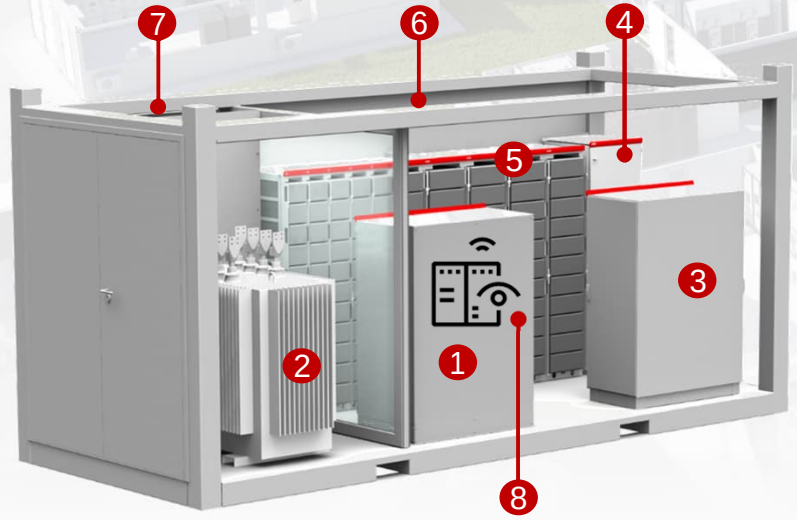
ABB Ability Energy Manager BESS & Solar Widgets

Battery Energy Storage Systems (BESS)

What is BESS?

BESS sample picture



1. AC Switchgear
2. Transformer
3. Power conversion
4. DC Switchgear
5. Battery Racks
6. Fire Suppresion
7. HVAC
8. Operating system

What are Battery Energy Storage Systems (BESS)?

A Battery Energy Storage System (BESS), is the industry's generic reference name for a collection of equipment that comprise a system to store energy in batteries and use the energy later when it is advantageous.

A typical system is comprised of batteries, a battery management system, an inverter, switchgear, transformer, protection and a control system.

Often renewable energy sources are combined with a BESS to store the renewable energy during peak production time and then the energy is used when it is needed.

Market trends

What are the expectations for the BESS market?

As electricity consumption is on the rise, we need to find different and more sustainable ways to produce, use and consume our primary source of power.

151 bn $

MARKET VALUE

In 2019, Global Advanced Battery Energy Storage System Market was worth approximately 151.96 billion U.S. dollars.

9.5%

GROW RATE

The market is predicted to grow with a healthy growth rate of more than 4.8% over the forecast period 2020-2027.

221 bn $

EXPECTED GROWTH

By 2027, the market is forecast to be worth over 221 U.S. dollars.

+ 19%

RENEWABLE ENERGY PRODUCTION INCREASE

Renewable electricity generation in 2022 is set to expand by more than 19%.

E-kit: Typical architecture with 3° party devices

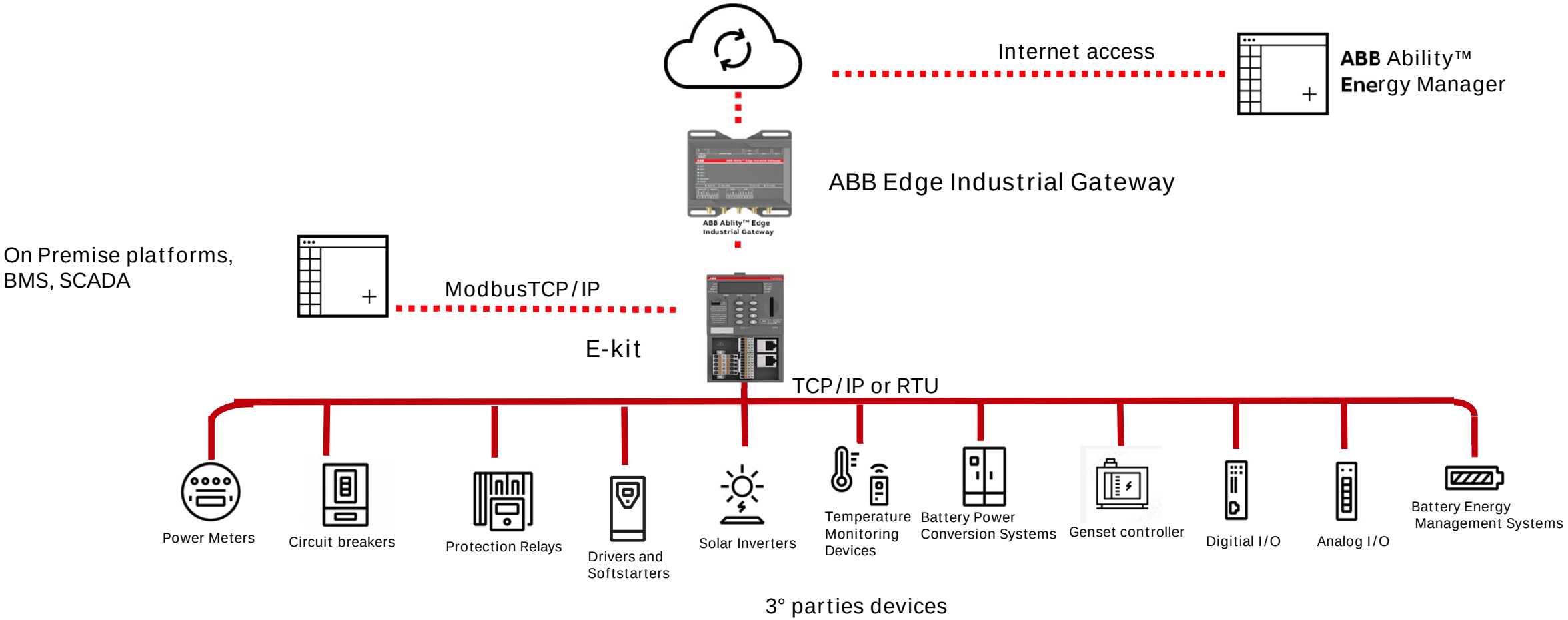


ABB Ability™ Energy Manager Widgets

Inverter Settings

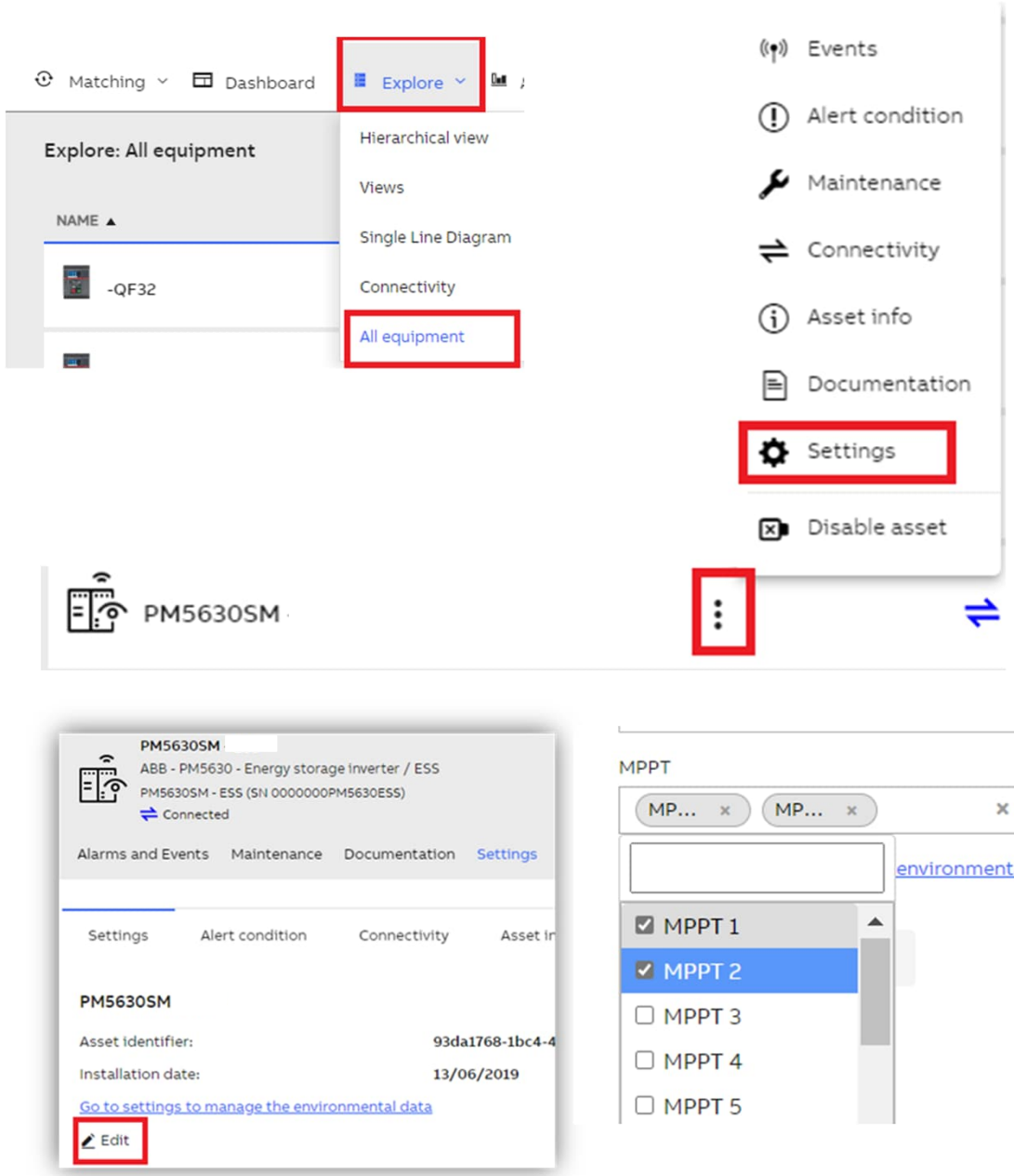
To visualize Solar Inverter-enabled widgets, please select the number of MPPTs (Maximum Power Points Tracking).

1.)Click on " Explore tab" – "All equipment" button find the Solar Inverter from the list.

2.) Click on 3 dots, and "settings".

3.)Click on "Edit".

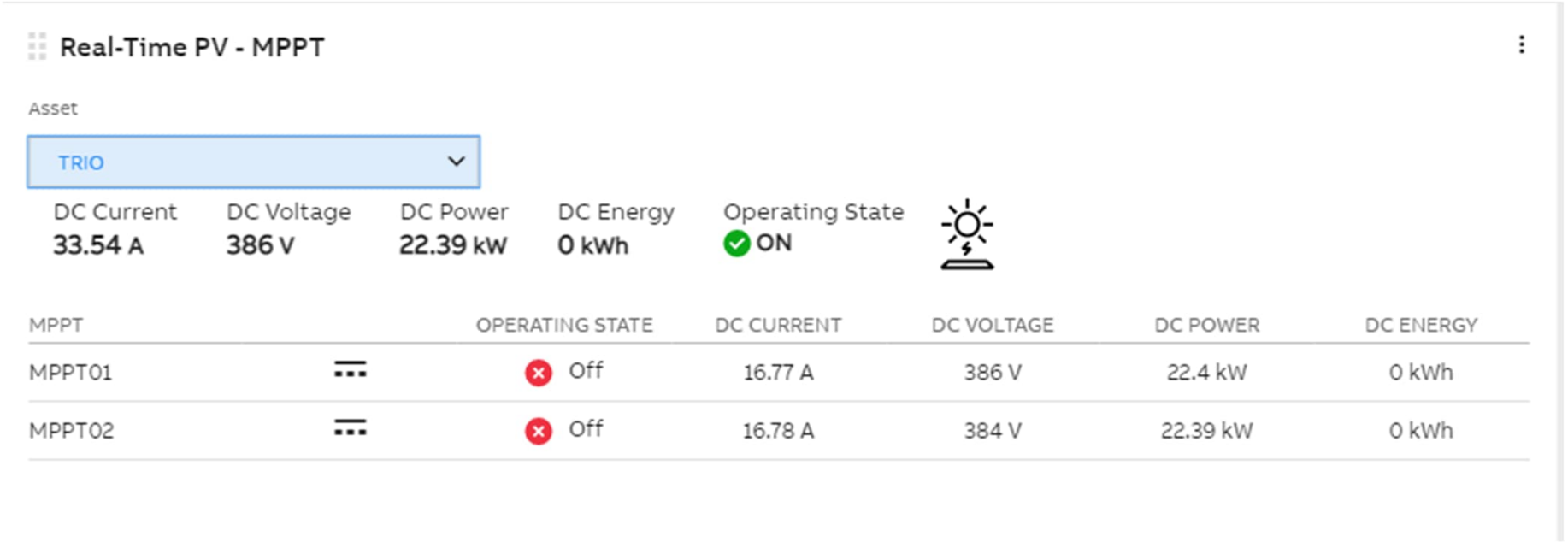
4.) Select the MPPTs and save them.



Real-Time PV - MPPT

Real- time PV- MPPT widget shows the real-time measurements of MPPTS (Up to 12) of a PV inverter.

Shows real-time measurements (30 seconds) of DC current, DC voltage, DC power, DC energy .



PV- MPPT Trend

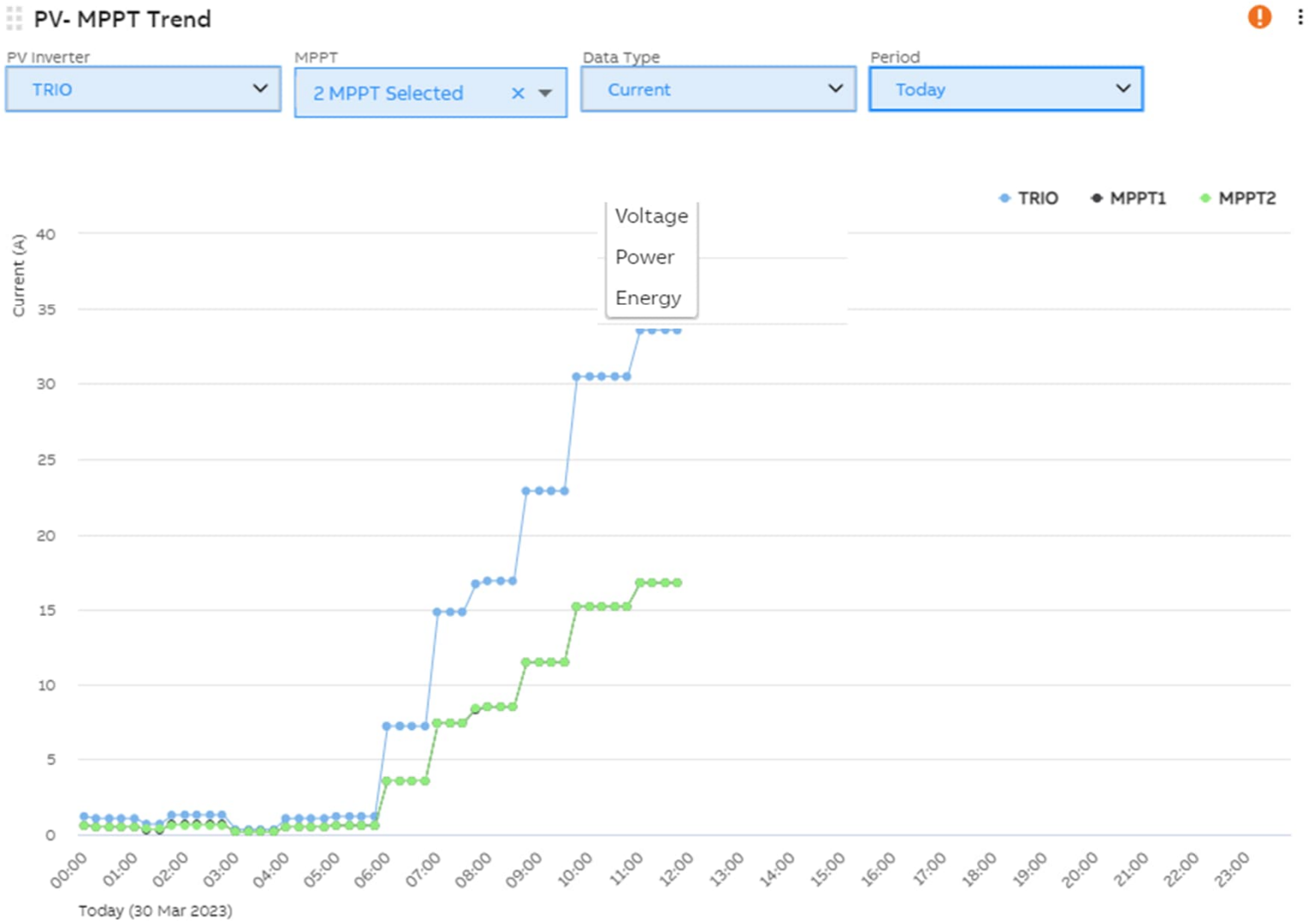
PV- MPPT Trend widget displays the measurements of MPPT data related to PV inverters in the plant.

The widget is organized as:

- Drop-down menu with the name of the PV inverters present in the plant
- Drop-down menu with all the MMPTs referred to the PV inverter selected (up to 9)
- Data type: DC current, DC voltage, DC power, DC energy
- Period

Aggregation process over 15 minutes time:

- current --> average
- voltage --> average
- power --> average
- energy --> cumulated



Battery manager system (BMS) Settings

Number of racks

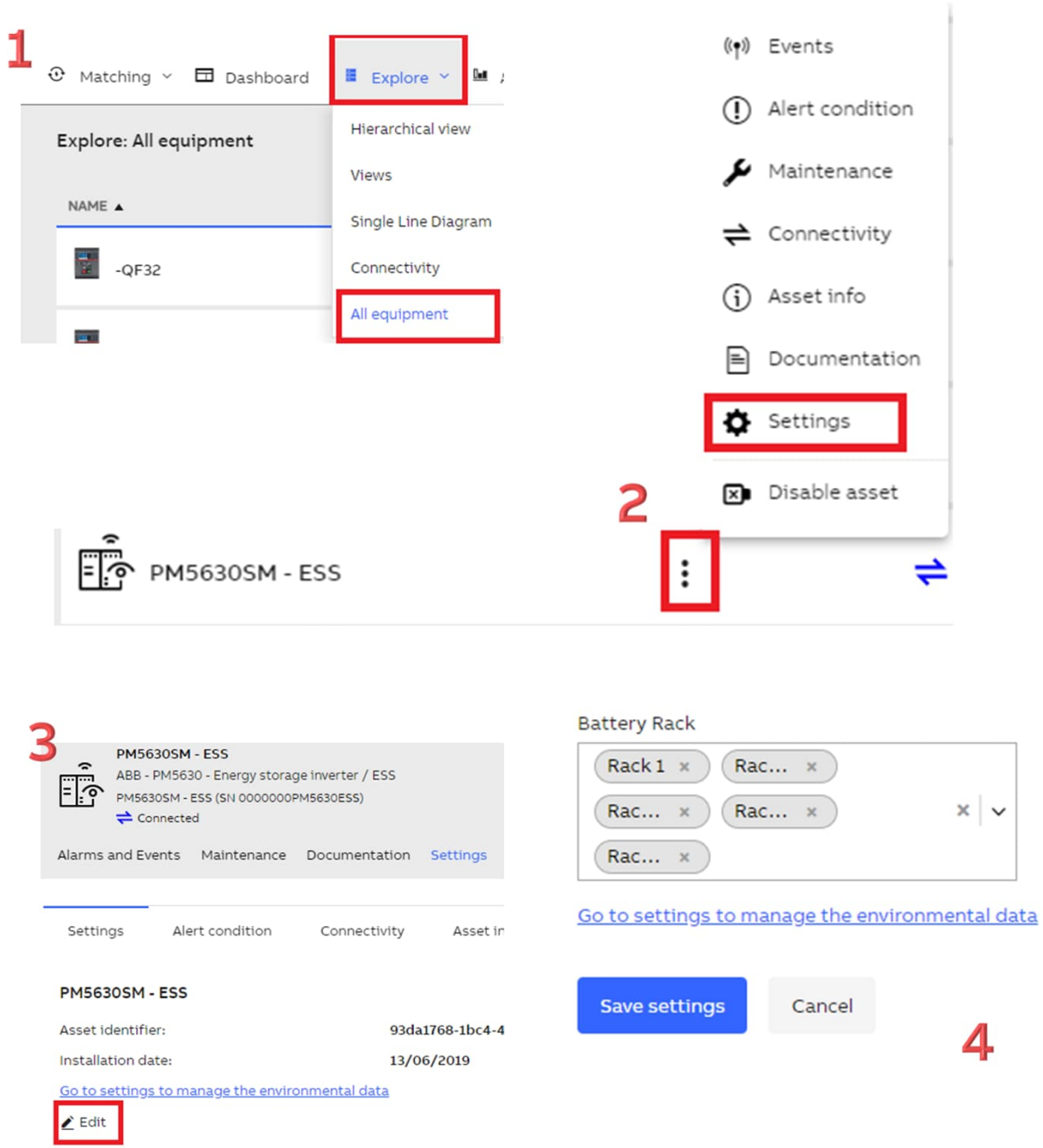
To visualize BMS-enabled widgets, please select the number of racks.

1.)Click on “ Explore tab” – “All equipment” button find the BMS from the list

2.) Click on 3 dots, and “settings”.

3.)Click on “Edit”.

4.) Select the racks and save them.

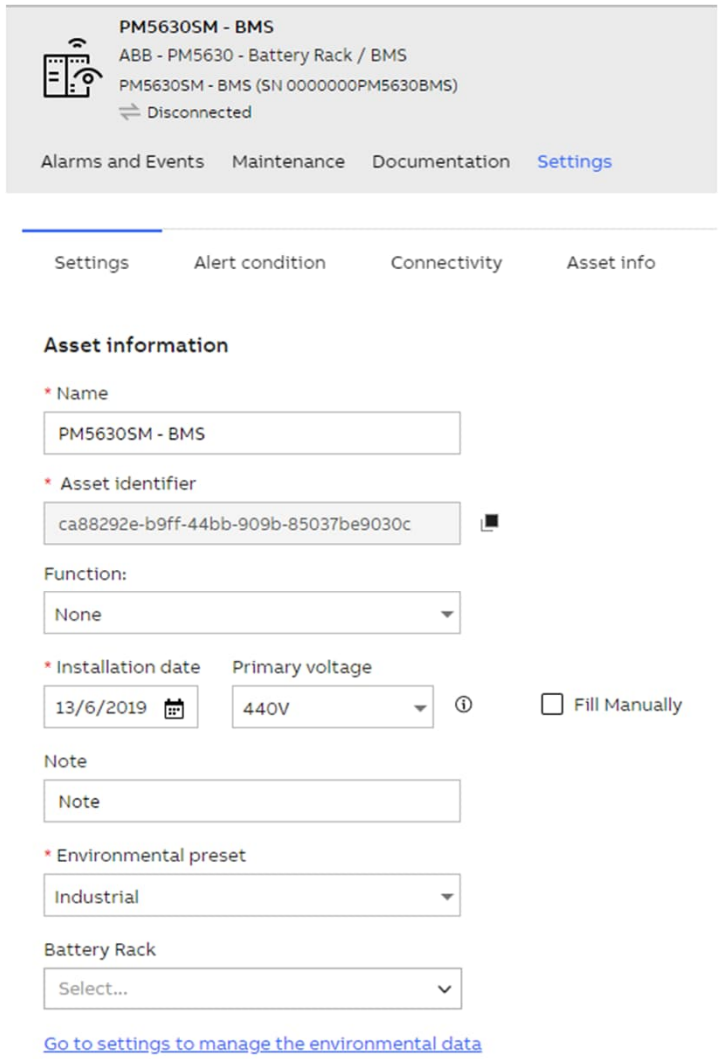


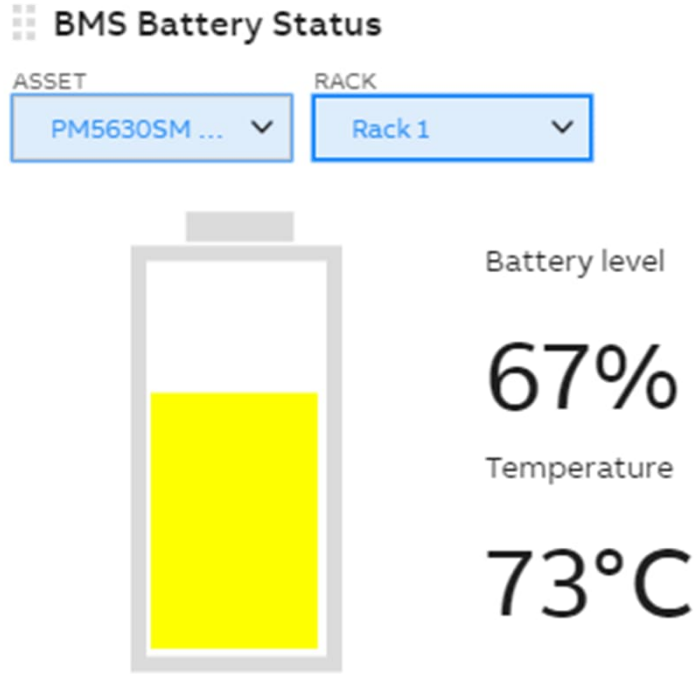
BMS Battery Status

BMS Battery Status Widget visualizes the temperature and the battery charge level of BMS.

The number of racks has to be set in the device settings .

(explore ->all equipment -> click on the device -> settings ->edit)





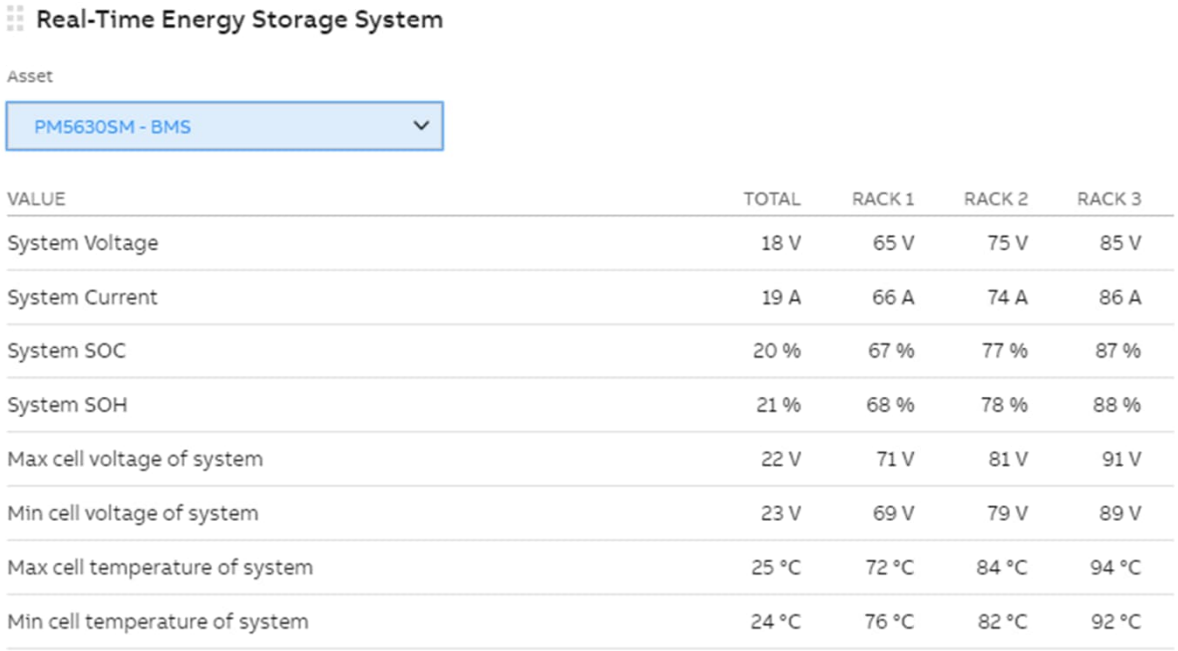
Real-Time Energy Storage System (ESS)

Shows real-time data of each Energy Storage System connected to the plant.

Maximum number of racks can be visualized : 5

Parameters:

Voltage
Current
SOC
SOH
Max Cell Voltage
Minimu Cell Voltage
Max Cell Temp
Min Cell Temp

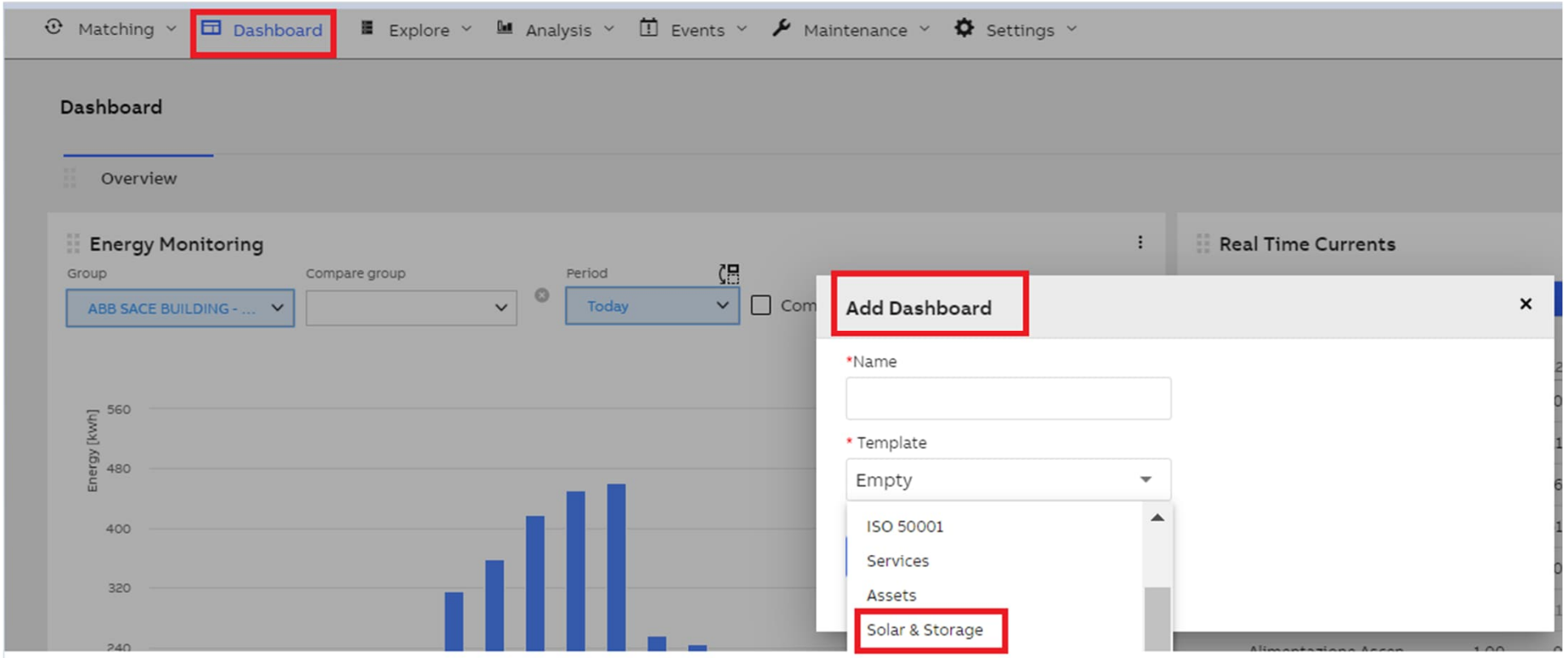


VALUE	TOTAL	RACK 1	RACK 2	RACK 3
System Voltage	18 V	65 V	75 V	85 V
System Current	19 A	66 A	74 A	86 A
System SOC	20 %	67 %	77 %	87 %
System SOH	21 %	68 %	78 %	88 %
Max cell voltage of system	22 V	71 V	81 V	91 V
Min cell voltage of system	23 V	69 V	79 V	89 V
Max cell temperature of system	25 °C	72 °C	84 °C	94 °C
Min cell temperature of system	24 °C	76 °C	82 °C	92 °C

Solar & Storage Dashboard

Widgets

- Predefined template available
- Asset Current, Energy, Power, p.f Trend
- Real-Time Energy Storage System
- Asset frequency trend
- Asset Voltage Trend
- Frequency
- Power Factor
- BMS Battery Status
- Real Time Currents , Voltage,power



Synchronization to Utility

Shows synchronization data of ESS inverters.

Utility f: Utility frequency

Actual f: Actual frequency

Utility V: Utility Voltage

System availability: availability of the system to start

The other voltages shown in the speedometer are the following:

Sync voltage L1-2

Sync voltage L2-3

Sync voltage L3-1

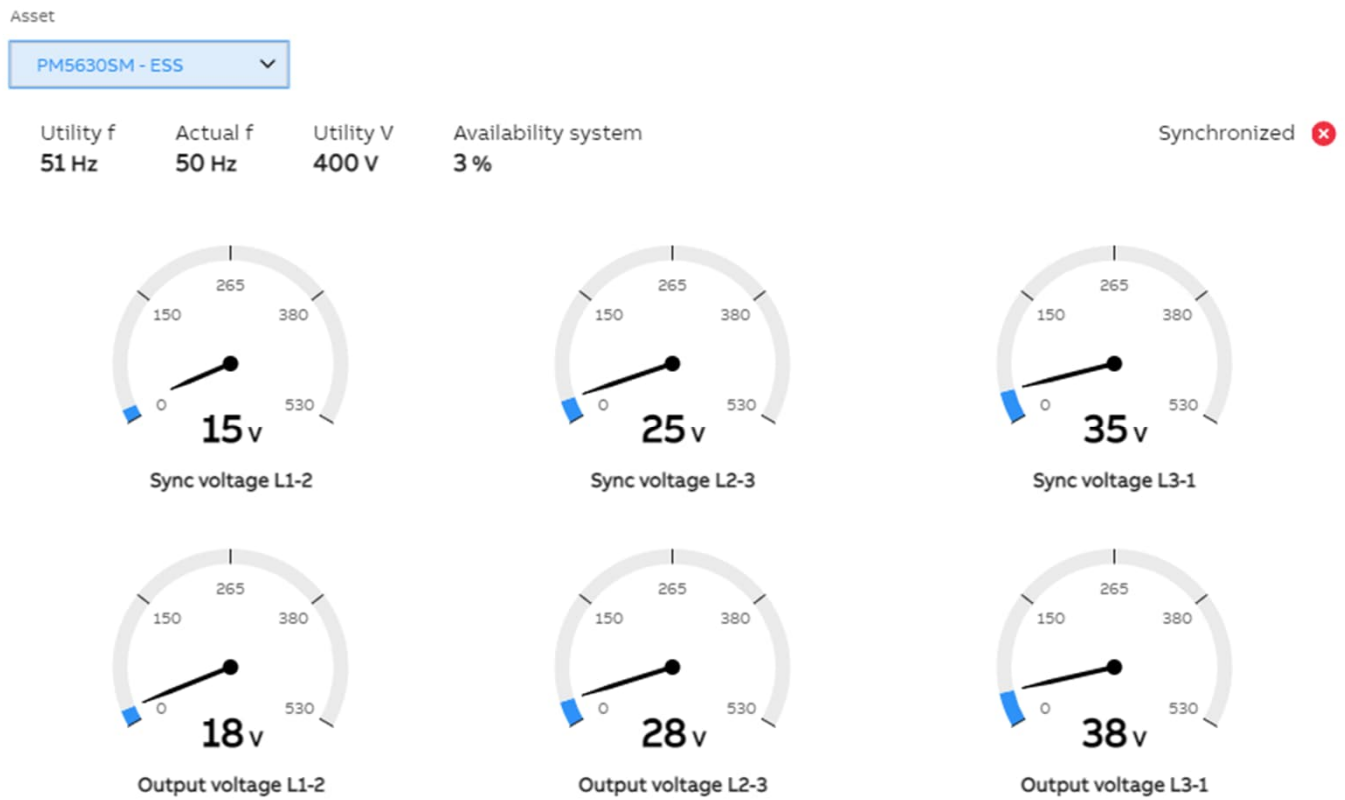
Output voltage L1-2

Output voltage L2-3

Output voltage L3-1

Max voltage value to be shown default 530 V

Min voltage: 0

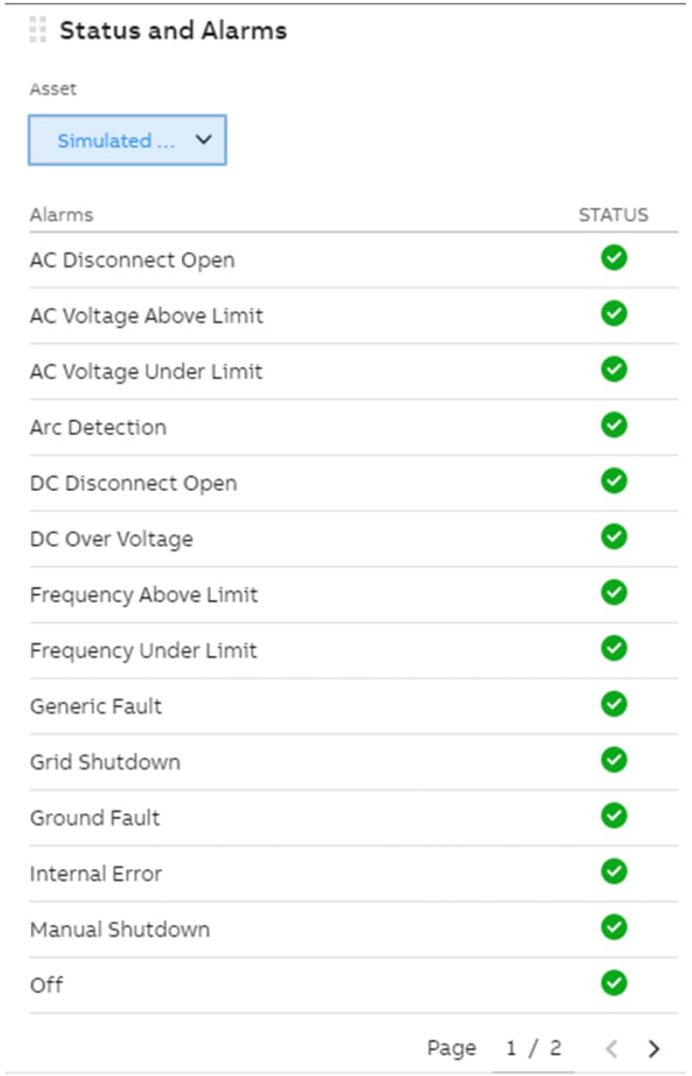


Status and Alarms

PV Inverter

From a drop-down menu, the user can select a PV inverter .
Alarms that are shown for the PV inverter are:

Off
Sleeping
Starting
Shutting Down
Generic Fault
Standby
Ground fault
AC disconnect open
DC disconnect open
Grid shutdown
Manual shutdown
Over temperature
Under Temperature
DC over voltage
Frequency above limit
Frequency under limit
AC Voltage above limit
AC Voltage under limit
internal error
Arc Detection



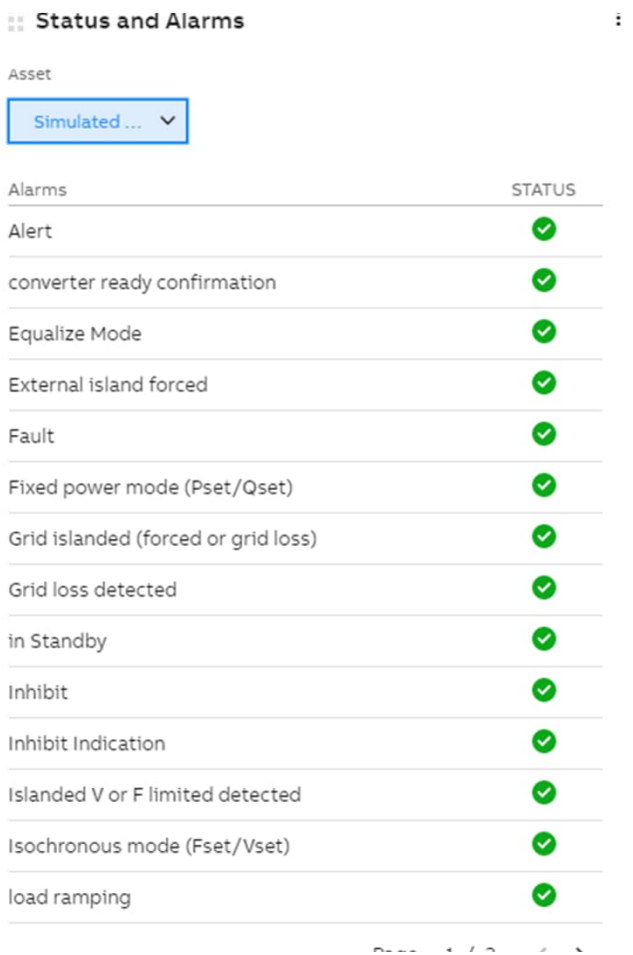
Status and Alarms

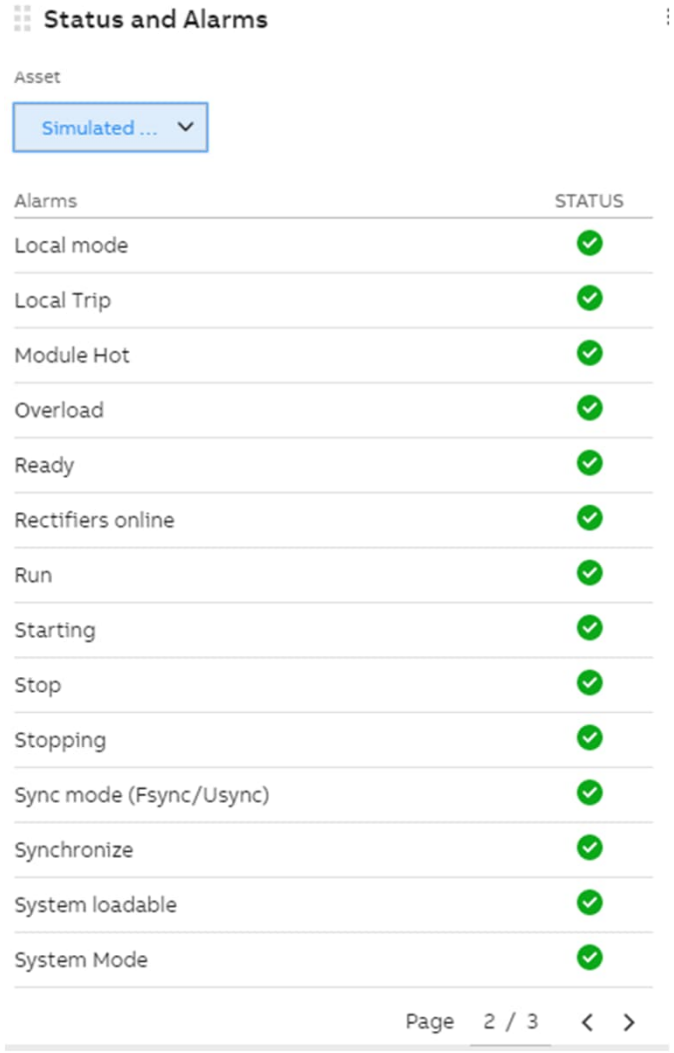
ESS

Triggered alarms/statuses are shown at first.

All of the triggered alerts are shown in alphabetic order.

The list of alarms is in alphabetic ordered (all the remaining alerts (not triggered) are shown in alphabetic order).

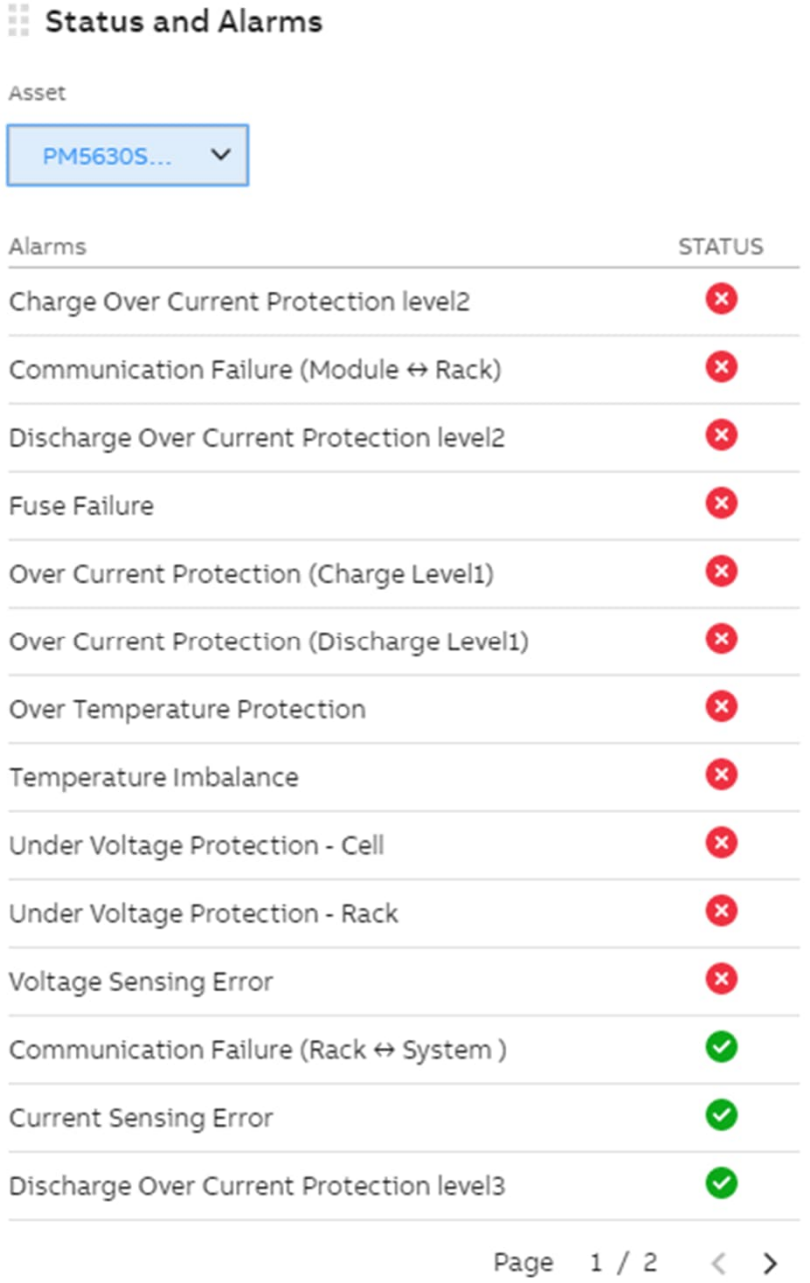




Status and Alarms

BMS

Charge Over Current Protection level2
Discharge Over Current Protection level2
Discharge Over Current Protection level3
Discharge Over Current Protection level4
Under Temperature Protection
Over Temperature Protection
Under Voltage Protection - Cell
Over Voltage Protection - Cell
Voltage Imbalance
Temperature imbalance
Communication Failure (Module ↔ Rack)
Communication Failure (Rack ↔ System)
Over Current Protection (Charge Level1)
Over Current Protection (Discharge Level1)
Under Voltage Protection - Rack
Over Voltage Protection - Rack
Voltage Sensing Error
Current Sensing Error
Fuse Failure
Emergency Stop (Dry Contact input)



Asset Power Trend

ESS

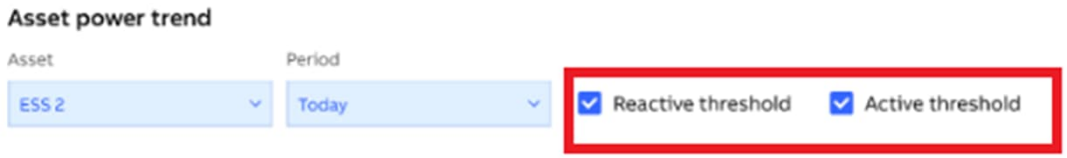
When the user selects an ESS in the "asset power trend widget" , they can select positive and negative limits for reactive and active power using checkboxes and visualize them on the graph.

When an ESS is selected, two check-boxes should appear:

Reactive thresholds: this will activate in the graph the visualization of Negative &positive reactive power limit

Active thresholds: that will activate visualization of Negative & Positive real power limit

ESS



Solar