COMMISSIONING GUIDELINE

Provisioning and visualization in ABB Ability™ Energy Manager of M4M Network Analyzer

Getting started

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In order to carry out the provisioning of M4M in ABB Ability™ Energy Manager, please follow the procedure as described below. Before starting the provisioning via Ekip Connect 3 wizard, please make sure that correct settings on the device itself are fulfilled, according to the procedure described below

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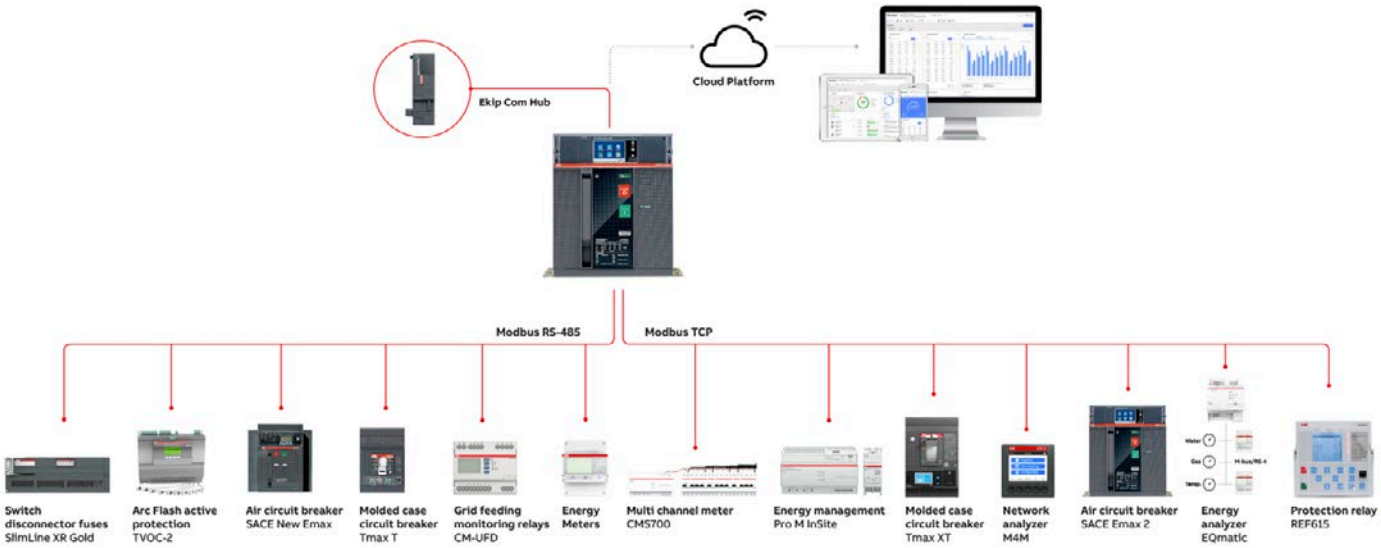
Architectures scenario

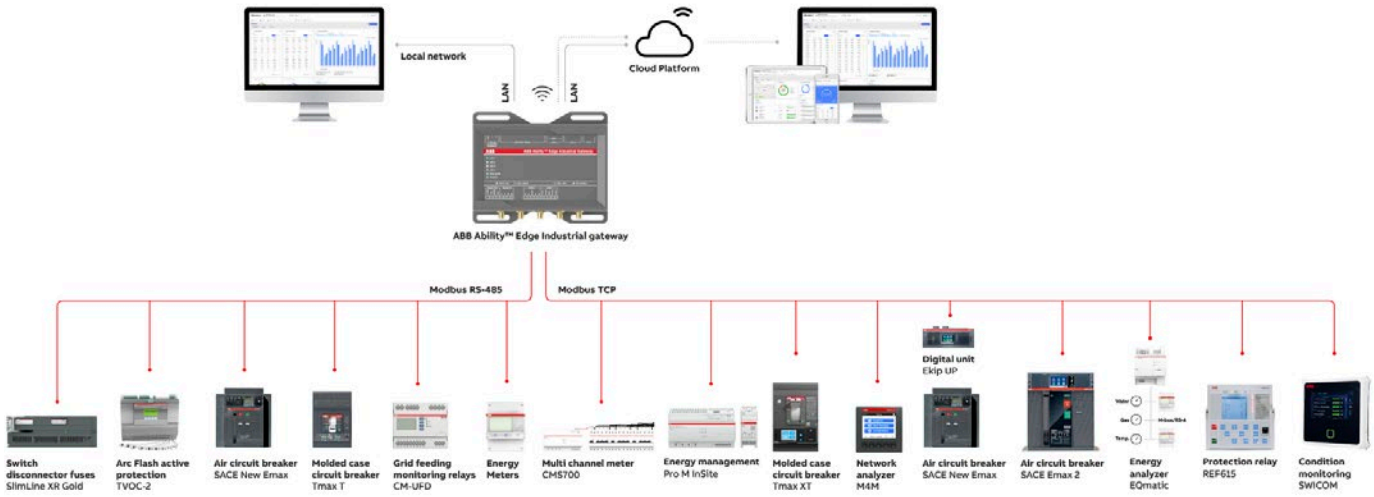
Before proceeding with the commissioning, please check all the possible architectures you can experience.

Embedded Solution
Emax 2 equipped with the new Ekip Com Hub establishes the cloud connection for the whole switchboard.
This dedicated cartridge-type communication module just needs to be inserted into the terminal box and connected to the internet.



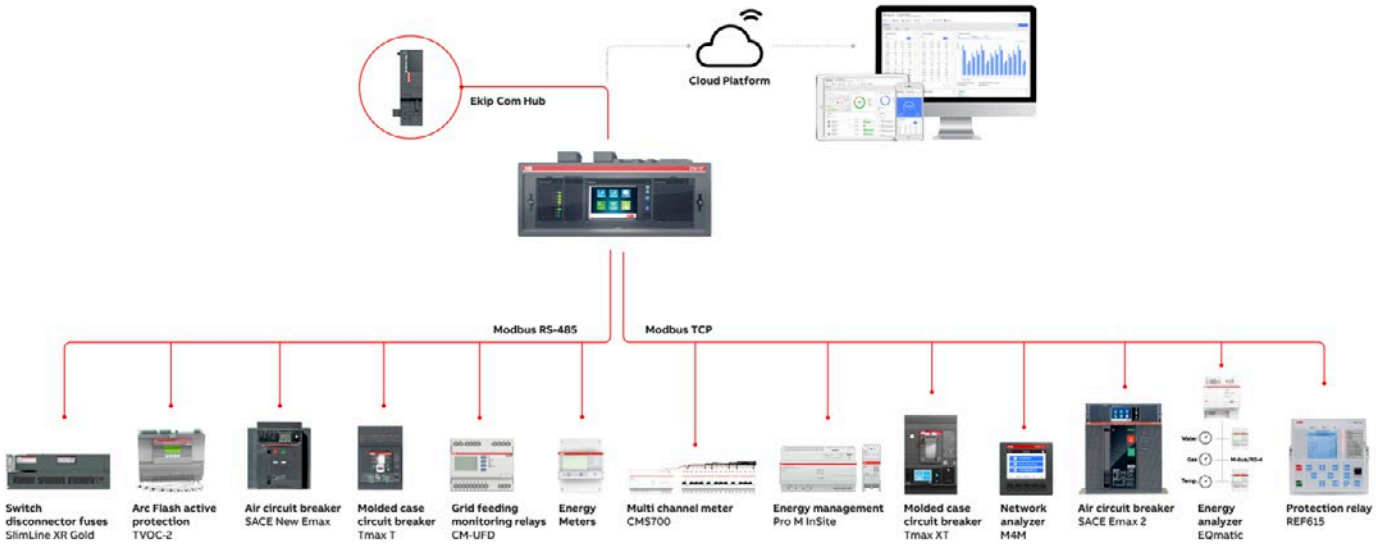
External Solution

The ABB Ability™ Edge Industrial gateway is an independent IoT gateway which can gather data from field devices as well as consumption of water, gas etc. and connect to the ABB Ability™ Energy Manager cloud solution. As a result, all the downstream field devices can be monitored from the cloud via ethernet cable, wi-fi or cellular connectivity.



Provisioning and visualization in ABB Ability™ Energy Manager of M4M

Upgrade Solution
Ekip UP equipped with Ekip Com Hub establishes the cloud connection for a specific feeding line, load or even for the whole distribution system. This dedicated cartridge type communication module just needs to be inserted into the terminal box and connected to the internet using an external router.



Material and tools you might need during provisioning

- User manual of M4M Network Analyser 20 available at this link (2CSG445032D0201)
- User manual of M4M Network Analyser 30 available at this link (2CSG445042D0201)
- Ekip Connect 3 software, updated to the latest version. Please download the software tool from the ABB Library (1SDC20011X3000)
- In case the cloud access point is Ekip Com Hub, “Ekip Com Hub Getting started” document, available at this link (1SDC200063B0204)
- In case the cloud access point is Ekip E-Hub, “Ekip E-Hub Getting started” document, available at this link (1SDC200078B0201)
- In case the cloud access point is the ABB Ability™ Edge Industrial gateway, "E-hub 2.0 Getting started" document, available at this link (1SDC200100B0201).

Initial settings on M4M device

Steps described below shall be completed per each M4M before starting provisioning on the wizard tool.

In case of M4M product communicating via Modbus RTU, please follow the dedicated section "M4M Modbus RTU (M4M Modbus, M4M I/O, M4M Rogowski)" for both M4M 20 and M4M 30 versions. In case of M4M M4M product communicating via Modbus TCP/IP, please follow the dedicated section "M4M Ethernet" for both M4M 20 and M4M 30 versions.

M4M Modbus RTU (M4M Modbus, M4M I/O, M4M Rogowski)

A. Check that Modbus RTU cable connected to the ABB power meter is correctly connected, in particular make sure that
   W1=A=+
   W2=B=-
   TIP: in case the device is not communicating, re-cable the device by switching terminals (hence: W1=B=-; W2=A=+)
B. Verify that Modbus RTU communication settings are equal to “Modbus RTU” settings of the selected access point to the cloud. Here below the default settings of access points:
   - Baud Rate = 19200
   - Protocol = 8E1 (8 bit data, even parity and 1 bit stop)
   - RTU address for Master Device = 1
   - RTU address for Slave device: to be inserted starting from 2 to 247.

   Steps to set Modbus RTU communication parameters are described in section “Communication of M4M 20 and M4M 30 user manual:
   1. on the device, go to "HOME">"Configuration">"Communication">"Modbus RTU".
   2. in the "Address" section, select an address from 2 to 247.
   3. in the "Baud rate" section, select the desired baud rate from the list (9600, 19200, 38400, 57600, 115200).
   4. in the "Parity" section, select the desired parity from the list (Even, Odd, None).

   Tip: each device has to be provided with a different slave address. Otherwise, only one of the devices with the same slave address can be recognized.

M4M Ethernet

C. In case multiple M4M Ethernet are to be provisioned in ABB Ability™ Energy Manager, please commission one by one keeping the others switched off. Once settings procedure on the device is completed, M4M Ethernet can be maintained in operations and it is possible to switch on and start provisioning the next M4M Ethernet.
   Steps to set Modbus TCP/IP communication parameters are described in section "Communication" of M4M 20 and M4M 30 user manual. To reach the settings section, on the device, go to "HOME">"Configuration">"Communication">"Modbus TCP/IP". Parameters that can be set are DHCP, IP address, Subnet mask, Gateway and TCP port.
   Change IP address so that it is in the same sub-network of TCP devices which have to be provisioned in ABB Ability™ Energy Manager. Additionally, maintain DHCP disabled (as default) and TCP port, which is already enabled, at the default value (502).
   Tip: It is recommended a sub-network with IP range 192.168.0.XXX, where XXX ranges from 1 to 254. In case of Ekip E-Hub used as access point, sub-network default IP range is 10.86.92.2 … 10.86.92.99 (LAN2 default configuration has static IP address which is 10.86.92.1).
   Tip: in the list of settings of access point, “Gateway” IP address shall be IP address of the connection point to the internet, i.e. IP address of the dedicated router if present.
   Tip: do not give same IP address to different devices, otherwise only one of the devices with same IP address can be recognized.

Provisioning and visualization in ABB Ability™ Energy Manager of M4M

Ekip Connect 3 provisioning wizard

A. Make sure you have a MyABB account. If not, please register on MyABB to activate an account.

B. To commission ABB Ability™ Energy Manager access point to the cloud please follow the configuration procedure of the selected access point:
   - Procedure for Ekip Com Hub is described in “Ekip Com Hub Getting started” document.
   - Procedure for Ekip E-Hub is described in “Ekip E-Hub Getting started” document.

   Tip: Please note that the laptop shall be connected to the same Ethernet network where the cloud access point is connected, which must be provided with access to the internet.. To access IP settings in Windows, access laptop “Control Panel”>”Network and Sharing Center”>”Change adapter settings”>right click on “Local Area Connection (LAN)”>”Properties”>”Internet Protocol Version” and “Properties”.

   Make sure communication is now set as described in the documents (see sections “Configuring the system” and “Laptop configuration”).

C. Before provisioning M4M products in ABB Ability™ Energy Manager, it is recommended to have the latest Firmware version installed on the devices in order to have the most updated set of funtionalities. Installed FW version can be checked in the "Device info" menu: how to reach this menu is reported in the M4M 20 and M4M 30 user manual in the section "7.1 Unit" > "Device info menu". The procedure explaining how to update FW from EPiC is detailed in the dedicated document Ekip Connect 3.

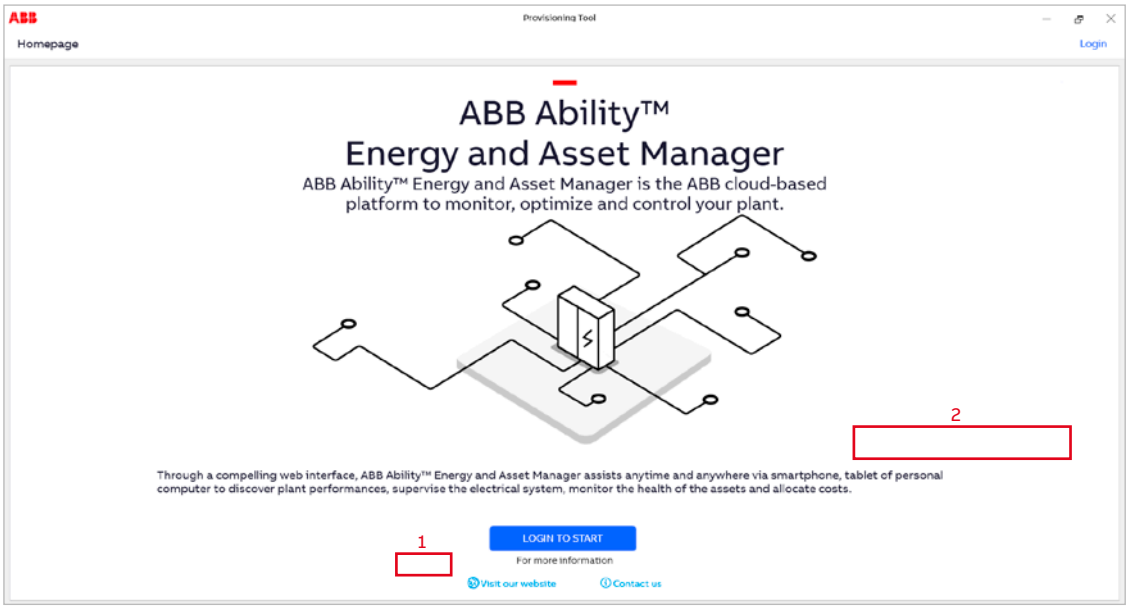


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Image 1

D. Follow the “Device Provisioning” procedure of the specific access point installed, either Ekip COM Hub or the cloud commissioning tool which is part of the the ABB Ability™ Edge Industrial gateway

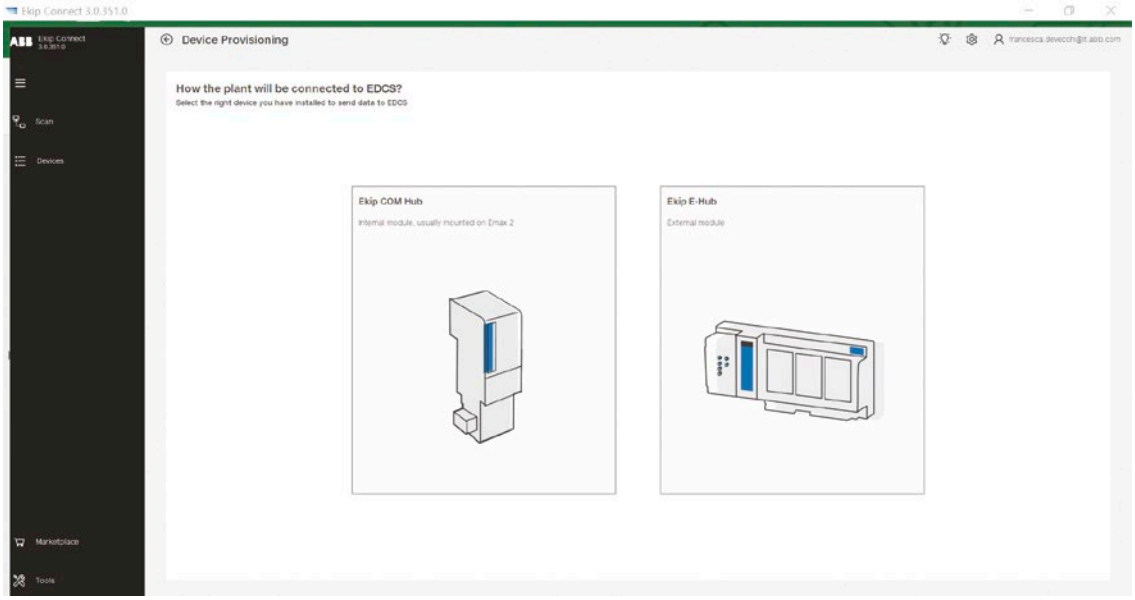

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Image 2

E. When the “Discover configuration” page is reached, Ekip Connect 3 scans the whole Ethernet and Modbus network, looking for devices to provision. With “Manual discovery”, it is possible to insert specific IP addresses and Modbus RTU addresses to narrow the addresses range to be scanned. Before proceeding with manual discovery, please make sure
   - all TCP devices to be provisioned have a static IP address in the sub-network range, as described
   - to know all ID slave addresses of Modbus RTU devices to be provisioned

   Tip: Manual discovery is preferred because it allows shorter scanning time.

Here the steps to follow to scan for devices:
1. Click on “Manual discovery settings”
2. In order to scan the whole Ethernet and Modbus RTU network
   a. In the section “IP addresses” (2a), insert the IP address of M4M Ethernet in the list of IP addresses to be scanned, together with IP addresses of selected access point and other TCP devices. It is possible to either add IP addresses one by one (“Use IP address list”), or input IP address range (“Use IP address range”).
   b. in the drop-down menu, select "slave addresses" (2b) of all devices connected via Modbus RTU to be provisioned. In the example, one M4M whose slave address is 141 is to be provisioned.
3. Then press “OK” and “Start Discovery”.

Provisioning and visualization in ABB Ability™ Energy Manager of M4M

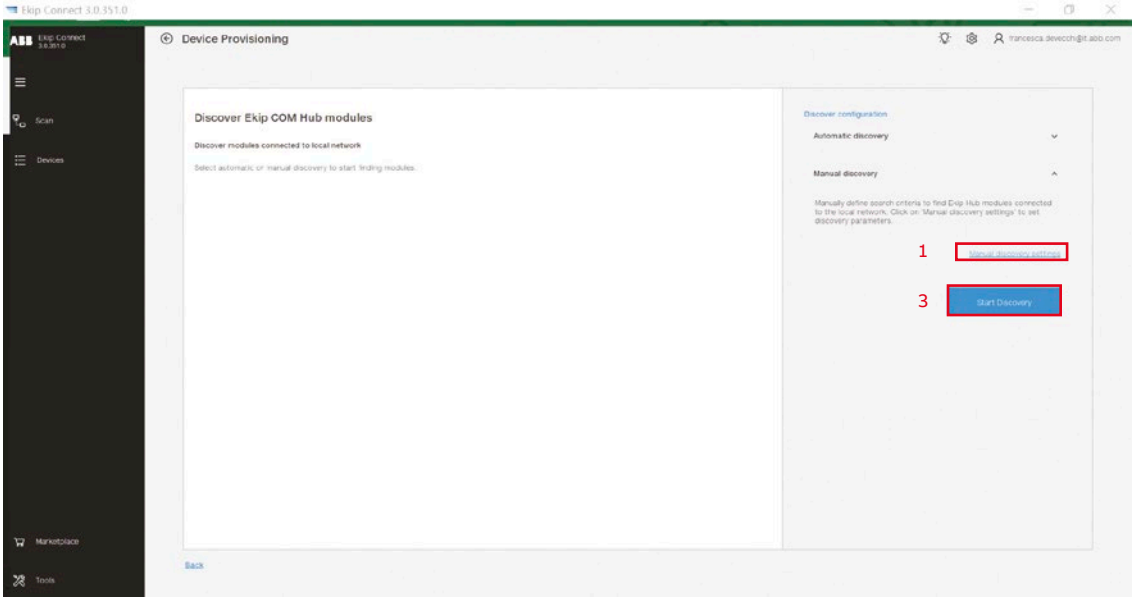

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Image3

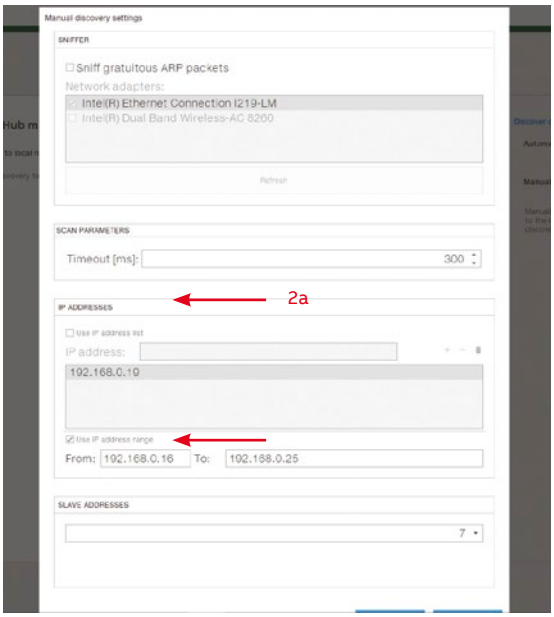

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Image4

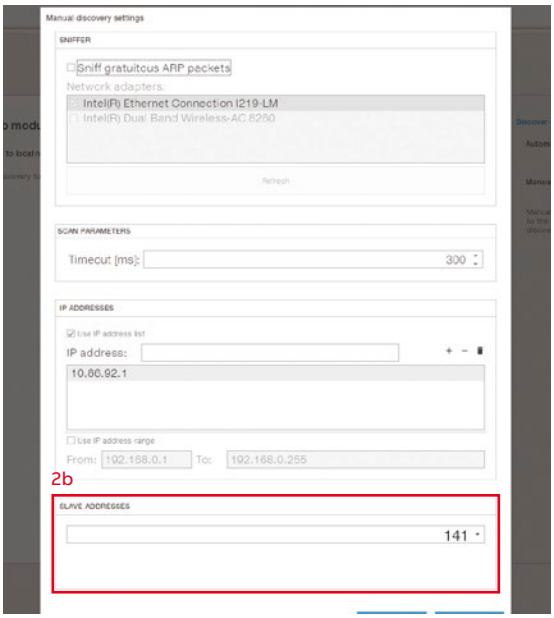

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Image5

F. Once M4M is found and inserted into the list of the connected devices,
   1. click on the blue arrow on the right of the selected device
   2. In the section “Device information”, please add a tag name.

   TIP: “TAG Name” shall have the following characteristics:

   a) Do not give same TAG Name to different devices
   b) Each TAG Name cannot be more than 10 characters
   c) Special characters are not allowed
   d) Backspace is not allowed (please use underscore).

Please ensure “Enable device to send data” is ON.

G. After completing assignment of tag names to all devices, complete the commissioning by clicking on “Add to ABB Ability™ Energy Manager” (3).

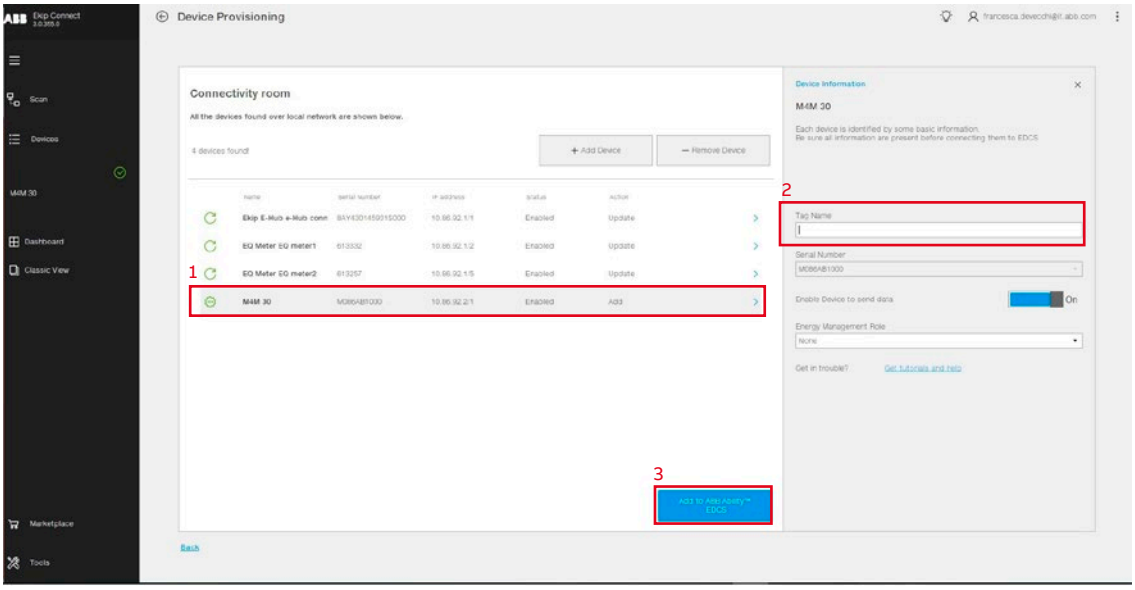

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Image6

H. Follow instructions on “Ekip Com Hub Getting started”/”Ekip E-Hub Getting started” document to publish the plant on ABB Ability™ Energy Manager.
Due to security checks between module and platform, you might not be able to see any real time data on the ABB Ability™ Energy Manager webapp during the first 15 to 30 minutes after completing the commissioning.
TIP: In case after 15 minutes you do not see data in the platform, please turn off and then back on the power supply to the Ekip Com Hub module or Ekip E-Hub.

M4M visualization in ABB Ability™ Energy Manager

Information

Information of the device are available on ABB Ability™ Energy Manager webapp once the device is connected.
Go to Monitor > devices > select device (M4M) > information. Three tabs are available:

- State
- General Parameters
- Electronics

Reports

Through Energy Manager it is possible to create and download reports. On ABB Ability™ Energy Manager webapp, go on “Optimize”> “Report”. Then select “Report type”, “Period”, “Aggregation time range” and devices to be included in the report. It is also possible to compare different plants.
To create the report, click on “Generate report”. In the reports the following measurements for each M4M can be downloaded:

- Avg, max and min currents (phase and neutral currents)
- Avg, max and min voltages (line and phase to phase voltages)
- Avg, max and min active, reactive and apparent power, total and per phase
- Avg, max and min THD
- Avg, max and min frequency
- Avg, max and min power factor
- Active, reactive and apparent total energy.

All these measurements can be included in the report only if those measurements are actually available from the selected M4M. In case some measurements are not supported by the device itself, it will not be possible to visualize them in ABB Ability™ Energy Manager. In order to select the correct M4M with all required functionalities, please refer to the catalogue available at this link (9AKK107492A3557).

Widgets where M4M can be displayed

Widgets and measurements described below will be visualized only if those measurements are actually available from the selected M4M. In case some measurements are not supported by the device, it will not be possible to visualize them. In order to select the correct M4M with all required functionalities, please refer to the catalogue available at this link (9AKK107492A3557).

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Image7

A. How to add a widget

Widgets can be added in the dashboard according to user's preferences and needs. Widgets can be added and removed any time.

In order to add a widget

1. go on "Monitor">"Dashboards">"Overview"
2. Click on "Add widget"
3. A new window with all available widgets appears ("Dashboard – Add widget" window). Click on "Add" to add the wanted widget. It is possible to add also more widgets of the same type.
   The green number on the upper right of each widget indicates how many widgets of that type are visible in the dashboard.
4. After adding all needed widgets, close the "Add widget" window.
   Tip: you can add as many widgets as needed, e.g. one per M4M connected.

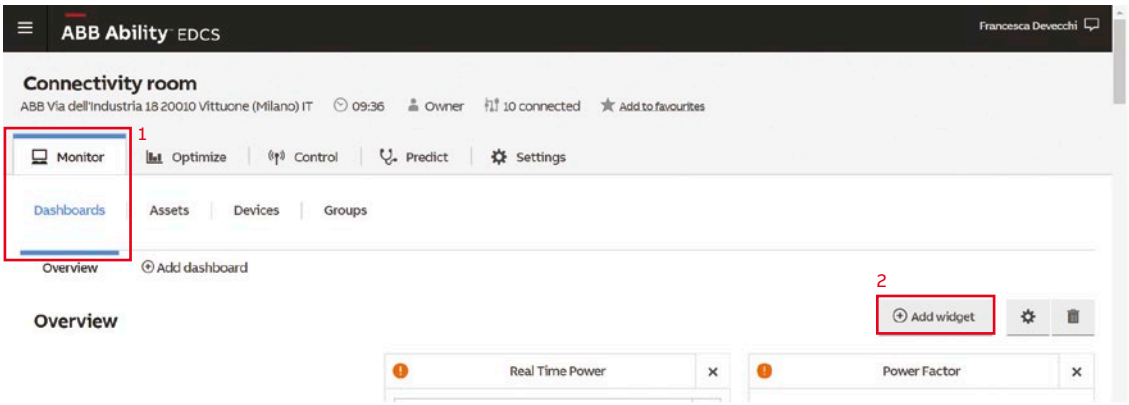

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Image8

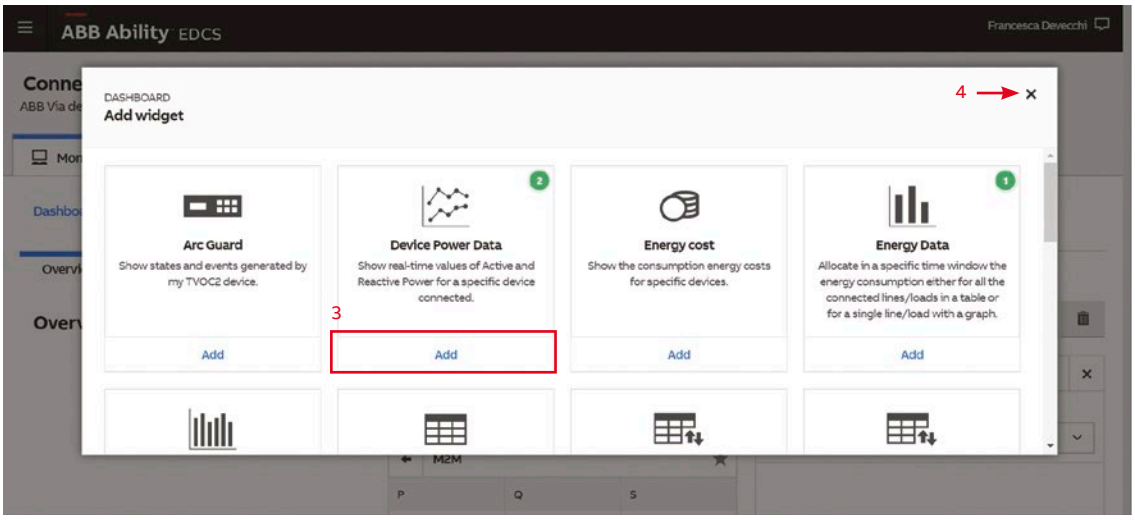

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Image9

M4M visualization in ABB Ability™ Energy Manager

B. Real Time Powers widget
The widget “Real Time Powers” monitors real-time data of Active, Reactive and Apparent Power for each connected device.
In case “all devices” is selected in the widget, measured powers from all devices are listed in a table.

In case only one M4M shall be visualized, select the device in the drop-down list of available devices in the widget. Measured Active, Reactive and Apparent Power are displayed as a graph.

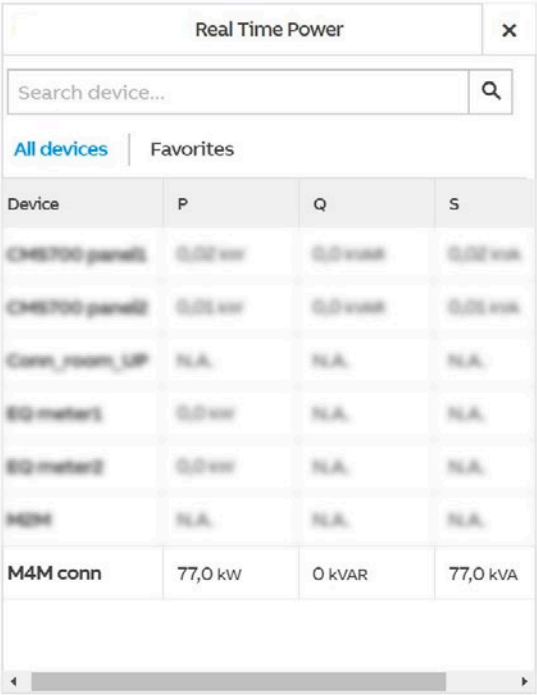

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Image10

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Image11

C. Real Time Currents widget

The widget “Real Time Currents” monitors real-time data of the currents for each connected device.

In case “all devices” is selected, measured currents from all devices in the plant (measuring current) are listed in a table.

In case only one M4M shall be visualized, select the device in the search bar listing available devices in the widget. Measured currents are displayed in a graph.

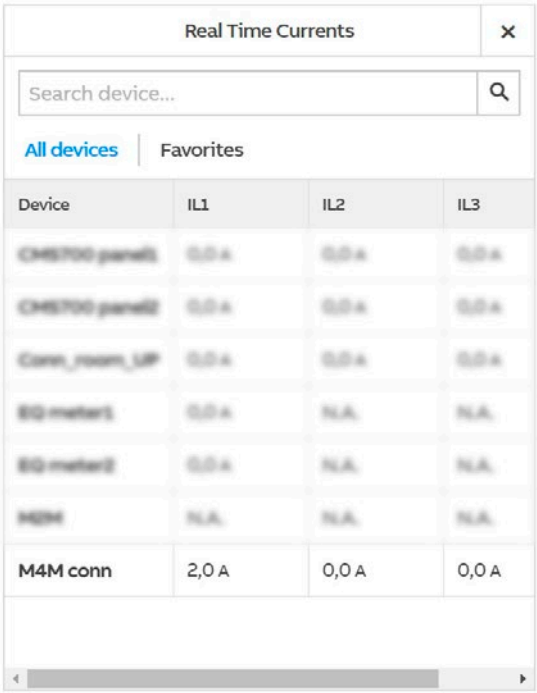

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Image12

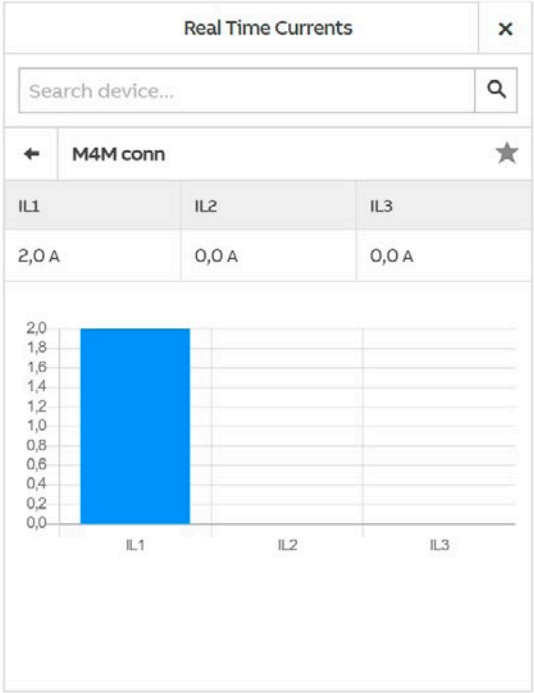

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Image13

M4M visualization in ABB Ability™ Energy Manager

D. Real Time Voltage widget

The widget “Real Time Voltage” shows real-time data of the voltage, either phase-phase voltage or phase-neutral voltage, for each connected device.

In case “all devices” is selected, measured voltages from all devices in the plant (measuring voltage) are listed in a table.
In case only one M4M shall be visualized, select the device in the search bar listing available devices in the widget. Measured voltages are displayed in a graph.

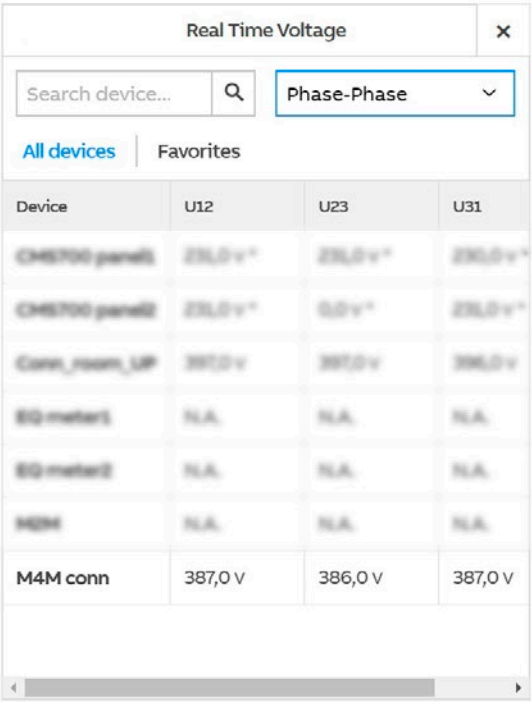

Image14

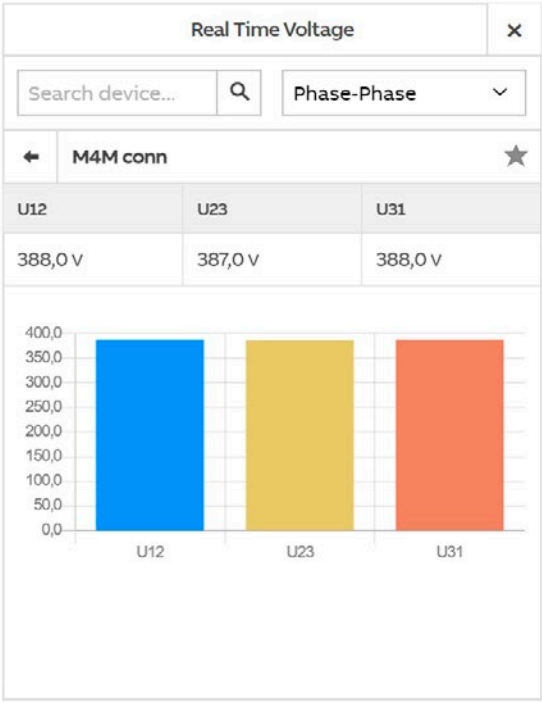

Image15

E. Device Power Data widget

The widget “Device Power Data” shows in a graph the real-time values of Active and Reactive Power for a specific device connected and for a selected period of time.

The widget allows the visualization of one device at a time. Select the device in the drop-down list of available devices in the widget.

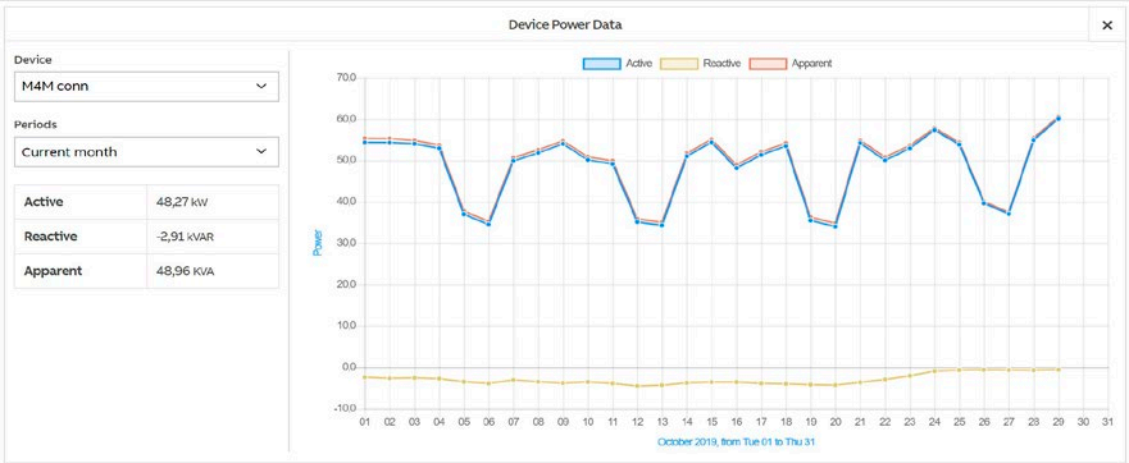

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Image16

M4M visualization in ABB Ability™ Energy Manager

F. Power Factor widget
The Power Factor can also be monitored by the dedicated widget “Power Factor”.
A specific period of time can be selected.
The widget allows the visualization of one device at a time. Select the device in search bar listing available devices in the widget.

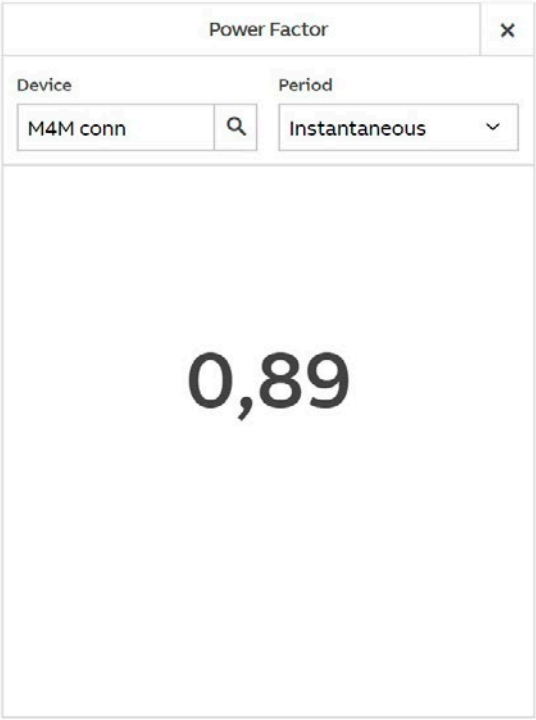

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Image17

G. Power Quality widget
Power quality can also be monitored by the dedicated widget “Power Quality”.
The widget allows the visualization of one device at a time. Select the device in the search bar listing available devices in the widget.
For M4M, it displays in a table THD of voltage and current for each phase.

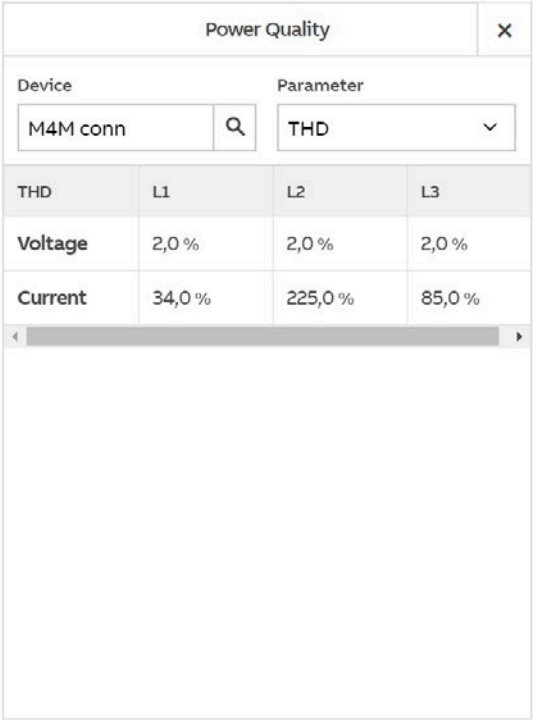

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Image18

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