

MANUAL

M4M desktop software

Getting started with Ekip Connect



Table of Contents

1	Material and tools needed	4
2	Initial settings on M4M device	5
2.1	M4M Modbus RTU (M4M 20 Modbus, M4M 20 I\O, M4M 20 Rogowski, M4M 30 Modbus, M4M 30 I\O, M4M 30 Rogowski)	5
2.2	M4M Ethernet (M4M 20 Ethernet, M4M 30 Ethernet)	6
3	M4M on Ekip Connect	7
3.1	Scan.....	7
3.2	Dashboard	10
3.3	Configuration	11
3.3.1	General parameters	11
3.3.2	Installation parameters	11
3.3.3	Tariffs.....	12
3.3.4	Demand settings.....	14
3.3.5	Load profile settings	15
3.3.6	Energy historicals.....	16
3.3.7	Alarms.....	16
3.3.8	Complex alarms	17
3.3.9	Communication parameters	18
3.3.10	Reset commands.....	18
3.4	Monitoring.....	19
3.4.1	Energy.....	19
3.4.2	Realtime	21
3.4.3	Power Quality.....	21
3.4.4	Demand	23
3.4.5	Load Profile	23
3.5	I/O	24
3.5.1	Status.....	24
3.5.2	Configuration.....	24
3.6	Notifications	27
3.6.1	All	27
3.6.2	Alarms.....	27
3.6.3	Warnings	27
3.6.4	Errors	28
3.7	Classic View	29
3.8	Tools – File manager	29
3.8.1	Export of settings.....	29
3.8.2	Import of settings.....	31
3.9	Tools – System Update	33
3.10	Tools – Firmware update.....	33
3.11	Tools – Report.....	36
4	Annex: Product details	37
4.1	M4M versions and features	37
4.2	M4M 2X feature packages.....	38

1 Material and tools needed

- Latest FW version of M4M downloaded automatically from Ekip Connect in C:\ProgramData\ABB\EkipConnect3\Firmware\M4M. Alternatively, available at this [link](#) (1SDC200011X0100)
- **M4M 2X**: Please follow this manual; for M4M 2X feature packages please check annex (chapter 4)
- **M4M 20**: User manual available at this [link](#) (2CSG445032D0201)
- **M4M 30**: User manual available at this [link](#) (2CSG445042D0201)
- Ekip Connect 3 software, updated to the latest version, available at this [link](#) (1SDC20011X3000)

2 Initial settings on M4M device

- In case of M4M 2X communicating via Modbus RTU, please follow chapter 3 and scan the device with following default configurations:
 - Baud rate: 19200
 - Parity: Even
 - Address: 1
- In case of M4M 2X communicating via Modbus TCP/IP, please follow chapter 3 and scan the device with following default configurations:
 - DHCP: Disabled
 - IP address: 192.168.1.12
- In case of M4M communicating via Modbus RTU, please follow the dedicated section "M4M Modbus RTU"
- In case of M4M communicating via Modbus TCP/IP, please follow the dedicated section "M4M Ethernet"

2.1 M4M Modbus RTU

(M4M 20 Modbus, M4M 20 I\O, M4M 20 Rogowski, M4M 30 Modbus, M4M 30 I\O, M4M 30 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. Steps to set Modbus RTU communication parameters are described in section "Communication menu" of M4M 20 and M4M 30 user manual.

To reach the settings section, on the device:

"HOME"→"Configuration"→"Communication"→"Modbus RTU".

In the "Address" section, select an address from 1 to 247. [Default: 1]

In the "Baud rate" section, select the desired baud rate from the list (9600, 19200, 38400, 57600, 115200). [Default: 19200]

TIP: with a default baud rate of 19200 the FW update takes about 20 minutes. With 115200 it takes about 6 minutes.

In the "Parity" section, select the desired parity from the list (Even, Odd, None). [Default: Even]

- C. Follow the instructions both if M4M works in an RS485 network or if it is connected via serial port to PC:

TIP: In order to directly connect M4M to PC, a RS-485/USB converter is needed.

Verify that Modbus RTU communication settings of M4M are equal to Modbus RTU settings of the master device.

If the master device is an ABB cloud access point, default settings are reported below:

- Baud Rate = 19200
- Protocol = 8E1 (8 bit data, even parity and 1 bit stop)
- RTU address for Master Device = 1
- RTU address for M4M slave device: to be inserted starting from 1 to 247.

TIP: Each device shall be provided with a different slave address. Otherwise, only one of the devices with the same slave address can be recognized.

2.2 M4M Ethernet

(M4M 20 Ethernet, M4M 30 Ethernet)

- A. 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.

In the "DHCP" section, select between Enable and Disable. [\[Default: Disabled\]](#)

In the "IP address" section, select the desired address of the device (if the DHCP flag is "Enable", then the IP address is given by the DHCP. In this case the IP address is read only). [\[Default: 192.168.1.12\]](#)

TIP: In case of ABB cloud access point, DHCP on M4M should be disabled (as default) and its TCP port, should be at the default value (502).

TIP: In case of ABB cloud access point, IP of M4M shall be in the range of the sub-network where the cloud access point is connected, which must be provided with access to the internet.

- B. According to the architecture, follow the instructions

1. M4M directly connected to laptop via Ethernet port

Laptop shall be connected to same Ethernet network where the M4M is connected. 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".

2. M4M connected in the local area network

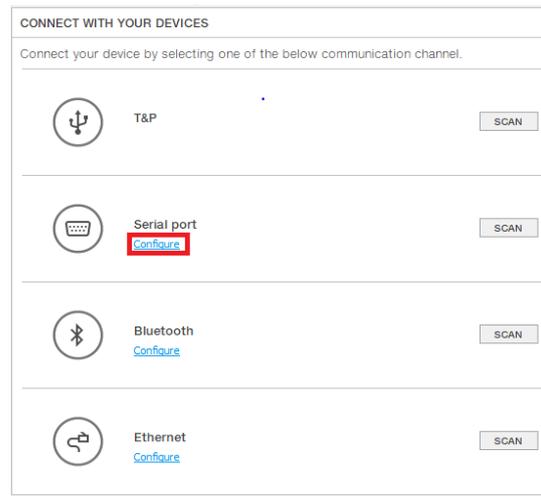
Laptop shall be connected to the same local area network as M4M.

3 M4M on Ekip Connect

3.1 Scan

- A. Make sure you have a MyABB account. If not, it is recommended to register on MyABB to activate an account.
- B. Open Ekip Connect desktop in the “Scan” tab
- C. Configure the scanning via communication protocol
 1. Via Modbus RTU (M4M Modbus)

Click on “Configure” under Serial port.



Select port name, baud rate (default: 19200), parity (default: Even), slave addresses (default: 1) of all devices connected via Modbus RTU to be updated.

Suggested timeout is 500ms.

Press “OK”.



2. Via Modbus TCP/IP (M4M Ethernet)

Click on “Configure” under Ethernet

CONNECT WITH YOUR DEVICES

Connect your device by selecting one of the below communication channel.

- T&P [SCAN]
- Serial port [SCAN] [Configure](#)
- Bluetooth [SCAN] [Configure](#)
- Ethernet [SCAN] [Configure](#)

In the section “Sniffer”, do not select the “Sniff gratuitous ARP packets” box if not needed.

Suggested timeout is 500ms.

In the section “IP addresses”, insert the IP address of M4M Ethernet in the list of IP addresses to be scanned (default: 192.168.1.12). It is possible to either add IP addresses one by one (“Use IP address list”), or input IP address range (“Use IP address range”).

Press “Ok”.

Ethernet settings

SNIFFER

Sniff gratuitous ARP packets

Network adapters:

- Intel(R) Ethernet Connection I219-LM
- ASIX AX88179 USB 3.0 to Gigabit Ethernet Adapter

Refresh

SCAN PARAMETERS

Timeout [ms]:

IP ADDRESSES

Use IP address list

IP address:

192.168.1.12

192.168.1.13

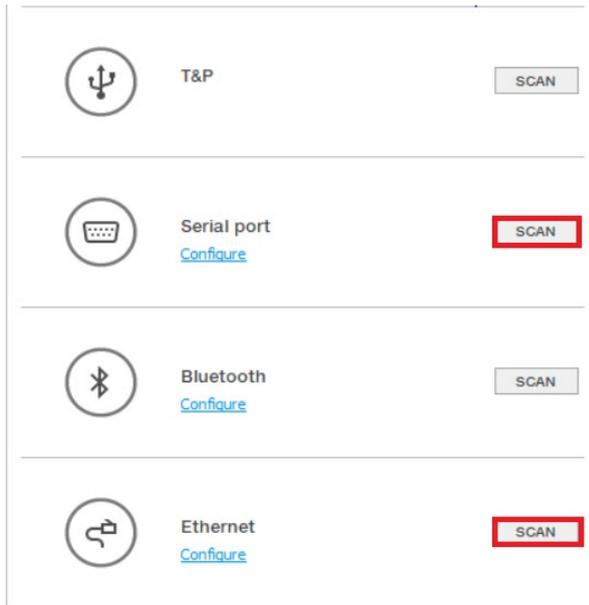
Use IP address range

From: To:

SLAVE ADDRESSES

OK Cancel

D. After the configuration is completed, click on “Scan”



E. M4M is now connected to Ekip Connect.

3.2 Dashboard

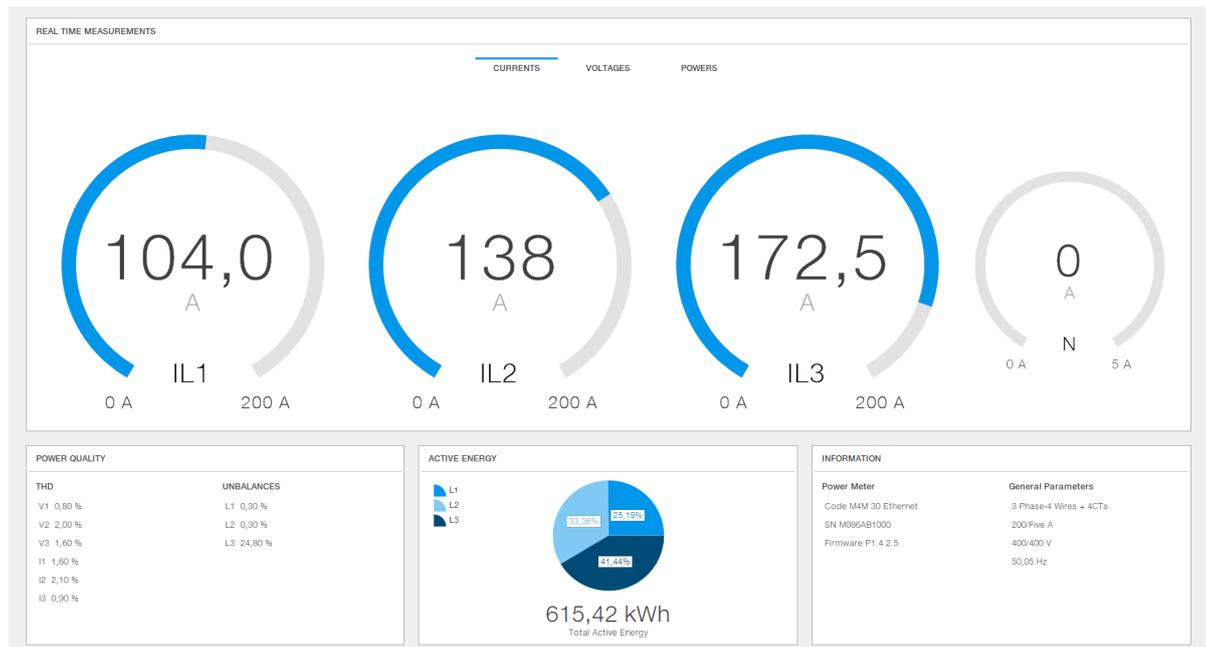
In this section, it is possible to visualize the device dashboard, showing the basic information (Real-Time Measurement, Power Quality KPIs, Energy values, Information).

Real-Time measurements widget includes info on currents, voltages, powers.

Power Quality KPIs widget includes info on THD and unbalances.

Energy values widget includes info on energy value, per phase and total.

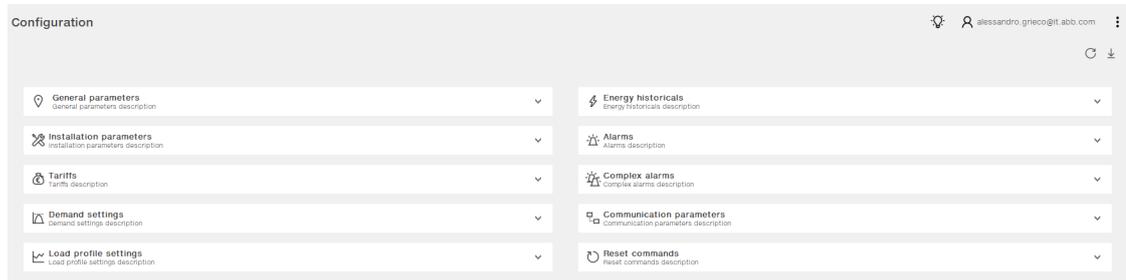
Information widget includes info on the device (product name, serial number, FW version, installation parameters configured on the power meter).



Info: In case of multiple devices connected, you can read out the list of devices in the “Devices” tab and change the M4M to read and/or configure.

3.3 Configuration

In this section, it is possible to fully, remotely setup and configure a M4M network analyzer via desktop computer.

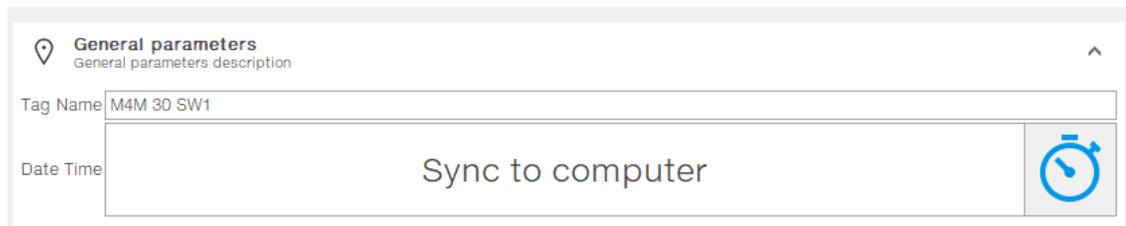


Once one of the configurations is completed, please press on the “Write” button on the top right to send it remotely to the M4M.

3.3.1 General parameters

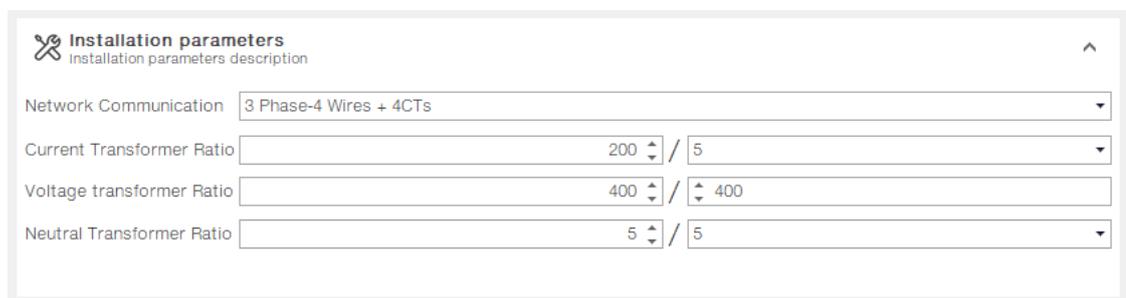
This section allows the user to assign a unique Tag Name to the M4M device for an easier identification.

Furthermore, it is possible to manually set date and time on the device, or to sync them to computer’s date and time through the dedicated icon.



3.3.2 Installation parameters

This section allows the user to configure the main installation parameters of the M4M device.



Type of network

In order to configure the type of network it is needed to choose one of the available options according to the installation conditions.

According to the type of network that has been chosen, the parameters visualized on the software and device HMI change.

CT ratio

M4M is capable to measure current only via indirect connection by means of current transformers CTs.../5A or .../1A (M4M 30 Modbus, M4M 30 Ethernet, M4M 30 I/O, M4M 30 Profibus, M4M 30 Bacnet, M4M 2X Modbus, M4M 2X Ethernet, M4M 20, M4M 20 Modbus, M4M 20 Ethernet, M4M 20 I/O, M4M 20 Profibus, M4M 20 Bacnet), or Rogowski coils (M4M 30 Rogowski, M4M 20 Rogowski).

If CTs are used, then on the network analyzer it is needed to set the transformation ratio of the installed current transformers.

If Rogowski coils are used (M4M 30 Rogowski, M4M 20 Rogowski), it is not needed to set any transformation ratio.

In order to configure the current transformers ratio it is possible to manually enter a value.

Info: CT secondary can either be 1 or 5. CT primary value cannot be lower than CT secondary value.

VT ratio

M4M is capable to measure voltage via direct connection up to 400 VL-N (690V L-L), or via indirect connection by means of voltage transformers.

In order to configure the voltage transformer ratio it is needed to enter manually the values of both primary and secondary.

Info: In case of direct insertion without voltage transformers (possible up to 400V L-N), please set VT ratio as 400/400 (default)

CT ratio Neutral

In case a 4th current transformer is used to measure the neutral current, CT ratio for the Neutral has to be configured.

Info: This feature is available on all M4M 30 or M4M 2X with PQ2 package (M4M 2X RTU/TCP PQ2, PQ2+R). *See Annex (chapter 4) for details.*

3.3.3 Tariffs

In this section it is possible to configure up to six tariffs to monitor consumption in different time frames. It is possible to control activation via: clock, setting up to three input channels and settings sent via bus.

Info: This feature is available on all M4M 30 or M4M 2X with RTS package (M4M 2X RTU/TCP RTS, PQ1+R, PQ2+R). *See Annex (chapter 4) for details.*

Clock

Selecting Clock, it is possible to define when the different tariffs are active, according to specific day and hour, driven by Real Time Clock.

After selecting a tariff (6 tariffs available), it is needed to configure the type of day of the tariff – during the week or during the weekend.

Select the day type among one of the following options: None, Weekday, Weekend. In order to disable a tariff, please select None.

If weekday or weekend is chosen, then the tariff will be enabled during the weekdays or during the weekend, and it is needed to select the start hour and minute of the tariff.

Info: Each tariff is kept active until the next tariff is activated, thus to define the end hour of each tariff set it as the start hour of the following tariff in the same day type.

€ Tariffs
Tariffs description

Tariff Source **Clock** Communication Input

#	Day Type			Hour	Minute
Tariff 1#6	None	Weekday	Weekend	23	00
Tariff 2#6	None	Weekday	Weekend	07	00
Tariff 3#6	None	Weekday	Weekend	23	00
Tariff 4#6	None	Weekday	Weekend	07	00
Tariff 5#6	None	Weekday	Weekend	00	00
Tariff 6#6	None	Weekday	Weekend	00	00

Communication

Selecting Communication, the activation of the tariffs is controlled by bus.

It is possible to select which tariff is the current one.

€ Tariffs
Tariffs description

Tariff Source Clock **Communication** Input

Current Tariff **Tariff 2**

- Tariff 1
- Tariff 2**
- Tariff 3
- Tariff 4
- Tariff 5
- Tariff 6

Input

Selecting Input, the activation of the tariffs will follow the following table:

Input 1	Input 2	Input 3	Tariff
OFF	OFF	OFF	= T1
ON	OFF	OFF	= T2
OFF	ON	OFF	= T3
ON	ON	OFF	= T4
OFF	OFF	ON	= T5
ON	OFF	ON	= T6

It is possible to visualize which tariff is the current one.

€ Tariffs
Tariffs description

Tariff Source Clock Communication **Input**

Current Tariff **Tariff 2**

3.3.4 Demand settings

Max/min demand functionality is used to measure and store in the product flash memory the maximum and minimum demand values referred to a specific time period (day, week, month) of main real time measured.

Demand values are calculated over a specific time interval (from 1 to 60 minutes). When the last interval of an ongoing period has finished, the maximum and/or minimum values are stored together with the timestamps, and a new period starts. Therefore, within the defined time period M4M will provide the max/min demand values calculated over the time interval. It is possible to store also the 2nd and the 3rd max/min.

Max/min demand functionality allows to store up to the 3 highest and/or lowest demand values per each parameter. Up to 25 parameters, thus up to 25 channels of flash memory can be configured.

Info: This feature is available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R). *See Annex (chapter 4) for details.*

Setting	Description
Interval	Time interval used for calculation of demand values that will be stored into the memory with timestamp.
Sub-interval	In case of sliding demand it is needed to setup a sub-interval, with measured interval that will slide forward one sub interval at a time.
Period	Time period over which max and/or min values are evaluated and then stored.
Quantity	It is possible to link each channel to one of the parameters, allowing to store one parameter in each channel. Up to 25 parameters can be selected and stored. Default parameters are already setup in the M4M for each channel
Trace type	Configure the max/min type among one of the following options: Max, Min or Max and Min.
Levels	It is possible to store 2nd and 3rd max/min. Possible to store up to the 3 highest and/or lowest demand values per each parameter.

Demand settings
Demand settings description ^

Interval:

Sub-interval:

Period:

#	Quantity	Trace Type	Levels
1	Active power import total	Both min and max	3 Levels
2	Active power import L1	Both min and max	3 Levels
3	Active power import L2	Both min and max	3 Levels
4	Active power import L3	Both min and max	3 Levels
5	Reactive power import total	Both min and max	3 Levels
6	Reactive power import L1	Both min and max	3 Levels
7	Reactive power import L2	Both min and max	3 Levels
8	Reactive power import L3	Both min and max	3 Levels
9	Apparent power import total	Both min and max	3 Levels
10	Apparent power import L1	Both min and max	3 Levels
11	Apparent power import L2	Both min and max	3 Levels
12	Apparent power import L3	Both min and max	3 Levels
13	Voltage L1	Both min and max	3 Levels
14	Voltage L2	Both min and max	3 Levels
15	Voltage L3	Both min and max	3 Levels
16	Voltage L1-L2	Both min and max	3 Levels
17	Voltage L2-L3	Both min and max	3 Levels
18	Voltage L3-L1	Both min and max	3 Levels
19	Current L1	Both min and max	3 Levels
20	Current L2	Both min and max	3 Levels
21	Current L3	Both min and max	3 Levels
22	Current N	Both min and max	3 Levels

3.3.5 Load profile settings

Load profile functionality allows to calculate the demand value of main real time measured quantities like voltage, current, power and THD, calculated over a specific time interval. These demand values are then visualized in a load profile curve in order to check the trend of the real time quantities.

At the end of each time interval, the average value of defined quantities is stored into the memory with timestamp. Up to 25 parameters, thus up to 25 channels of flash memory can be configured.

Info: This feature is available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R). *See Annex (chapter 4) for details.*

Setting	Description
Interval	Time interval used for calculation of demand values that will be stored into the memory with timestamp.
Quantity	It is possible to configure each channel to one of the parameters, allowing to store one parameter in each channel. Up to 25 parameters can be selected and stored. Default parameters are already configured and defined in the M4M for each channel.

 **Load profile settings**
Load profile settings description ^

Interval:

#	Quantity
1	Active power import total
2	Active power import L1
3	Active power import L2
4	Active power import L3
5	Reactive power import total
6	Reactive power import L1
7	Reactive power import L2
8	Reactive power import L3
9	Apparent power import total
10	Apparent power import L1
11	Apparent power import L2
12	Apparent power import L3
13	Voltage L1
14	Voltage L2
15	Voltage L3
16	Voltage L1-L2
17	Voltage L2-L3
18	Voltage L3-L1
19	Current L1
20	Current L2
21	Current L3
22	Current N
23	THD Current L1
24	THD Current L2
25	THD Current L3

3.3.6 Energy historicals

This section is linked to two different functionalities: Energy Snapshots allows to obtain instantaneous energy snapshots taken in each time interval, and Energy Trend allows to obtain the difference between the energy values at the end and at the beginning of each time interval.

At the end of a defined time interval, up to 20 energy parameters are stored together with the timestamp.

Info: This feature is available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R).

Setting	Description
Period	Time period selected for storage of energy values.
Quantity	It is possible to link each channel to one of the parameters, allowing to store one parameter in each channel. Up to 20 parameters can be selected and stored. Default parameters are already setup in the M4M for each channel.



3.3.7 Alarms

In this section it is possible to configure the single alarms, allowing to monitor certain value selected from a list of parameters.

When specific conditions are met, alarms are turned on or off. Triggering of alarms can be registered in the devices' notifications log, in the alarms section. In addition to that, they can be set up to control digital outputs of the device.

Up to 25 simple alarms can be configured in the device.

In order to set an alarm, it is needed to define the parameter associated to the alarm, the alarm type (cross up over threshold, or cross down under threshold), the threshold value for the parameter, the activation delay and the hysteresis for the turn off threshold.

Setting	Description
Quantity	It is possible to link each alarm to one of the parameters . Up to 25 alarms can be created.
Alarm Type	Cross up or Cross down.
Threshold	Manual entry according to parameter
Delay	Manual entry from 0s to 900s.
Hysteresis	Manual entry from from 0% to 40%.

Alarms
Alarms description

Alarm 1

Quantity Voltage L3

Alarm Type Cross Up Cross Down

Threshold 500,0 V

Hysteresis 16 %

Delay 0 s

3.3.8 Complex alarms

In this section it is possible to configure the complex alarms, allowing to combine simple alarm into single entity through specific logics.

Up to 4 complex alarms can be configured on the device. It is possible to create an alarm logic that will allow the activation only in case of specific conditions.

Each complex alarm can be linked to up to 4 simple alarms, selected along with OR / AND logical operator. When OR is selected alarm will be tripped every time one of the conditions of the equation will turn positive; when AND is selected alarm will be tripped when all the conditions of the equation will turn positive.

Info: This feature is available on all M4M 30 or M4M 2X with RTS package (M4M 2X RTU/TCP RTS, PQ1+R, PQ2+R).

Complex alarms
Complex alarms description

Complex Alarm 1

Operation between components AND OR

Component 1 None

Component 2 None

Component 3 None

Component 4 None

3.3.9 Communication parameters

Communication menu allow to set all the parameters related to the communication protocol available for a specific product version. The embedded communication protocol varies according to the different product versions.

Info: Please notice that after changing communication parameters settings, it is needed to repeat the scanning of M4M device on Ekip Connect.


Communication parameters
 Communication parameters description ^

Modbus TCP

DHCP enabled	<input type="checkbox"/>
IP Address	192.168.1.12
Subnet Mask	255.255.255.0
Gateway	192.168.1.1
Port	502 ^

M4M Modbus RTU

Setting	Description
Address	From 1 to 247 (default:1)
Baud rate	9600, 19200 (default), 38400, 57600, 115200
Parity	Even (default), Odd, None

M4M Ethernet

Setting	Description
DHCP	Enable / Disable (disabled by default)
IP address	192.168.1.12 (by default)
Subnet mask	255.255.255.0 (by default)
Gateway	192.168.1.1 (by default)
TCP port	502 (by default)

3.3.10 Reset commands

In this section it is possible to carry out total or partial resets in M4M device.


Reset commands
 Reset commands description ^

Factory Reset
Avg/Min/Max Reset
Notification Reset
Energy Reset
Counter Reset
Historical Reset

Type of reset	Description
Factory reset	Restore the device to the factory state except for the audit log. Up to 20 factory resets can be carried out over the product lifetime.
Avg/Min/Max reset	Reset the average, min and max data.
Notification reset	Erase all notifications (Alarms, Warnings, Errors).
Energy reset	Erase all energy measurement accumulators. Up to 240 energy resets can be carried out over the product lifetime.
Counter reset	Reset of the count-down timer.
Historicals reset	Erase all historical data (Load Profile, Demands, Energy Snapshots and Energy Trend).

3.4 Monitoring

In this section, it is possible to fully, remotely visualize the measurements of a M4M network analyzer via desktop computer.

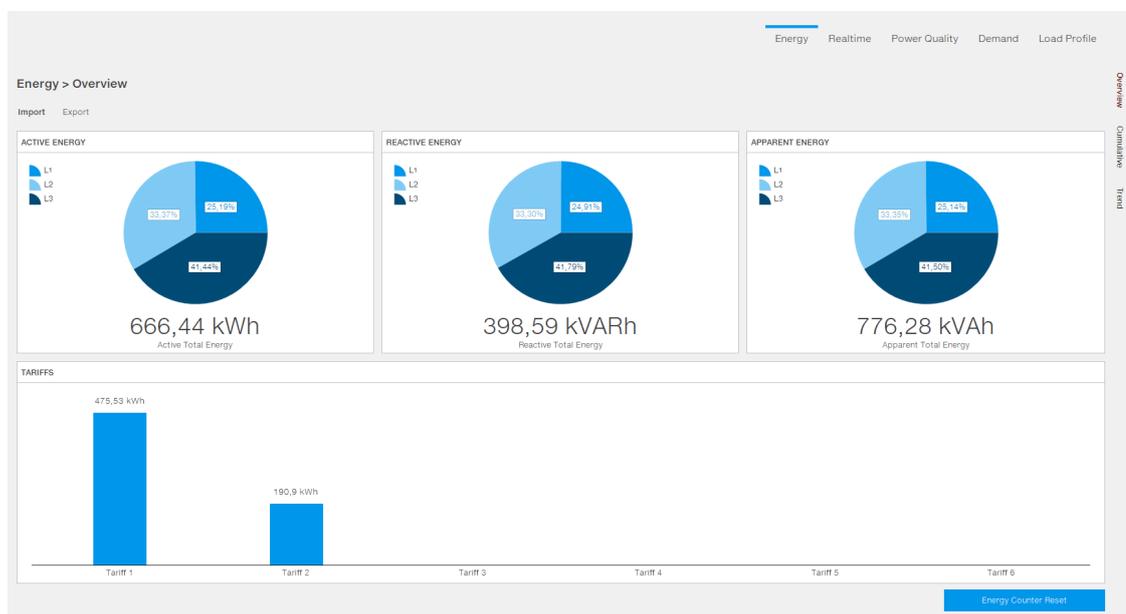
3.4.1 Energy

Overview

In this section it is possible to read out energy values, as well as resetting the energy counter, both for import and export values (4 quadrants).

It is also possible to read out the energy values divided per different tariffs, meaning user-defined time of use (TOU).

Info: Energy tariffs available on all M4M 30 or M4M 2X with RTS package (M4M 2X RTU/TCP RTS, PQ1+R, PQ2+R). *See Annex (chapter 4) for details.*



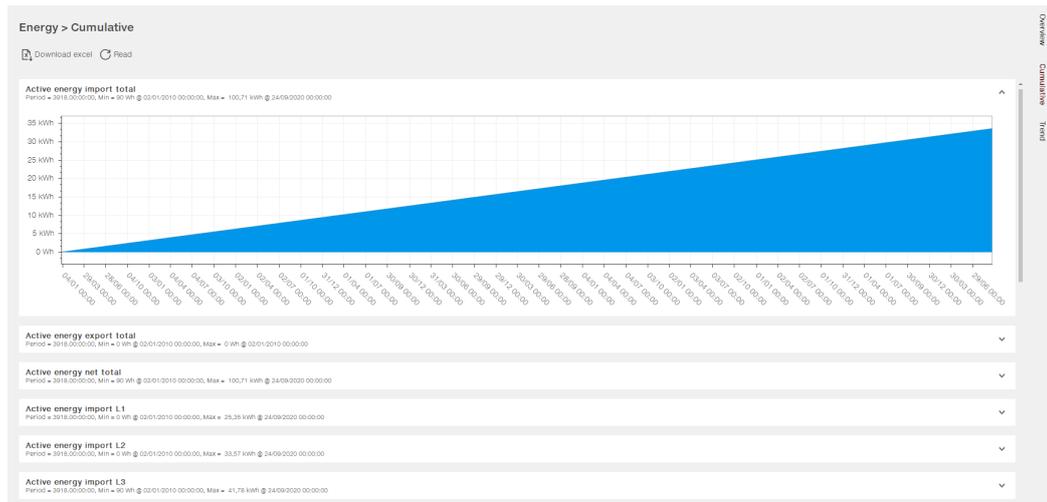
Cumulative

Visualization of energy graphs showing the energy consumption curve for 20 different parameters.

Each tab shows the graph of the stored energy snapshots taken according to the defined time interval. Description of each tab includes time period, as well as max and min value with respective timestamp.

Furthermore, the dedicated download icon allows the download of the full energy cumulative memory present in the meter as Excel file.

Info: This feature is available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R). See Annex (chapter 4) for details.

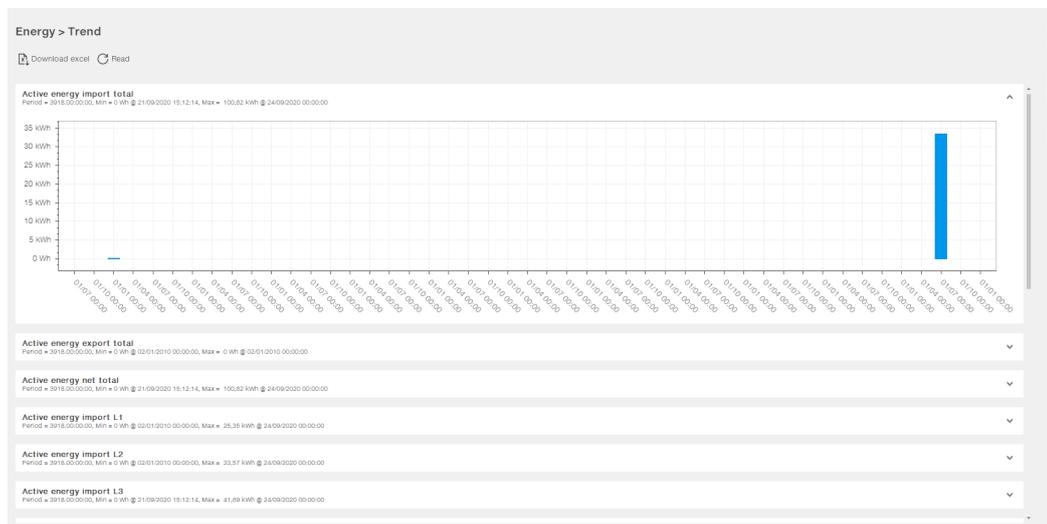


Trend

Visualization of energy trends graphs for 20 different parameters.

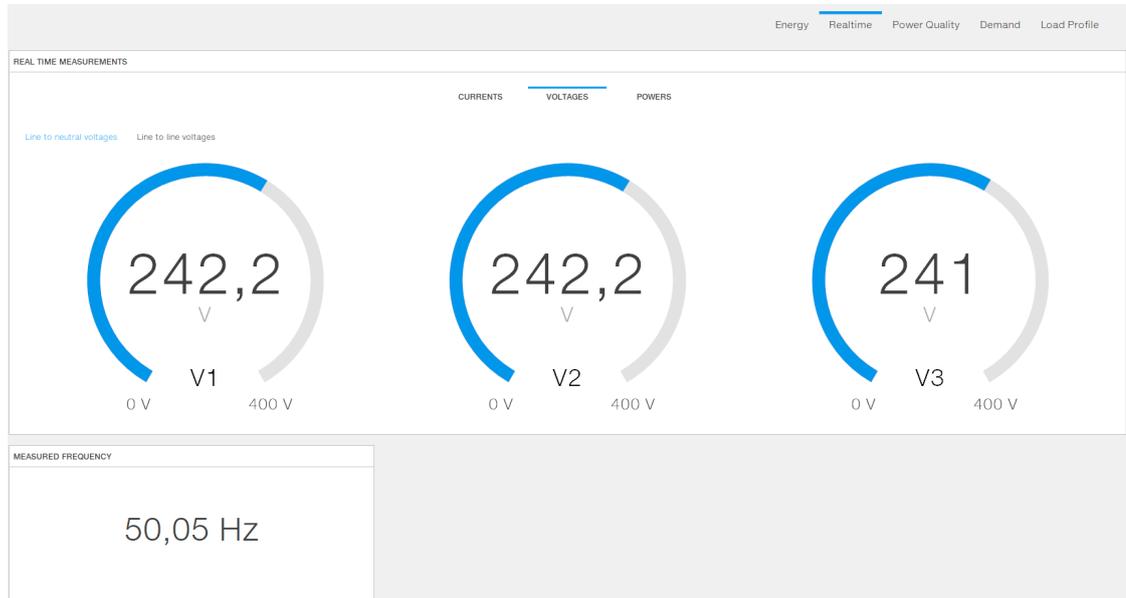
Each tab shows the graph of the stored energy values in the defined time interval (differences between value at the end and at the beginning of time interval). Description of each tab includes time period, as well as max and min value with respective timestamp.

Info: This feature is available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R). See Annex (chapter 4) for details.



3.4.2 Realtime

In this section, main real-time measurements are available, including current, voltage, power, frequency.

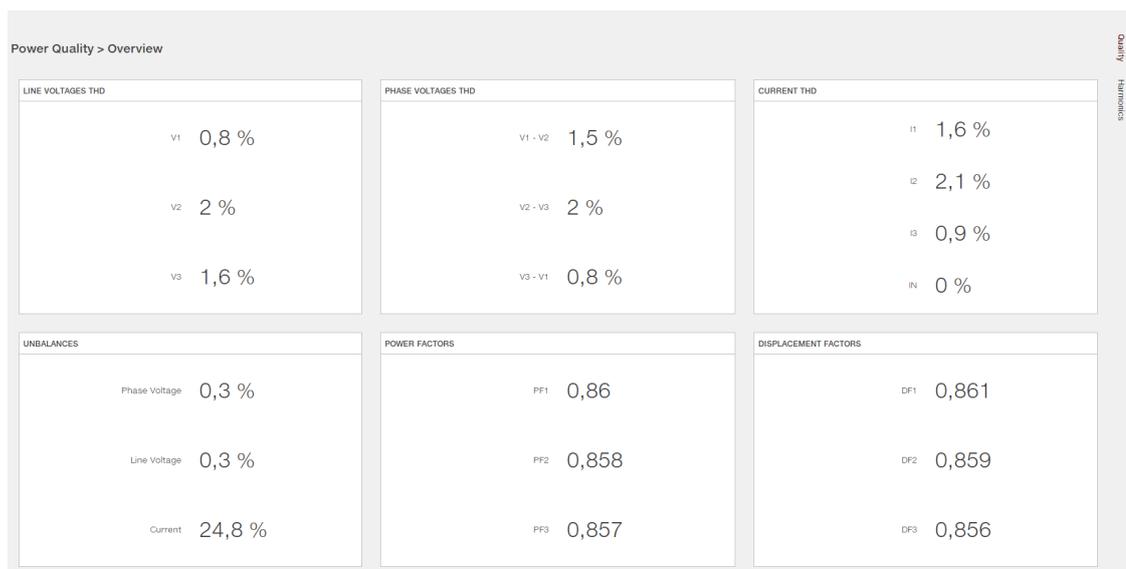


3.4.3 Power Quality

KPI

In this section, main power quality KPIs are available for reading, including Total Harmonic Distortion (THD), unbalances, power factor and displacement factor.

Info: Unbalances are available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R). *See Annex (chapter 4) for details.*



Harmonics

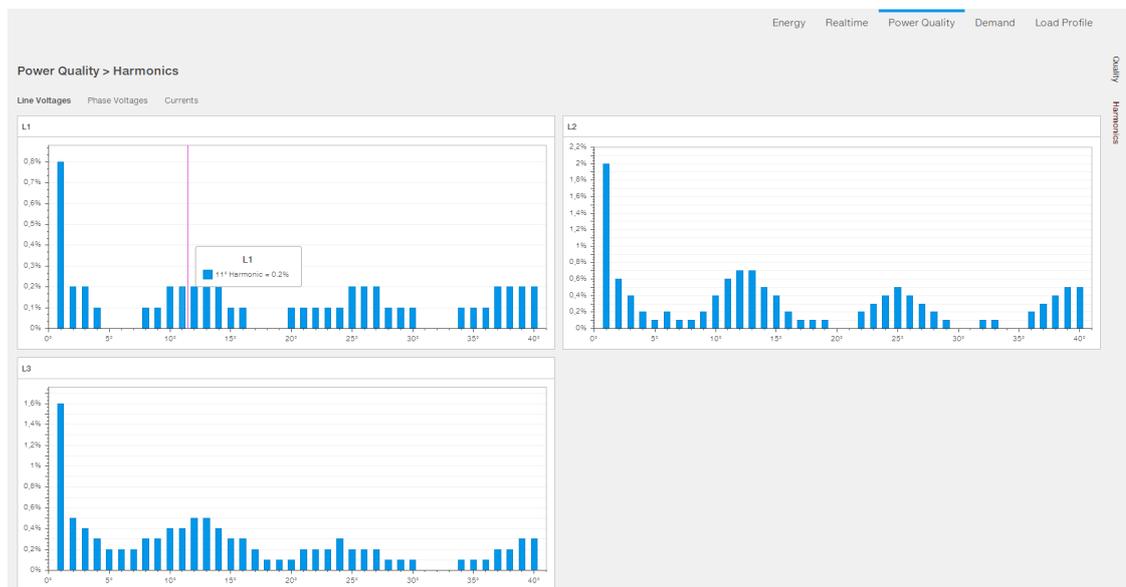
Harmonics are integer multiples of the fundamental frequency of the power system. Harmonics are used to identify if the supplied system power meets required power quality standards, or if non-linear loads are affecting your power system.

M4M, according to the product version, provides harmonic distortion metering up to the 40th harmonic, which are available on communication protocol.

In this section it is possible to visualize the harmonics as graphs, where the vertical axis of the harmonics graph indicates the harmonic's magnitude as a percentage of the fundamental harmonic.

Through the mouse pointer over the graph, it is possible to read out the value of the specific harmonic.

Info: Harmonics are available on all M4M 30 (40 harmonics), on M4M 2X with PQ1 package (25 harmonics – M4M 2X RTU/TCP PQ1, PQ1+R) or M4M 2X with PQ2 package (40 harmonics – M4M 2X RTU/TCP PQ2, PQ2+R). *See Annex (chapter 4) for details.*



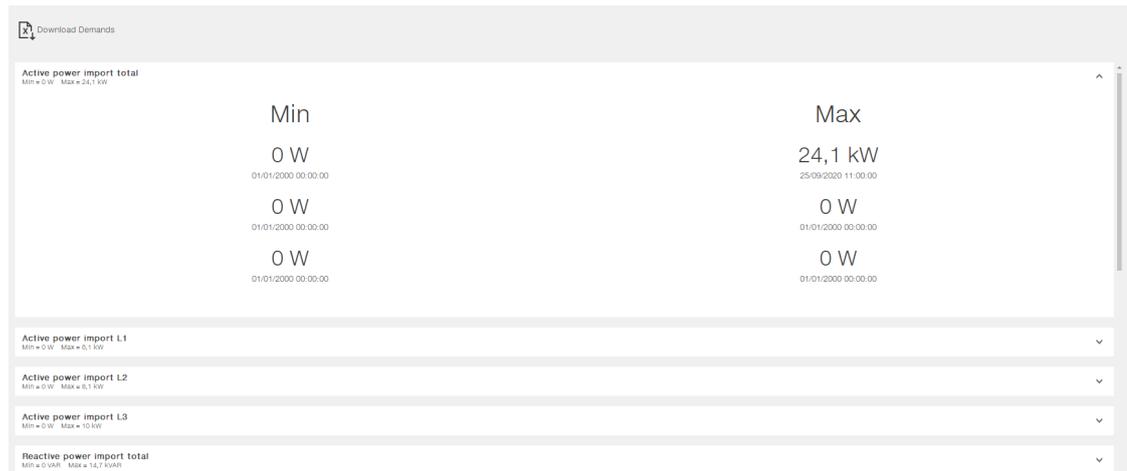
3.4.4 Demand

Visualization of the maximum and minimum values for 25 different parameters.

Each tab shows up to 3 levels of max and/or 3 levels of min demand values linked to the channel of memory, according to the configuration that has been carried out. Description of each tab includes max and min value.

Furthermore, the dedicated download icon allows the download of the full max/min demand memory present in the meter as Excel file.

Info: This feature is available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R). See Annex (chapter 4) for details.



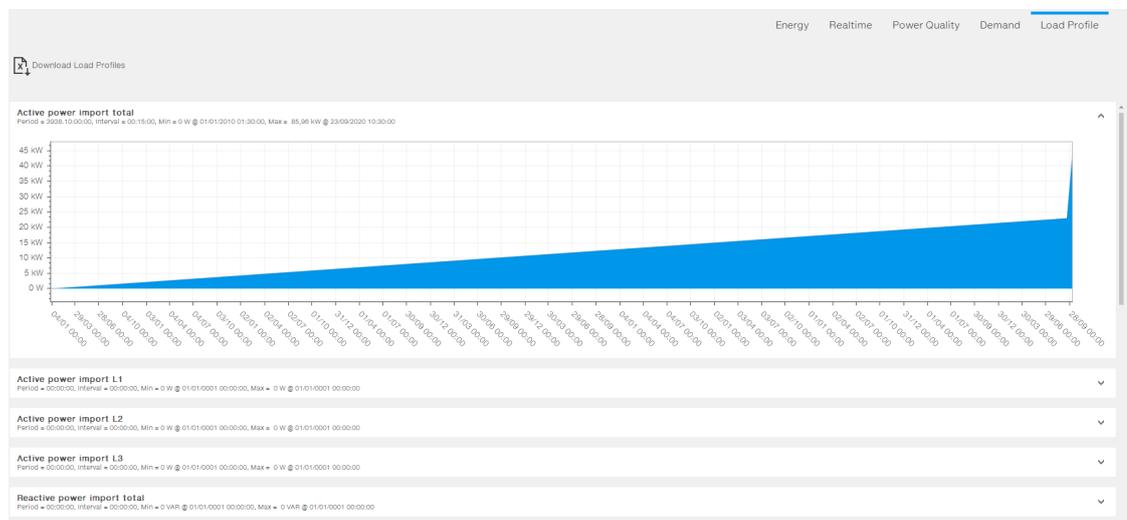
3.4.5 Load Profile

Visualization of load profile curves for 25 different parameters.

Each tab shows the graph of stored demand values for the selected parameter stored in a channel. Description of each tab includes time period, time interval info, as well as max and min value with respective timestamp.

Furthermore, the dedicated download icon allows the download of the full load profiles memory present in the meter as Excel file.

Info: This feature is available on all M4M 30 or M4M 2X with PQ1-PQ2 package (M4M 2X RTU/TCP PQ1, PQ2, PQ1+R, PQ2+R). See Annex (chapter 4) for details.



3.5 I/O

In this section it is possible to visualize the status of the I/O embedded in the M4M, as well as configuring them.

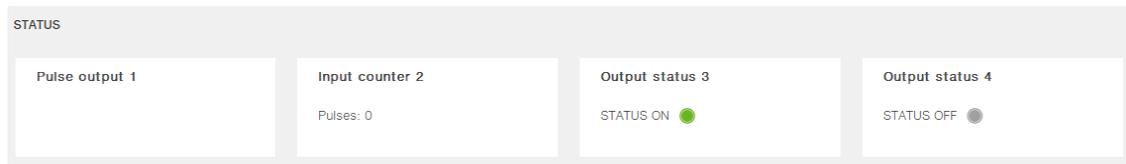
Info: The number and type of I/O on the M4M network analyzer varies according to the different product versions. Please refer to the table in “4.1. M4M versions and features” for the detail of I/O types per each M4M. Analogue outputs cannot be configured via Ekip Connect.

3.5.1 Status

In this section it is possible to read the status of each I/O slot of the meter.

According to the configuration chosen, the Status section shows different info:

- Alarm output: status (ON or OFF)
- Communication output: status (ON or OFF)
- Pulse output: no info shown
- Always ON: status ON
- Always OFF: status OFF
- Pulse input: counter of collected inputs
- Tariff input: status (ON or OFF)



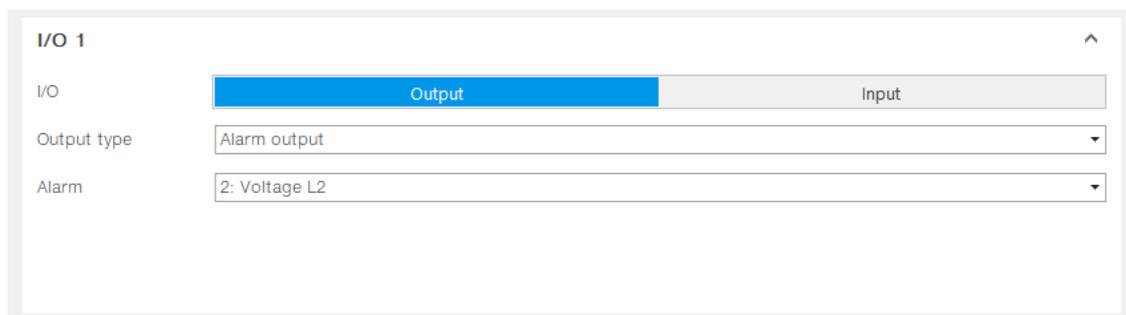
3.5.2 Configuration

In this section it is possible to configure I/O slots of the meter.

3.5.2.1 Alarm Output

Selecting Alarm output, the output can be associated to a simple alarm or to a complex alarm. Please note that it is mandatory to set up a single alarm or a complex alarm prior to setting an output as Alarm output.

For alarm settings, please refer to chapter “3.3.7. Alarms” and “3.3.8. Complex alarms”.



3.5.2.2 Communication Output

Selecting Communication output, the output status is controlled directly via bus.

3.5.2.3 Pulse Output

Selecting Pulse output, the output is set as a pulse generator associated with a measured parameter. It is needed to set a measured parameter associated to the pulse output, the frequency and the pulse length.

Setting	Description
Parameter	Total Active Import Energy, Total Active Export Energy, Net Active Energy, Total Reactive Import Energy, Total Reactive Export Energy, Net Reactive Energy, Total Apparent Import Energy, Total Apparent Export Energy, Net Apparent Energy.
Frequency	Manual between 1 and 999999 pulses for each MWh/ Mvarh/MVAh.
Length	Manual value between 10 and 990ms.

The screenshot shows the 'I/O 1' configuration window. The 'I/O' dropdown is set to 'Output'. The 'Output type' dropdown is set to 'Pulse output'. The 'Parameter' dropdown is set to 'Active energy import total'. The 'Frequency' field is set to '10000 pulses/MWh'. The 'Length' field is set to '100 ms'.

3.5.2.4 Output ON

Selecting Output ON, the output status is always set High.

3.5.2.5 Output OFF

Selecting Output OFF, the output status is always set Low.

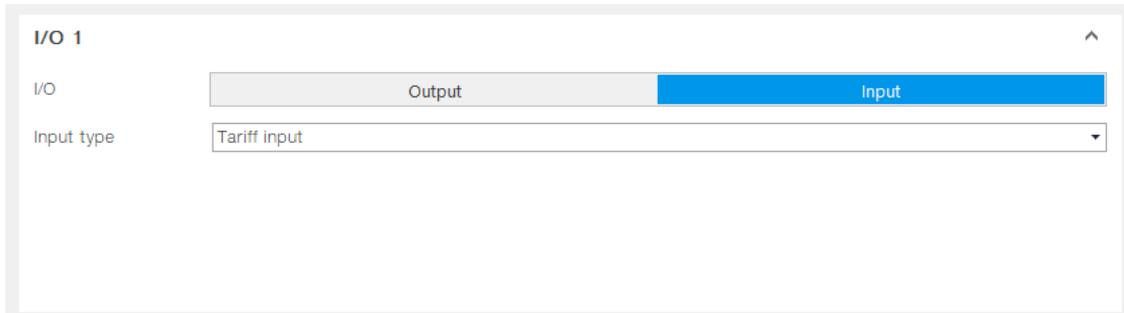
3.5.2.6 Pulse Input

Selecting Pulse Input, the device counts detected pulses connected to input port, that should last at least 30ms. It is needed to consecutively set a pulse ratio associated to the pulse counter, and then a unit of measurement to be associated to the pulses.

The screenshot shows the 'I/O 1' configuration window. The 'I/O' dropdown is set to 'Input'. The 'Input type' dropdown is set to 'Pulse input'.

3.5.2.7 Tariff Input

Selecting Tariff Input allows to manage the tariffs via inputs. Only I/O1, I/O2 and I/O3 can be used for Tariff inputs.



I/O 1

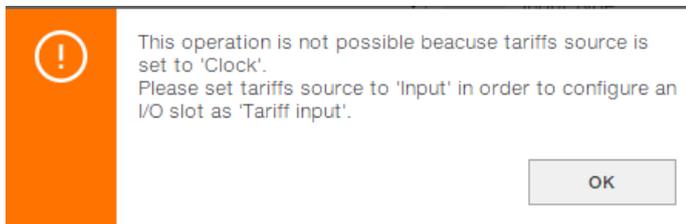
I/O

Output Input

Input type

Tariff input

Info: It is mandatory to select Tariff source as “Input” inside Configuration -> Tariffs. Please see chapter “3.3.3.Tariffs” for relationship between tariffs and input status.



3.6 Notifications

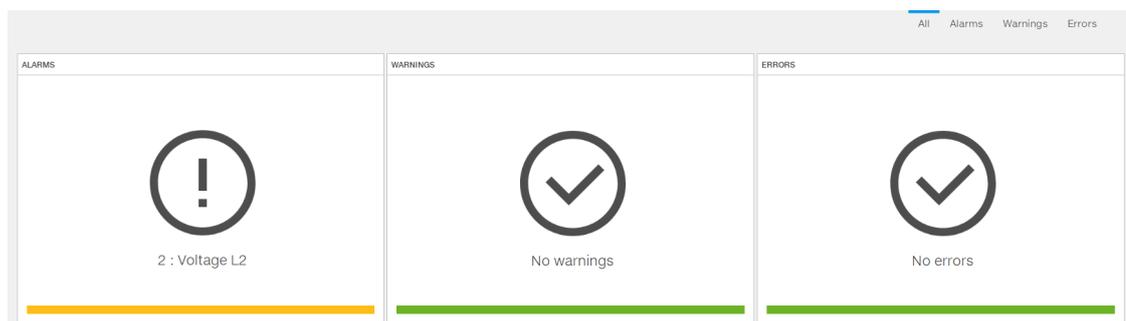
In this section it is possible to read out the notifications coming from the M4M network analyzer.

Notifications are divided into alarms, warnings and errors:

Notification	Description
Alarms	User settable, related to specific parameters, threshold, etc.
Warnings	Related to installation conditions and device settings.
Errors	Related to the device and to its self-diagnostics.

3.6.1 All

This section allows to read out currently active notifications.



3.6.2 Alarms

This section allows to display all alarms configured by the user in chronological order, including alarm description, date, time and duration.

For alarms configuration please refer to chapter “3.3.7. Alarms” and “3.3.8. Complex alarms”.

#	Description	Type	Date	Time	Duration
1	2 : Voltage L2	Alarm	27/11/2020	09:29:35	1549 s
2	2 : Voltage L2	Alarm	26/11/2020	15:15:29	3399 s
3	2 : Voltage L2	Alarm	26/11/2020	15:09:09	0 s
4	2 : Voltage L2	Alarm	26/11/2020	11:49:58	4551 s
5	2 : Voltage L2	Alarm	26/11/2020	10:54:59	0 s
6	2 : Voltage L2	Alarm	26/11/2020	10:50:41	0 s

3.6.3 Warnings

This section allows to display all warnings in chronological order, including warning description, date, time and duration.

#	Description	Type	Date	Time	Duration
1	Time not set	Warning	01/01/2000	00:00:00	0 s
2	Data not set	Warning	01/01/2000	00:00:00	0 s
3	Time not set	Warning	01/01/2000	00:00:00	0 s
4	Data not set	Warning	01/01/2000	00:00:00	0 s
5	Time not set	Warning	01/01/2000	00:00:00	0 s
6	Data not set	Warning	01/01/2000	00:00:00	0 s

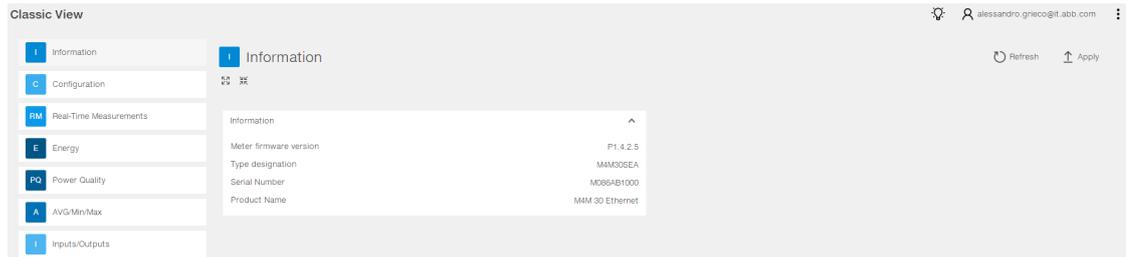
3.6.4 Errors

This section allows to display all errors in chronological order, including error description, date, time and duration.

ERRORS					
#	Description	Type	Date	Time	Duration
1	Audit log full	Error	27/11/2020	11:34:12	34 s
2	Error in the data storage error	Error	26/11/2020	10:02:54	843 s
3	FW CRC error	Error	23/10/2020	12:56:03	2 s
4	Hardware problem with RTC	Error	02/10/2020	11:34:05	2345 s
5	Audit log full	Error	02/10/2020	03:02:47	59 s

3.7 Classic View

In this section it is possible to have a simple R/W of M4M Modbus map.



3.8 Tools – File manager

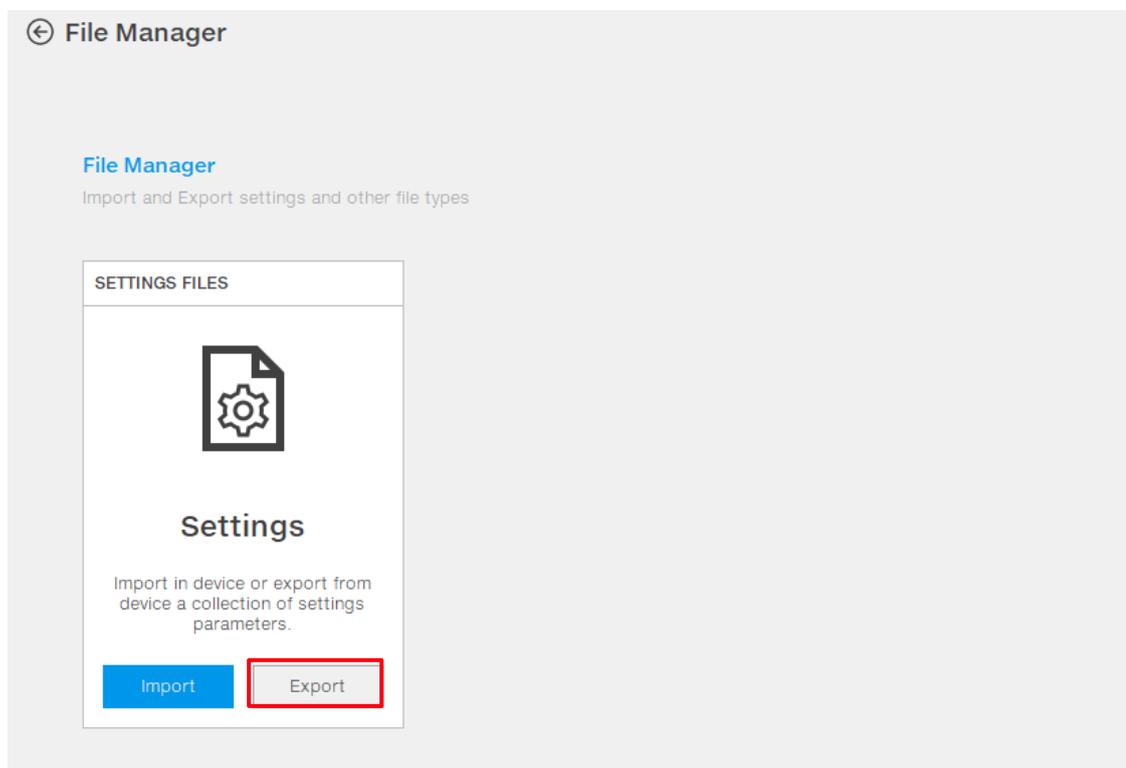
In this section, it is possible to transfer the configuration of M4M from one device to another.

Info: Product type of the devices involved in the import/export of the configurations need to be the same.

3.8.1 Export of settings

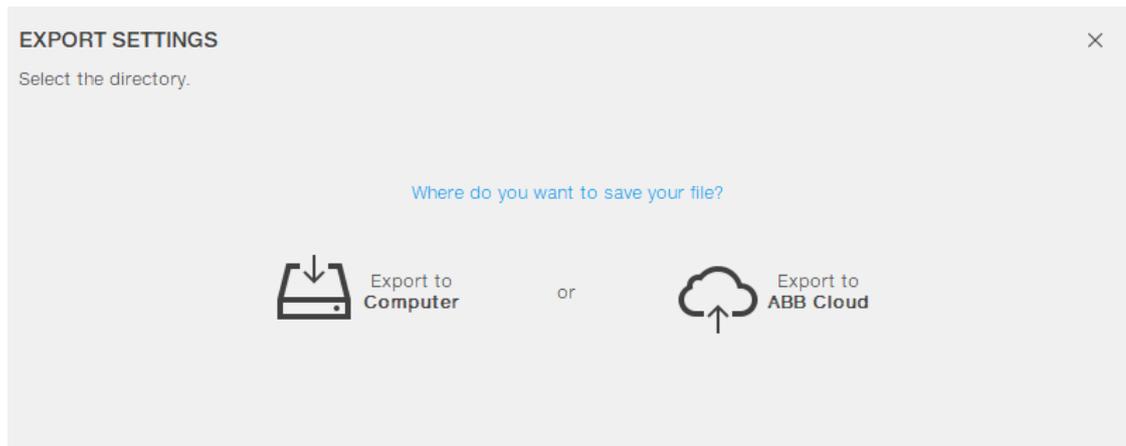
First it is needed to export the settings from the M4M device already configured, and save the file on your desktop computer.

A. Click on “Export”

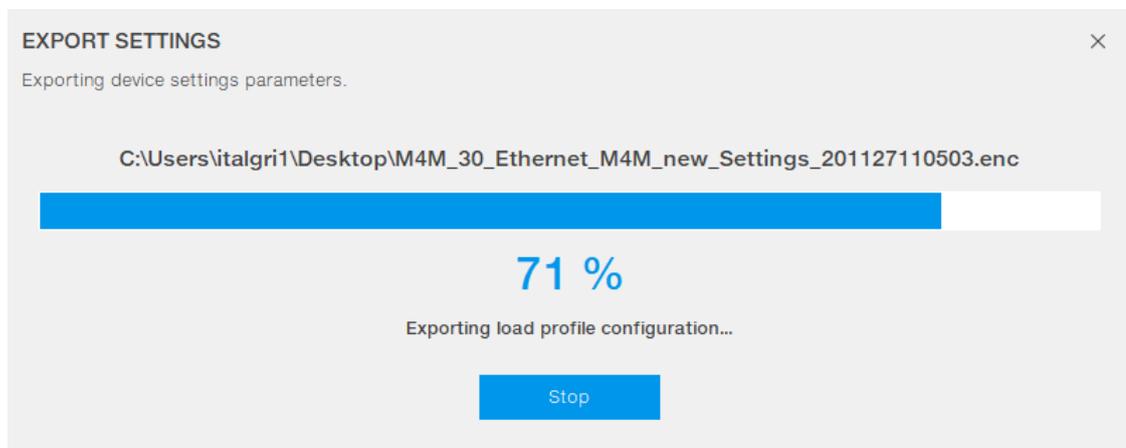


B. Click on the “Export to Computer” option. You will export a .enc file related to the settings of the M4M with following name

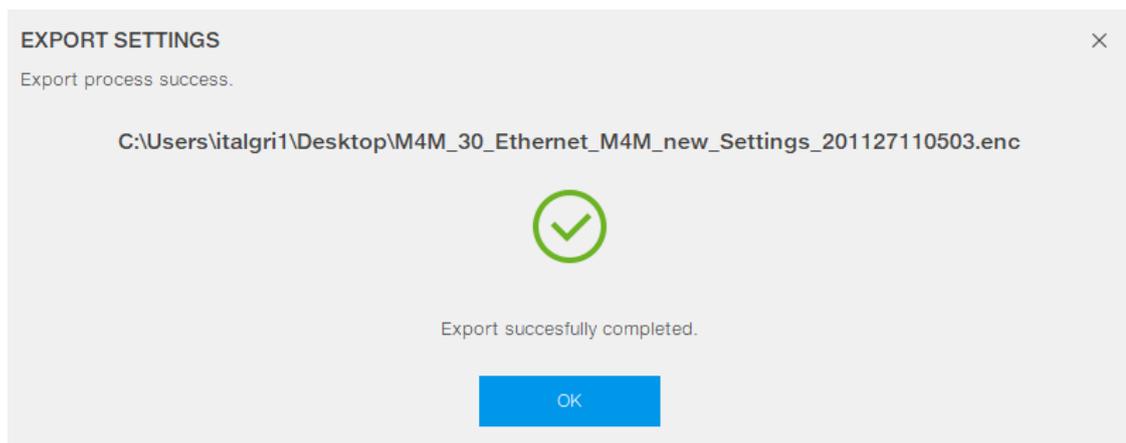
“Product_name_Tag_name_Settings_YYMMDDHHMMSS.enc”



- C. A loading bar will inform regarding the status of the settings export. Please do not unplug the M4M's auxiliary power supply during this operation.



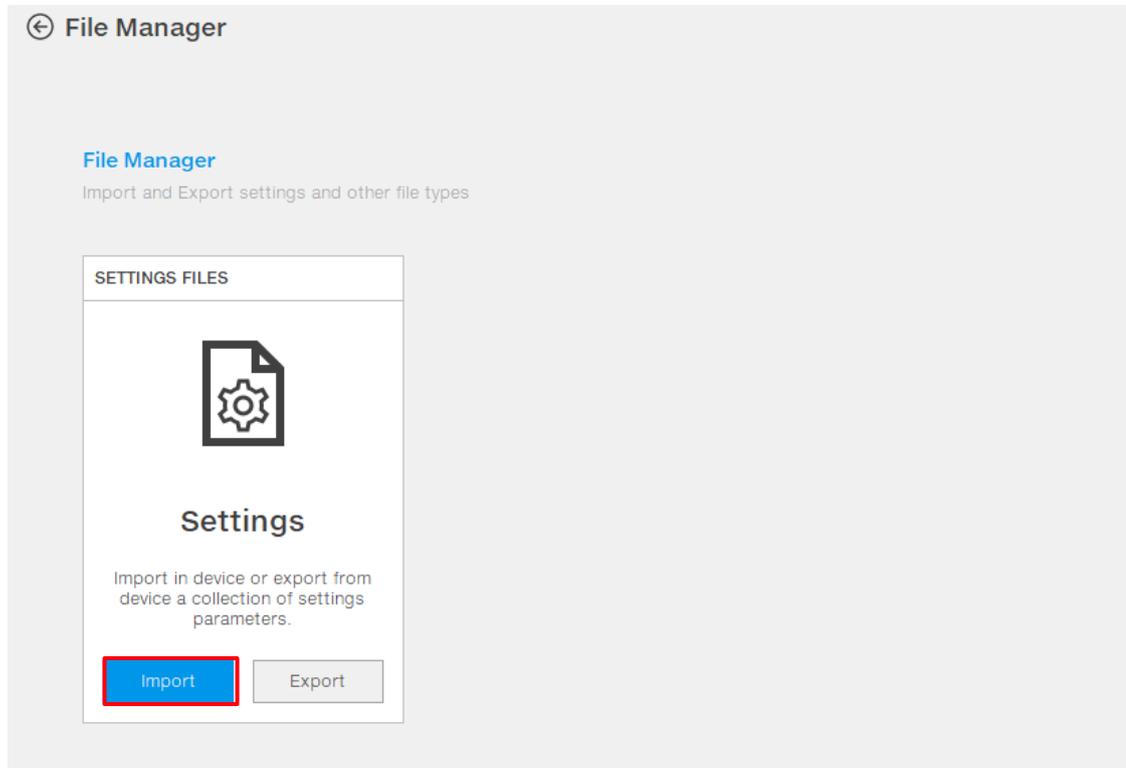
- D. As the Settings export is completed successfully, a banner will appear on Ekip Connect to inform the user.



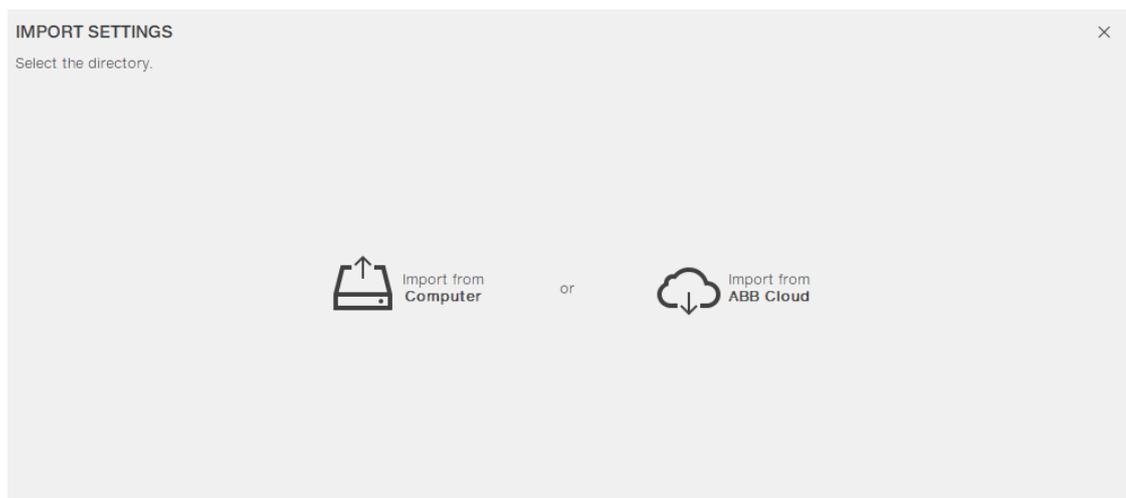
3.8.2 Import of settings

As second step, it is possible to export the already exported settings to different M4M not yet configured.

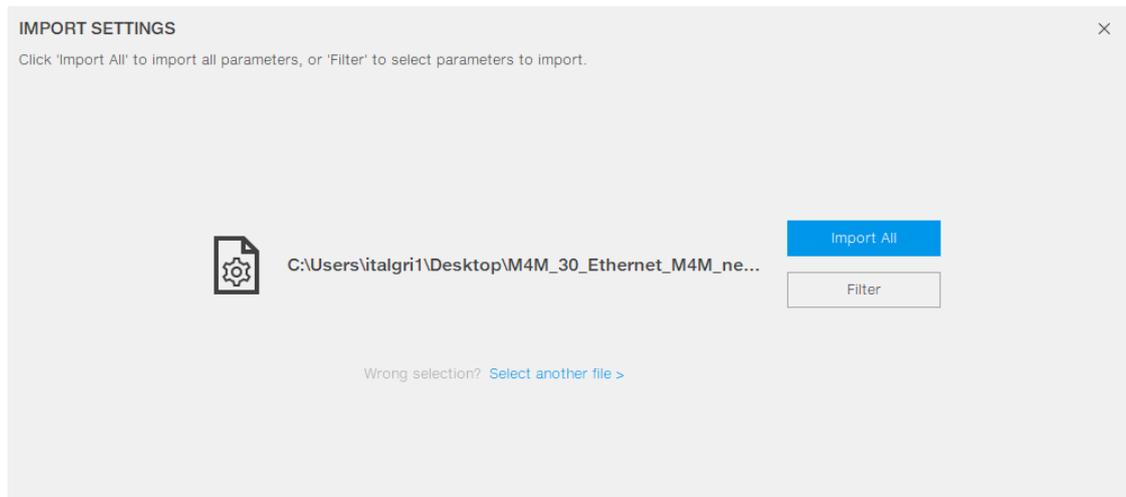
A. Click on “Import”



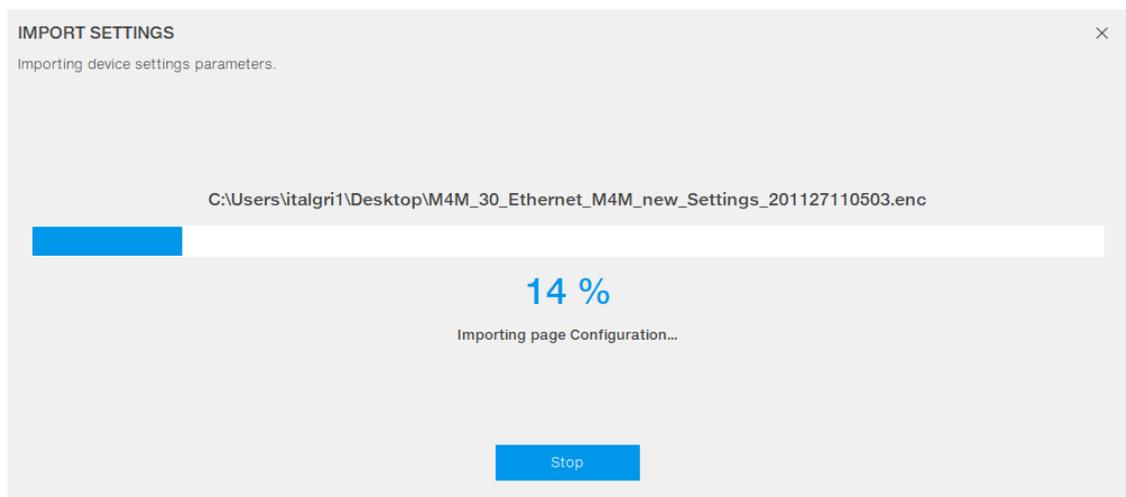
B. Click on the “Import from Computer” option. You will import the .enc file previously exported.



- C. In order to import all configurations, please click on “Import all”. Alternatively, please filter the configuration to be imported on the new M4M.



- E. A loading bar will inform regarding the status of the settings export. Please do not unplug the M4M’s auxiliary power supply during this operation.



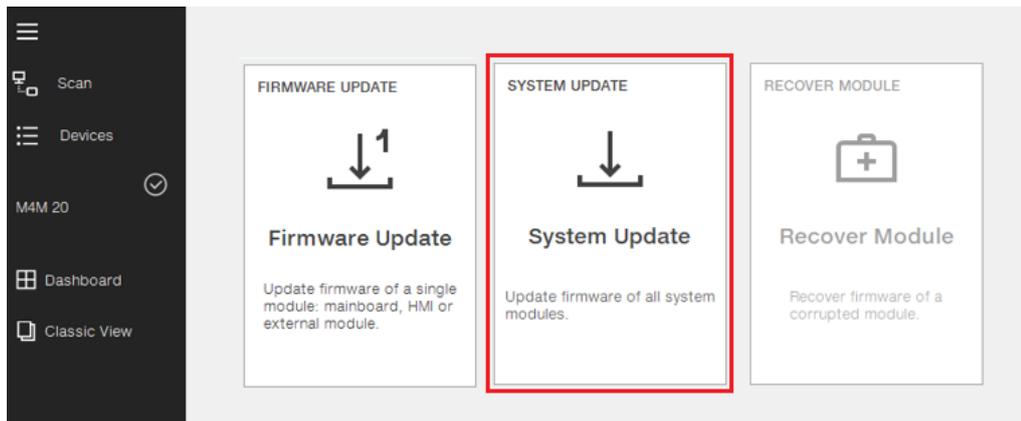
- F. As the Settings export is completed successfully, a banner will appear on Ekip Connect to inform the user with detail of each configuration (before import value, imported configuration and after import value).

Need ...	Page	Group	Variable	Before import	Imported value	After import	In Sync
	Configuration	CT ratio L1 L2 L3	CT ratio L1 L2 L3 ...	1000	1000	1000	☑
	Configuration	CT ratio L1 L2 L3	CT ratio L1 L2 L3 ...	5	5	5	☑
	Configuration	VT ratio	VT ratio (Numerat...	400	400	400	☑
	Configuration	VT ratio	VT ratio (Denomin...	400	400	400	☑
	Configuration	CT ratio N	CT ratio N (Nume...	5	5	5	☑
	Configuration	CT ratio N	CT ratio N (Deno...	5	5	5	☑
	Configuration	Type of Network	Type of Network	3 phase-4 wires ...	3 phase-4 wires ...	3 phase-4 wires ne...	☑
	Configuration	Modbus TCP	DHCP	Disable	Disable	Disable	☑
	Configuration	Modbus TCP	IP address	192.168.1.12	192.168.1.12	192.168.1.12	☑
	Configuration	Modbus TCP	Mask	255.255.255.0	255.255.255.0	255.255.255.0	☑
	Configuration	Modbus TCP	Gateway	192.168.1.1	192.168.1.1	192.168.1.1	☑
	Configuration	Modbus TCP	Port	502	502	502	☑
	Alarms Collection	Alarm 0	Obis Code	1.0.72.7.0.255	1.0.72.7.0.255	1.0.72.7.0.255	☑

3.9 Tools – System Update

In this section it is possible to update M4M FW version through the System update feature.

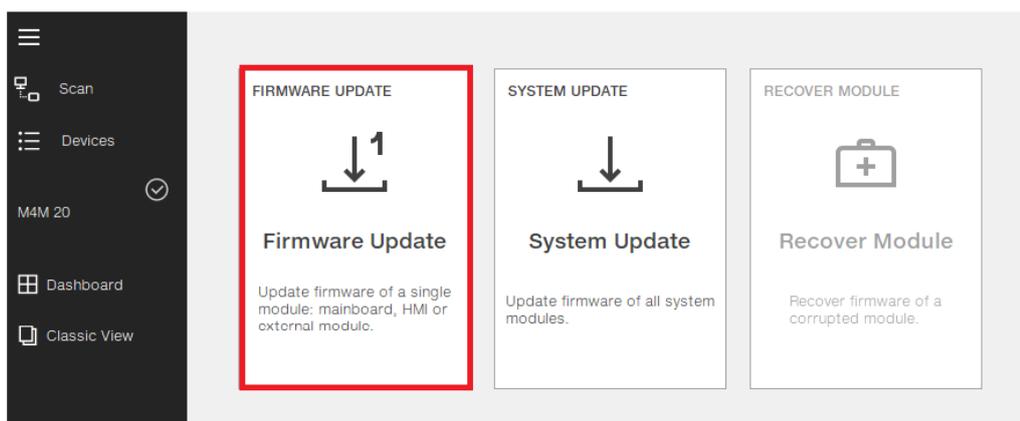
- A. Click on “System update” in order to upload the FW version. Ekip Connect automatically downloads from ABB Library the latest M4M FW version, stored in: C:\ProgramData\ABB\EkipConnect3\Firmware\M4M. Alternatively, download from the ABB Library [here](#). Please extract the .enc file from the .zip.



3.10 Tools – Firmware update

In this section it is possible to update M4M FW version through the Firmware update feature.

- D. Click on “Firmware update” in order to upload the FW version. Ekip Connect automatically downloads from ABB Library the latest M4M FW version, stored in: C:\ProgramData\ABB\EkipConnect3\Firmware\M4M. Alternatively, download from the ABB Library [here](#). Please extract the .enc file from the .zip.

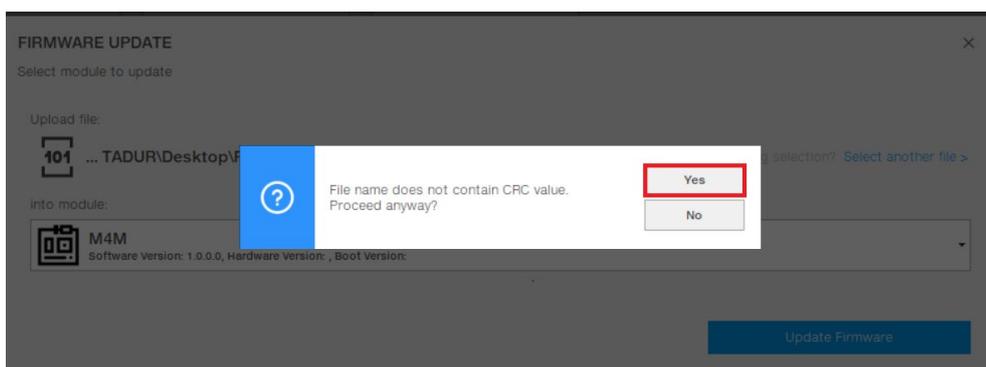
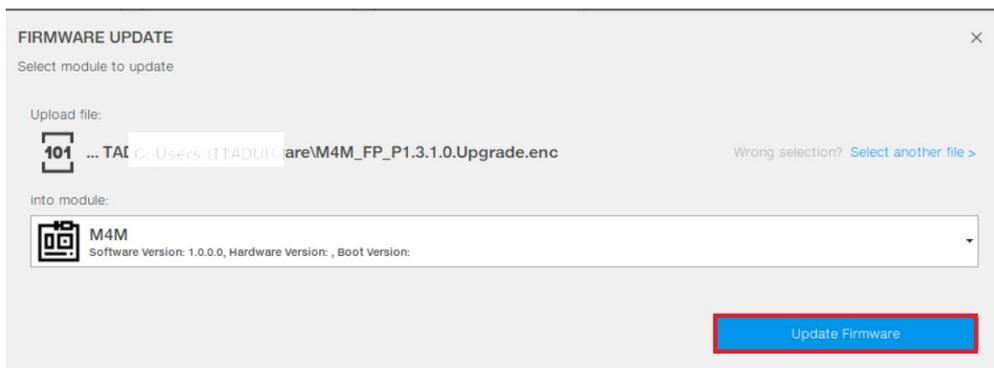


- E. Please click on the “Select file from Computer” option and select the .enc related to the latest FW version of M4M.

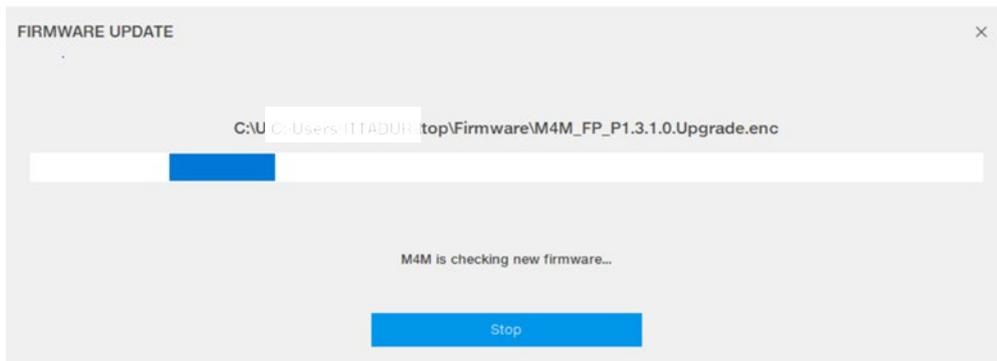
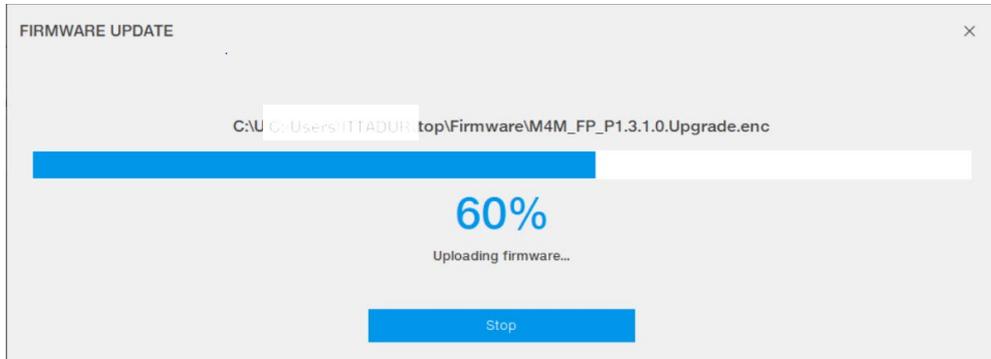


- F. Click on “Update Firmware” and later on “Yes” in order to start the update process.

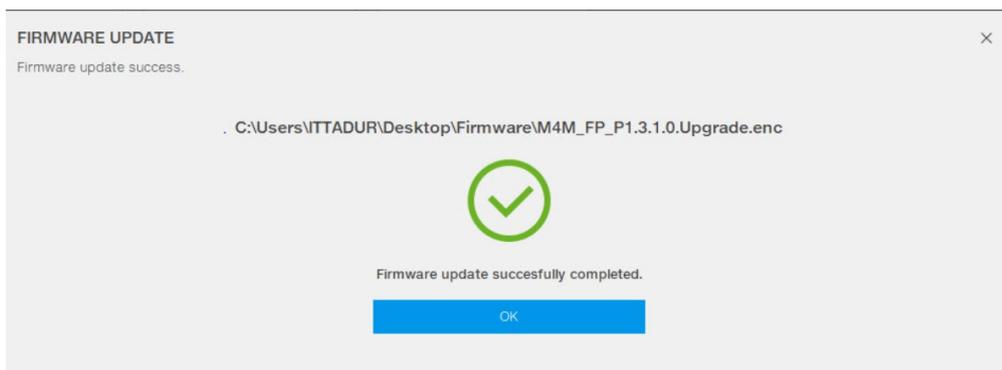
TIP: Please ensure that no other software or devices are actively communicating with the M4M during the FW update process, in order to have a successful update.



- G. A loading bar will inform regarding the status of the FW update. After reaching the 100%, M4M will start the rebooting process for few minutes while checking the new firmware. The screen will turn black and the red LED lights will be on. Please do not unplug the M4M's auxiliary power supply during this operation.



- H. As the FW update is completed successfully, a banner will appear on Ekip Connect to inform the user.



3.11 Tools – Report

In this section it is possible to generate a report for each M4M device connected, reporting the main information on the device (measurements, configurations, etc). It is also possible to download, print and share the report.

The screenshot displays the 'Reports' section of the M4M Desktop Software. The main content area shows a report titled 'REPORT TEST' for an ABB device. The report includes the ABB logo, device information, and a table of key specifications.

Device: M4M 30 Ethernet M4M 30 SW1
Descriptor: 287_M4M30_v3.6.enc
13 ott 2020 11:21

Information

Information	
Meter firmware version	P1.4.2.5
Type designation	M4M30SEA
Serial Number	M086AB1000
Product Name	M4M 30 Ethernet

The interface also features a 'Bookmarks' sidebar on the left with a tree view containing categories like Information, Configuration, Real-Time Measurements, Energy, Power Quality, and more. At the top, there are navigation and utility buttons: Back, Download, Print, and Share.

4 Annex: Product details

4.1 M4M versions and features

Product type ID	Product name	I/O	Communication protocol	Features				
				M4M 20	M4M 30	PQ1	PQ2	RTS
0	M4M 20	2 Digital Out.	-	.				
1	M4M 20 Modbus	2 Digital Out.	Modbus RTU	.				
2	M4M 20 Ethernet	2 Digital Out.	Modbus TCP/IP	.				
3	M4M 20 Bacnet	2 Digital Out.	BACnet/IP	.				
4	M4M 20 Profibus	2 Digital Out.	Profibus DP-V0	.				
5	M4M 20 I/O	2 Digital Out. 2 Progr. I/O 2 Analog Out.	Modbus RTU	.				
6	M4M 20 Rogowski	2 Digital Out.	Modbus RTU	.				
7	M4M 30 Modbus	4 Progr. I/O	Modbus RTU		.			
8	M4M 30 Ethernet	4 Progr. I/O	Modbus TCP/IP		.			
9	M4M 30 Bacnet	4 Progr. I/O	BACnet/IP		.			
10	M4M 30 Profibus	4 Progr. I/O	Profibus DP-V0		.			
11	M4M 30 I/O	6 Progr. I/O 2 Analog Out.	Modbus RTU		.			
12	M4M 30 Rogowski	4 Progr. I/O	Modbus RTU		.			
15	M4M 2X RTU	2 Digital Out.	Modbus RTU	.				
16	M4M 2X RTU PQ1	2 Digital Out.	Modbus RTU	.		.		
17	M4M 2X RTU PQ2	2 Digital Out.	Modbus RTU	.			.	
18	M4M 2X RTU RTS	4 Progr. I/O	Modbus RTU	.				.
19	M4M 2X RTU PQ1+R	4 Progr. I/O	Modbus RTU	.		.		.
20	M4M 2X RTU PQ2+R	4 Progr. I/O	Modbus RTU	.			.	.
21	M4M 2X ETH	2 Digital Out.	Modbus TCP/IP	.				
22	M4M 2X ETH PQ1	2 Digital Out.	Modbus TCP/IP	.		.		
23	M4M 2X ETH PQ2	2 Digital Out.	Modbus TCP/IP	.			.	
24	M4M 2X ETH RTS	4 Progr. I/O	Modbus TCP/IP	.				.
25	M4M 2X ETH PQ1+R	4 Progr. I/O	Modbus TCP/IP	.		.		.
26	M4M 2X ETH PQ2+R	4 Progr. I/O	Modbus TCP/IP	.			.	.

Only M4M with Modbus RTU and Modbus TCP/IP communication can be used with Ekip Connect software.

Analogue outputs cannot be configured via Ekip Connect.

4.2 M4M 2X feature packages

M4M 2X (same as M4M 20)	
TRMS current	•
TRMS voltage	•
Frequency	•
Active, Reactive and Apparent power	•
Power factor	•
Operating timer, countdown timer	•
Active, Reactive and Apparent energy	•
4 quadrants Energy (Import/Export)	•
THD (I, VLN, VLL)	•
Neutral current	Calculated
Single alarms	25
Demand values (average)	Basic
Historicals logs	Basic
Warnings, alarms and errors logs	•
Digital Outputs	2
+PQ1	
Individual Harmonics	25th
Unbalances	•
Historicals logs	Intermediate
RTC	•
+PQ2	
Individual Harmonics	40th
Unbalances	•
Historicals logs	Advanced
RTC	•
Neutral current	Measured
+RTS	
Tariffs	6
Complex alarms with logics	4
RTC	•
Programmable I/O	4*

**replacing 2 Digital Outputs features*