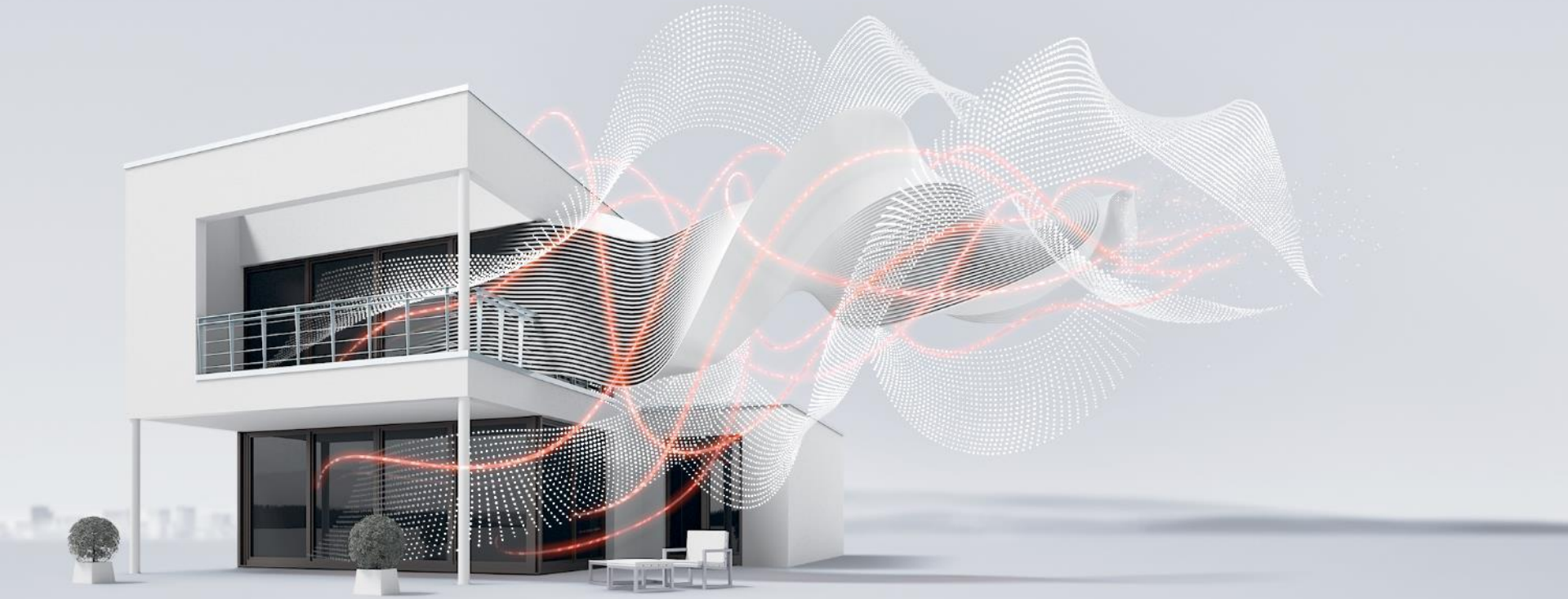


HEIDELBERG, SEPTEMBER 2018

Webinar ABB EQmatic Energy Analyzer QA/S

M-Bus and Modbus

Thorsten Reibel, Jürgen Schilder, Stefan Grosse, Martin Wichary & Ilija Zivadinovic
Competence Center Europe – Building Automation

Agenda

Introduction

New Energy Analyzer QA/S 4.xx.1 Modbus RTU

New software features

Web user interface

Connecting to the device and demonstration in practice

Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

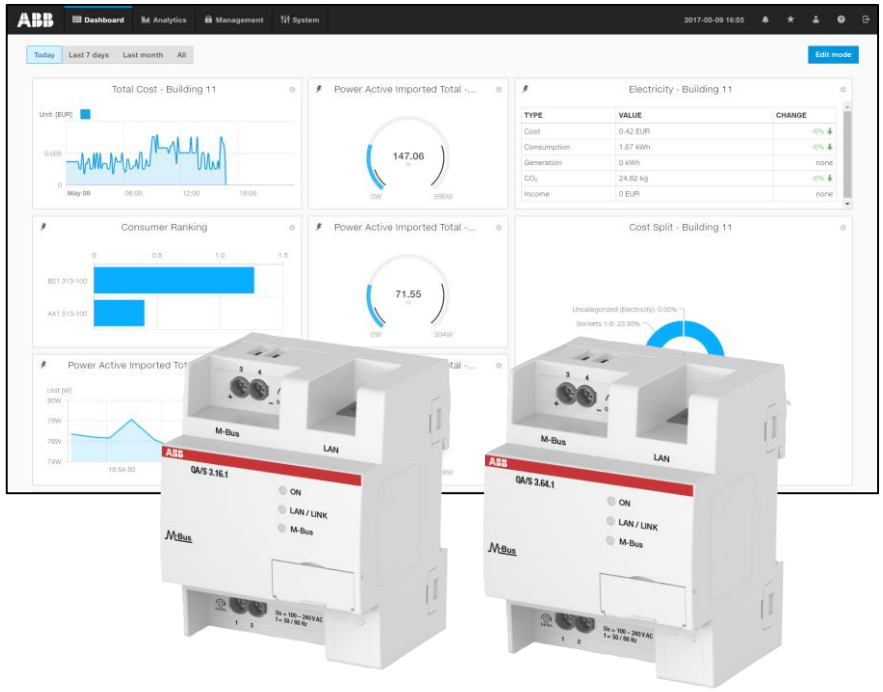
Energy measurement

The recording of energy variables and values, as well as their processing, is continually gaining in significance

This is not just due to the rising energy costs but also due to the frequently demanded evaluation and reading possibilities via a decentralized reading station

The features of the ABB EQmatic series help to meet these requirements and can provide operators and users with convenient, cost-effective solutions for modern energy management

ABB offers a wide range of devices and solutions specially designed for these applications



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

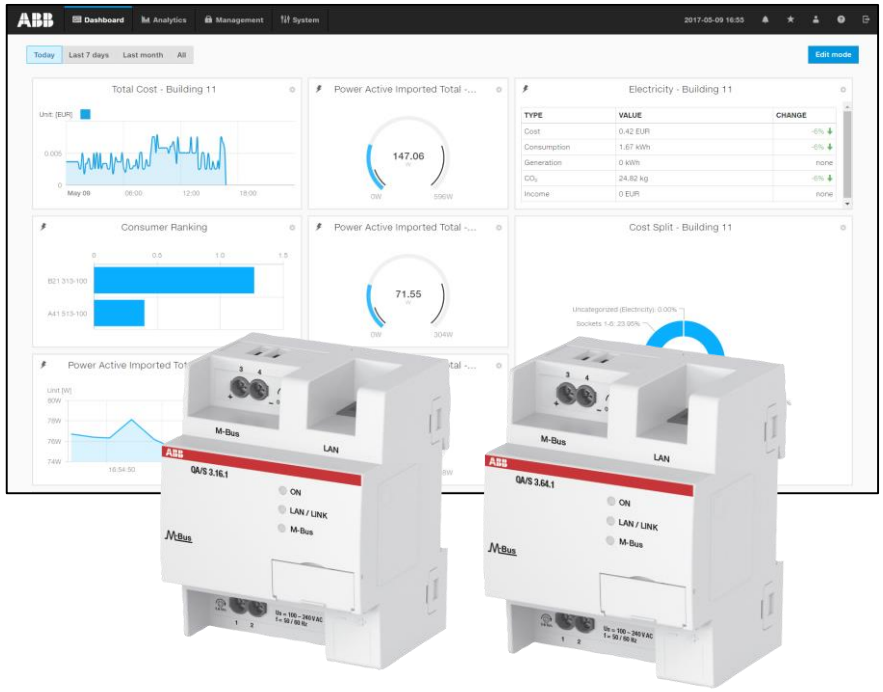
ABB EQmatic

ABB EQmatic Energy Analyzer are compact modular installation devices designed to monitor and display consumption and measured values

They log and store consumption data for electricity, gas, water or heat meters

This means that they can help those operating purpose-built premises or commercial buildings (offices, hotels, schools, public buildings) to implement energy management systems such as ISO 50001 or to put in place low-voltage installations compliant with VDE 0100-801

As a result, they make building energy flows and costs transparent



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

Device technology

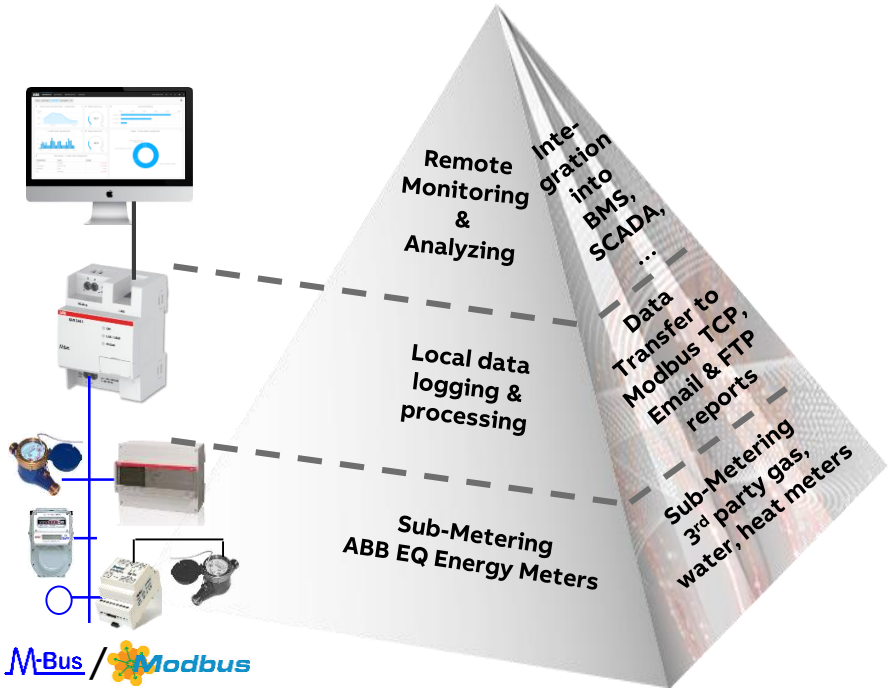
ABB EQmatic Energy Analyzer QA/S collects data from

- M-Bus meters
- Modbus RTU meters

The collected data can be

- Saved locally in the device database
- Sent as reports via E-Mail
- Uploaded via FTP
- Shared with other systems via Modbus TCP (IP)

Note: Some functions in QA/S 3.xx.1 (M-Bus) require software version 2.0.0



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

Device technology

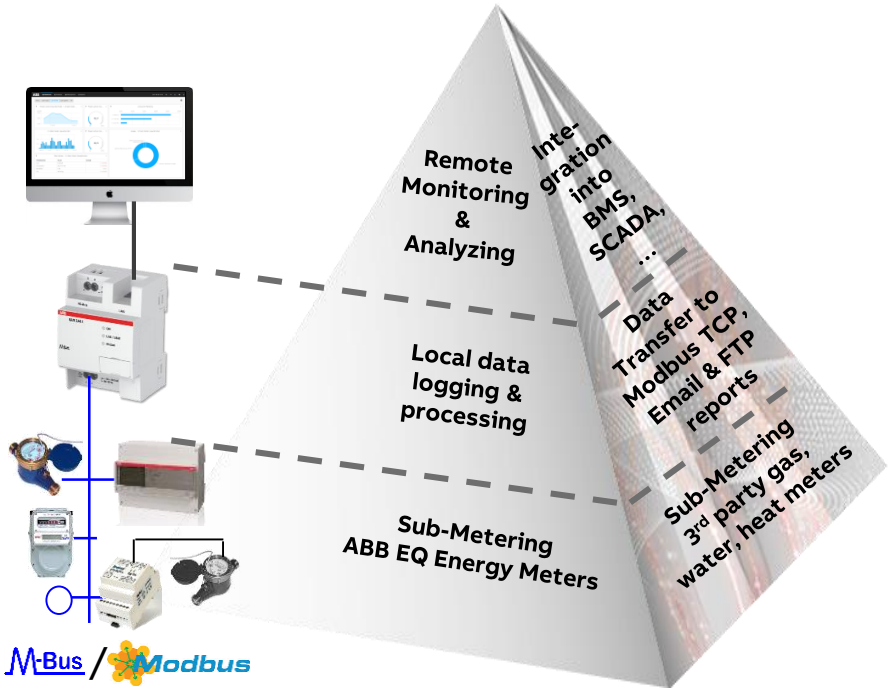
ABB EQmatic Energy Analyzer are compact, web-based standalone devices for energy management applications

They log, store, display and analyze consumption data for up to 16 or 64 electricity, gas, water or heat meters

Device access is via web browser (integrated web server)

They automatically detect ABB A and B Series Energy Meters and M2M Modbus Network Analyzer during commissioning

Other meters (water, gas,…) or pulse adapters must be manually configured and added to the system



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

A, B and C Series ABB Energy Meters

The ABB EQ Energy Meters are designed as intermediate meters and offer a wide range of functions for countless applications

The meters are available in various variants: Meters for single- or three-phase measurement, as well as meters for direct connection or transformer rated

The energy meters are optionally available with integral serial interfaces for M-Bus or Modbus RTU (RS485)

The ABB A and B Series Energy Meters and M2M Modbus Network Analyzer are automatically detected and configured during configuration

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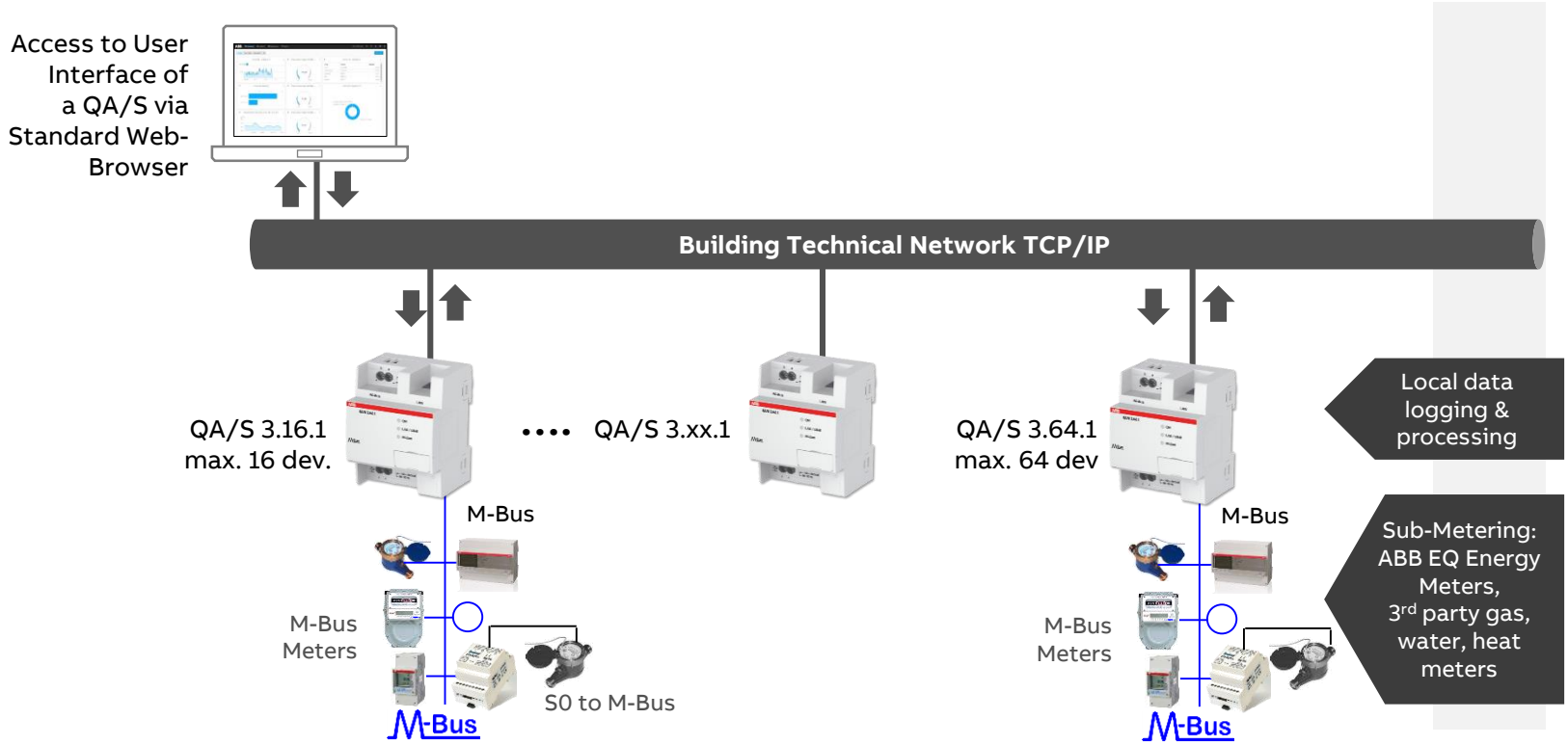
Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Review

Energy Analyzer M-Bus QA/S 3.xx.1 – Market launch in 2017



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Review

Energy Analyzer M-Bus QA/S 3.xx.1
Market launch in 2017

- Display and evaluation of historical consumption and measured data via configurable charts
- Cost and consumption analysis for media such as electricity, water, heat and gas
- Display of CO_2 emission and Energy Performance Indicator (EnPI)
- Storage and export of metering data from up to 64 meters for at least 3 years
- Data export to XLS, CSV, …
- User addition and administration functions (simultaneous access for up to 10 users)
- Notifications/alarms when connected meters fail

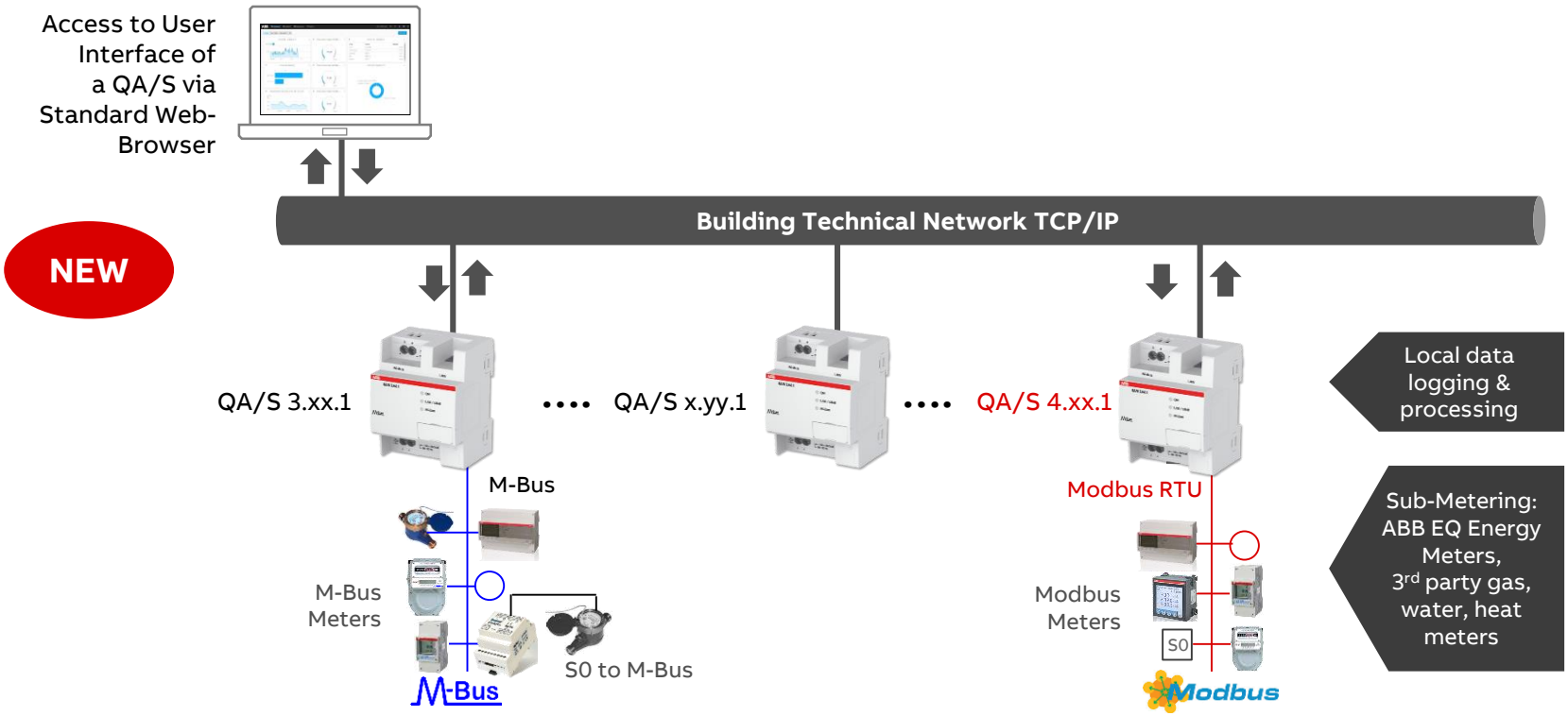
QA/S 3.xx.1

M-Bus

Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

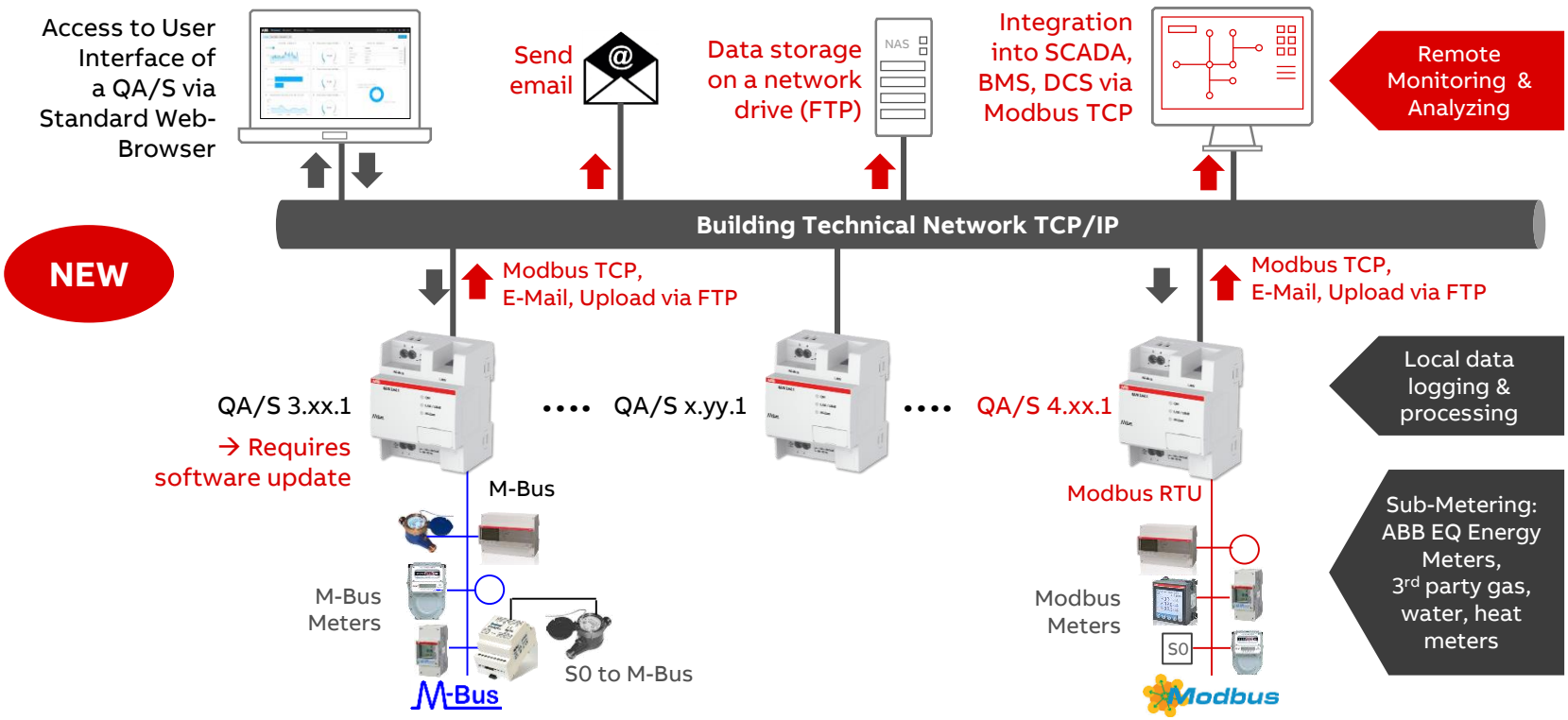
Device technology



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

Device technology



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Overview

Device technology – software functions NEW

- Data export
  - Cyclic (e.g. monthly) export of reports to
    - FTP server and/or
    - Email recipients
  - Provision of the data to higher-level systems (e.g. SCADA, BMS) via Modbus TCP
- Adjustable language for each user
- Activate or deactivate automatic logout
- Submenu “System diagnostics”
- Custom name for the widgets in the dashboard
- Display resolution of the recorded data

The software update for the Energy Analyzer M-Bus QA/S 3.xx.1 will be available shortly

QA/S 3.xx.1

M-Bus

NEW QA/S 4.xx.1

Modbus

Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

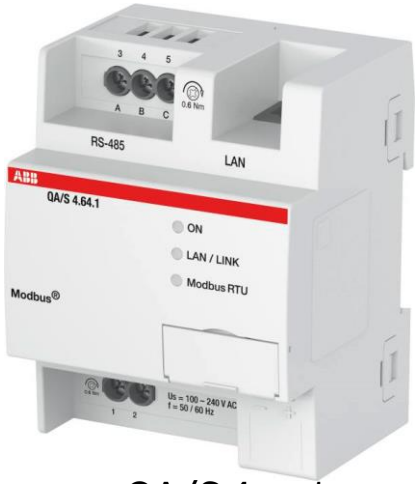
Overview

Device technology – hardware

- QA/S 3.xx.1 Energy Analyzer, M-Bus
  - M-Bus master to DIN EN 13757-2
  - QA/S 3.16.1 max. 16 meters
    QA/S 3.64.1 max. 64 meters
- QA/S 4.xx.1 Energy Analyzer, Modbus **NEW**
  - Modbus RTU master
  - QA/S 4.16.1 max. 16 meters
    QA/S 4.64.1 max. 64 meters
- Modular installation device (MDRC)
- Mounting width: 4 space units
- Display elements (LEDs)
- LAN connection
- Supply voltage 100…240 V AC

QA/S 3.xx.1

M-Bus



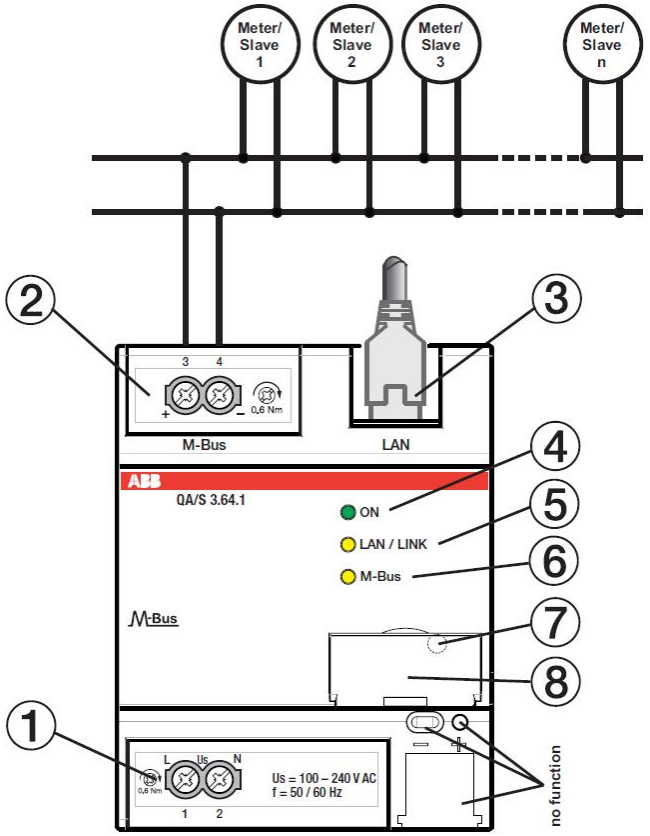
NEW QA/S 4.xx.1

Modbus

Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

QA/S 3.xx.1 (M-Bus): Connection diagram

1	Power supply connection U_s
2	M-Bus slave/meter connection
3	Ethernet/LAN connection
4	ON LED (green)
5	LAN/LINK LED (yellow)
6	M-Bus LED (yellow)
7	Reset button (behind label carrier)
8	Label carrier



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M-Bus

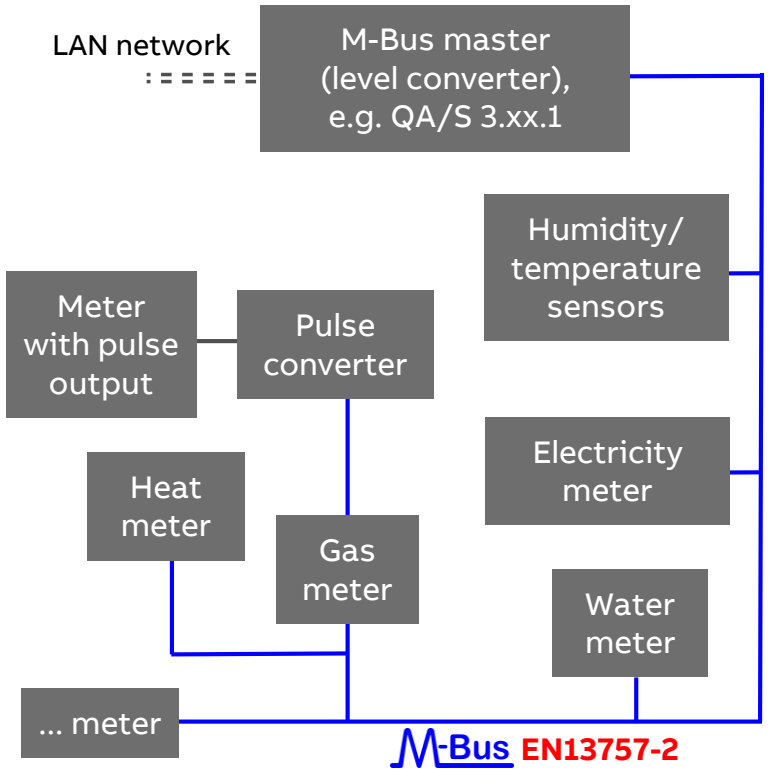
M-Bus (Meter-Bus) is a technical standard (EN 13757-2), applying its rules, e.g. in electricity meters, allows the electricity consumption to be transmitted as measured data

The gas, heat or water consumption can also be measured and transmitted by meters with M-Bus

The special feature here is remote reading, which involves additional connected devices transmitting their collected data over the Internet or the mobile telecommunications network

This can eliminate the need for humans to read the meters

Source: WIKIPEDIA



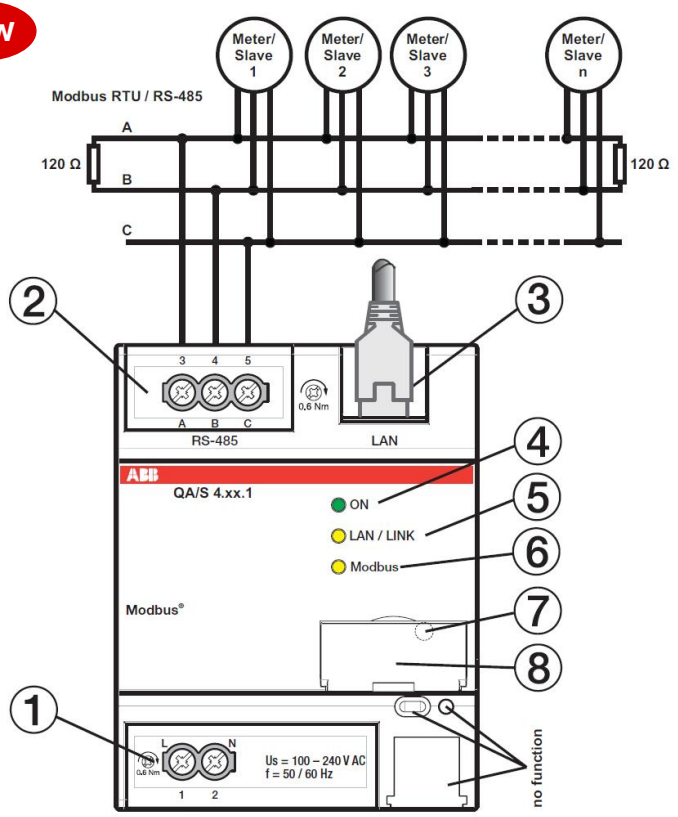
Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

QA/S 4.xx.1 (Modbus): Connection diagram

NEW

1	Power supply connection U_s
2	Modbus slaves/meter connection (RS485)
3	Ethernet/LAN connection
4	ON LED (green)
5	LAN/LINK LED (yellow)
6	Modbus RTU LED (yellow)
7	Reset button (behind label carrier)
8	Label carrier

- The bus cable must be terminated with resistors (120 Ω, 0.25 W) at both ends
- A third conductor must interconnect all the devices of the bus (terminal “C” – common)



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Modbus RTU (RS485)

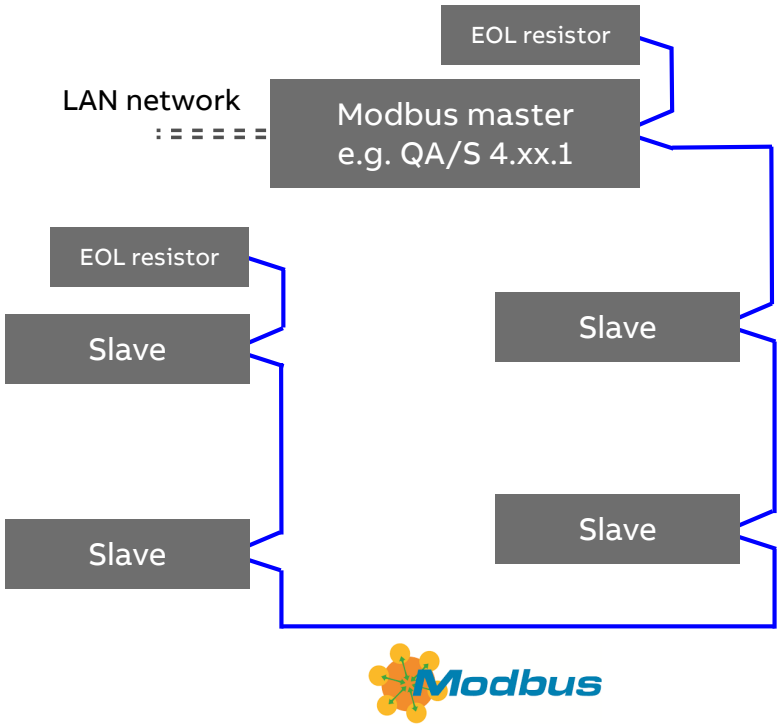
Modbus is a serial communications protocol originally published by Modicon in 1979 for use with its programmable logic controllers (PLCs)

Modbus has become a de facto standard communication protocol and is now a commonly available means of connecting industrial electronic devices

The main reasons for the use of Modbus in the industrial environment are:

- Developed with industrial applications in mind
- Openly published and royalty-free
- Easy to deploy and maintain

Source: WIKIPEDIA



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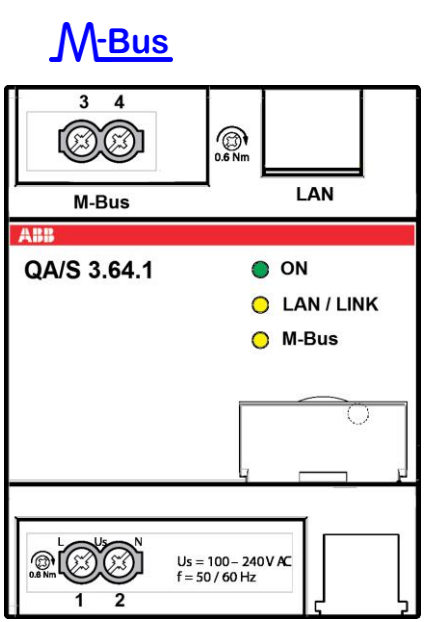
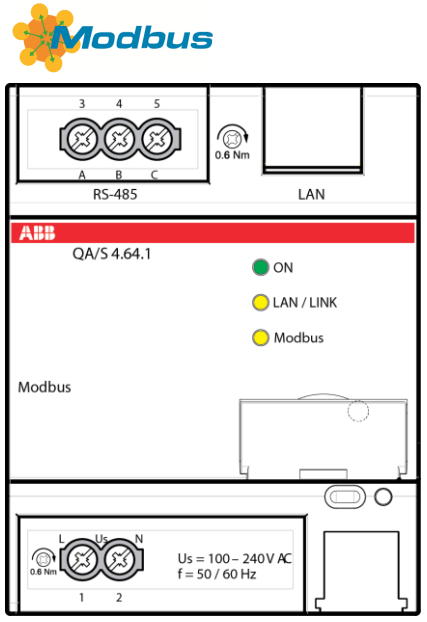
Display elements

LED	Function	Description
ON	ON	Operating system initialization process complete. Supply voltage on. The device is ready for operation.
	OFF	No supply voltage during operating system initialization process.
	Flashing (1 Hz)	During initialization.
	FLASHING (3 Hz)	Resetting network settings and restarting the device
	FLASHING (10 Hz)	Factory reset; internal error.
LAN/Link	OFF	No supply voltage. No network connection.
	FLASHING	Network connection OK. Telegram traffic.
M-Bus/ Modbus	ON	Supply voltage OK, device ready for operation and M-Bus/Modbus connected.
	OFF	No supply voltage. M-Bus/Modbus RTU not connected.
	FLASHING (1 Hz)	Scanning process for slaves/devices.
	FLASHING (3 Hz)	Resetting network settings and restarting the device.
	FLASHING (10 Hz)	Resetting to factory settings.



QA/S 3.xx.1



QA/S 4.xx.1

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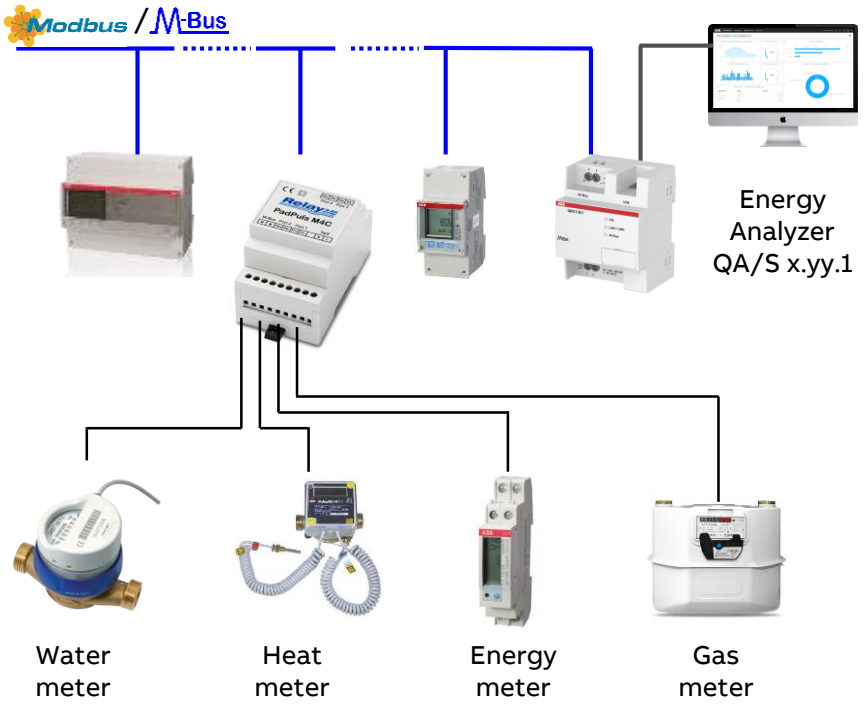
Pulse adapter

A pulse adapter is used to adapt consumption measuring devices, e.g. electricity, gas or water meters, to the M-Bus/Modbus system

The measuring devices must feature a floating pulse output or a mounted pulse module for sensing

Pulse adapters with different numbers of channels are available as rail-mounted devices and in surface mounted enclosures, etc.

Configuration (primary address, medium, unit, …) is performed using a programming adapter and software



Meter with pulse output or pulse module for scanning

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User interface

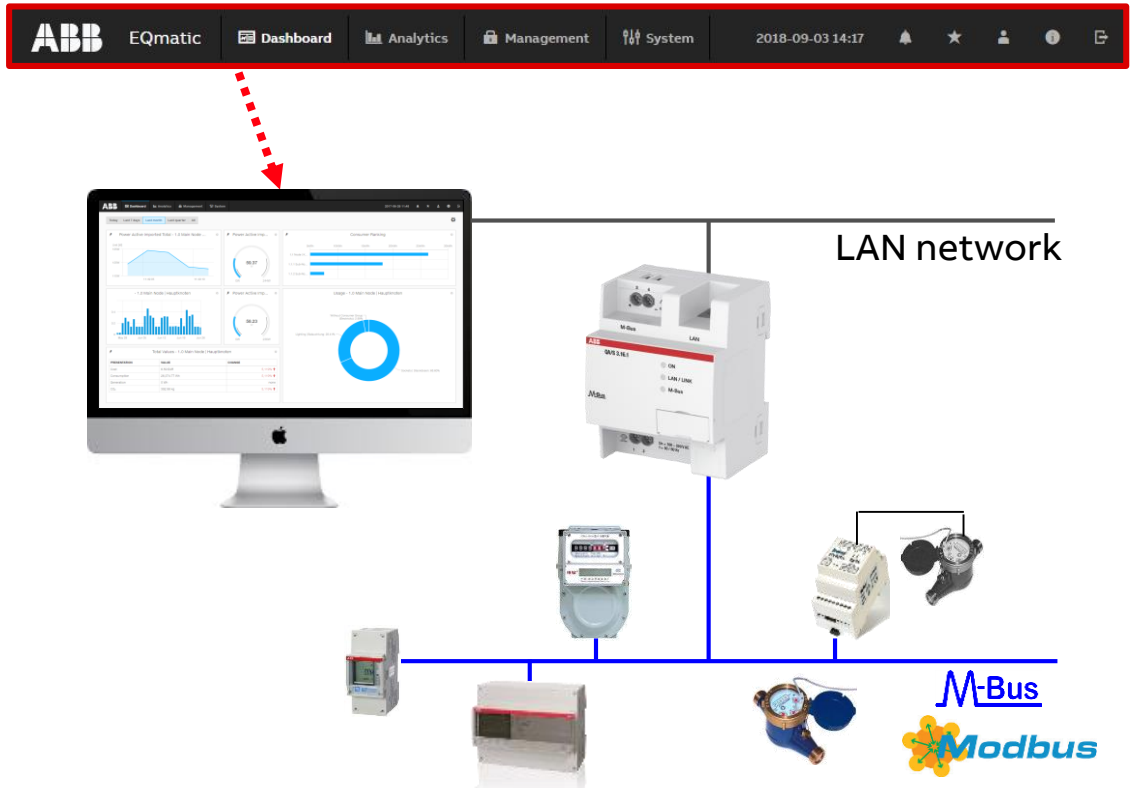
Main menu

The device has a user interface for commissioning and operating purposes

To access the user interface there must be an IP connection to the device

The user interface offers

- A configurable dashboard
- Graphical analysis functions (historical data, benchmark - time interval, instantaneous values, …)
- Management
- System settings



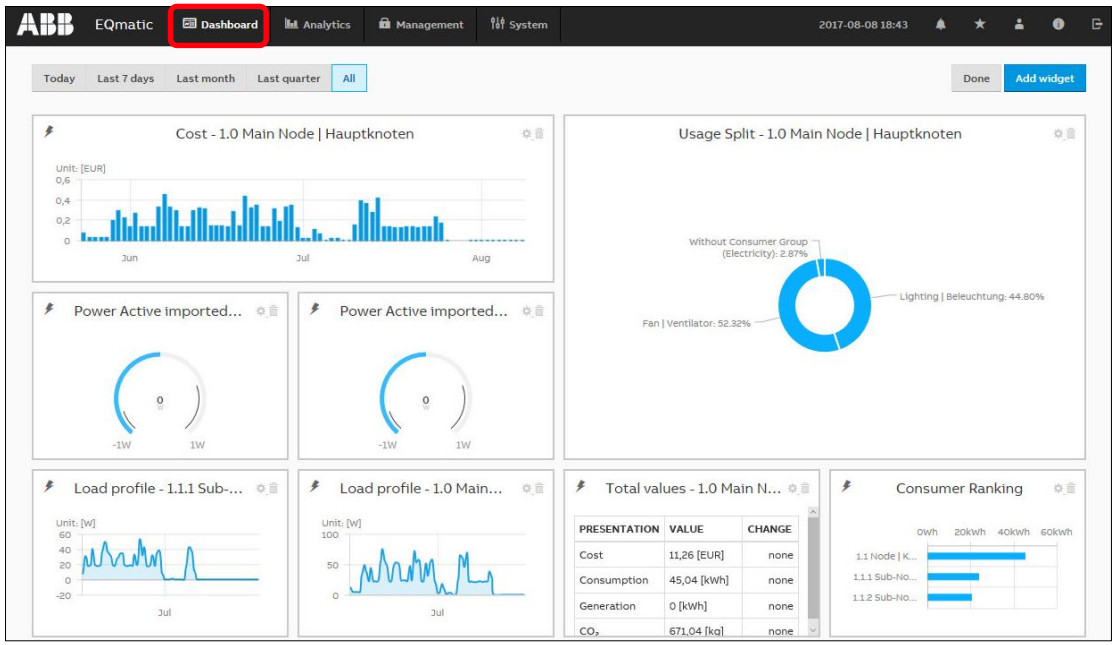
Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Main menu

Dashboard

The dashboard provides a rapid overview of costs and consumers in the building

In the dashboard you can configure user-defined views using widgets (graphical display elements)



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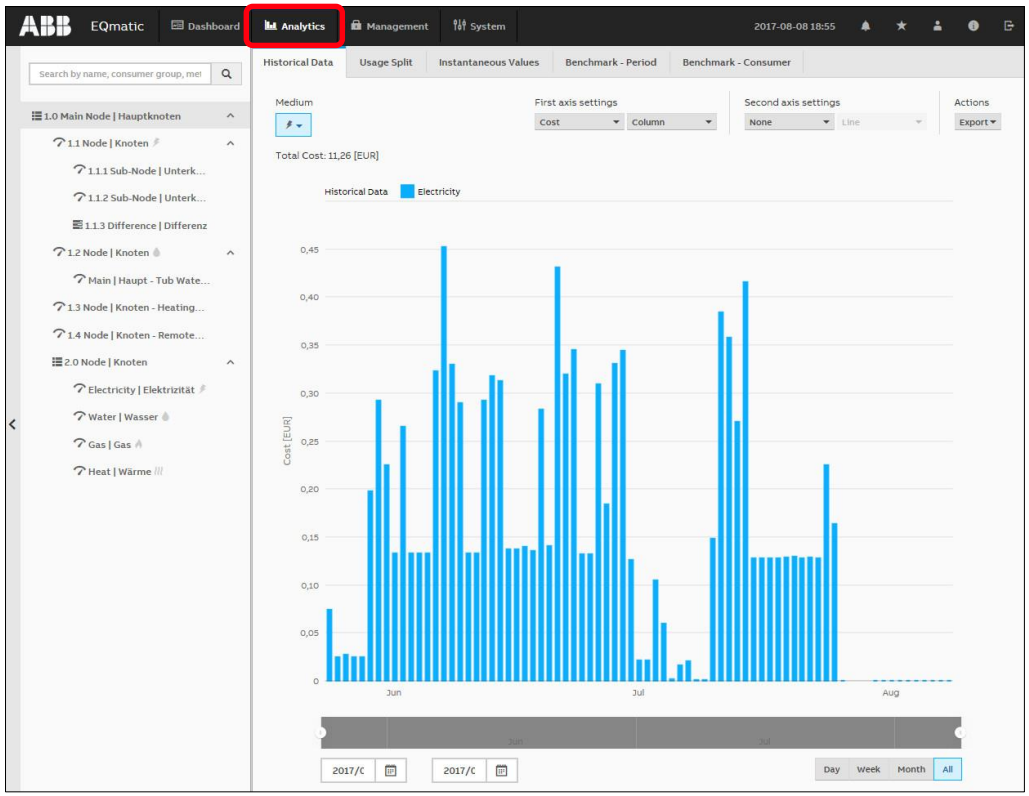
Main menu

Analytics – Historical Data

For analysis and display of historical measured data



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Main menu

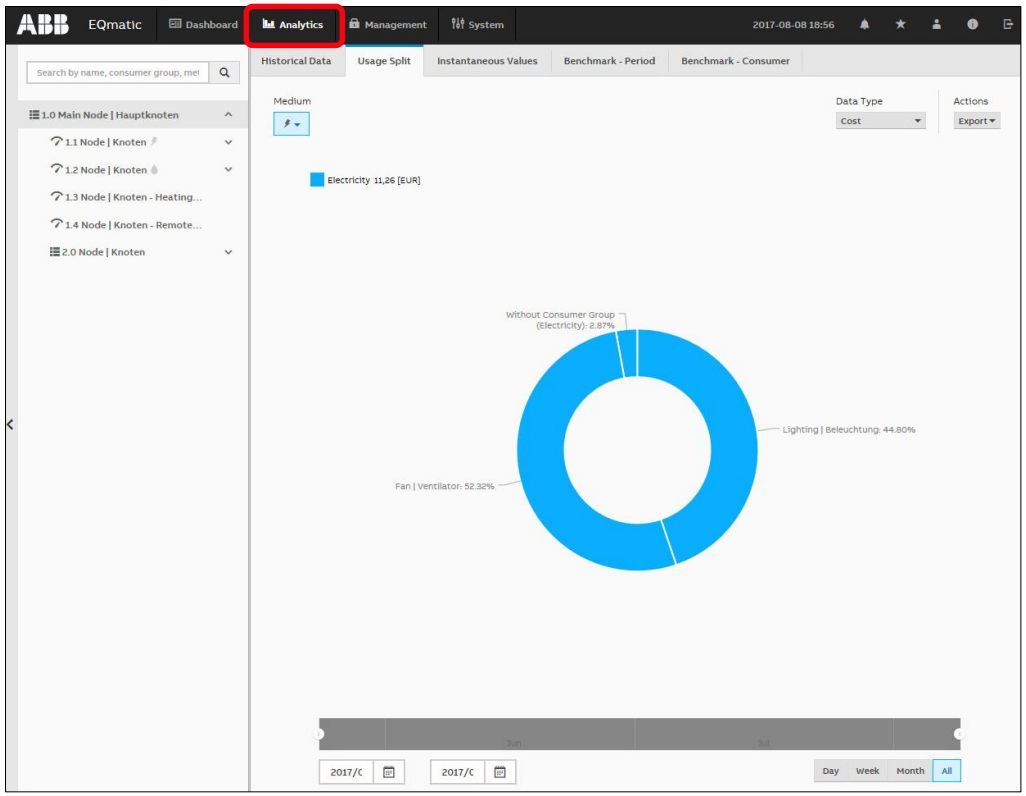
Analytics – Usage

For analysis and display of

- Cost
- Consumption
- Generation
- Income
- …

per medium or consumer group

- Lighting
- Cooling
- Ventilation
- …



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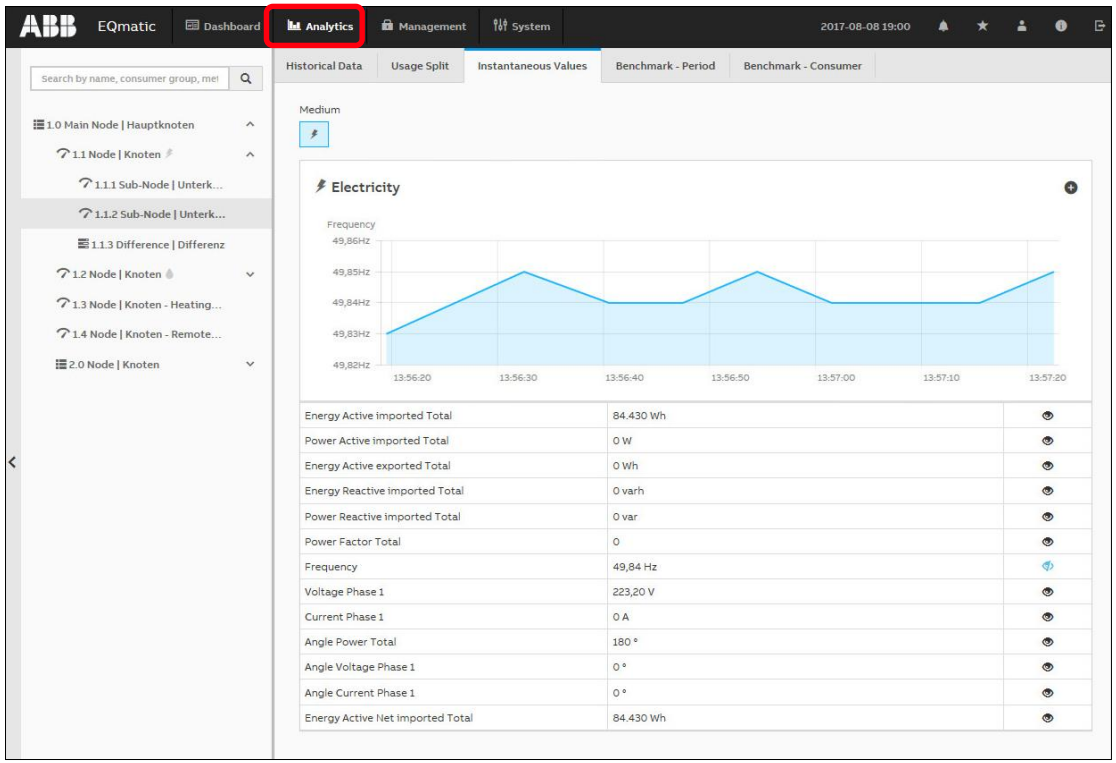
Main menu

Analytics – Instantaneous Values

This function displays the instantaneous value of a single data point in real time

The desired metering point or meter must first be selected in the metering structure

Depending on the meter’s scope of functions, various data points are available for display



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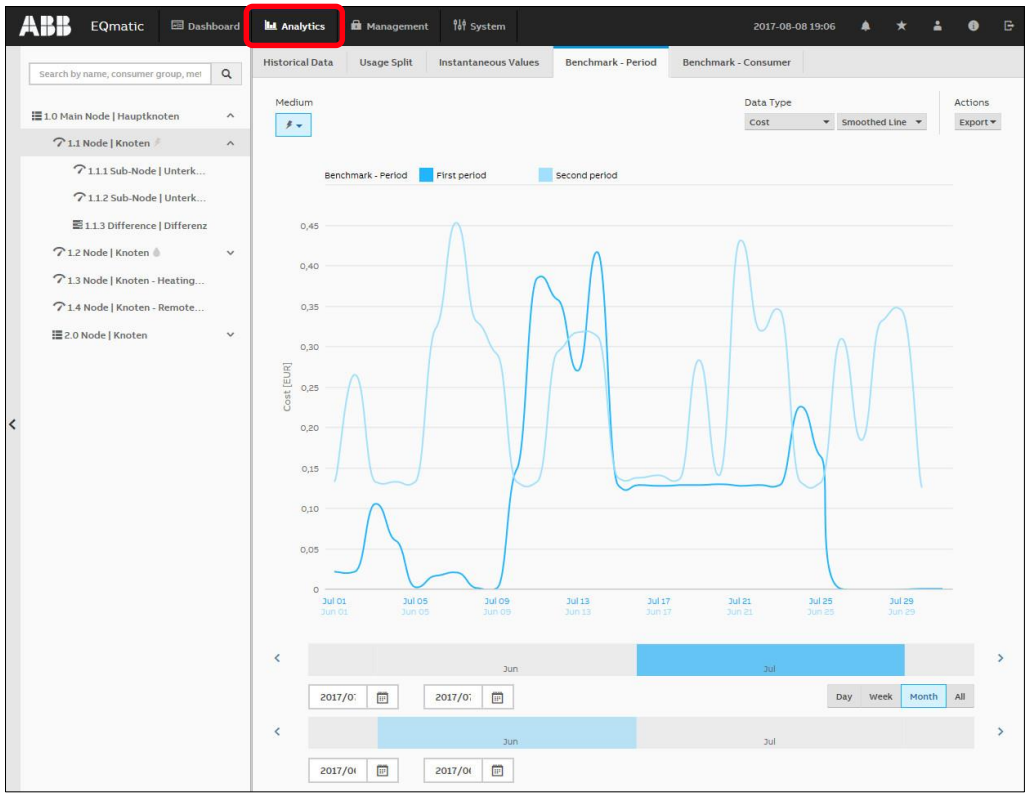
Main menu

Analytics – Benchmark - Period

To compare a consumer or node referred to two time intervals (e.g. current month and previous month)



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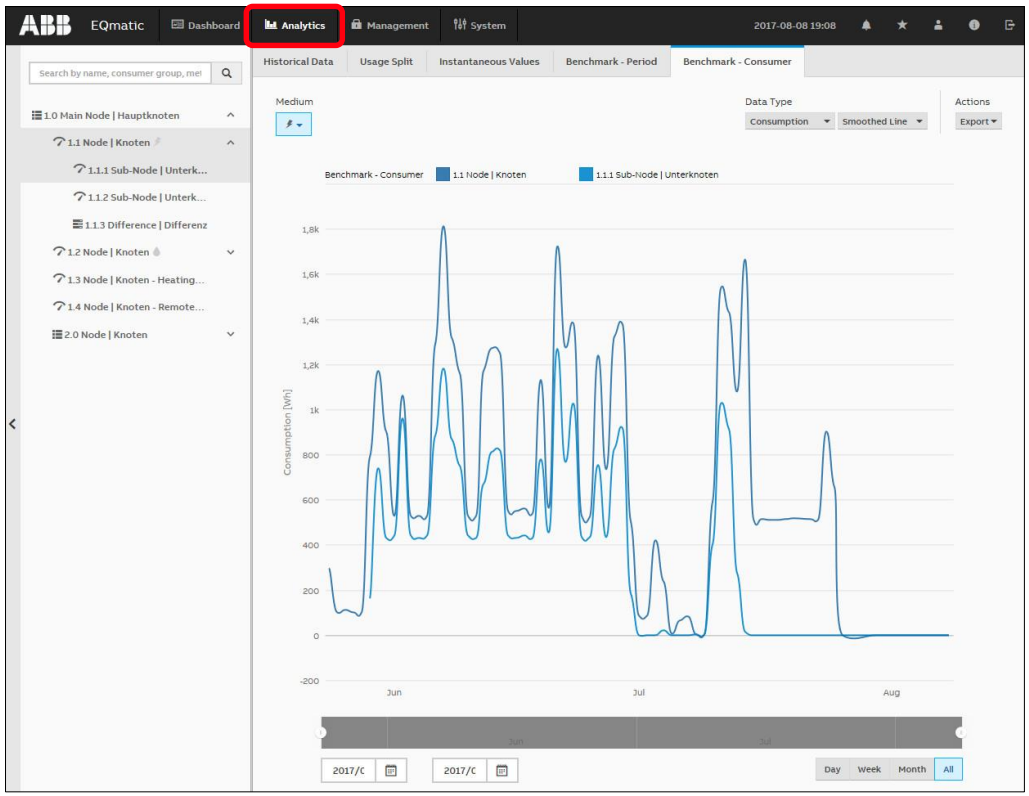
Main menu

Analytics – Benchmark - Consumer

To compare up to five consumers or nodes referred to a time interval



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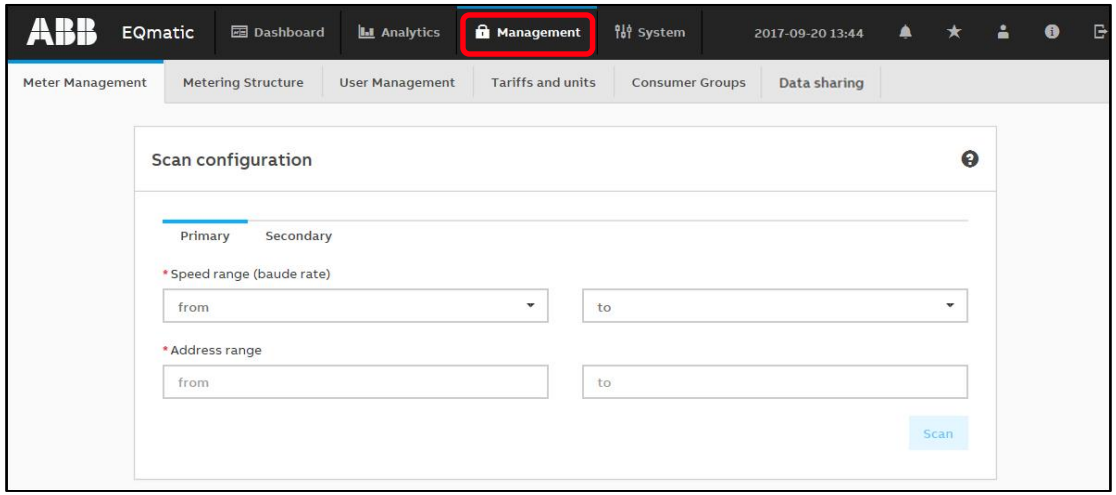
Main menu

Management

The *Management* menu can be used to make settings

- Meter Management
- Metering Structure
- User Management
- Tariff and Units
- Consumer Groups
- Data Sharing



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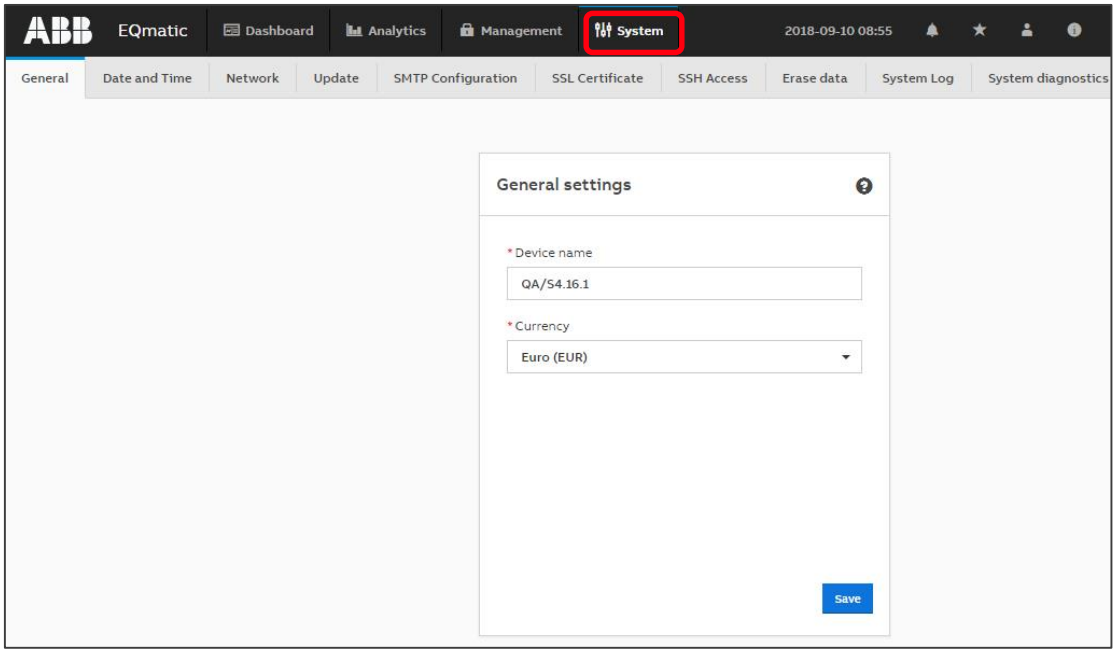
Main menu

System Settings

Basic settings are made in the system settings

- General
- Date and Time
- Network
- Update
- SMTP Configuration
- SSL Certificate
- SSH Access
- Erase data
- System Log
- System diagnostics



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Device overview

	QA/S 3.16.1	QA/S 3.64.1	QA/S 4.16.1	QA/S 4.64.1
Protocol	M-Bus		Modbus RTU	
Max. devices	16	64	16	64
Design	Modular installation device (MDRC)			
Order code	2CDG 110 226 R0011	2CDG 110 227 R0011	2CDG 110 228 R0011	2CDG 110 229 R0011
List price	699.- €	1,199.- €	699.- €	1,199.- €
	All devices have the same settings and menus (dashboard, historical data, …) → Only the commissioning step for scanning the connected meters (M-Bus or Modbus) is different			

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Technical documents

www.abb.com/KNX
→ Products and Downloads
→ Energy Management
→ QA/S x.yy.1 Energy Analyzer

- Product Manual
- Technical datasheet
- Installation and operating instructions
- Specification text
- Product information
- Presentation slides
- CE declaration of conformity
- • •

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Connecting to the Energy Analyzer

Commissioning requirements

A PC/laptop with web browser for commissioning and operating

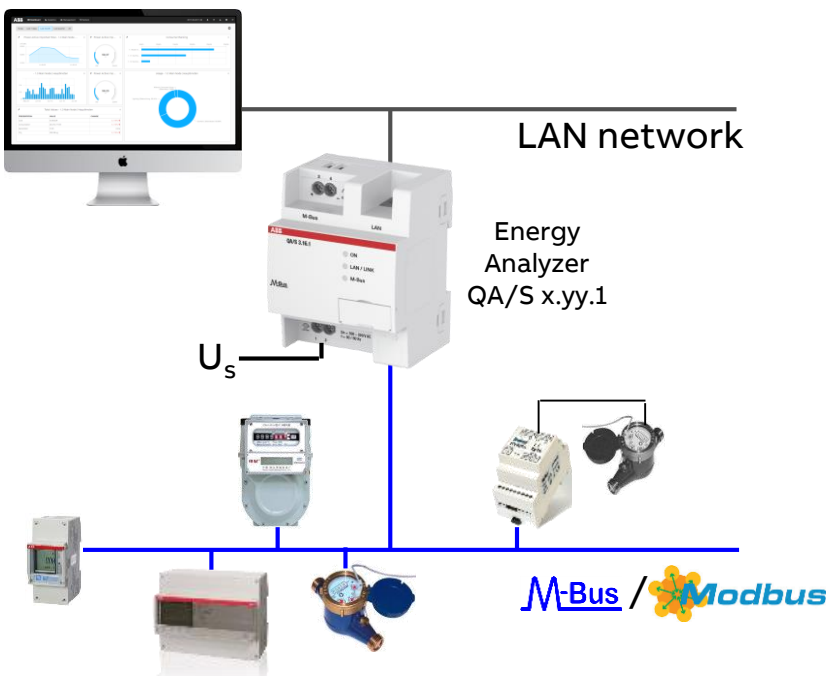
The QA/S is ready for operation and a LAN connection is established

The PC/laptop and the QA/S are in the same IP network

Meters are operating and connected to M-Bus or Modbus RTU terminal on the QA/S

The M-Bus and Modbus devices comply with the current M-Bus or Modbus standard

The M-Bus and Modbus devices are connected and configured according to manufacturer's instructions (e.g. speed, primary address, transformer ratios, etc.)



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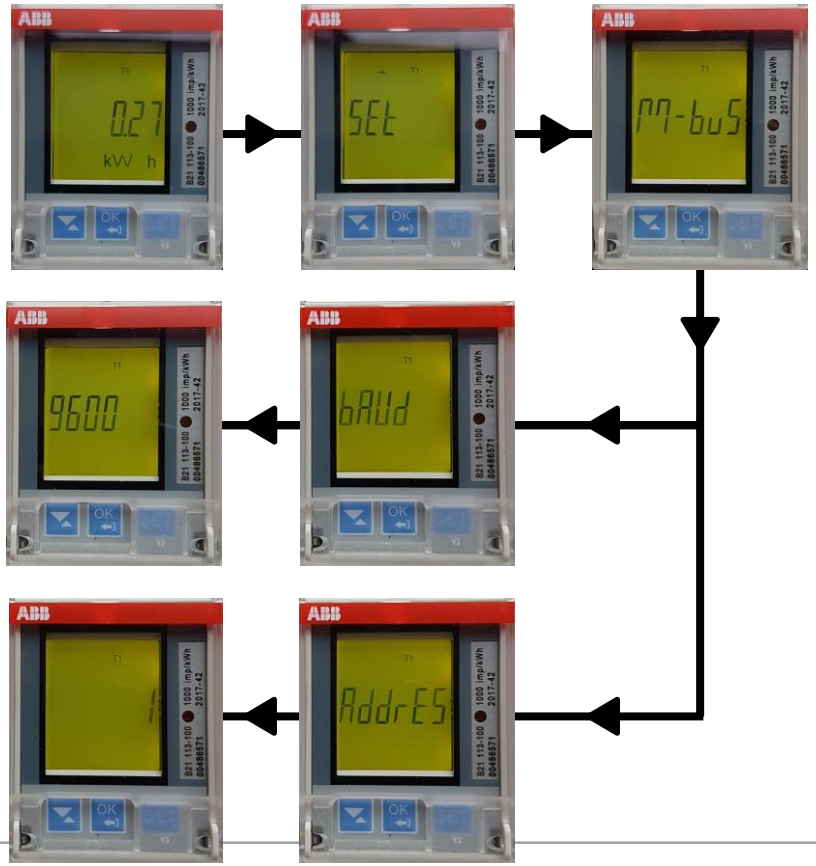
Connecting to the Energy Analyzer

Example: Set the wired M-Bus interface

1. Select “SET” in the main menu and press OK
2. Select “M-Bus” and press OK
3. Press ▼ once to get to the next menu “Baud”
   - The display will show the baud rate
   - Set baud rate (e.g. 9600)
4. Press ▼ once to get to the next menu “Address”
   - The display will show the address
   - Set address (e.g. 001)



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Connecting to the Energy Analyzer

Commissioning steps
The steps are identical except for scanning the connected meters (M-Bus or Modbus)

Connect device

Start ABB i-bus® Tool to detect ABB EQmatic device in your local network

Open web site and log in

Follow wizard instructions

System Settings

Set user name + password

Set date and time

Meter Management I

Configure settings for Bus scan

Perform scan to detect connected ABB devices.

Configure custom meters (optionally)

Meter Management II

Configure tariffs and units

Define consumer groups, e.g. HVAC, lighting, etc. (optionally)

Building structure

Configure Building Structure:
- Manually (tree structure)
- Automatically (flat list)

You're done!

Configure Dashboard

Start your analytics

Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Connecting to the Energy Analyzer

Access via the ABB i-bus® Tool

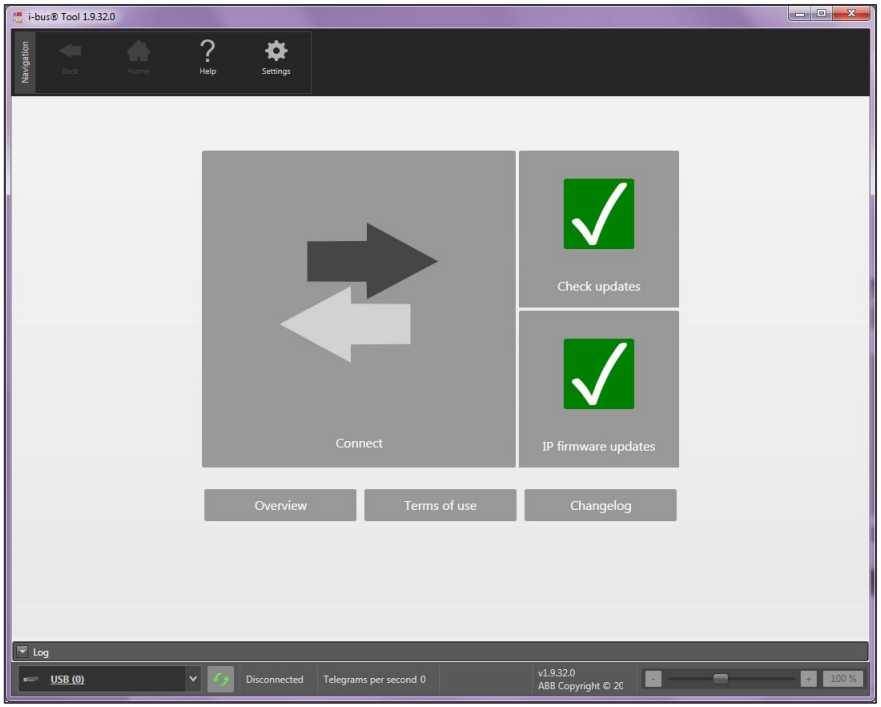
The ABB i-bus® Tool is free software that provides help with commissioning

The device can be accessed with the ABB i-bus® Tool during initial commissioning

IP address assignment in the QA/S is set to automatic addressing (DHCP/autoIP) at the factory, and the IP address can be read with the ABB i-bus® Tool

Download the ABB i-bus® Tool and install it on the Windows PC/laptop

Download link: www.abb.com/knx



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Connecting to the Energy Analyzer

Access via the ABB i-bus® Tool

Start the ABB i-bus® Tool

Click:

– “Connect”

– “IP devices”

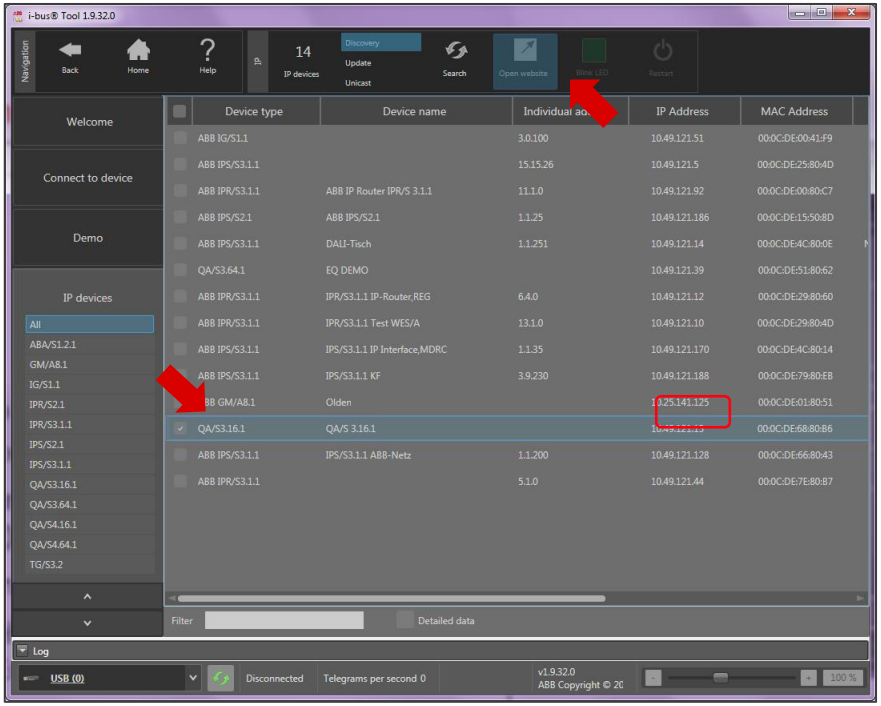
– “Discovery”

The ABB i-bus® Tool automatically searches for known IP devices in the local network

Select the desired Energy Analyzer QA/S from the table (click)

Click the “Open Website” button

The default web browser opens, and the start screen of the Energy Analyzer appears



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Connecting to the Energy Analyzer

User interface

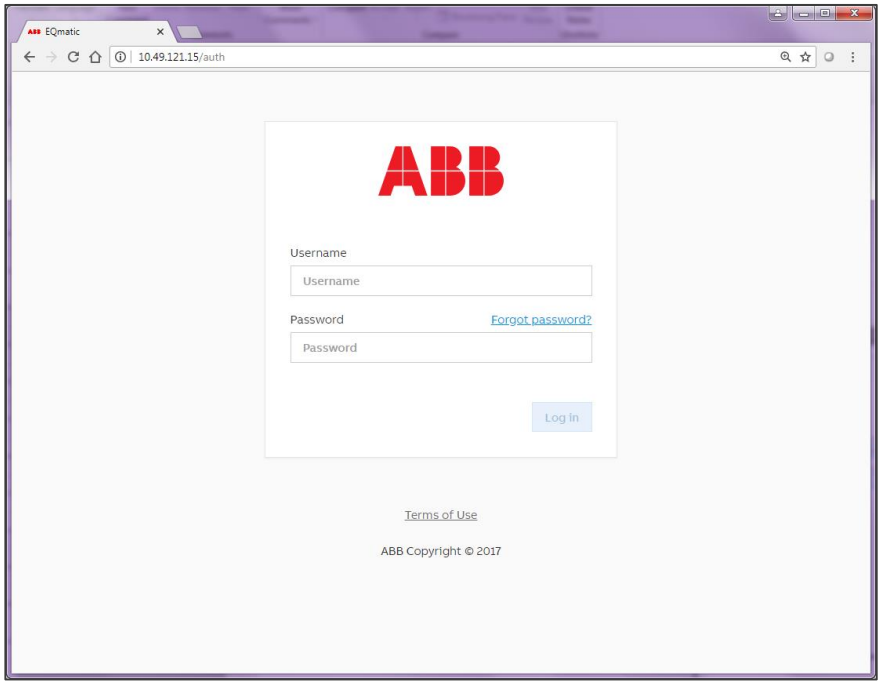
The connection to the device’s web server is established

Enter the user name and the password

Default user name and password on delivery

- Username: admin
- Password: admin

Follow the instructions in the commissioning wizard to proceed with commissioning



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

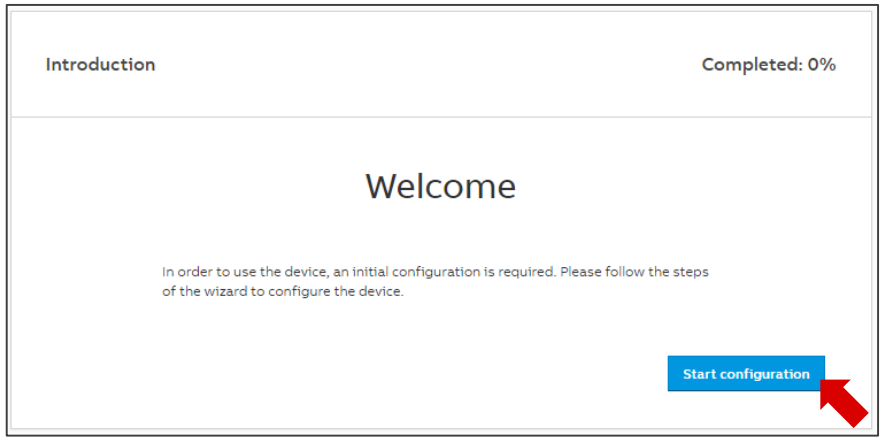
Commissioning wizard (1)

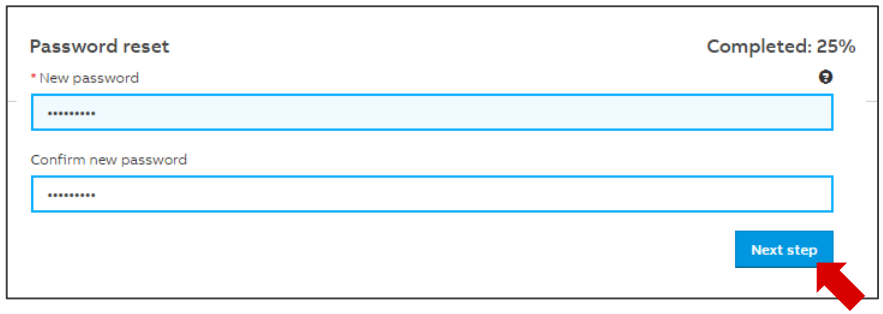
Once a connection to the device is established, the commissioning wizard starts for the first time

The steps are identical except for scanning the connected meters (M-Bus or Modbus)

It guides the user through the steps and basic settings required for initial commissioning

- Read and confirm the terms and conditions of use
- Change the default password
  - This is important for device and data security
  - The password is expected to be at least 9 characters long and contain capital letters, small letters and non-letter (numeric or special) symbols





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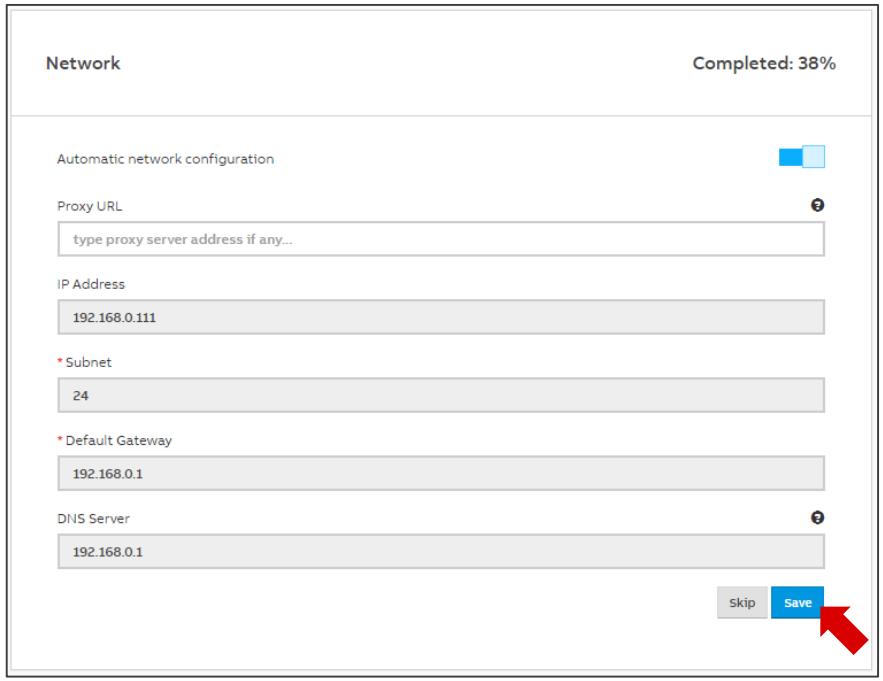
Commissioning wizard (2)

– Change the network settings if necessary



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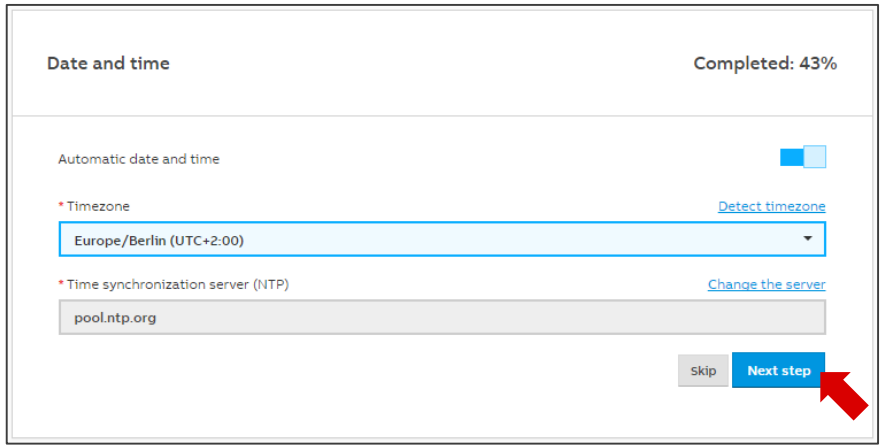
Commissioning wizard (3)

– Configure the date and time



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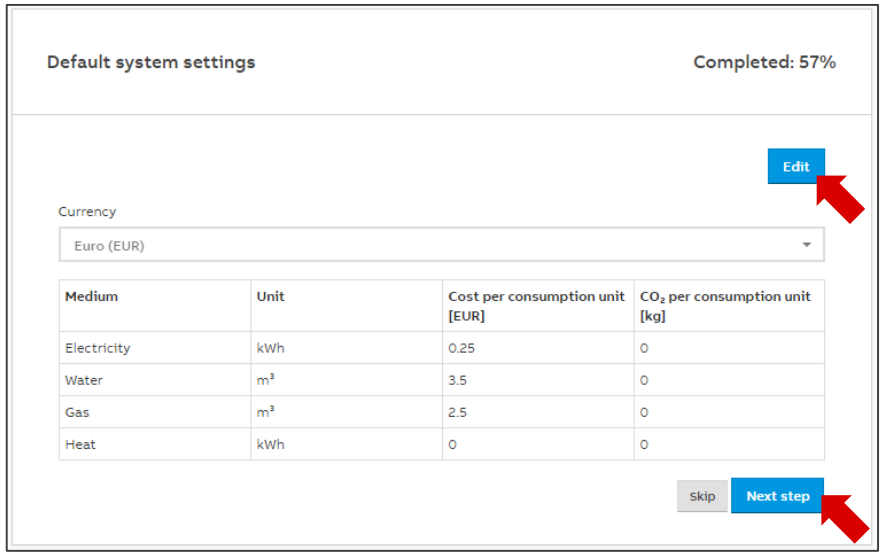
Commissioning wizard (4)

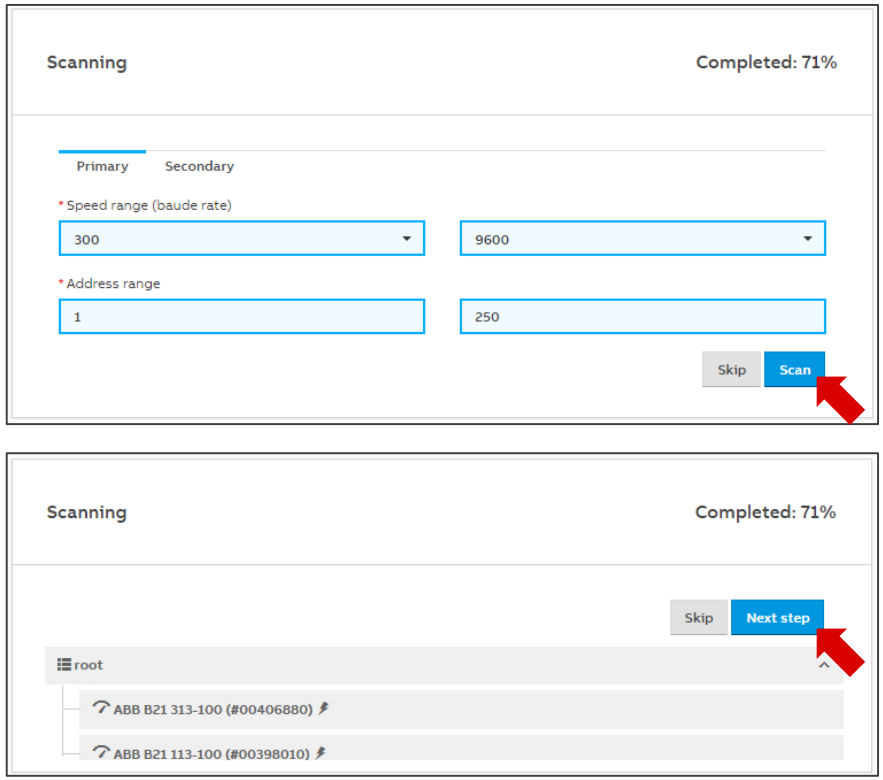
– Configure the currency, costs and CO_2 factor per consumption unit



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

QA/S 3.xx.1 (M-Bus): Commissioning wizard (5):

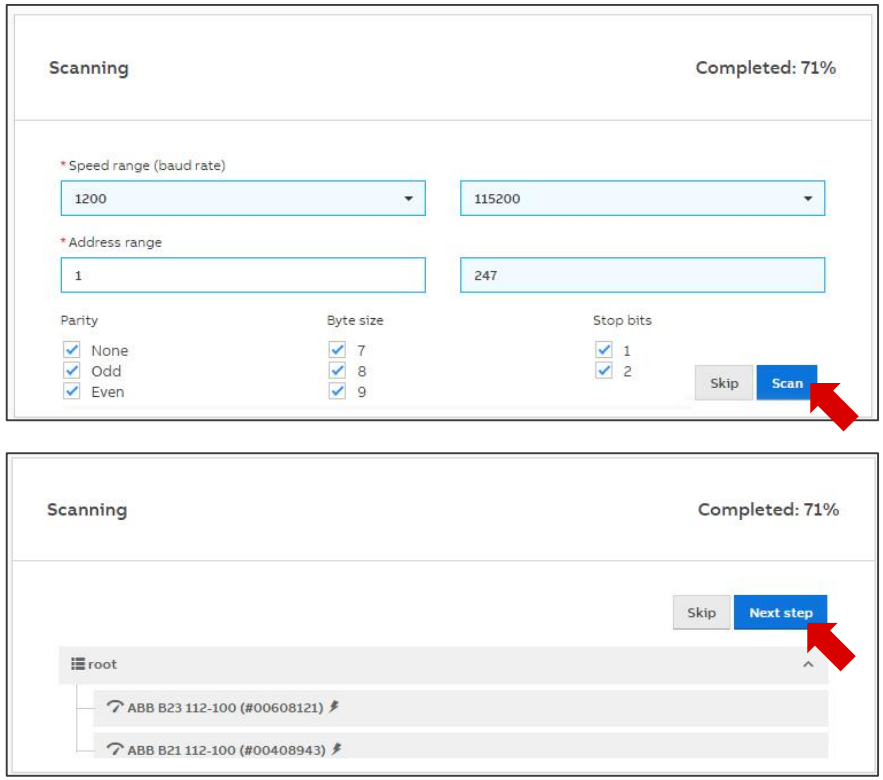
- Scan the bus for connected M-Bus devices and create the automatic metering structure
  - 300 … 9,600 baud
  - Primary address 1 … 250
  - Secondary address
- Limit the scan range as much as possible to reduce the scanning process time
- Detected meters will be listed in a table
- Clicking on “Skip” allows the user to search for connected M-Bus devices or slaves in the *Management* menu later on and to select creation of a manual or automatic metering structure



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

QA/S 4.xx.1 (Modbus): Commissioning wizard (5):

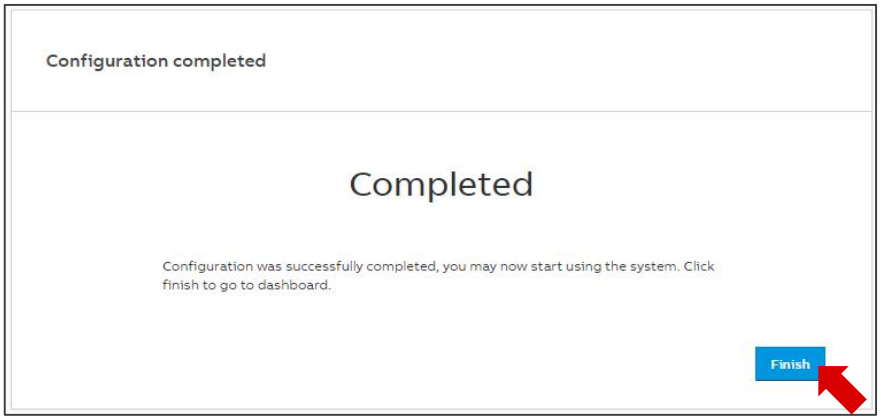
- Scan the bus for connected Modbus devices and create the automatic metering structure
  - 1,200 … 115,200 baud
  - Address range 1 … 247
- Limit the scan range as much as possible to reduce the scanning process time, e.g. ABB EQmeters: Parity “Even”, Byte size “8” and stop bits “1”
- Detected meters will be listed in a table
- Clicking on “Skip” allows the user to search for connected Modbus devices or slaves in the *Management* menu later on and to select creation of a manual or automatic metering structure

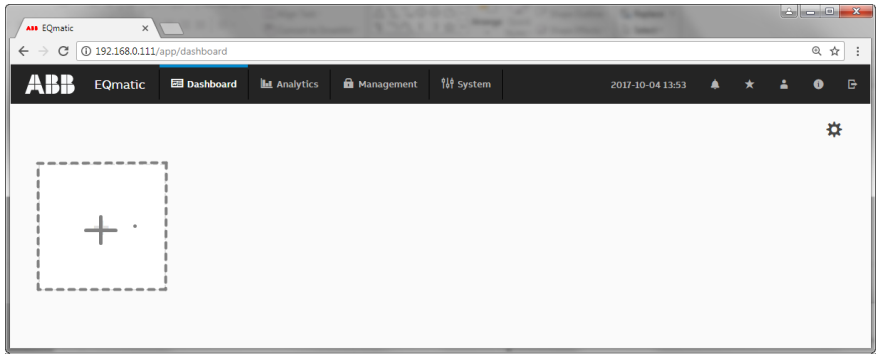


Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Commissioning wizard (6)

- Configuration has been completed successfully
- The device is ready for operation
- The *main* menu with the individually configurable dashboard is displayed





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Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

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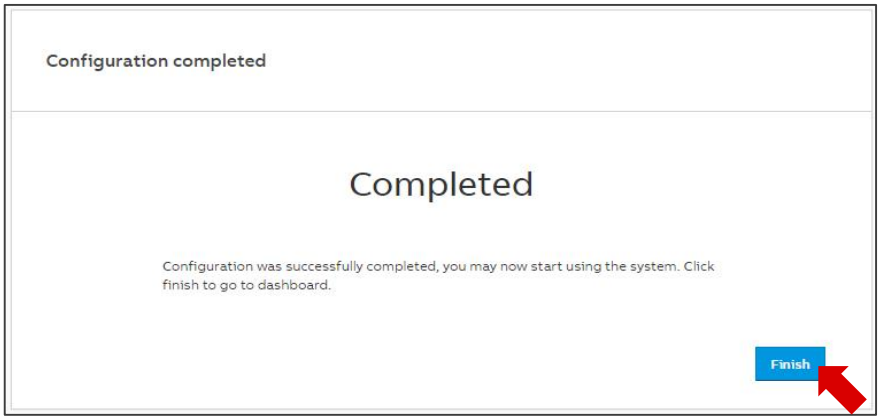

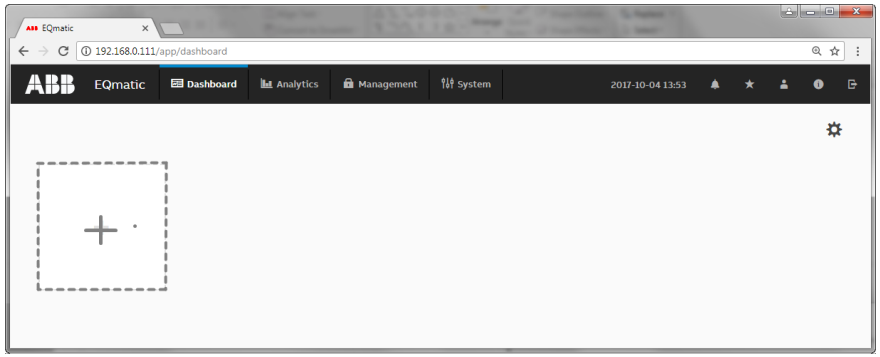

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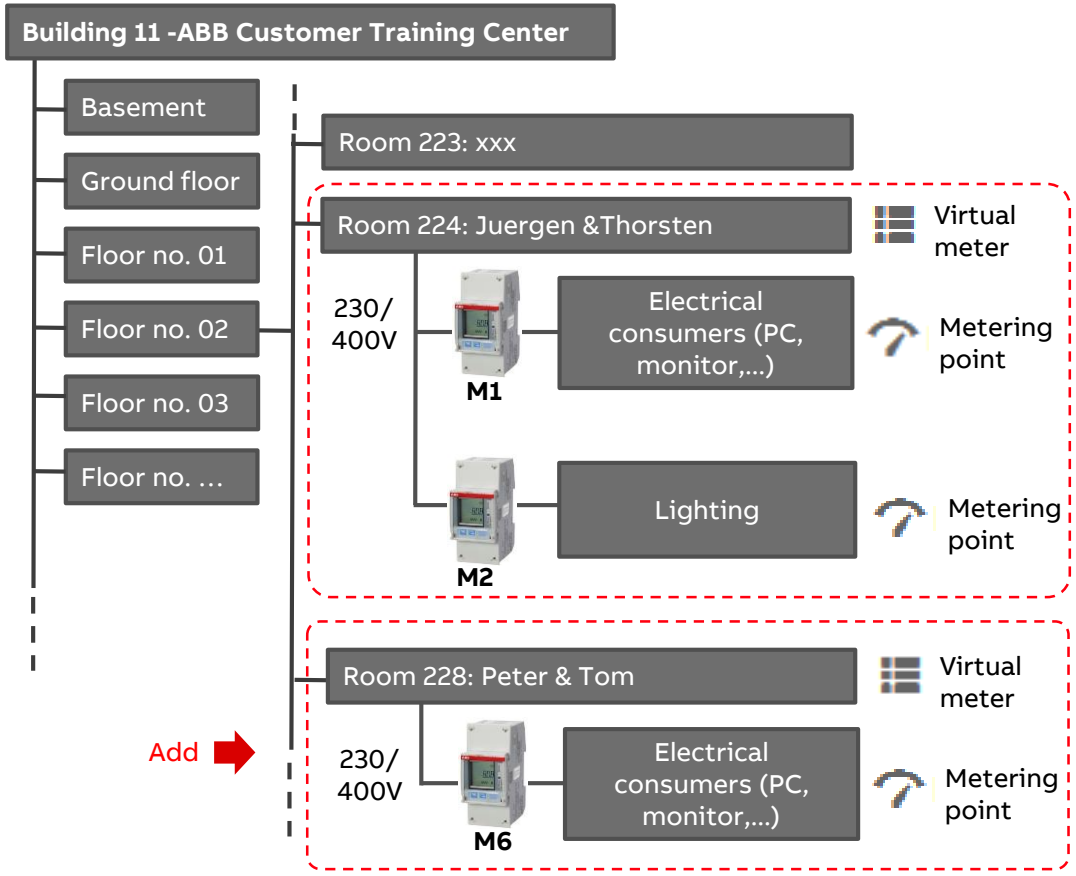
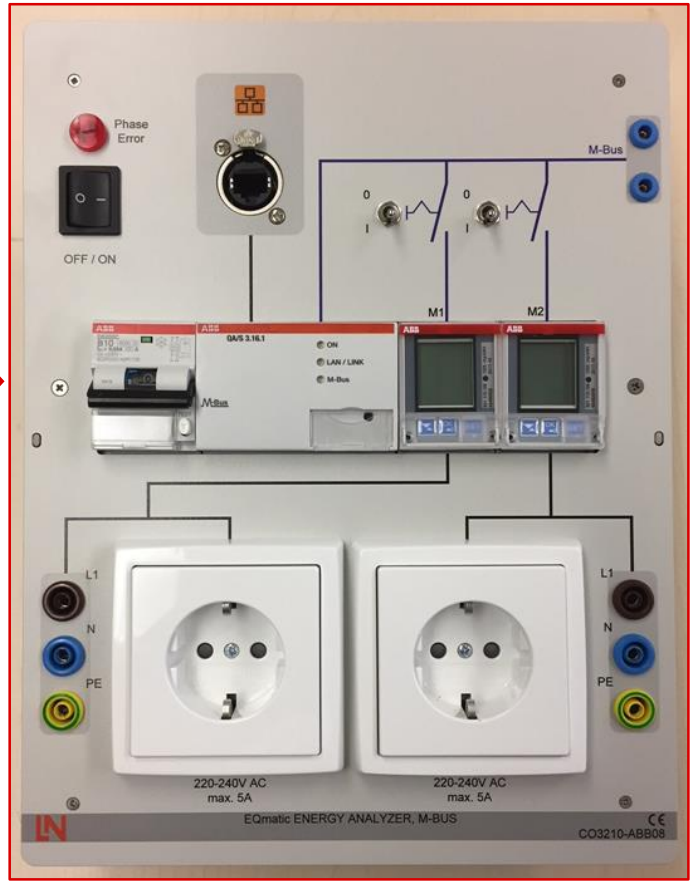
Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Demonstration in practice





Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

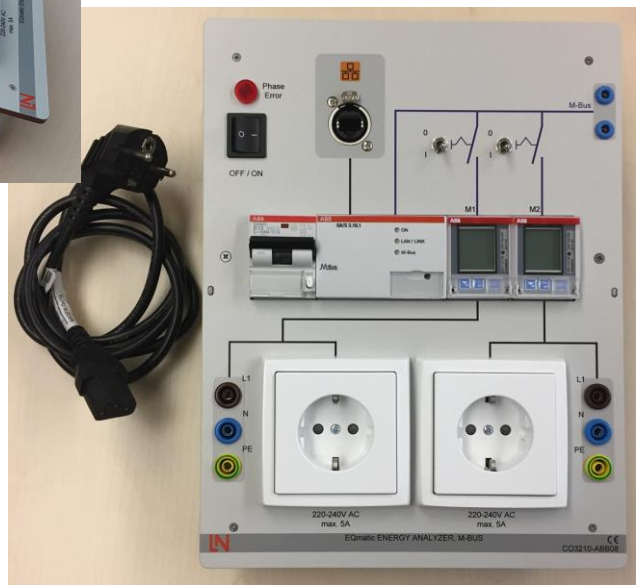
Training

ABB EQmatic training boards

Energy Analyzer Board with

- Energy Analyzer M-Bus QA/S 3.16.1
- Two load circuits with EQ Energy Meters B21 313-100

To be hung in a rack or put on the table



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Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Training

Further information

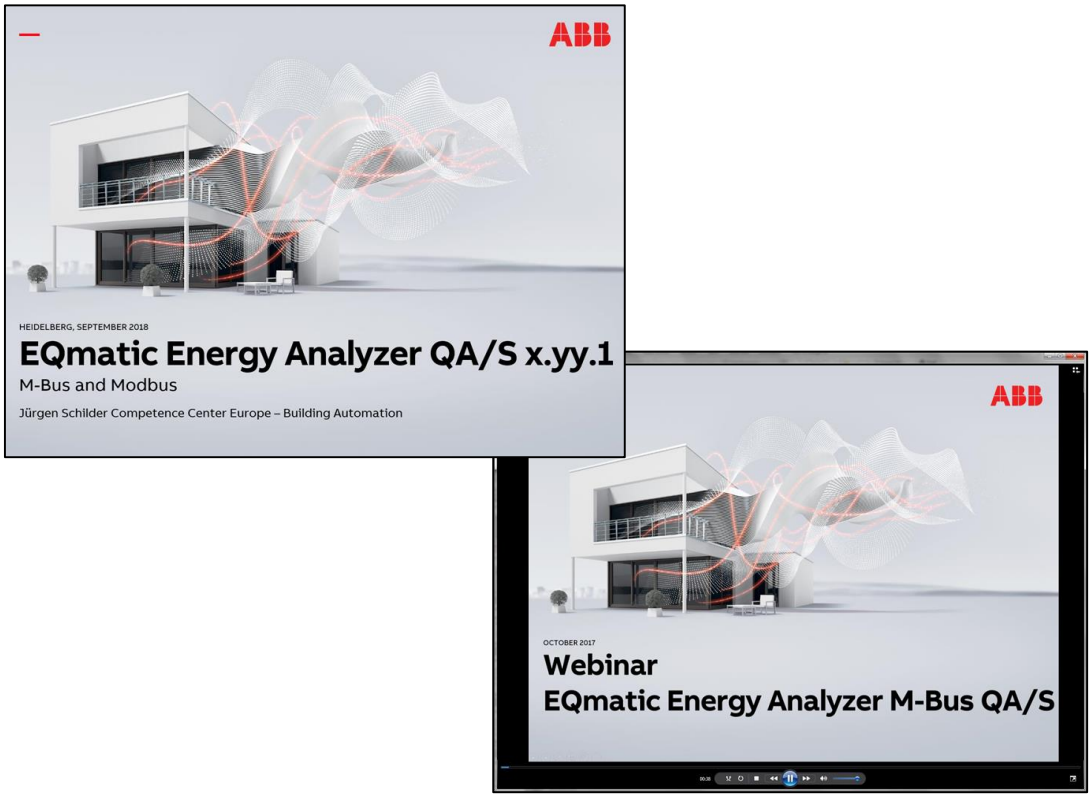
Training presentation incl. introduction, basics, planning, installing, commissioning, … (ABB library 9AKK107046A7077):

- PPT (only ABB): Download link
- PDF: Download link

Training & Qualification Database (webinars in October 2017 and September 2018):

- Webinar slides
- Webinar recording (MP4)

https://go.abb/ba-training



Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Training

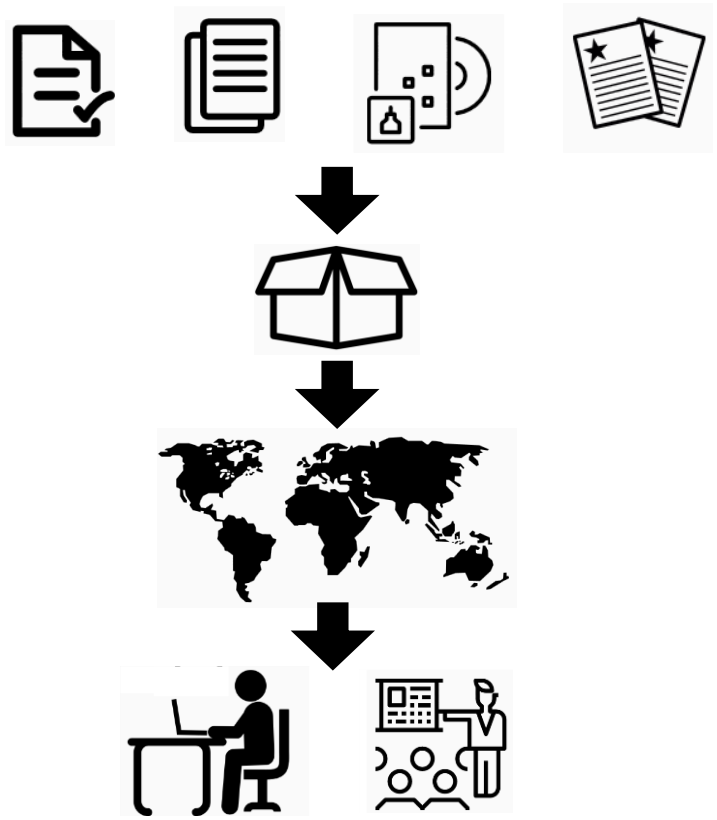
Training packages

Solution-oriented training (HVAC, security, shading, lighting, …)

Created individual training packages for trainers in the countries including

- Agenda with course description
- PowerPoint Presentation
- Practical exercises and solutions
- ETS Training project (ENG), incl. group addresses and solution
- Feedback form
- Certificate of attendance

The documents can be used directly for self-study, training or basis for individualized training in the countries



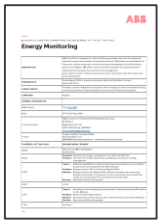
Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

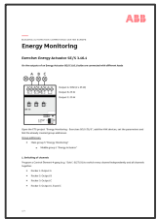
Training

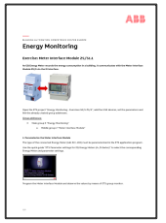
Training package “Energy Metering"

- Agenda with course description
- PowerPoint presentation
  - Energy Monitoring with KNX
  - Energy Analyzer QA/S
  - EQmeters –Technical
  - EQmeters – Commercial

  ETS project for the exercises incl. the group addresses created
- Exercise
  - Energy Actuator SE/S 3.16.1
  - Meter Interface Module ZS/S1.1
- Certificate of Attendance
- Feedback form







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Training

Virtual Classroom Training (VC)

Online training with a limited number of participants

However, the participants do not sit in the classroom on site, but connect worldwide via the IP network

The theoretical learning contents are taught as usual

New:

→ The ABB EQmatic training boards are connected to the ABB IP network

→ The participants can connect to the Energy Analyzer QA/S via the IP address and do practical exercises (e.g. commissioning)

Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Training

KNX Certified Training

Certified KNX Courses in Heidelberg

- Tutor Course 09th to 13th Oct.
- Basic Course : 05th to 09th Nov. New!!!

And many more training courses in the calendar “International Training Dates 2018”

www.abb.com/knx or
https://go.abb/ba-training

Webinar “ABB EQmatic Energy Analyzer QA/S x.yy.1”

Next Webinar

ClimaECO

New ClimaECO devices:

– Application Controller AC/S 1.x.1

The heart of ClimaECO

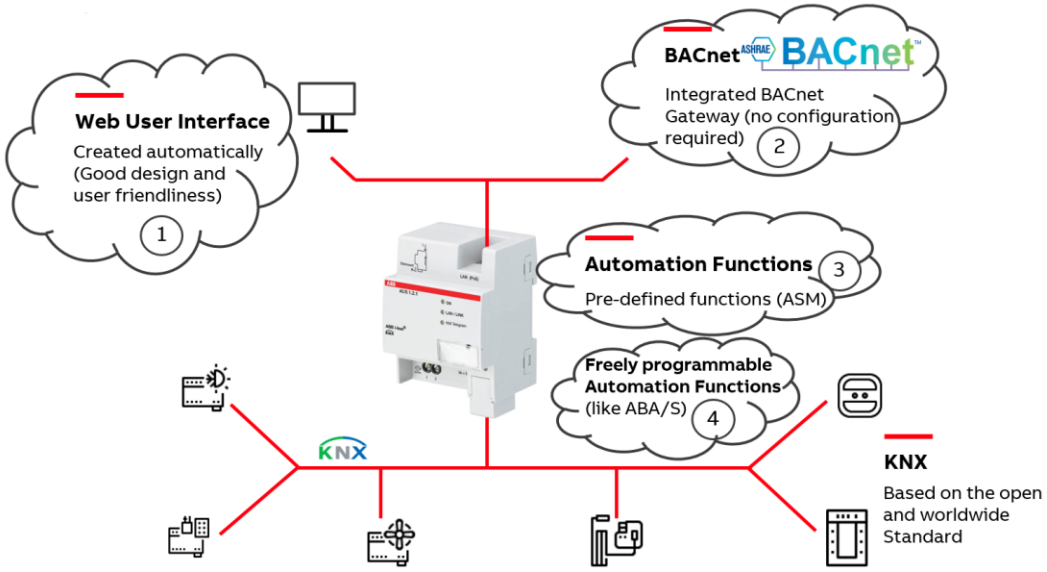
– Web User- and BACnet interface

– Pre-defined and freely programmable automation functions

Wednesday 10th October 2018

– Morning 09:00 am Europe Time (Berlin, UTC + 2h)

– Afternoon 03:00 pm Europe Time (Berlin, UTC + 2h)



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