges are used to measure the pump's efficiency in relation to its BEP:

- **Overconsumption**: this gauge represents the loss compared with the BEP in kW and therefore in % at the last measuring point.
- **Losses relative to BEP over the period**: This is the difference between the pump's actual consumption over the period and its consumption if it had been operating at its BEP during the same period. In other words, it's the amount of energy that could have been saved if the pump had always operated at the BEP.

### 5.3.3 Pump operation

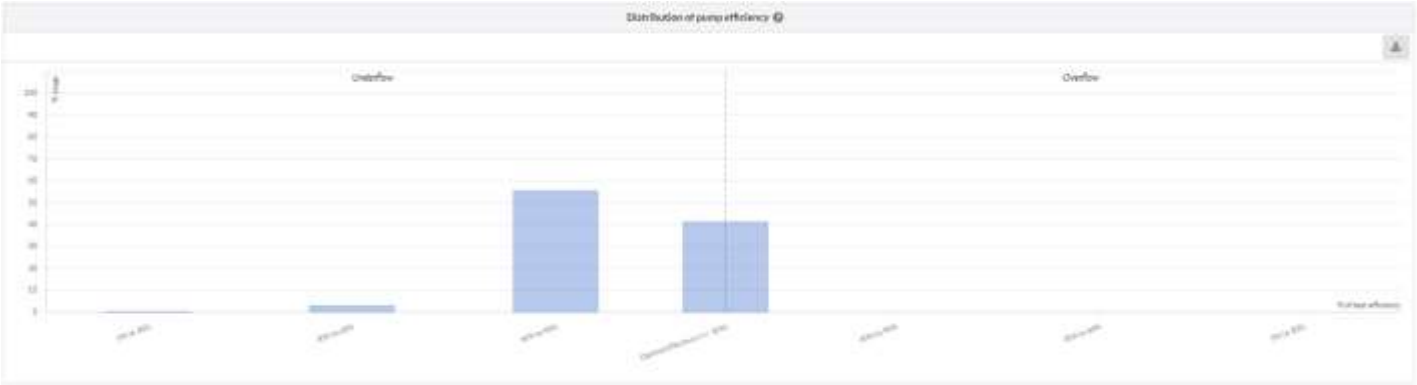
The first graph displayed is the pump curve, reconstructed from data entered in the pump characteristics form. The horizontal axis is the flow rate in $m^3/h$ and the vertical axis is the pressure (height) in m.




The green Area corresponds to the points around the pump's BEP. A point in the orange or red Area indicates lower or even poor efficiency. Points to the right of the green Area correspond to overflow, while points to the left correspond to underflow.

In this example, most points are in the orange or red range. This means that the pump is rarely running at its optimal operating point.

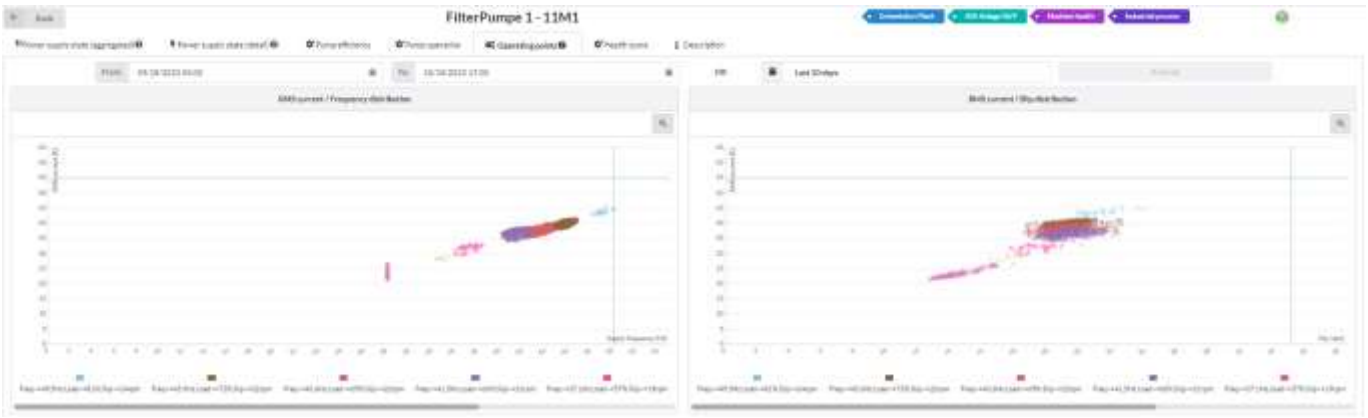
The second graph in the **Pump operation** tab is a histogram of the pump efficiency distribution:




This graph shows the distribution of pump operating points in different efficiency ranges in relation to the BEP. The objective for optimum pump utilization is 100% in the middle range (+/- 10% of optimum efficiency).

This tool gives a different angle of view to pump efficiency visualization.

## 5.4 Operating Points




To make a relevant analysis of the machine, it is essential to classify the motor's operating points. For this reason, the points are grouped according to three parameters:

- Supply frequency (Hz)
- RMS current (A)
- Motor slip (rpm)

*Definition of motor slip: for asynchronous motors, slip is the difference between actual rotor speed and synchronous speed (magnetic field rotation).*

A machine can operate over different load ranges for the same supply frequency. These ranges are therefore called "Operating Points" and are represented by different colors. The two graphs to visualize these Operating Points are described in the following paragraphs.

### 5.4.1 RMS current as a function of supply frequency

The graph on the left shows the RMS value of the current as a function of the motor supply frequency for different operating points. The green horizontal bar represents the motor's rated current (taken from the motor nameplate). The green vertical bar represents the motor's rated frequency (also taken from the motor nameplate).

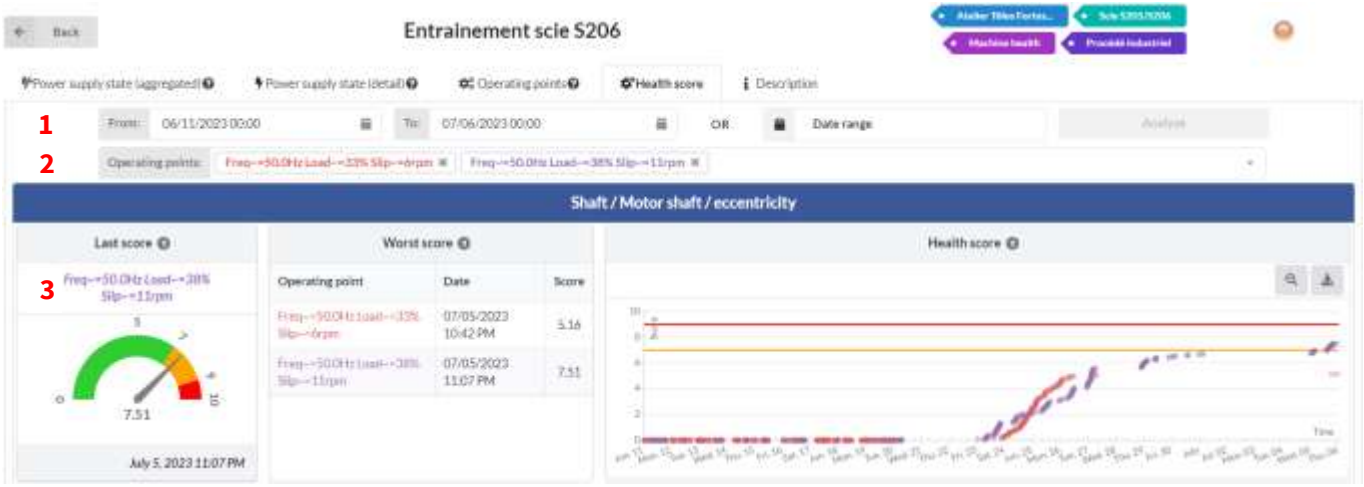
### 5.4.2 RMS current as a function of motor slip

The graph on the right shows the RMS value of the current as a function of motor slip for different Operating Points. The green horizontal bar represents the motor's rated current (derived from motor nameplate information). The green vertical bar represents the motor's rated slip (calculated from the motor nameplate).


It is possible to zoom in on a group of points as shown above (item **1**). To do this, hold down a left click while dragging to create a rectangle that outlines the zoom window.

It is also possible to hide groups of points by clicking on their associated box in the graph legend (item **2**).

## 5.5 Health Scores




The screen below comprises three sections:

- **1**: Selecting a date range: click on the **From:** and **To:** fields to enter the period start and end dates and times using the calendar. Click on **Date range to** view the list of pre-configured periods. The "last 3 months" period refers to calendar months. If you select this range on June 16th, the data displayed will be from March 1st to May 31st.
- **2**: **Selecting/Deselecting Operating Points:** by clicking on the cross to the right of the Operating Point names, you can hide the data for the corresponding Operating Point from all graphs in this tab. To select them again, click on a free space in the window or on the arrow on the far right to return to the list of Operating Points.
- **3**: Health Scores - more details in the following paragraphs.

### 5.5.1 Health Scores by machine component

Any machine has at least three Health Scores:

- Shaft / Motor shaft / Eccentricity
- Motor - Stator
- Motor - Rotor

There may be other Health Scores if other components have been entered in the kinematics form, such as bearings, pulley-belt systems, gearboxes, etc.


The "Last score" display shows a gauge of the machine's health over the last Acquisition. Above this gauge is the Operating Point corresponding to this score.

**Worst score**

| Operating point | Date | Score |
|---|---|---|
| Freq~=50.0Hz Load~=33% Slip~=6rpm | 07/05/2023 10:42 PM | 5.16 |
| Freq~=50.0Hz Load~=38% Slip~=11rpm | 07/05/2023 11:07 PM | 7.51 |

The "worst score" table shows the worst scores achieved by each Operating Point.

It also includes the date on which the score was observed.


The "Health Score" graphs show the Health Scores history for all Operating Points. Information on the Health Score value, date and Operating Point is available by hovering over a point. Place your cursor over the question mark next to the "Health Score" title to obtain more information on interpreting Health Scores.

## 5.6 Description

This tab is useful for viewing motor and machine data, as well as machine-related events.

The sections of this tab are presented in the following paragraphs:

### 5.6.1 General information

This section summarizes general information about the machine and its power supply.

### 5.6.2 Motor

This section presents motor plate data and motor bearing data.

### 5.6.3 Event list

This section redirects you to the machine event management page. Please refer to the Machine event declaration section.

### 5.6.4 Kinematics visualization

Depending on the machine configuration status, this button redirects to:

- The initial kinematic data declaration form if no kinematic data has yet been entered. To complete this form, see the section describing kinematics data entry.
- Viewing the kinematics form if kinematic data already exists on the platform. This page shows the parameters and information previously entered.

### 5.6.5 Equipment edition

This section refers to the Equipment edition form (not to be confused with kinematics edition). For more information on the contents of this form, please refer to the section Equipment configuration or modification.

The dashboard is therefore a useful tool for visualizing and analyzing data from your rotating machines. To monitor the evolution of machine life, and to enable Predict algorithms to adapt their Health Scores calculations, the next chapter looks at the machine event reporting functionality.

# 6. Machine event declaration

An event is created to report any action related to the machine, especially those likely to influence the calculation of its Health Scores:

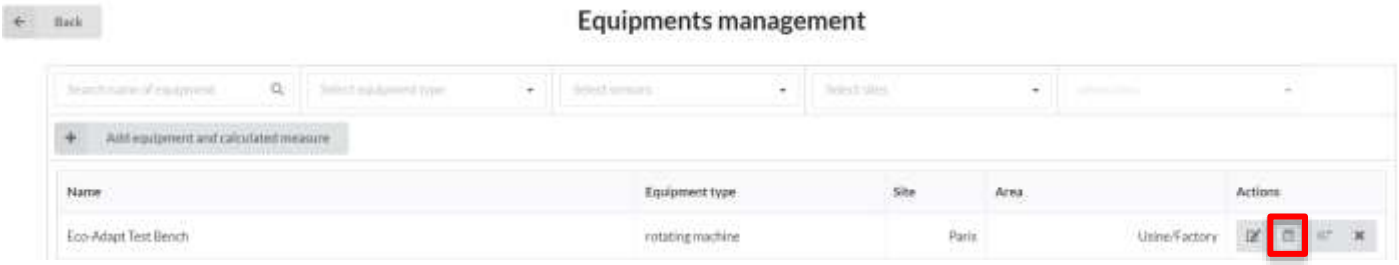
- Maintenance (preventive or corrective)
- Failure
- Correction of kinematic information initially entered.

It is essential to enter them on the platform, as events can trigger automatic relearning of scores, to ensure a consistent reference period.

## 6.1 Machine events visualization

To access the events, go to the **Equipment** section: 

Then click on the **List machine events** icon:



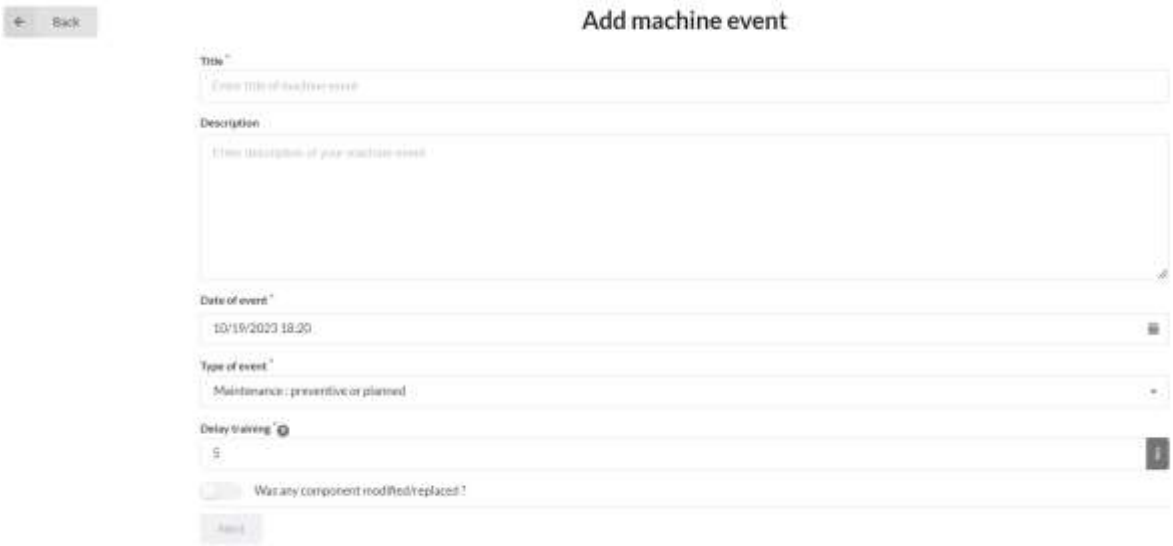

Events are listed with their basic information (you can change the sorting order by clicking on the columns):

## 6.2 Event declaration

Click on the 

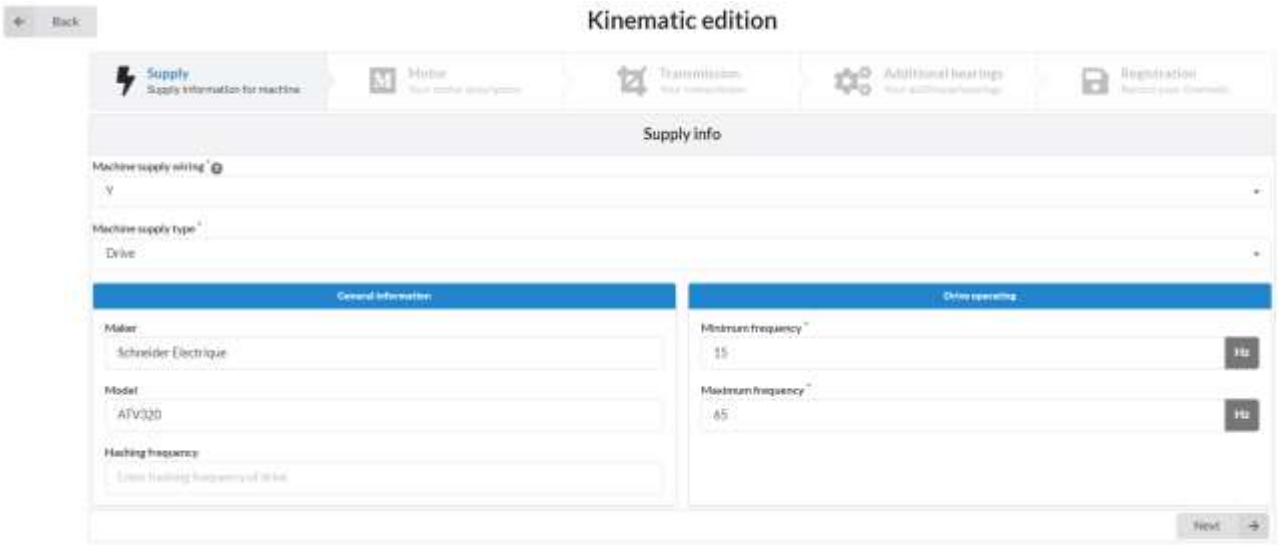
button to declare an event. The declaration is made in the following 3 steps, one of which is optional:

### 6.2.1 Event description

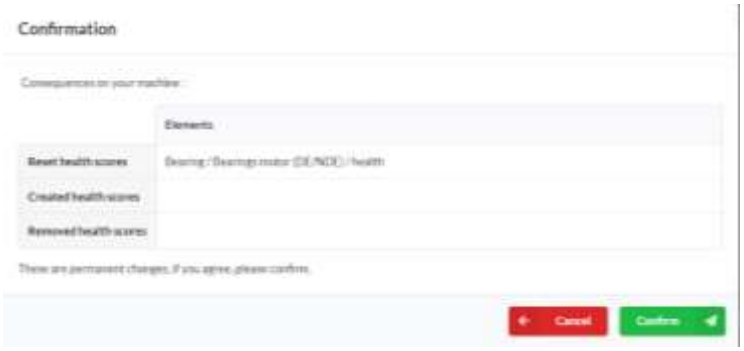



- **Date of event**: The date on which the maintenance/breakage took place. If it's a simple change of information, leave today's date.
- **Type of event:** Choose among the 6 options presented. The selection of *Modification of machine information* automatically redirects to the kinematics form and does not propose the addition of maintenance actions.
- **Delay training**: The Health Scores affected by the event will only start learning after this delay (from the date of the event), to avoid any run-in effects following maintenance. The default value of 5 days is generally a good compromise.
- **Was any component modified/replaced?:** If this cursor is activated, you will be able to modify machine information ("kinematics" form).

### 6.2.2 Kinematics form (optional)



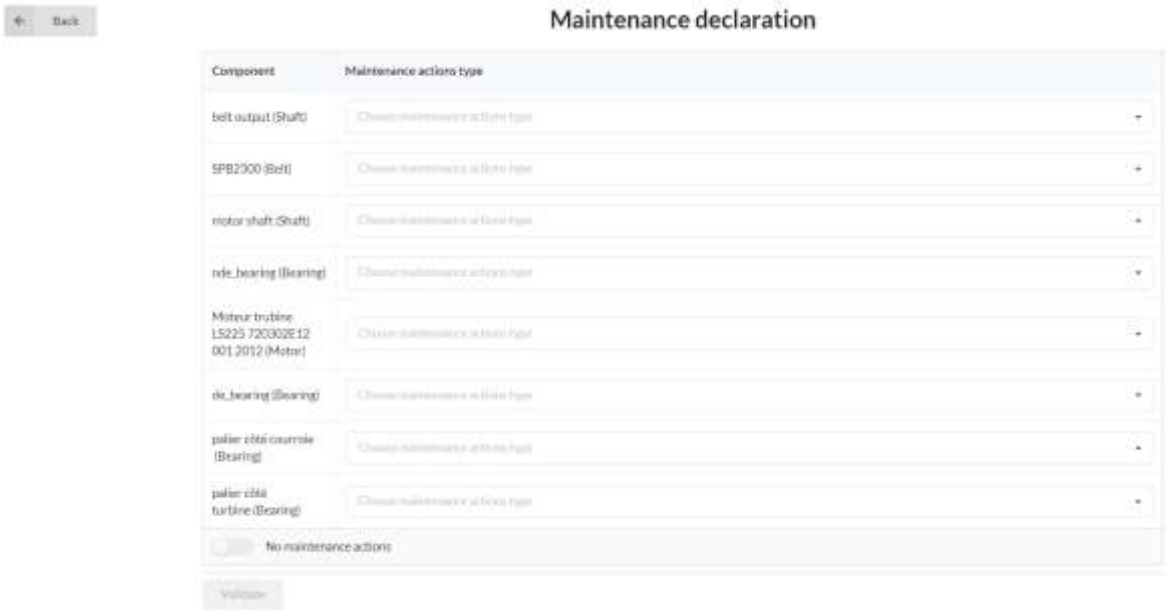

As with the first declaration of machine information, you will be able to modify power supply, motor and transmission information.




At the end of the form, a confirmation window appears, showing you a summary of the scores that will be modified if you validate your declaration. Certain changes affecting the motor will result in a complete reset of all Health Scores and Operating Points.

### 6.2.3 Maintenance actions declaration

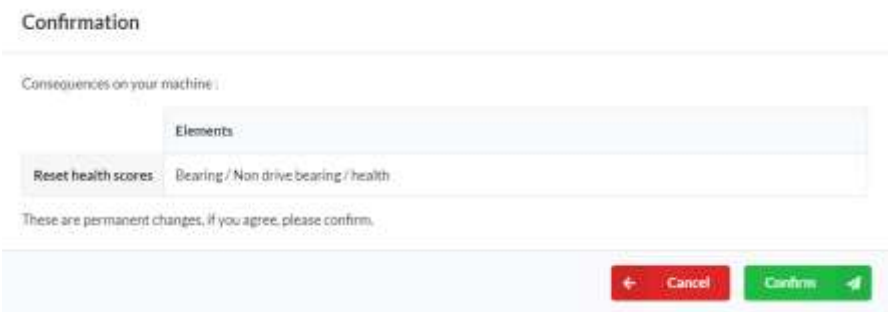
*N.B.: This form is not accessible if you are declaring a simple modification to machine information.*




From the various drop-down menus, you can select one or more maintenance actions. These correspond to actual interventions or events that have taken place on the Equipment.

The first category contains actions of a general nature, such as Predict-Adapt Sensor replacements, simple inspections, or actions on the motor.

Below, other specific actions are listed by component. If no maintenance action has been performed for this event, you can select the **no maintenance action** cursor, which will allow you to validate this form without selecting an action.



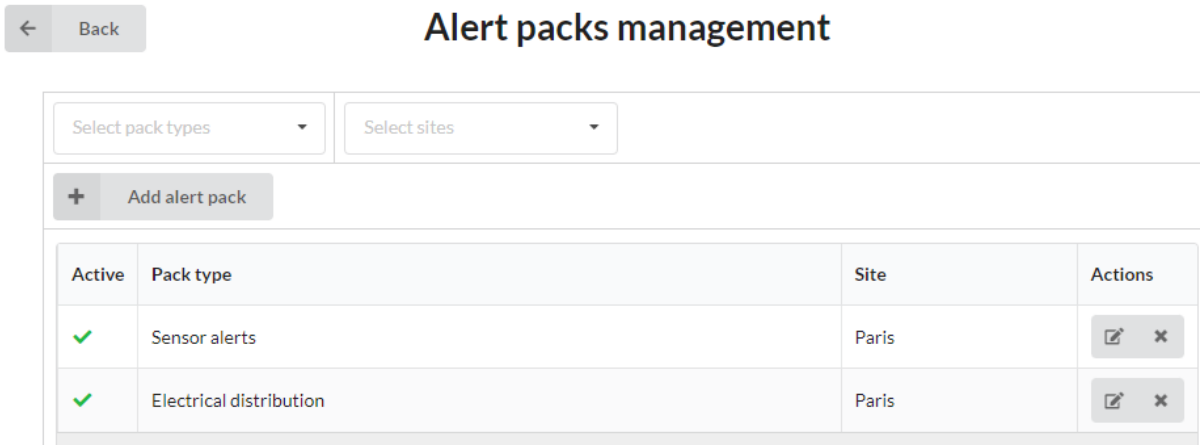

Once again, a confirmation window shows the scores that will be reset after validation.

# 7. Alert packs configuration

*Warning: Only an administrator may create or edit alert packs*

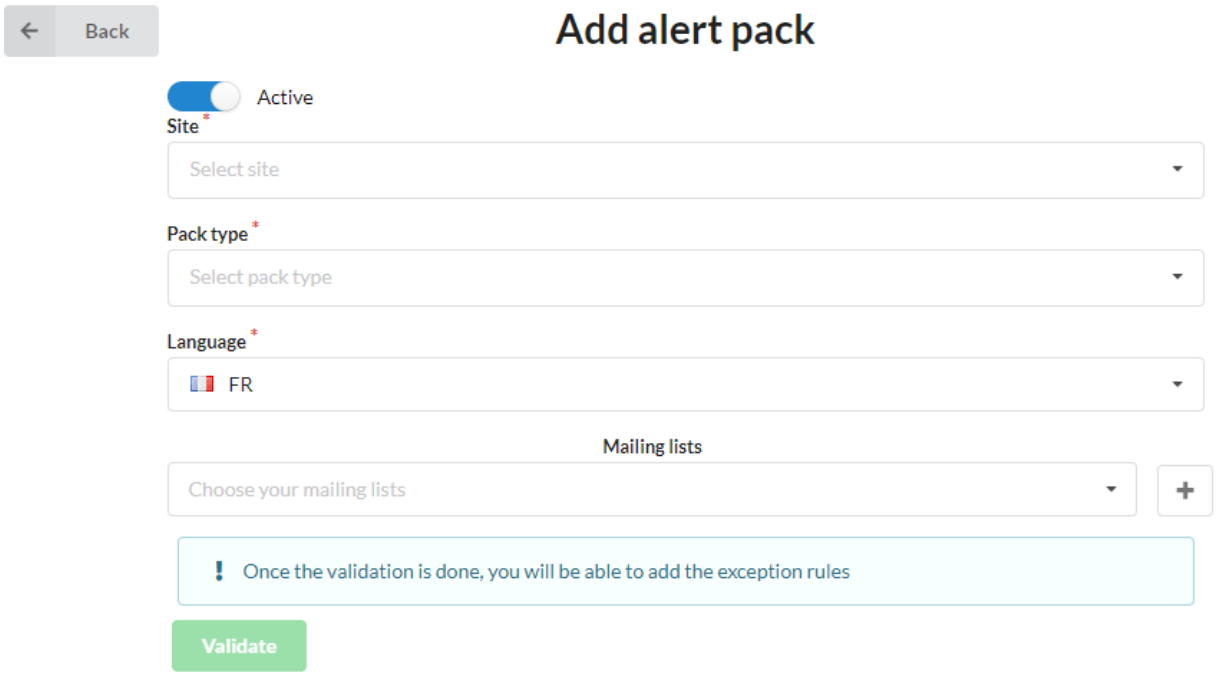
On the **home page**, click on the **Alert Packs** icon 

The alert packs management list is displayed.




Contrary to **Alerts**, **Alert packs** are preconfigured alerts that apply to all sensors of a site.

Click on the **Add alert** pack button to display the alert pack creation form.



Select the site to which the alert pack will apply, and the type of pack.

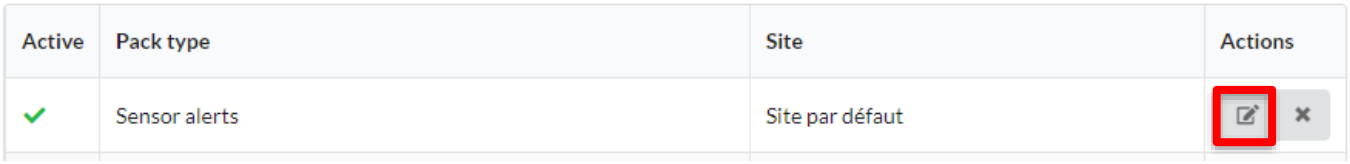
There are two alert pack types for Predict-Adapt:

- Sensor alerts: alerts when a sensor is disconnected
- Machine health scores alert: alerts when a health score value is too high

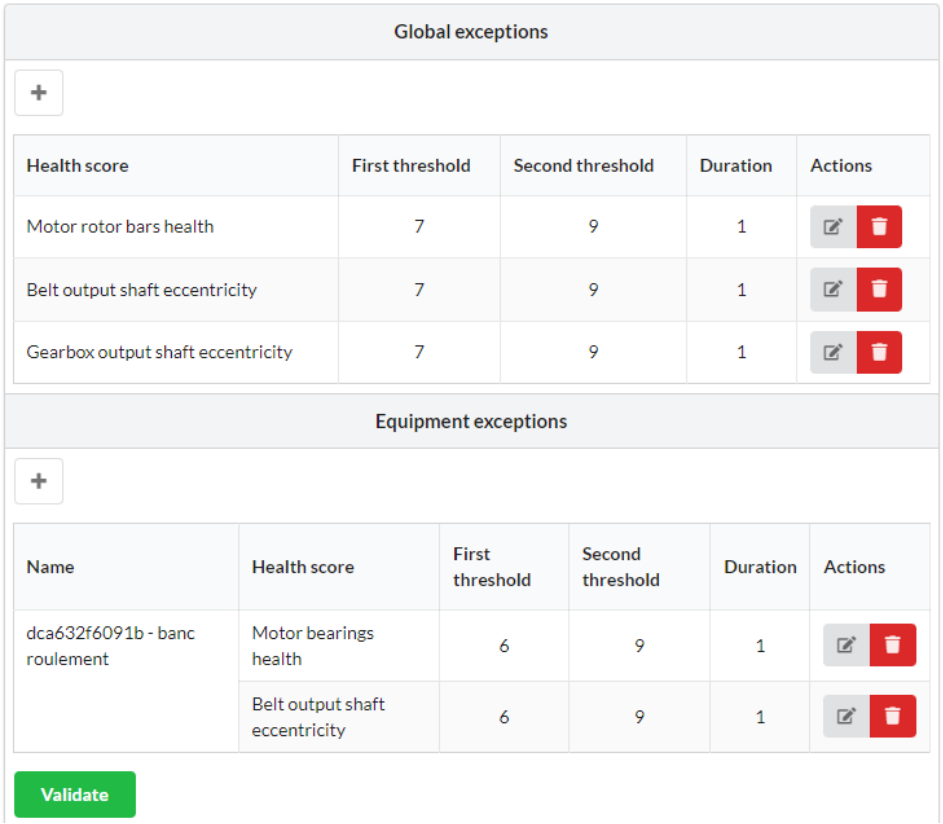
Then select the language in which the alert e-mail will be sent, and the associated e-mail list(s). You can create a new list of e-mail addresses by clicking on the icon. 

Finally, click on **Validate** to activate the alert pack.

Once validated, you can return to the form by clicking on the edit action button at the end of the line:




At the bottom of the form, you can add **exception rules** to the site's sensors. These exception rules allow you to take into account any specificities of certain machines or health scores, for which you do not wish to trigger alerts at the same level as others.



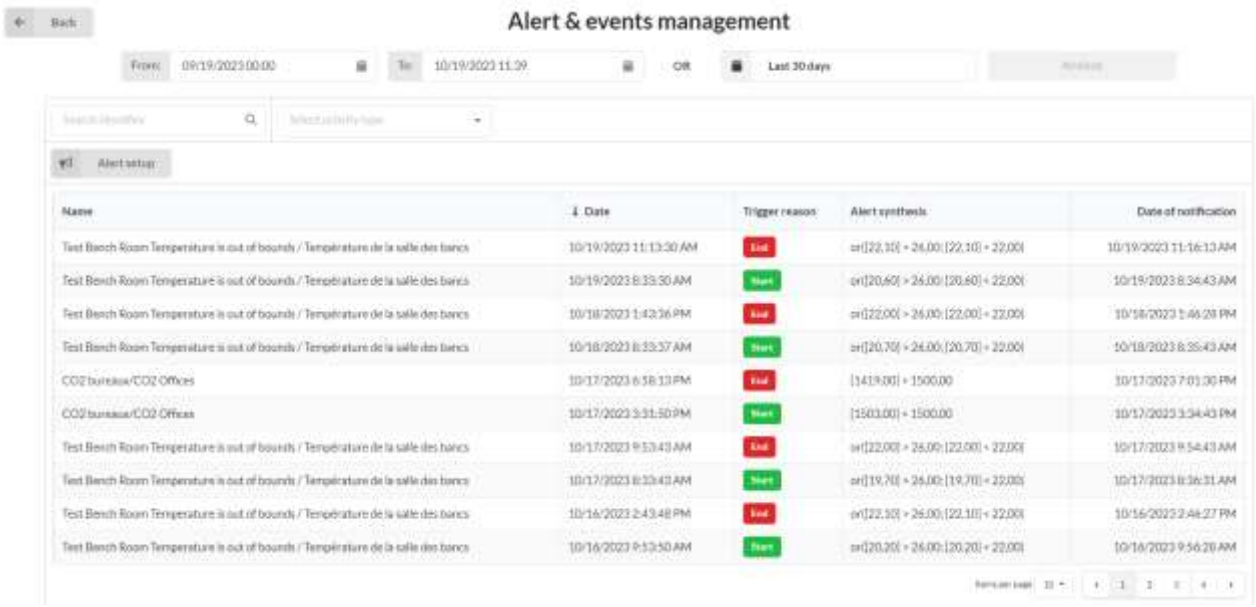
For **machine health score alert packs**, **global exceptions** can be used to define specific health score threshold values, for all machines on the site. **Equipment exceptions** allow you to do the same, but only for selected machines.

*Tip : to stop receiving alerts, simply set both threshold values to 10, which is the maximum possible score.*

# 8. Alert configuration

On the **home page**, click on the **Alerts** icon:

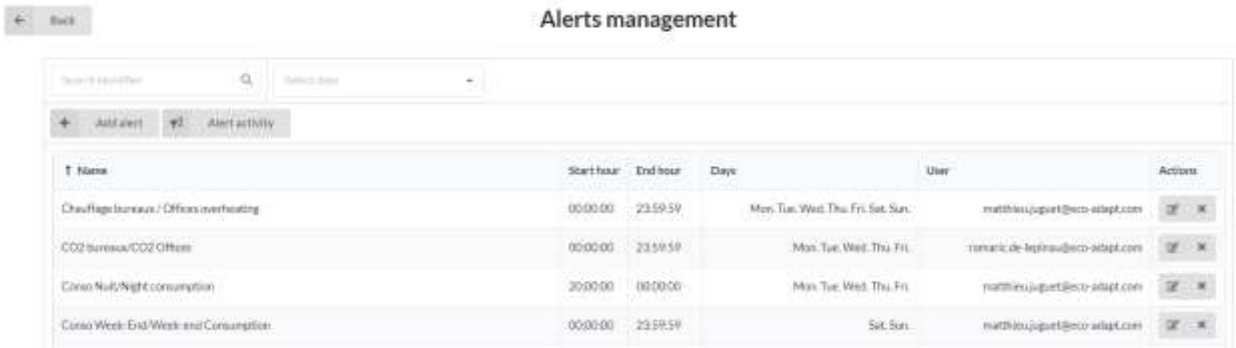
A page showing the Alert log is displayed:



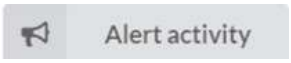

You can select a date range and filter Alerts by identifier (the name of the Alert) or by type. An **Event** refers to a disjunction or presence/absence of voltage (if measurement is present thanks to one of the Sensors in the Eco-Adapt range), while an **Alert** corresponds to a configured Alert rule.

By default, no Alert exists (except for Expert mode dataloggers). To create one, go to Alert setup

The Alert management page appears.

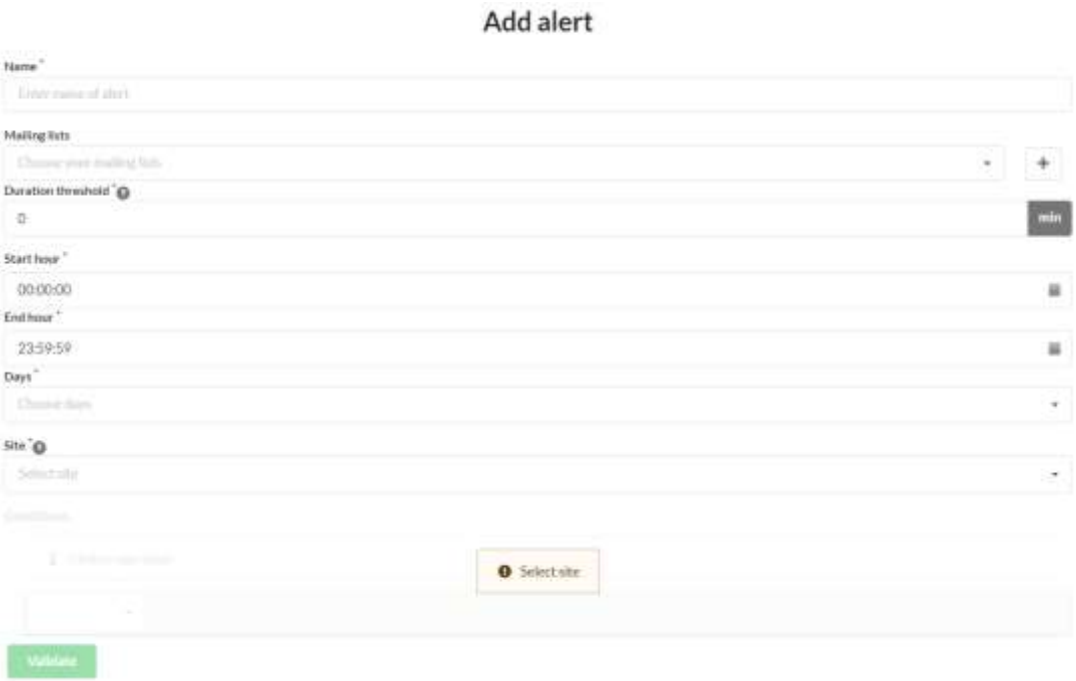



On this page, you'll find the different Alert rules you've created, along with their characteristics (validity times and days, name, User). You can modify or delete them using the end-of-line buttons. You can also filter them by day of validity or by name.

To return to the Alert activity log, click on 


To create an Alert, click on 

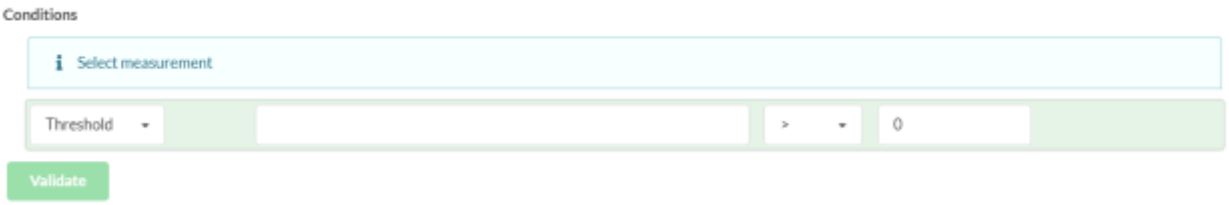

You will then be taken to the following Alert creation form:



The various fields are :

- **Name**: the name you wish to give to the Alert. This will be the subject of the Alert e-mail you receive.
- **Mailing lists**: all the Mailing lists to which you wish to share this Alert with.
- **Duration threshold** : Delay before an Alert is triggered. This corresponds to the period during which all the data satisfies the Alert rule. This time delay is particularly useful for issuing Alerts in the event of rapid fluctuations. By default, at 0 min, the Alert is sent as soon as the first piece of data satisfies the Alert rule.
- **Start hour** and **End hour:** Start and end times of Alert validity. Any condition met outside these times will not be the subject of an e-mail Alert.
- **Days**: Days of Alert validity.
- **Site**: Site where Alert rules will be defined. An Alert rule cannot concern two pieces of Equipment from different Sites.

Once the Site has been selected, the **Conditions** form appears:




The Alert rule, which can be simple or complex, is created in this form. There are three types of operators: **Threshold, AND** and **OR.** The Alert condition is conditioned by a **Threshold** (measure **<** or **>** to a value) and these conditions can be linked by logical operators to create multiple conditions.

It is possible to create an Alert rule with conditions on different types of measurement (current, frequency) Once the conditions have been configured, click on **validate**. The Alert rule has now been created, and you will receive an e-mail each time the Alert occurs.

# 9. Scheduled exports

To process data locally on your own computer, or to store platform data on your own server, it is possible to program data exports in Excel or csv format.

On the **home page**, click on the **Exports** icon**:** 

Like reports, this page allows you to modify, delete or generate an export. In the same way, you can create an export by clicking on **Add export.**

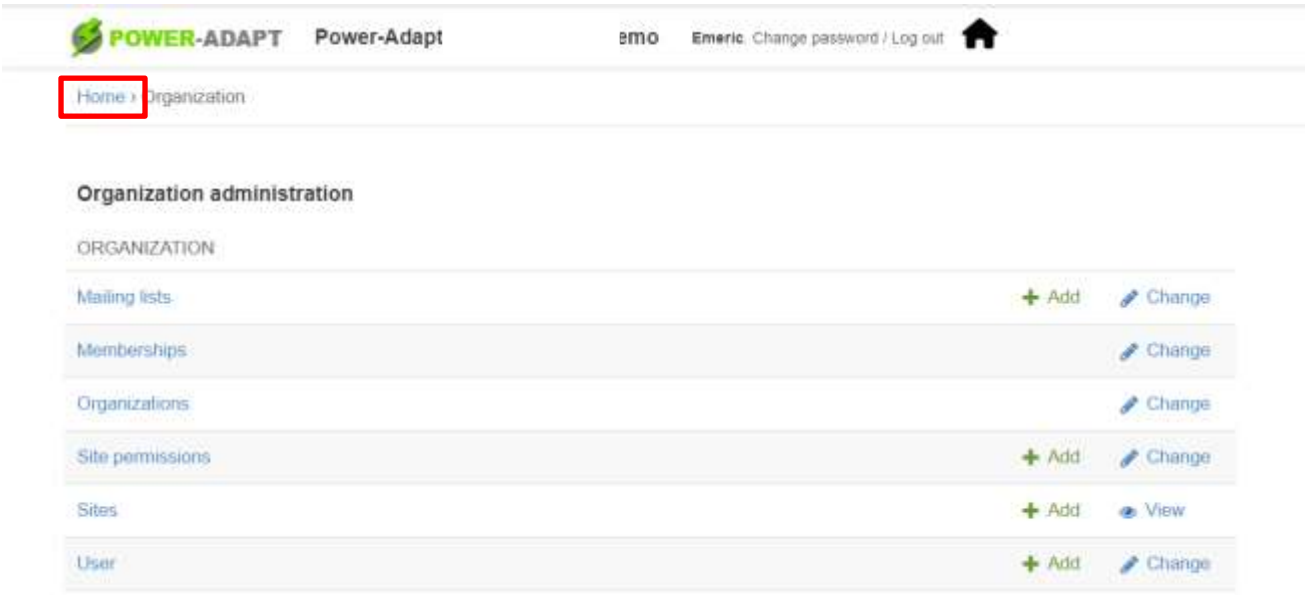
Several fields are identical to those used to create the report. The additional fields for exports are:

- **Frequency**: Daily, weekly or monthly
- **Hour (UTC):** time the export is sent. This time is in UTC. N.B.: we strongly advise you to enter a date/time with at least 4 hours between the end of the period to be exported and the time of export generation.
- **Depth of history**: time range over which to send data (the start date is calculated from the send date and the selected history depth).
- **File transfer method**: For exports, you can send files by e-mail or to an FTP, SFTP or FTPS server. When sending to a server, you will be asked to enter the address and the necessary authentication parameters.
- **Mailing lists**
- **Type of export:** *No impact for Predict-Adapt measurements*
    - **Detailed graph**: all measurement points at the smallest data transmission step (may vary according to Sensor).
    - **Daily graph**: daily consumption of Equipment (1 data item/day)
- **File format:** CSV (choice of separator) or **Excel**
- **Measurements:** Select all desired measurements for export.
- **Associated power/water flow** (if detailed curve) - *No impact for Predict-Adapt measurements**:***
    - **Related index:** Ascending index of measurement
    - **Associated power/flow:** Power calculated from the index difference between each point.

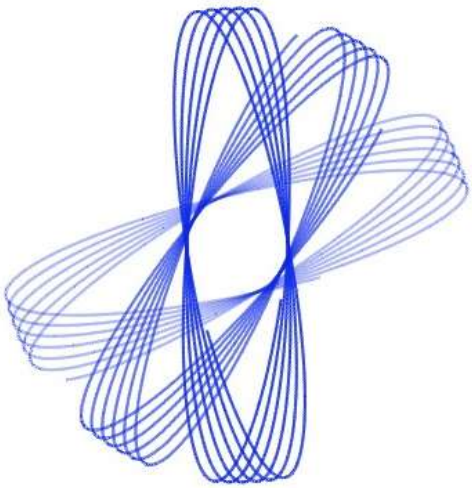
# APPENDICES

## Appendix 1: Accessing the administration interface

The administration interface gives you access to all the objects and parameters of the platform, and more specifically to your Organization. Go to **Organization**, then click on **Home** in the top left-hand corner.




The administration page is then displayed. It is divided into several sections. Each section contains links to configuration pages for different platform objects such as Areas, Tags, usages, imported data, etc.



# PREDICT-ADAPT