USER GUIDE

Factbird® Energy Monitoring - Clip-on Current Transducer

Introduction

The energy monitoring from Factbird that leverages clip-on current transducers, is a straightforward, plug-and-play solution for monitoring machinery current consumption. It works with one or three-phase systems, helping to figure out the total power consumed by measuring the current flow.

What are the benefits?

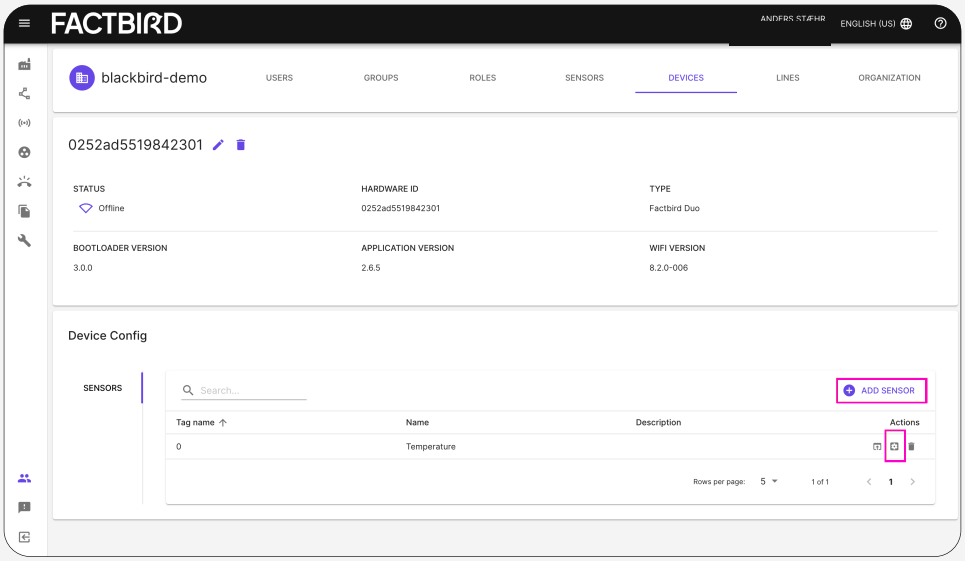
- **Easy installation**: Just clip onto the wire supplying the power and it's ready to start tracking energy use.
- **Standby consumption analysis**: Quickly identifies periods of high energy use even when systems are not active, helping to avoid wasteful standby consumption.
- **Detailed breakdowns**: Offers insights into energy use across different shifts, batches, and products, assisting in the granular analysis of power consumption.
- **Maintenance alerts**: Helps pinpoint when it's time for machine maintenance, aiding in preventive upkeep and avoiding larger issues down the line.
- **Cost reduction**: Utilizing the gathered data assists in making informed decisions to reduce energy waste and decrease operational costs.

Getting started

1

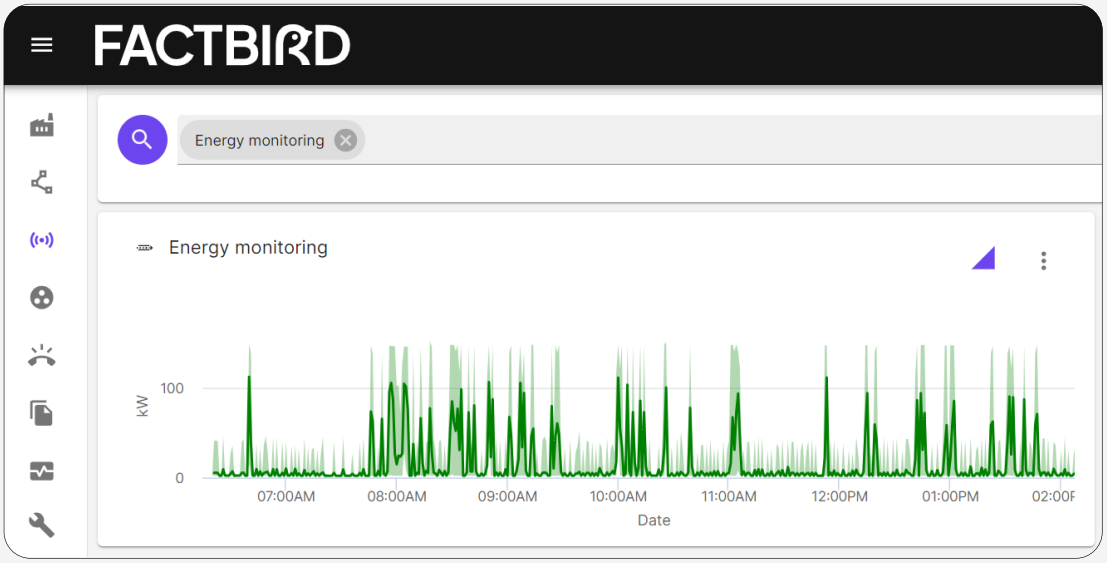
Add a new sensor

- Go to Devices in the Administration page and find the device you wish to set up an analog sensor on. Add a new sensor, or use an existing one if already in use.



2 Open sensor settings

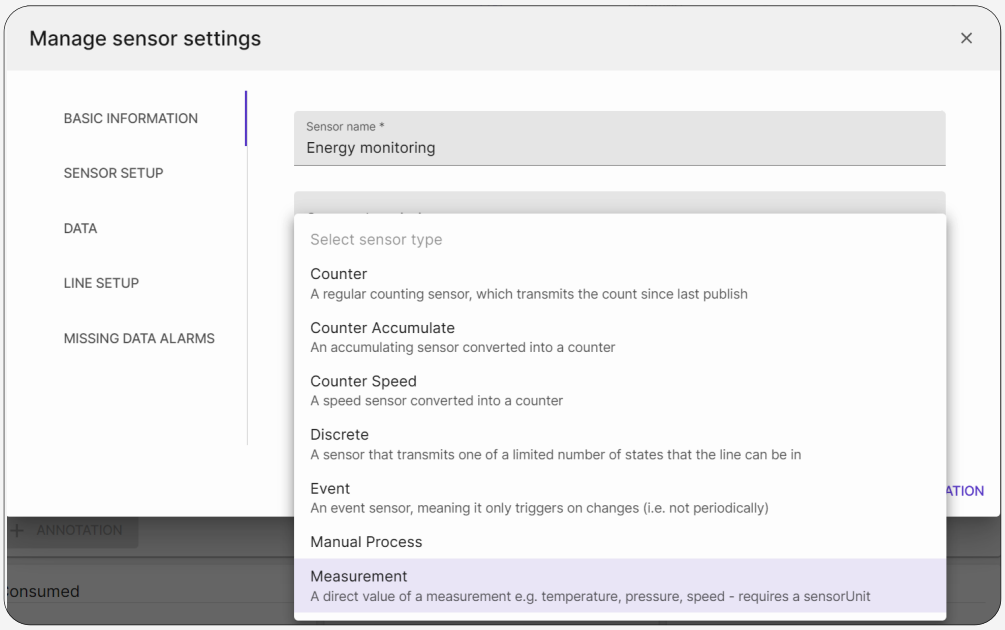
- Find your sensor in the sensor overview by searching for it.



- Open up the sensor settings

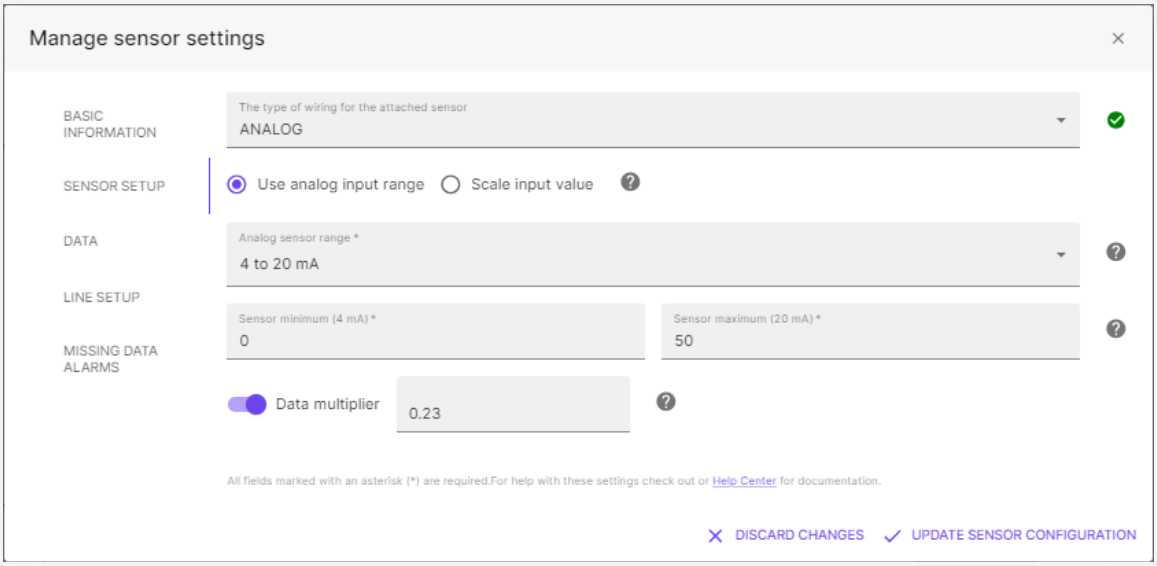
3 Configure the sensor - Basic information

- In the “BASIC INFORMATION” tab choose “Measurement” from the drop down menu.



4 Configure the sensor - Sensor set up

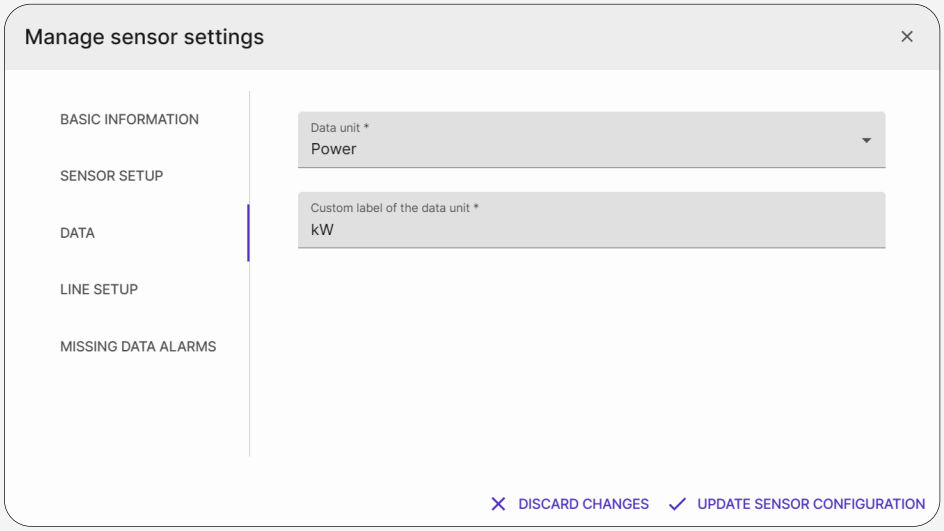
- Go to the “SENSOR SETUP” tab



1. Select “ANALOG” on “The type of wiring for the attached sensor”
2. Select “Use analog input range”
3. Select “4 to 20 mA” on “Analog sensor range”
4. Sensor minimum (4 mA): “0”
   - The sensor minimum is, by default, set to zero. However, due to component tolerances, this may often result in displaying a slight positive or negative energy consumption when no energy is actually being consumed. The sensor minimum can be changed to compensate for this by entering an offset.
5. Sensor maximum (20 mA): Type in the current transducer’s rated value
   - The current transducer has a maximum rating at which it outputs the maximum (20 mA) signal. In this example, the current transducer is a 50A model.
6. Data multiplier: Please see below for instructions on how to calculate the data multiplier.
   - The data multiplier is used to calculate energy consumption in kW from the current consumed, employing the following formula: kW = (current * voltage) / 1000.
   - e.g. In the EU, the data multiplier is set to 230 / 1000, which equals 0.23. Please check your local situation, as it may vary.

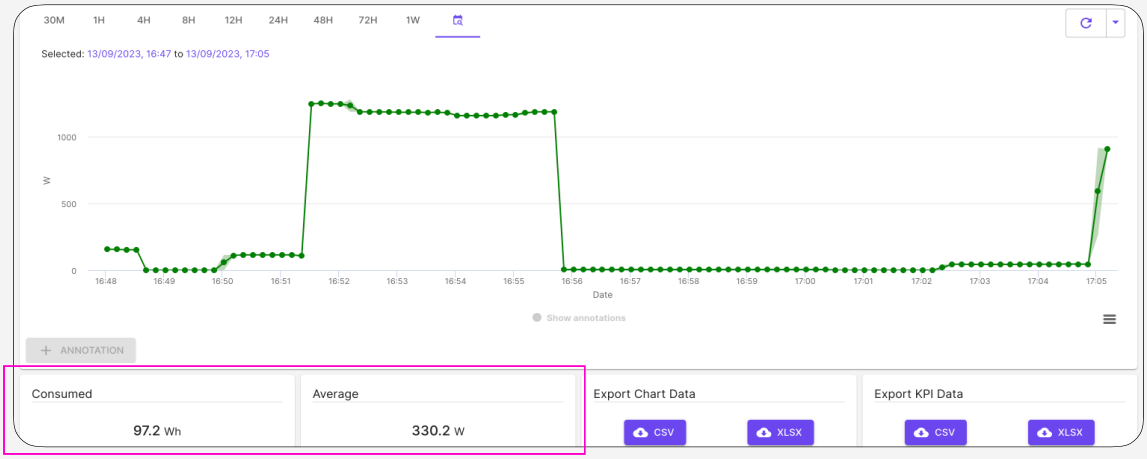
5 Configure the sensor - Data

- Go to the “DATA” tab
- Select “Power” in the “Data unit”
- Type in “ kW” in the “Custom label of the data unit”
- Press “UPDATE SENSOR CONFIGURATION” to apply changes to the sensor setup.



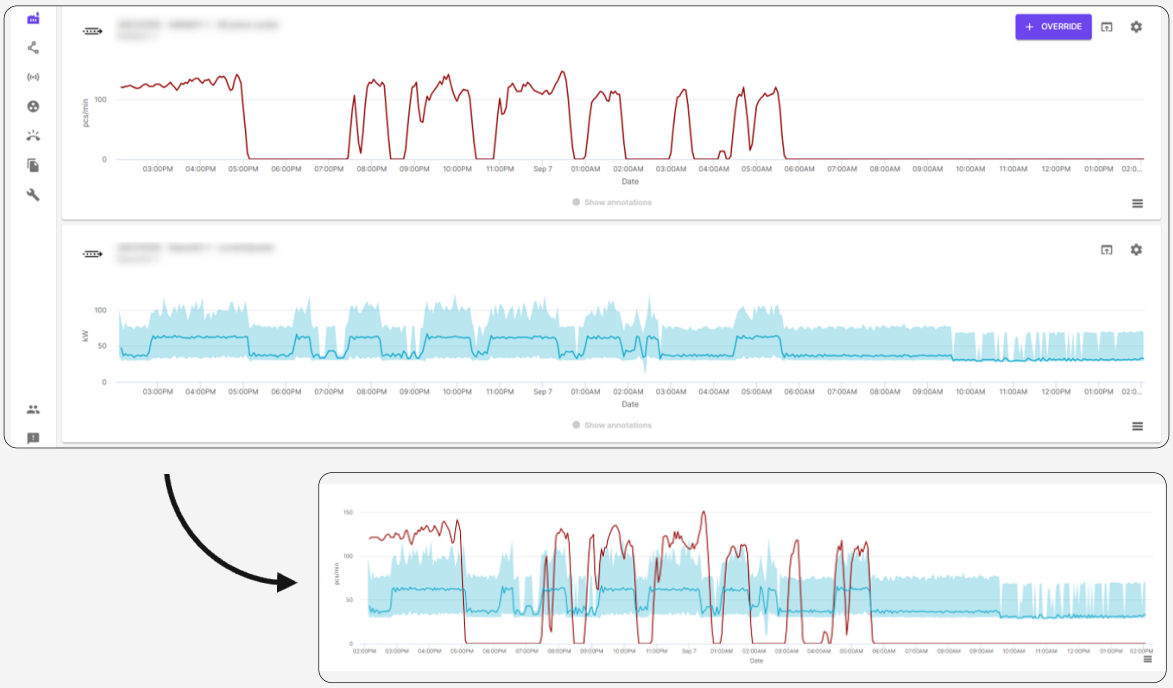
6 Verify data on Live graph

- Go to the “LIVE” page of the sensor
- The energy consumption is visualized over time (displayed in kW).
- Below the live graph, the total and the average energy consumed for the selected period is shown in kWh.



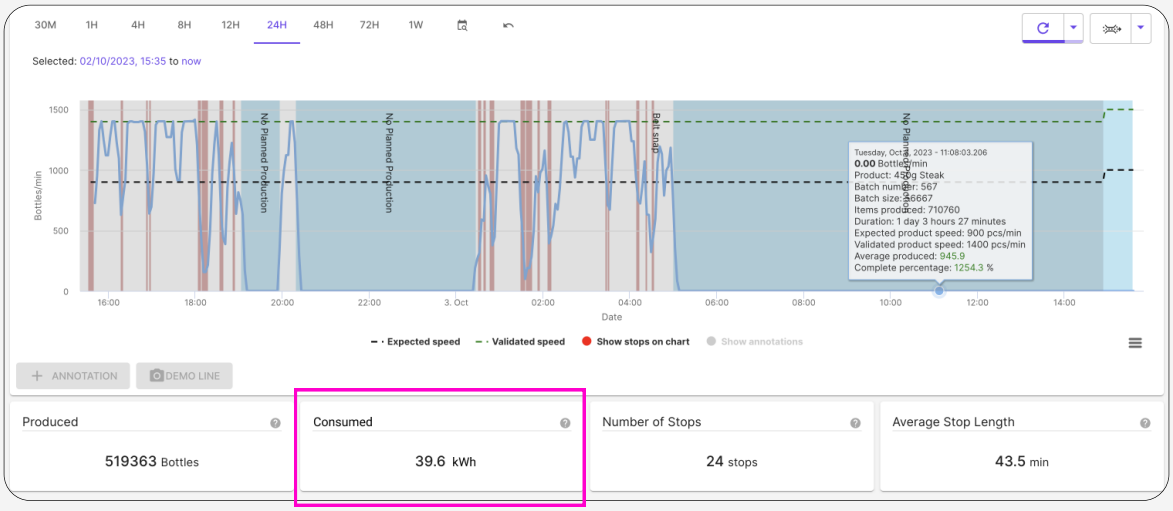
7 Analyze data

- Analyze the correlation between the amount produced and the machine's energy consumption by comparing the counting sensor data with the consumed energy.
- A closer look at the correlation can be viewed on the same graph by disabeling the ‘show separate’ view of the sensors



8 Visualize KPI on the line live view

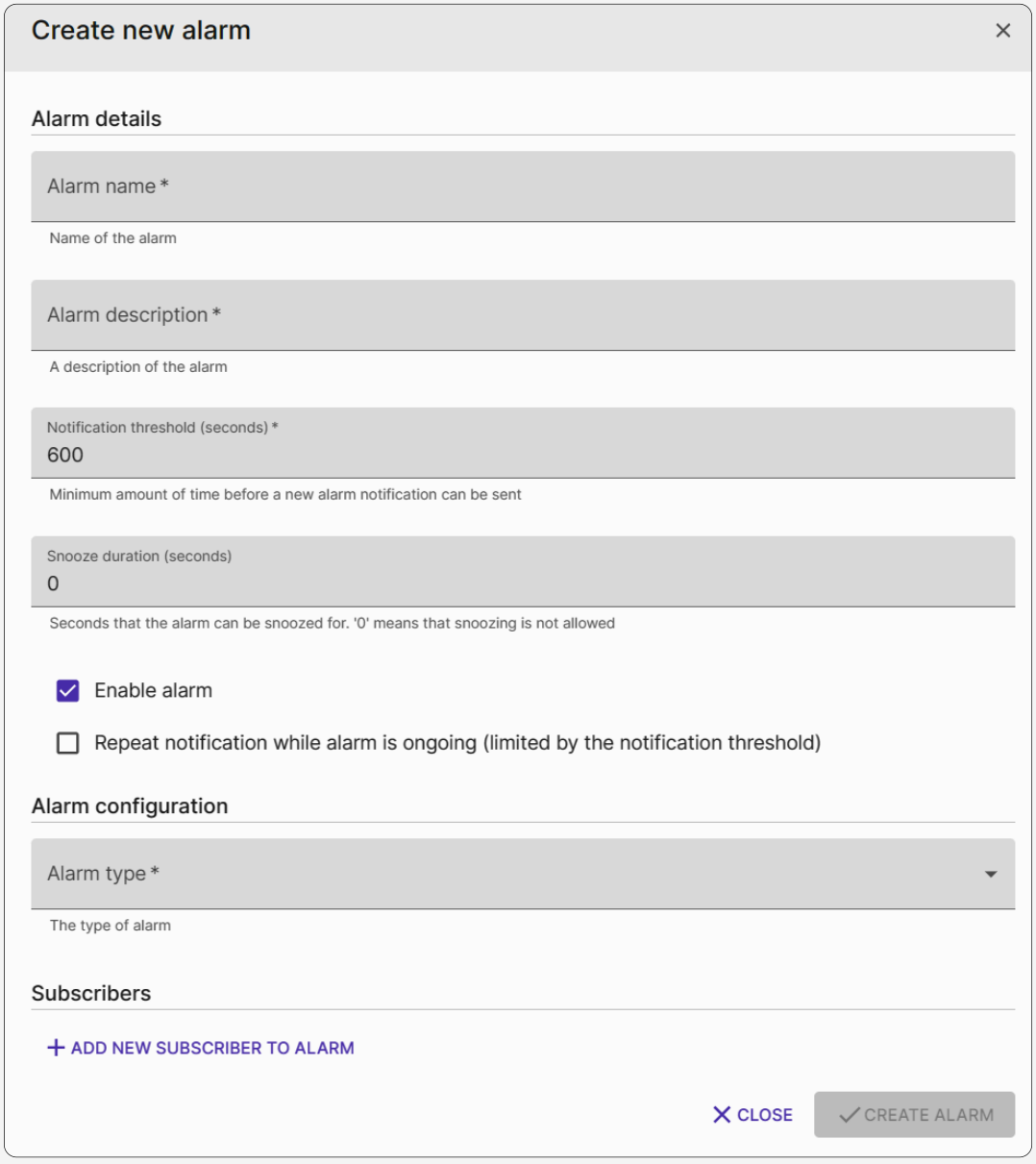
- In the line live view there will be a consumed KPI that sums up all energy analog sensors on the line into one KPI, as long as the data unit is set to ‘power’ or ‘current’)



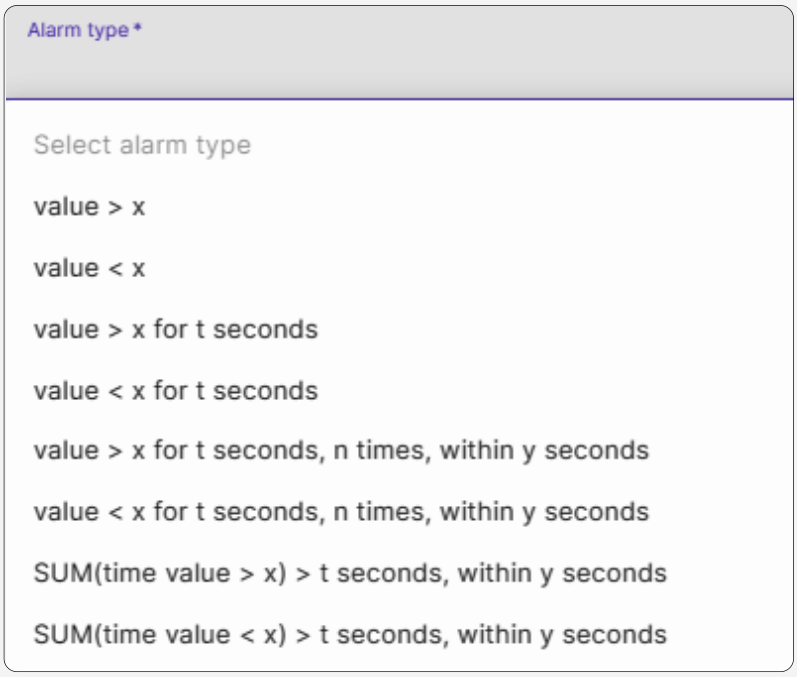
9 Set alarms

Beyond tracking energy consumption, the current transducer can be used to reveal crucial patterns and anomalies of the equipment.

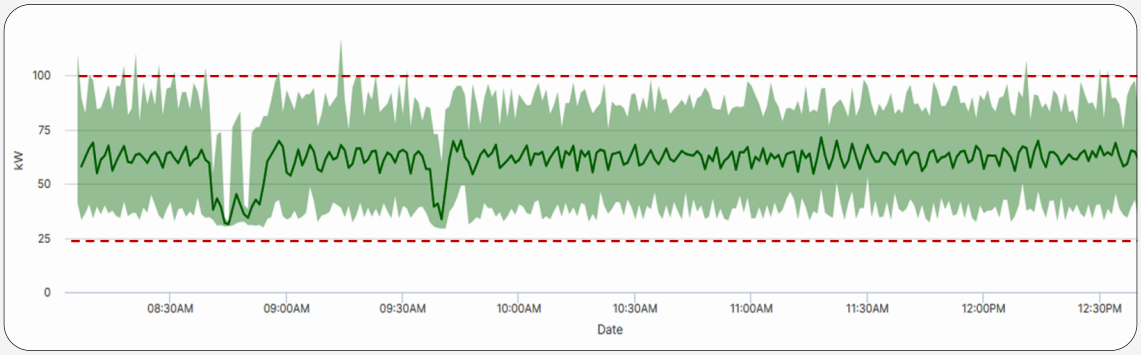
- On the Sensor View page, click on the “ALARMS” tab.
- Click the "+" button to initiate a new alarm configuration.
- Fill in relevant fields: Alarm Name, Description, Notification Threshold, and Snooze Duration.



- Choose your desired Alarm Type under Alarm Configuration. The Alarm function allows users to set up alarms based on the value alone or a combination of value, duration, and occurrences. For example, if the value goes higher than 10 kW three times within a 60-minute period, it will send a notification message to the desired email address or phone number.



- Upon selecting Alarm Type, additional fields like “limit value” and “time outside limit” will appear. Input your values accordingly.
- Click “ADD NEW SUBSCRIBER TO ALARM” and input the email address and/or phone number of the notification recipient and click “CONFIRM”.
- Click “CREATE ALARM” to activate your configured alarm,
- After setting the alarm you’ll notice in the sensor’s live view high and low limits as red dotted lines. If the value goes outside of these limits, it triggers a notification message.



Reference

Measurement Precision:

The precision of energy consumption measurement is influenced by several factors, including the choice of components and limitations when measuring only the current.

Precision of components used:

- LEM current transducer: ±1.5% of full-scale.
- J&D current transducer (model-dependent): ±2% or ±1.5% of full-scale.
- ifm input adapter DP2200: ±0.75% of full-scale.

Limitations when estimating energy consumption based only on measured current consumption:

- Actual voltage: the actual voltage supplied to the energy consuming equipment is not measured and a fixed value is used instead when configuring the device.
- Power factor: the current measured is the apparent current and this can differ from the real current used by the equipment. The ratio between the two values is called power factor. If the power factor of the equipment is known, it can be used where configuring the device. Otherwise the difference is ignored.
- Sample rate: the Factbird Duo samples the current consumption every 5 seconds. Short spikes/dips in the current consumption can therefore be overlooked.
- Uneven loads: equipment running on 1 phase or on 3 phases where the load of each phase goes to neutral (wye (Y) or star configuration) is handled correctly. Using 3 phases with a balanced load on all phases (Delta (Δ) configuration) is handled correctly. Using 2 or 3 phases where the load is not balanced (Delta (Δ) configuration) can introduce an incorrect measurement.

Calculating Data Multiplier:

- In a 230V installation (wye (Y) or star configuration in the EU), the data multiplier is set to 230 / 1000 = 0.23.
- In a 400V installation (Delta (Δ) configuration in the EU), the data multiplier is set to 400 / √3 / 1000 = 0.23.