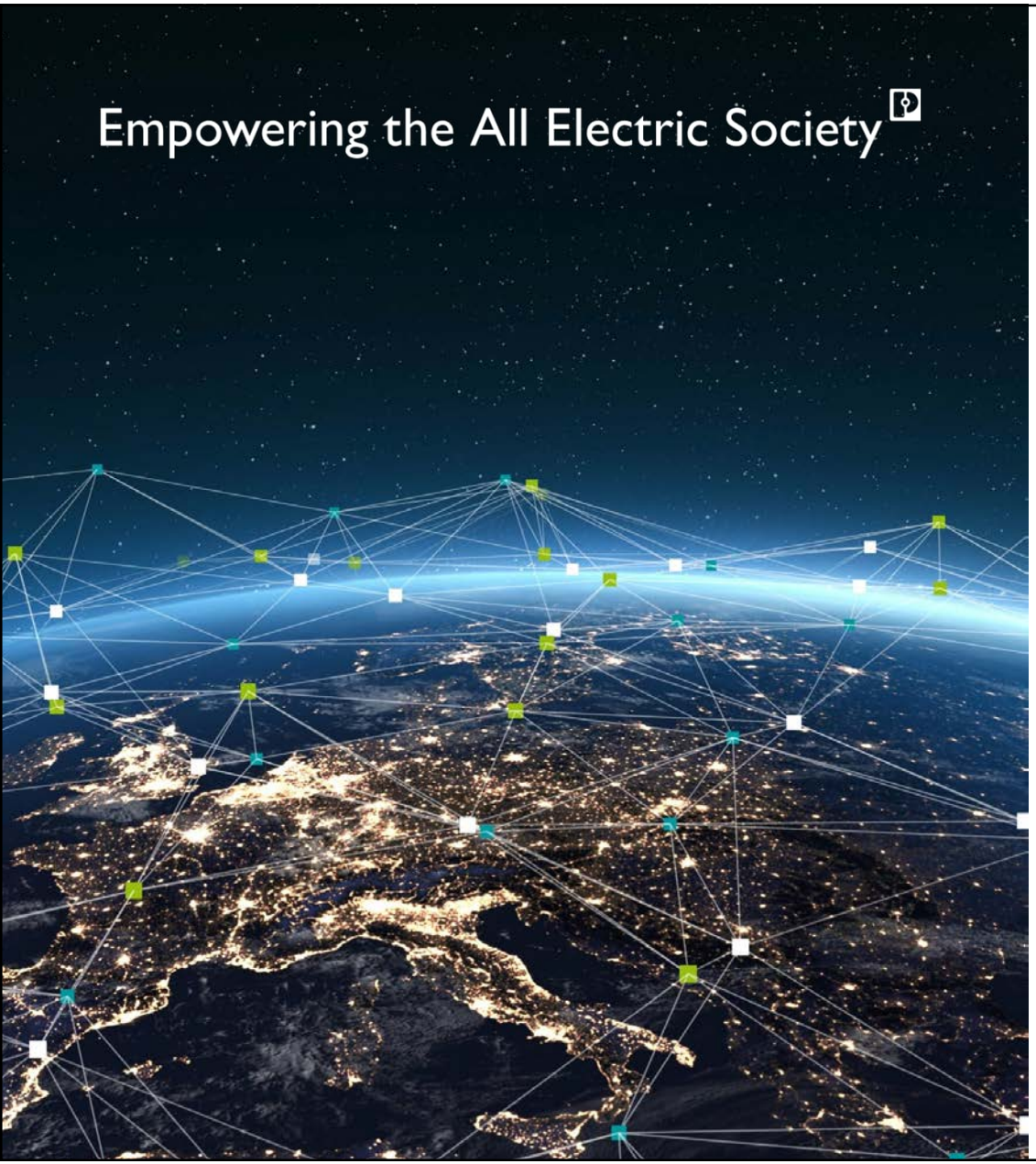


100 years of passion for technology and innovation

Welcome

Smart Building Expo 2025

Emalytics Framework.

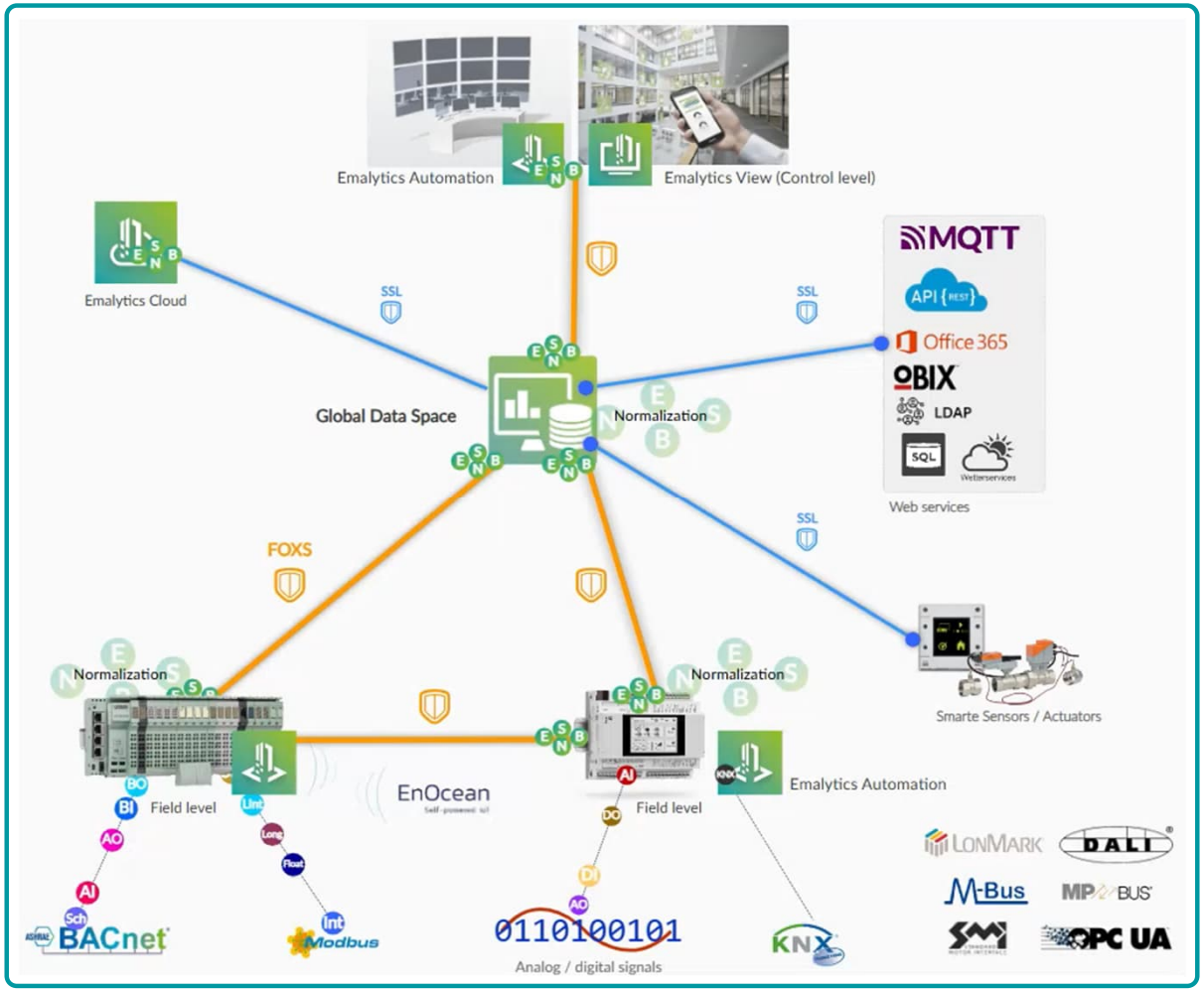
IoT-based software platform for intelligent building operation

PHOENIX CONTACT

Emalytics Framework

Agenda

- What is Emalytics?
- Emalytics Automation
- Emalytics View
- Emalytics Cloud
- Emalytics Controller
- One Stop Shop



What is Emalytics?

PHOENIX CONTACT

Emalytics Framework

What is Emalytics?

Automation View Cloud

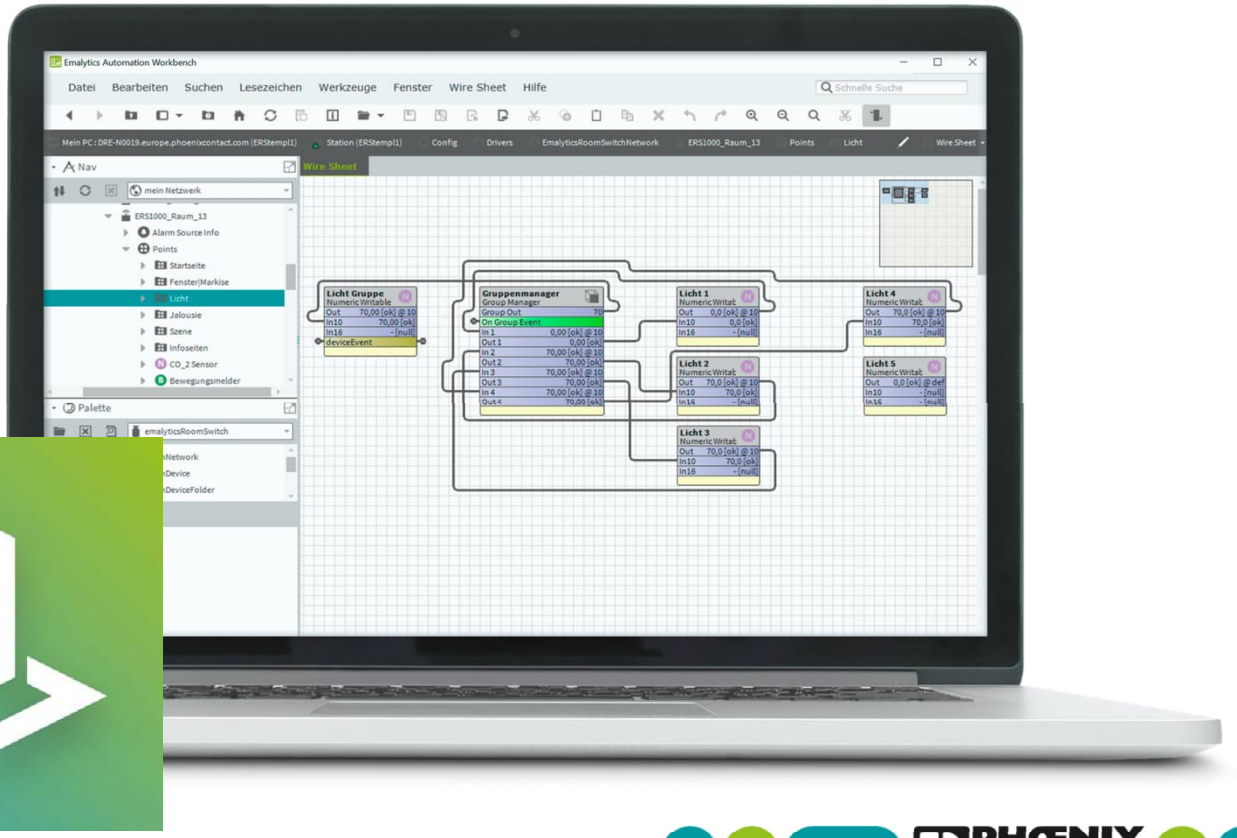
Emalytics Automation

PHOENIX CONTACT

Emalytics Framework

Emalytics Automation

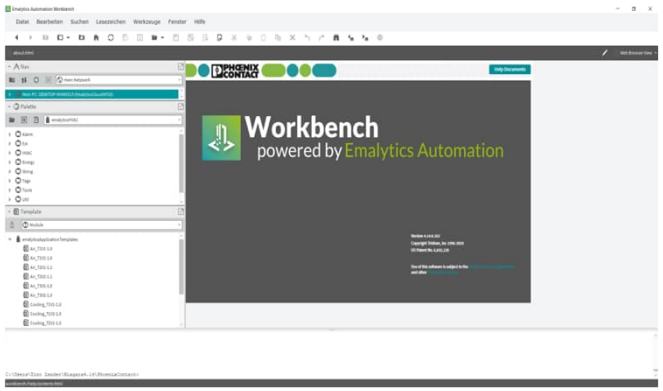
- Emalytics Workbench
- Emalytics Libraries
- Emalytics Drivers
- Emalytics Templates
- Basic functionality

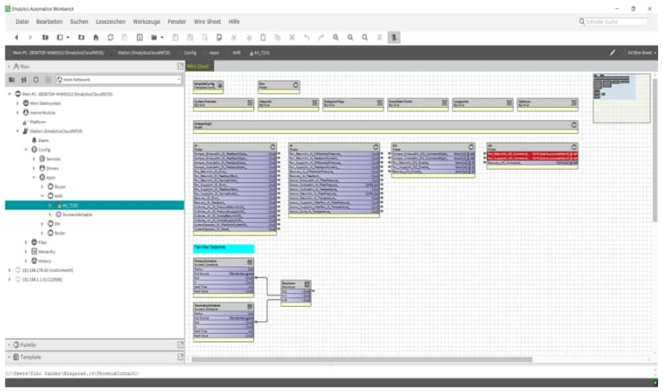


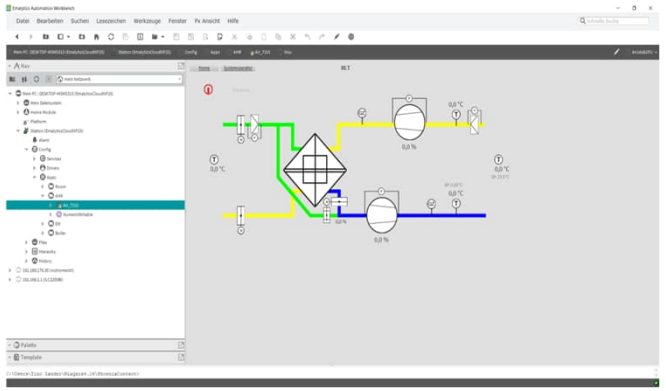
Emalytics Framework

Emalytics Automation – Emalytics Workbench

N 4.10 (old LTS)	N 4.11	N 4.12	N 4.13	N4.14	N4.15 (new LTS)
Emalytics 1.7.11					
	Emalytics 1.8.2				
		Emalytics 1.9.4			
			Emalytics 1.10.2		
				Emalytics 1.11.3	
					Emalytics 1.12

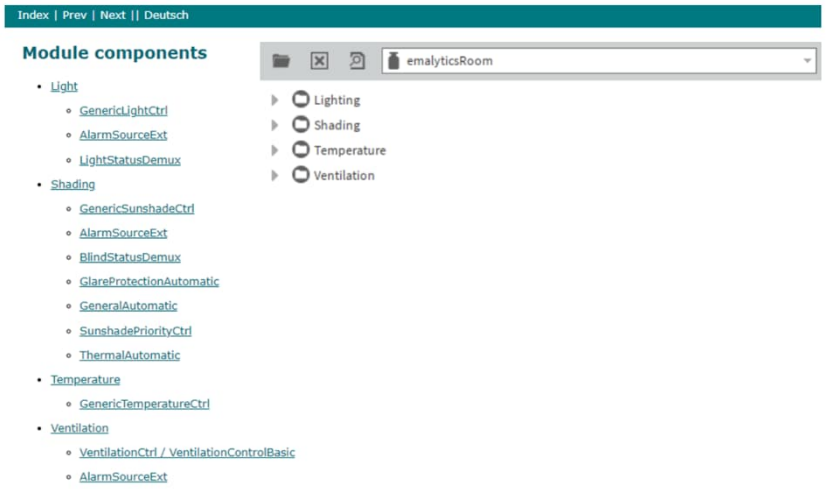


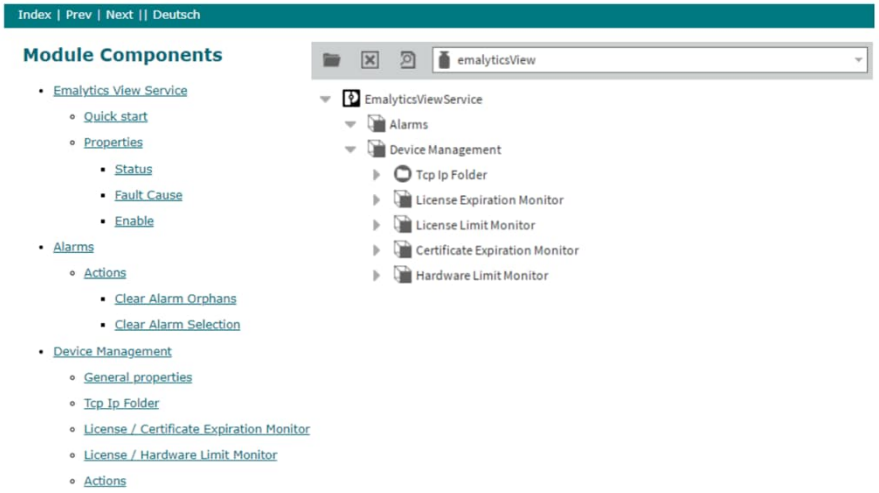


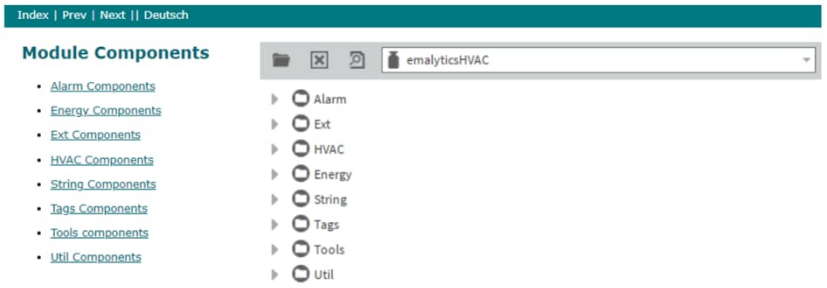


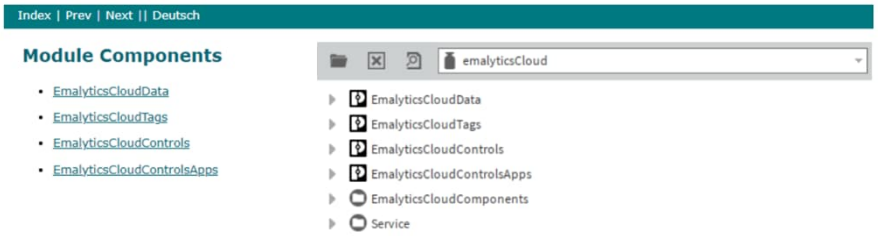
Emalytics Framework

Emalytics Automation – Emalytics Libraries









Emalytics Framework

Emalytics Automation – Emalytics Drivers

3.1. Inline system

The Emalytics I/O driver manages the interface between the ILC 2x50 BI Emalytics Controller and the connected I/O terminals.

Up to 63 I/O terminals can be connected to each ILC 2x50 BI.

The individual terminals belong to three different product versions. All of the terminals listed here can be combined regardless of the version.

Project+

The Project+ software tool makes it much easier to design an Inline station. Through graphical and text support, and taking into consideration the data points relevant to the project, the software helps you select the right terminals, arrange them physically in the station, take the basic electrical parameters into account, and find the best solution in terms of price (see Planning software section).

Hardware:

The I/O terminals approved for the ILC 2x50 BI are described below.

Inline I/O terminals

I/O terminals

The item designation of the I/O terminals is made up of the information shown on the right.

Description of the specific versions

PAC = package terminal

Standard terminal which was the first terminal to be shipped in a box as a delivery option comprising the connection terminal block including connector and marking.

Now all terminals are shipped with connector and marking.

The terminal was originally intended for industry automation.

ME = machine edition

Terminal with extra functions and with similar properties to the PAC version, for example ambient temperature for operation from -25°C ... +55°C, with optimized space requirements for the terminal itself and the packing unit.

ECO = basic (ECO) terminal

Functionality, properties optimized for buildings, for example temperature range from 0°C ... +55°C.

3.2. Catan system

The Emalytics I/O driver manages the interface between the CATAN C1 EN Emalytics Controller and the connected extension modules as well as the LO/ID display.

Hardware:

The Catan devices and the corresponding accessories are described below.

Catan system with controller, display, and extension module

3.3. BACnet

3.4. LonWorks

3.5. Modbus

3.6. M-Bus

3.7. KNX IP

3.8. EnOcean

EnOcean technology is a wireless energy harvesting technology.

Modules based on this technology combine micro-energy converters with ultra-low power electronics. They enable wireless communication between sensors and switches that are predominantly self-sufficient and draw their energy from the surrounding environment (motion, light, temperature differences) and gateways.

Hardware

The driver module can be used on the ILC 2050 BI, as it provides support for the Ethernet and serial interface (RS-485).

Option 1 (preferred version, all profiles are stored):

Connection is via EnOcean, BACnet/IP gateway. We recommend the STC BACnet IP external EnOcean receiver from Thermokon Sensortechnik GmbH for this.

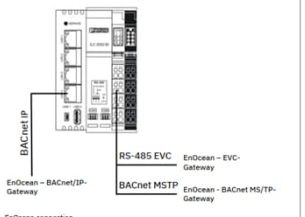
Option 2 (can only receive, not send):

Connection is via EnOcean, BACnet MS/TP gateway. We recommend the SRC65-BACnet MS/TP external EnOcean receiver from Thermokon Sensortechnik GmbH for this.

Option 3 (not all profiles are stored):

Connection is via EnOcean, EVC gateway. We recommend the STC65-RS485-EVC external EnOcean receiver from Thermokon Sensortechnik GmbH for this.

We generally recommend carrying out a field strength survey in advance to determine the number and position of any necessary receivers and amplifiers.



EnOcean connection

3.9. MP-Bus

The MP-Bus is a multi-point bus. Developed by BELIMO Automation AG (Switzerland), it replaces the traditional 0 V to 10 V interface for actuating drives in building automation. The MP-Bus reduces wiring costs and offers a feedback channel for sensor and status information. Bus and supply lines share a standard installation cable.

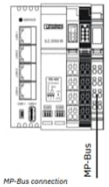
Hardware

The IB IL MP-BUS-PAC Inline MP-Bus terminal enables the integration of a lower-level MP-Bus in the ILC 2050 BI Emalytics Controller.

Within the Inline station, the terminal acts as a master for the lower-level MP-Bus.

We recommend using a maximum of eight MP-Bus nodes (eight MP-Bus devices) on one MP-Bus line or one function terminal because of the speed and the possible connection of sensors to the MP-Bus devices.

If only MPL drives are used on an MP-Bus line (product name ends with "-MPL"), up to 16 devices can be connected to an IB IL MP-BUS-PAC terminal.



MP-Bus connection

3.10. DALI

Digital Addressable Lighting Interface (DALI) is a lighting control system, a standardized dimming protocol, developed jointly by a consortium of lighting device manufacturers. It enables lighting devices from various manufacturers to be connected to the same lighting system.

DALI uses a low-voltage two-way communication protocol, which enables messages to be sent and received by the devices. The bus is used for both the signal and the power supply.

A typical DALI lighting control system can support the addressing of up to 63 individual lights that are split into 16 control zones.

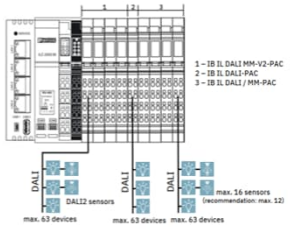
Hardware

DALI I/Os can be configured without programming effort using any external DALI tool as well as the DALI tools available in Emalytics. Configuration data is stored directly in the lights. This data defines the group assignment for each light as well as the dimming level in each scene.

The DALI-2 terminal (type: IB IL DALI MM-V2-PAC) provides extended functions such as color selection and color temperature (DT8) on the software side.

When integrating sensors, it should be noted that the number of devices depends on the current consumption (max. 250 mA in total including the ballasts).

The DALI communication terminals listed in the table below are available for connection to the ILC 2050 BI.



DALI connection

3.11. SMI

SMI (Standard Motor Interface) is a uniform interface for building automation that is used to control electronic drives for blinds or shutters with bus topology.

SMI supports distances of up to 350 m between the controller and drive, where a normal 5-wire cable is used for the cabling. With the option of parallel connection and the simultaneous individual addressability of up to 16 motors, overall costs can be reduced easily.

The height and angle of the SMI motor can be controlled via the SMI interface. The height can be controlled with absolute precision and defines the height at which the roller shutter should be set.

Hardware

The SMI driver module can be used on all Emalytics hosts with support for serial interfaces (RS-485). Here, we recommend the internal COM interfaces of the ILC 2050 BI. This driver enables SMI to be integrated via the external Vestamatic interfaces:

- IF SMI RS-485 DIN (item no. 01092124 and item no. 01092714)
- IF SMI RS-485 (item no. 01092811)

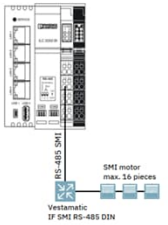
We recommend the DIN version as it enables tunneling.

Please also note that Vestamatic motors offer an additional proprietary function that can be used to set an absolute rotation value. Vestamatic uses Dunker motors with a special chip that ensures this additional functionality.

Dunker and Warema SMI shutters use the same motor with a different chip and therefore do not support absolute rotation.

The following SMI motors have been successfully integrated so far and are recommended by us:

- Dunker "D370" motors
- SELVE "SE Plus 2/7-SMI" tubular motor
- Vestamatic "VL-SMI-WISO-230-2x5Nm"



SMI connection

3.12. PROFINET

PROFINET (Process Field Network) is an open industrial Ethernet standard protocol that is used for controllers among other things. PROFINET uses TCP/IP and IT standards and is real-time-capable.

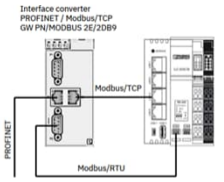
Hardware

One way to integrate PROFINET is to use a Phoenix Contact PROFINET/Modbus interface converter.

This supports data exchange between a PROFINET network (e.g., SIEMENS PLC) and a Modbus/TCP or Modbus/RTU client network (Emalytics system).

GW PN/MODBUS... interface converters

Flexible, bidirectional communication between the PROFINET controller and Modbus ASCII/RTU/TCP clients and servers. GSDML files provide submodules that are mapped to Modbus registers in the GW PN/MODBUS... that can be written or read directly by a Modbus client or using Modbus commands.



PROFINET connection

The user-friendly web-based management (WBM) can be used to manage GW...E/...DB9 device servers and gateways from anywhere in the network using a standard browser. Comprehensive configuration and diagnostic functions, including a wide range of information about the GW...E/...DB9 itself, the set parameters, and the operating state, are clearly displayed in graphical format.

3.13. SNMP

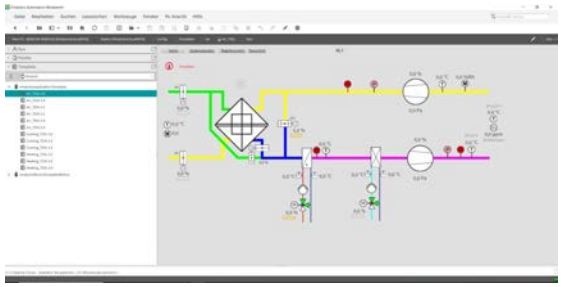
3.14. MQTT

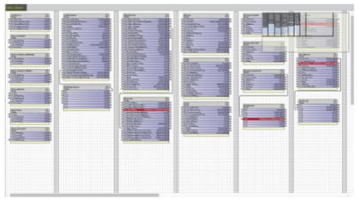
3.15. OPC UA (client and server)

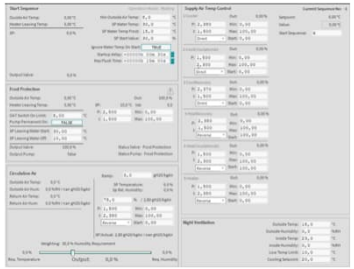
Emalytics Framework

Emalytics Automation – Emalytics Templates

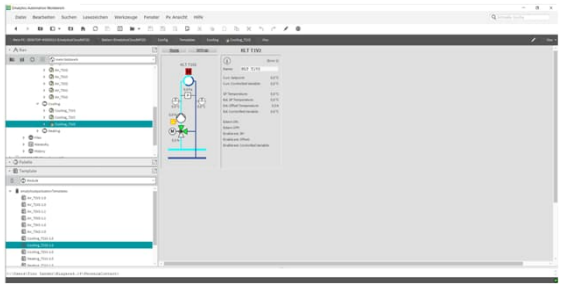
Air Handling

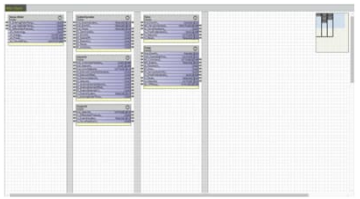


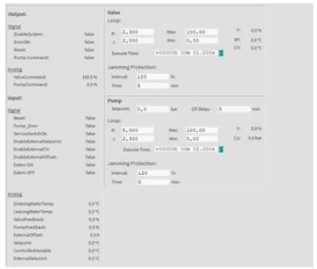




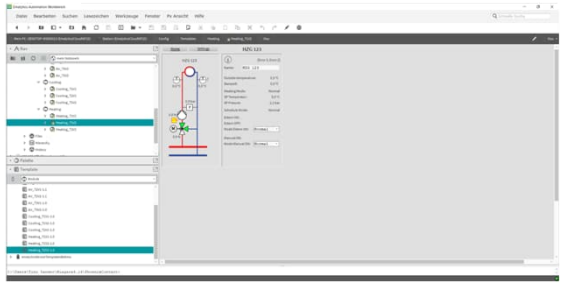
Cooling

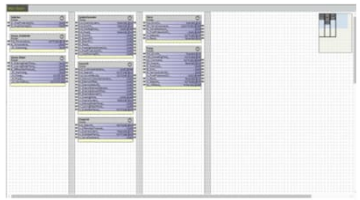


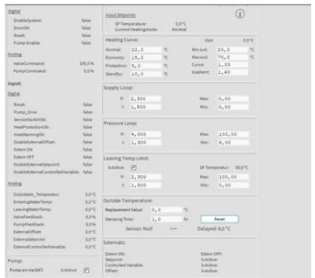




Heating



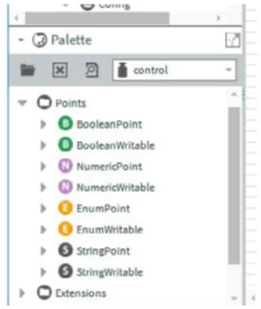




Emalytics Framework

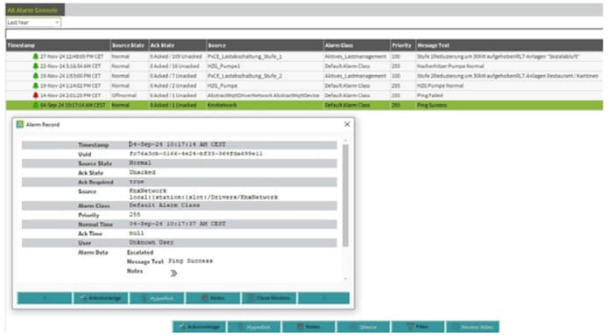
Emalytics Automation – Basic functionality

Data standardization

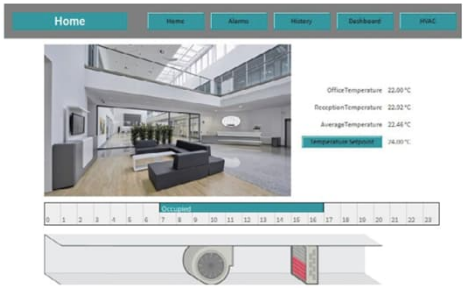


Central network management

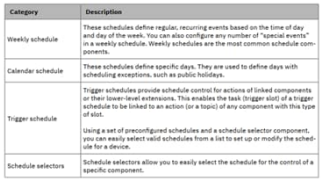
Alarm management



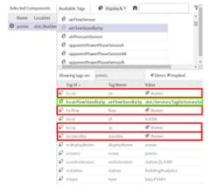
Visualization



Scheduling

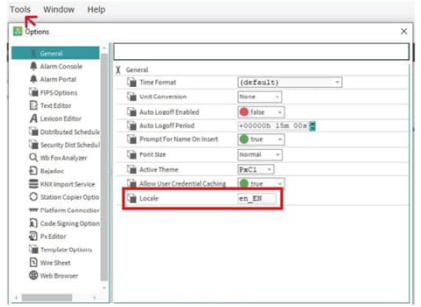


Tagging



Graphic trends and reports

Lexicon / languages



Emalytics View

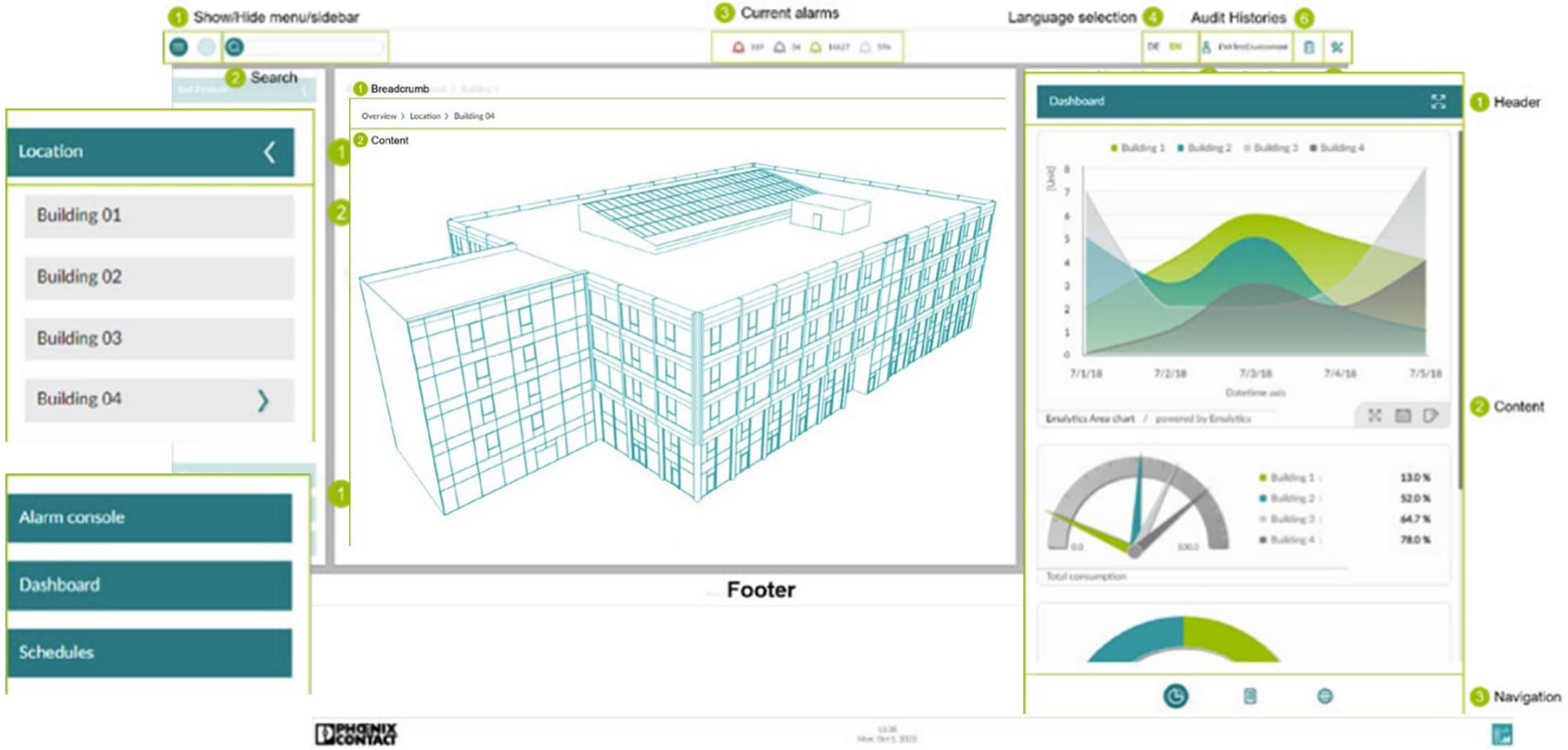
Emalytics Framework

Emalytics View

- Layout
- Alarm console
- Dashboard
- Time schedules
- HVAC library

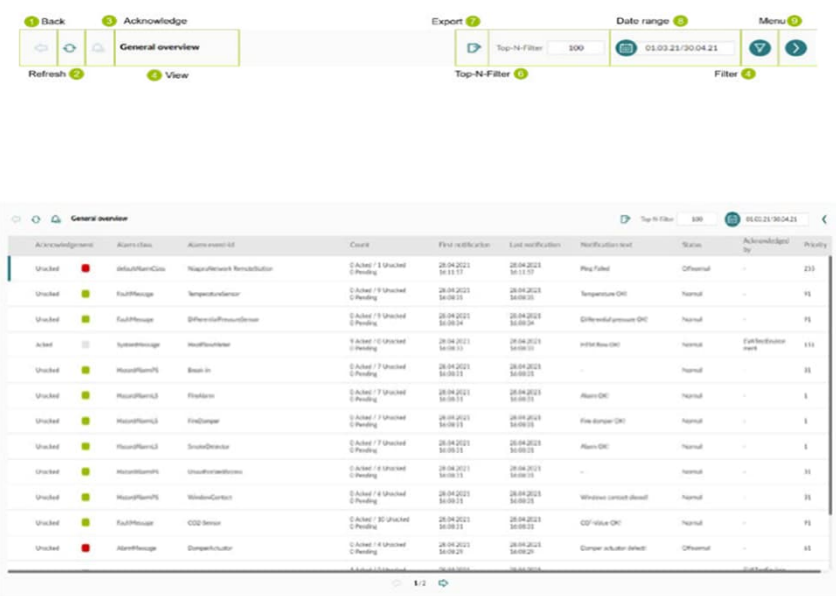
Emalytics Framework

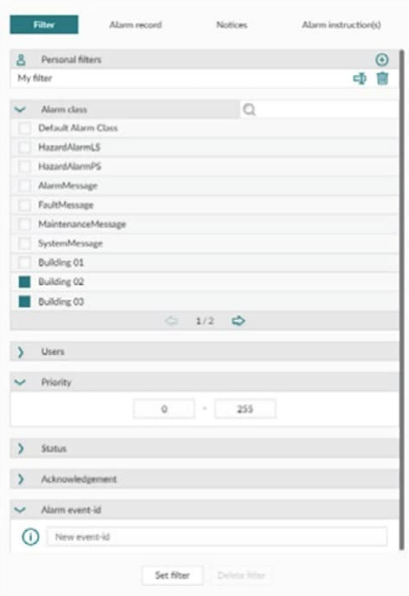
Emalytics View - Layout



Emalytics Framework

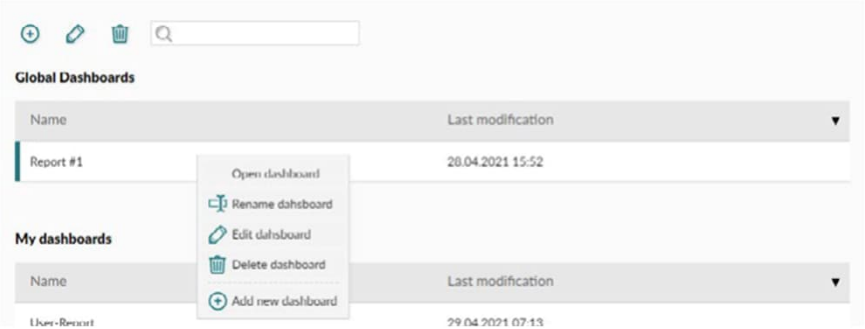
Emalytics View – Alarm console

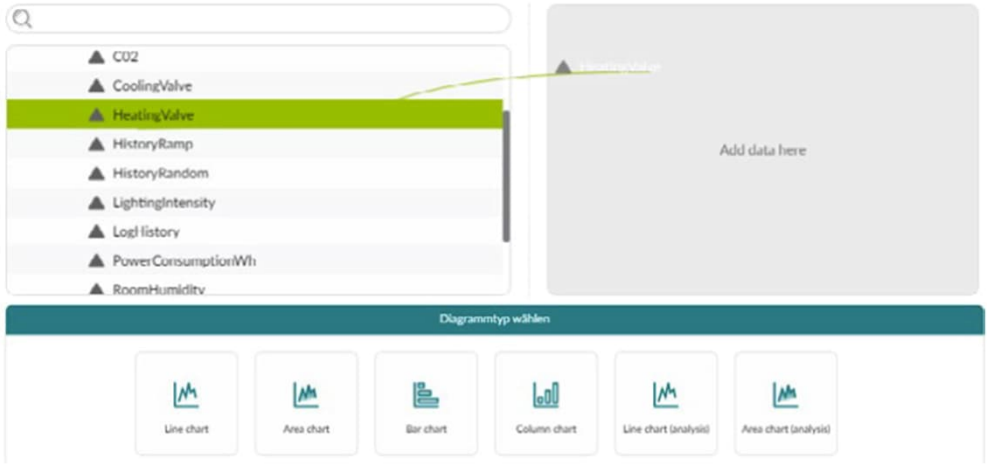




Emalytics Framework

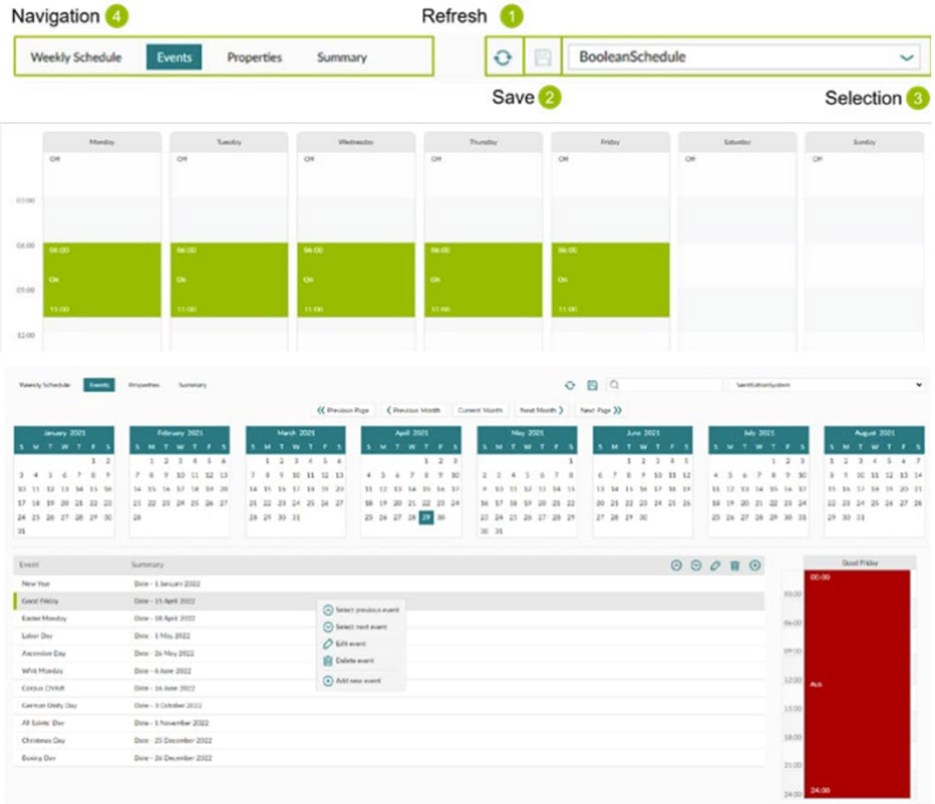
Emalytics View – Dasboard

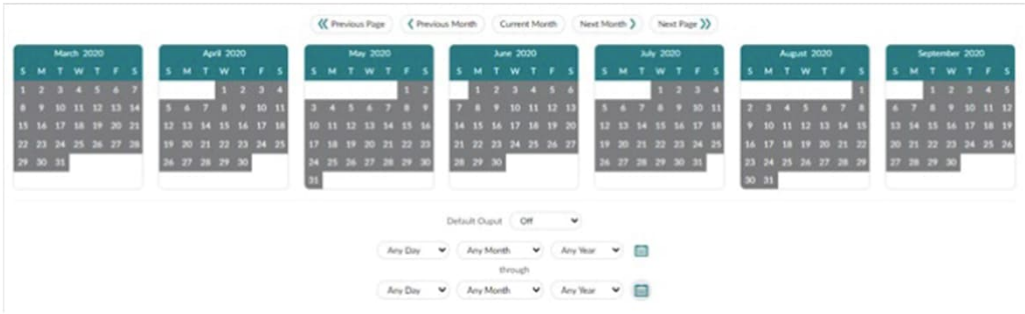


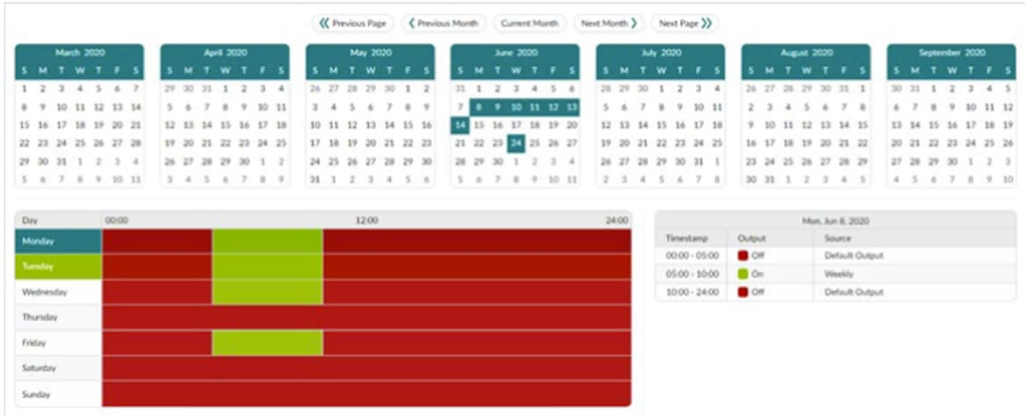


Emalytics Framework

Emalytics View – Time schedules

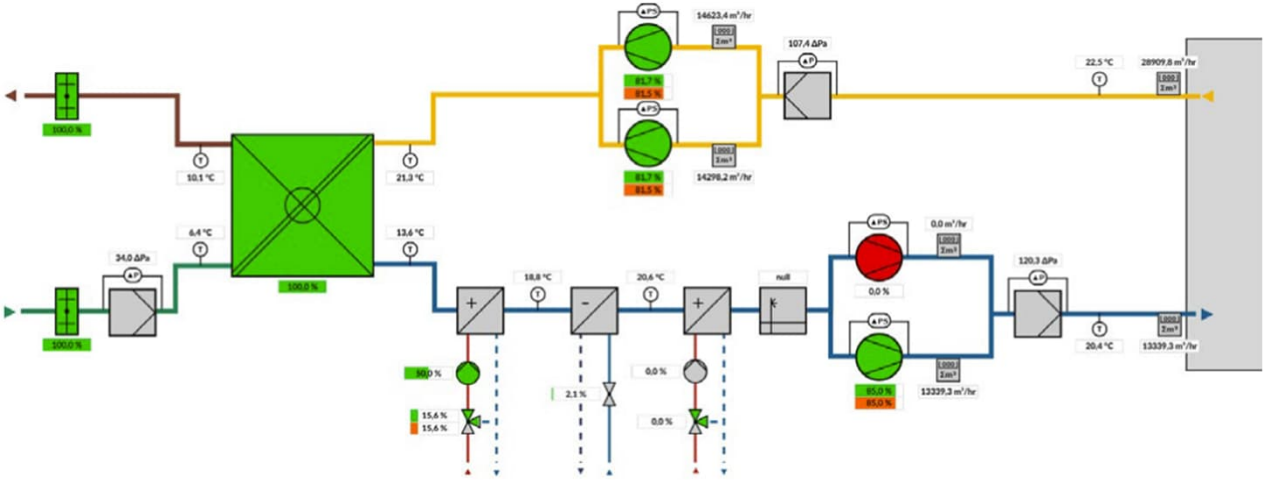


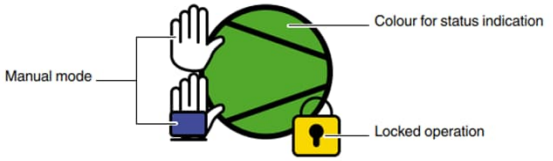


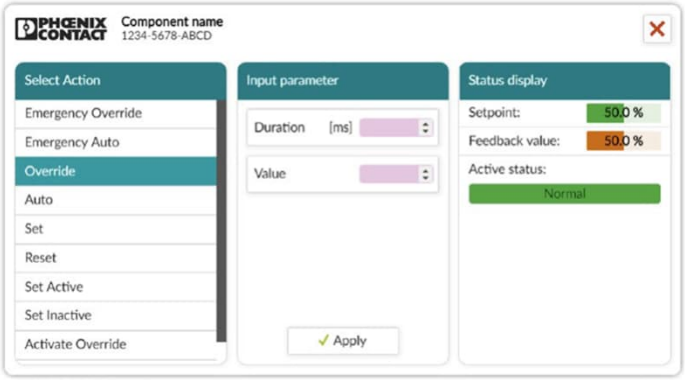


Emalytics Framework

Emalytics View – HVAC library







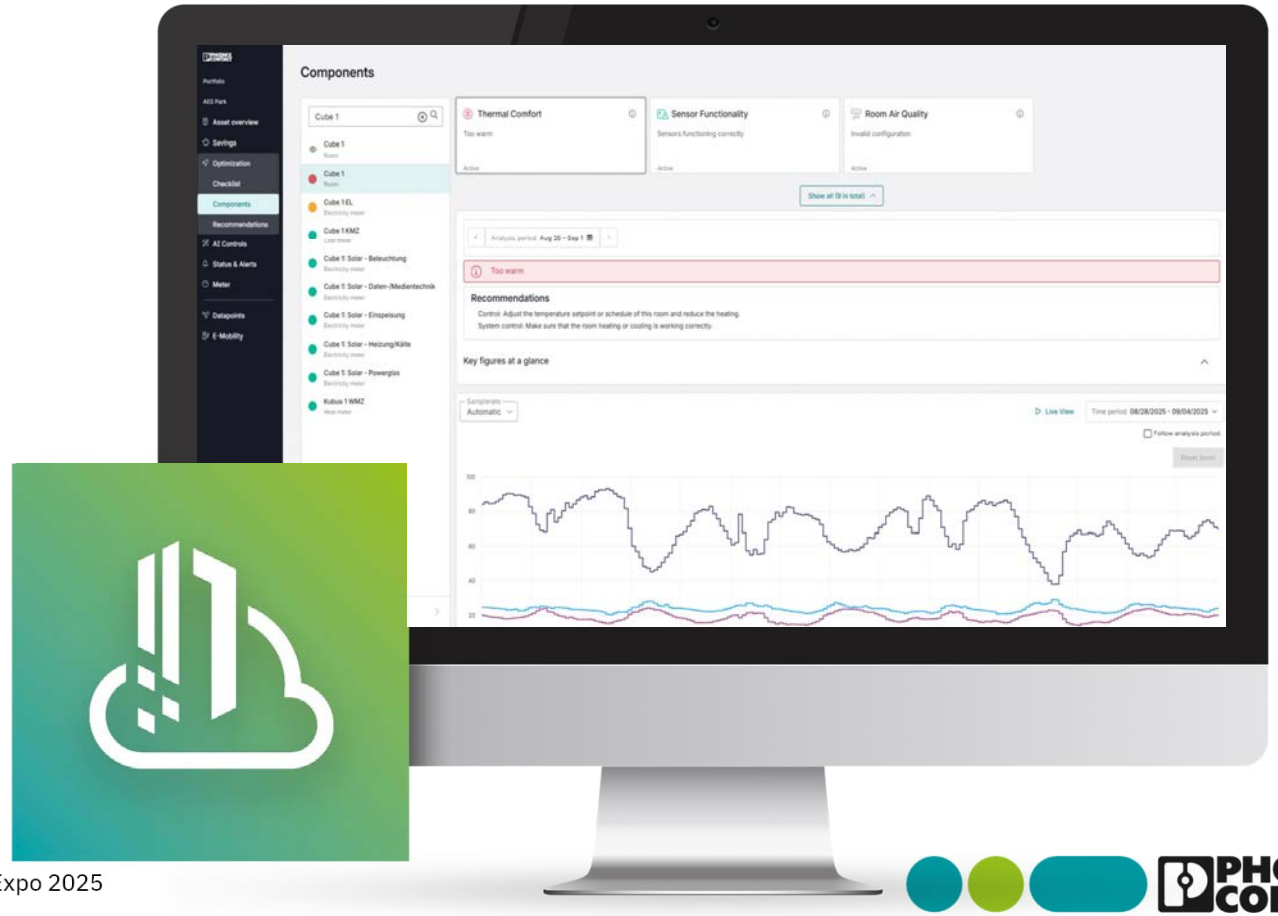
Emalytics Cloud

PHOENIX CONTACT

Emalytics Framework

Emalytics Cloud

- Decarbonization tool
- EPBD compliance
- ESG components
- Niagara Framework service
- SparkplugB
- License model



Emalytics Framework

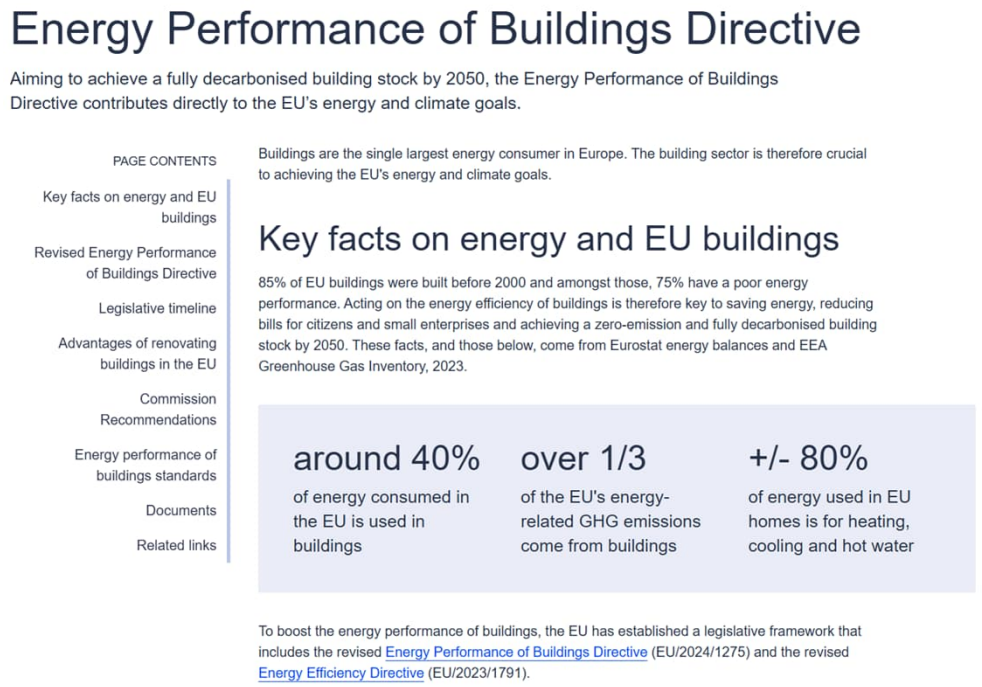
Emalytics Cloud – Decarbonization tool

- **Emalytics Cloud**
  - Instructions that minimize a building’s carbon footprint
- **Emalytics**
  - One-tool edge solution using Sparkplug B technology for standardizes communication with Digital Twins in the cloud

Emalytics Framework

Emalytics Cloud – EPBD compliance

- Monitoring and analysis
- Data accessibility
- Energy efficiency values
- **Detection of efficiency losses**
- **Information on improvements**



Energy Performance of Buildings Directive

Aiming to achieve a fully decarbonised building stock by 2050, the Energy Performance of Buildings Directive contributes directly to the EU's energy and climate goals.

PAGE CONTENTS

- Key facts on energy and EU buildings
- Revised Energy Performance of Buildings Directive
- Legislative timeline
- Advantages of renovating buildings in the EU
- Commission Recommendations
- Energy performance of buildings standards
- Documents
- Related links

Buildings are the single largest energy consumer in Europe. The building sector is therefore crucial to achieving the EU's energy and climate goals.

Key facts on energy and EU buildings

85% of EU buildings were built before 2000 and amongst those, 75% have a poor energy performance. Acting on the energy efficiency of buildings is therefore key to saving energy, reducing bills for citizens and small enterprises and achieving a zero-emission and fully decarbonised building stock by 2050. These facts, and those below, come from Eurostat energy balances and EEA Greenhouse Gas Inventory, 2023.

around 40%	over 1/3	+/- 80%
of energy consumed in the EU is used in buildings	of the EU's energy-related GHG emissions come from buildings	of energy used in EU homes is for heating, cooling and hot water

To boost the energy performance of buildings, the EU has established a legislative framework that includes the revised Energy Performance of Buildings Directive (EU/2024/1275) and the revised Energy Efficiency Directive (EU/2023/1791).

Emalytics Framework

Emalytics Cloud – ESG components

- **E**nvironmental
  Reducing emissions

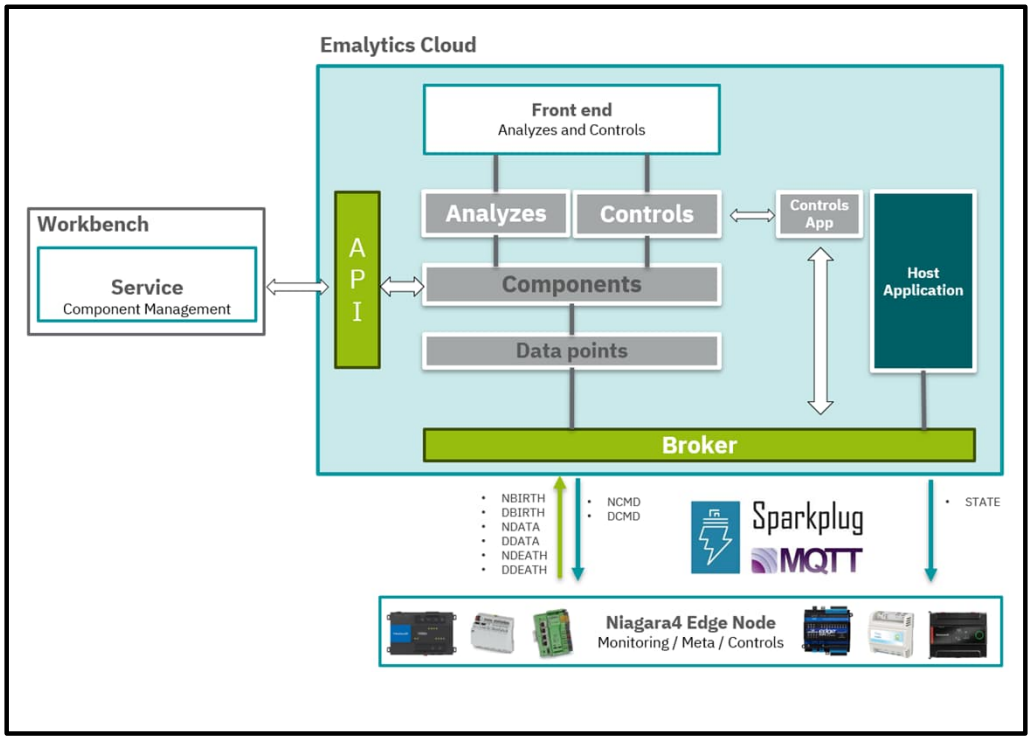
- **S**ocial
  Health protection

- **G**overnance
  Reporting

Emalytics Framework

Emalytics Cloud – Niagara Framework service

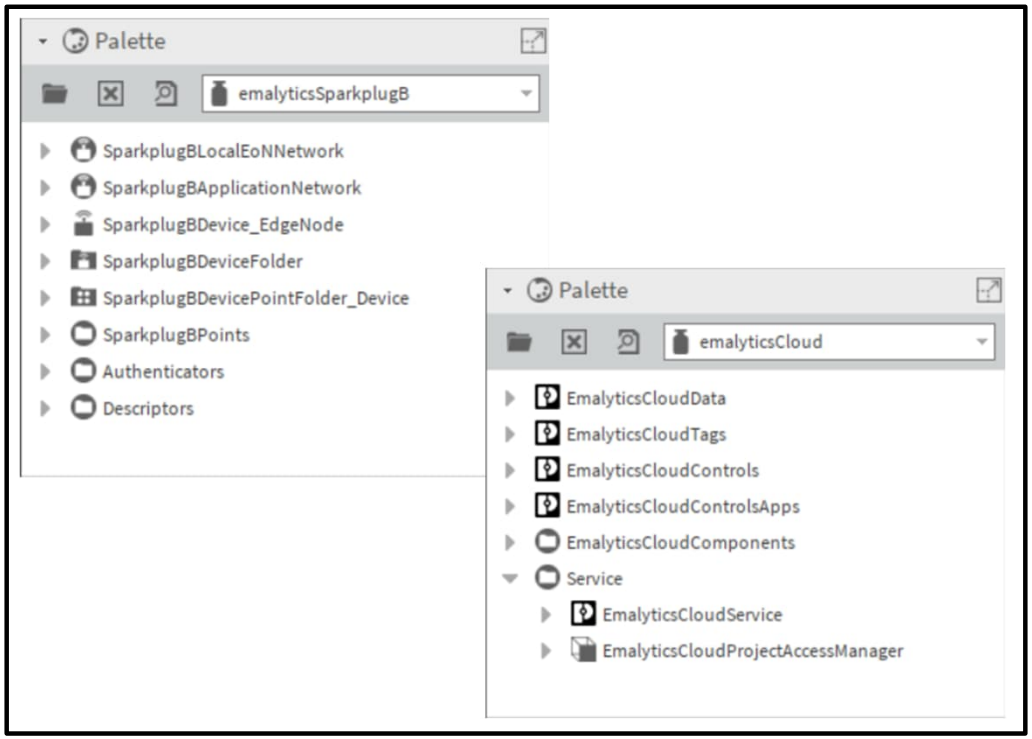
- Every Niagara4 Supervisor
- Every Niagara4 Controller
- Greenfield projects
- Brownfield projects



Emalytics Framework

Emalytics Cloud – SparkplugB

- SparkplugBLocalEoNNetwork
  - **MQTT** connection with Emalytics Cloud
  - Engineering of all Digital Twins
- EmalyticsCloudService
  - **Sparkplug B** connection with Emalytics Cloud
  - Management of all Digital Twins



Emalytics Cloud – License model

- SaaS
- Annual term
- Data point quota per building
- German Data Centre

- Free libraries for every Niagara Framework installation / project

Points	.io	.analytics	.controls
Cloud-100			
Cloud-250			
Cloud-500			
Cloud-1250			
Cloud-5000			
Cloud-10000			
Cloud-20000			
Cloud-50000			

Start with
Detection of efficiency losses and Information on improvements for
< 1.000 € per anno.

Emalytics Controller

PHOENIX CONTACT

Emalytics Framework

Emalytics Controller

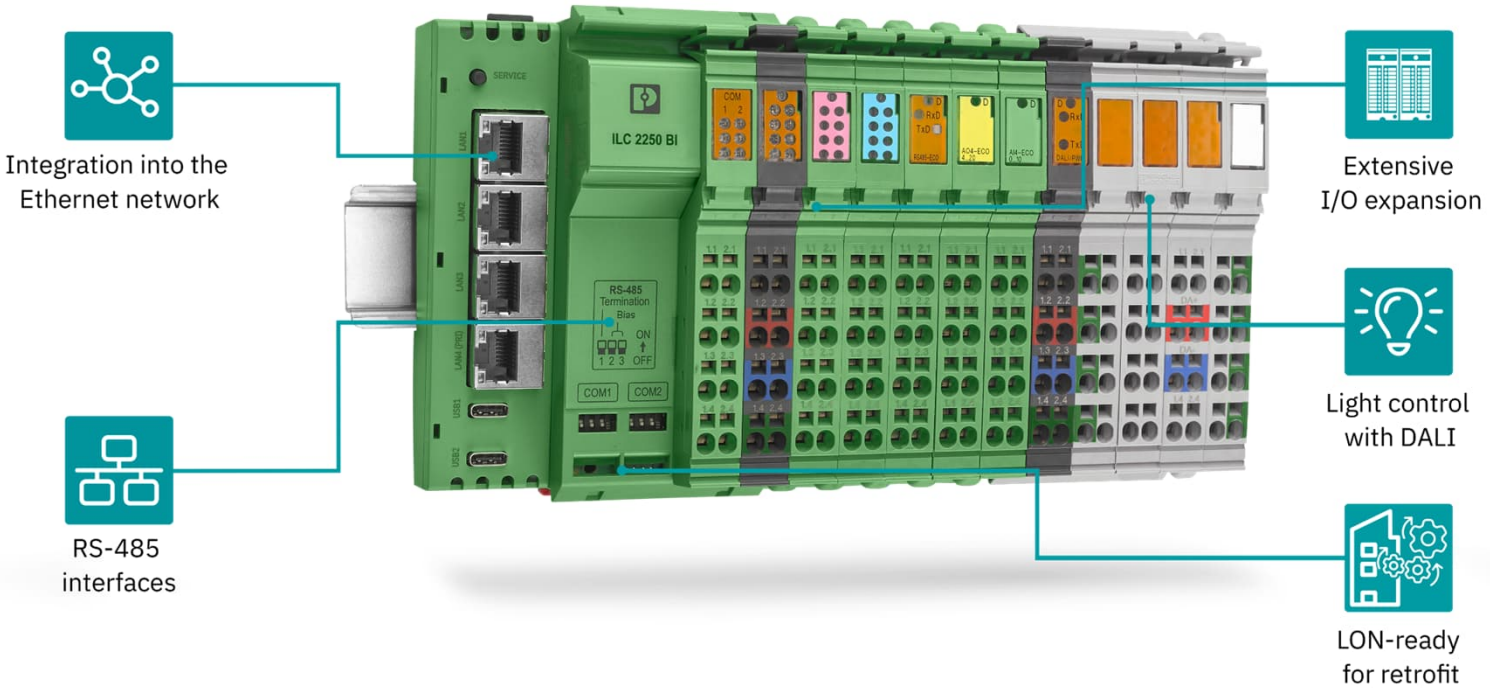
ILC 2050 BI(-L)

ILC 2250 BI(-L)

Catan C1 EN

Emalytics Framework

Emalytics Controller – ILC family

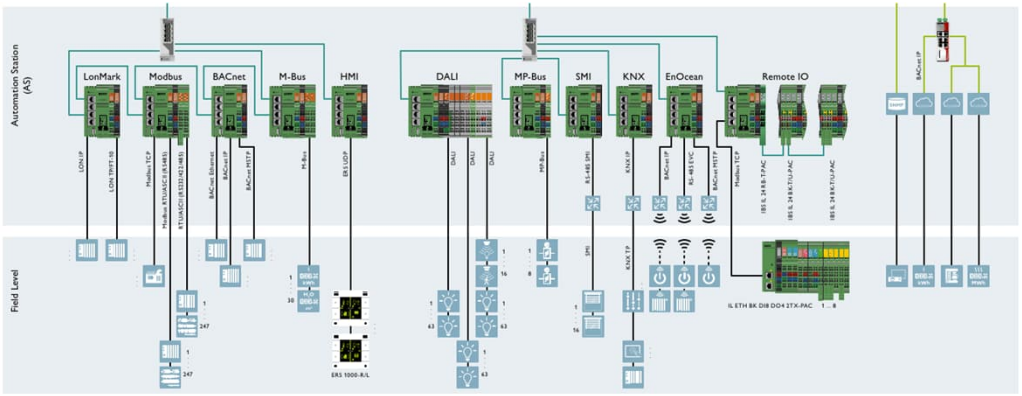


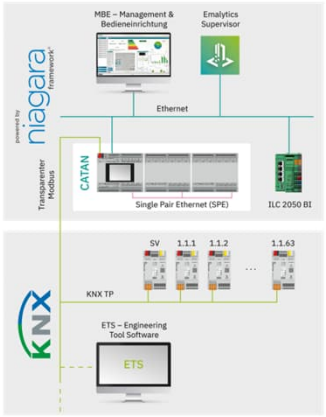
Emalytics Framework

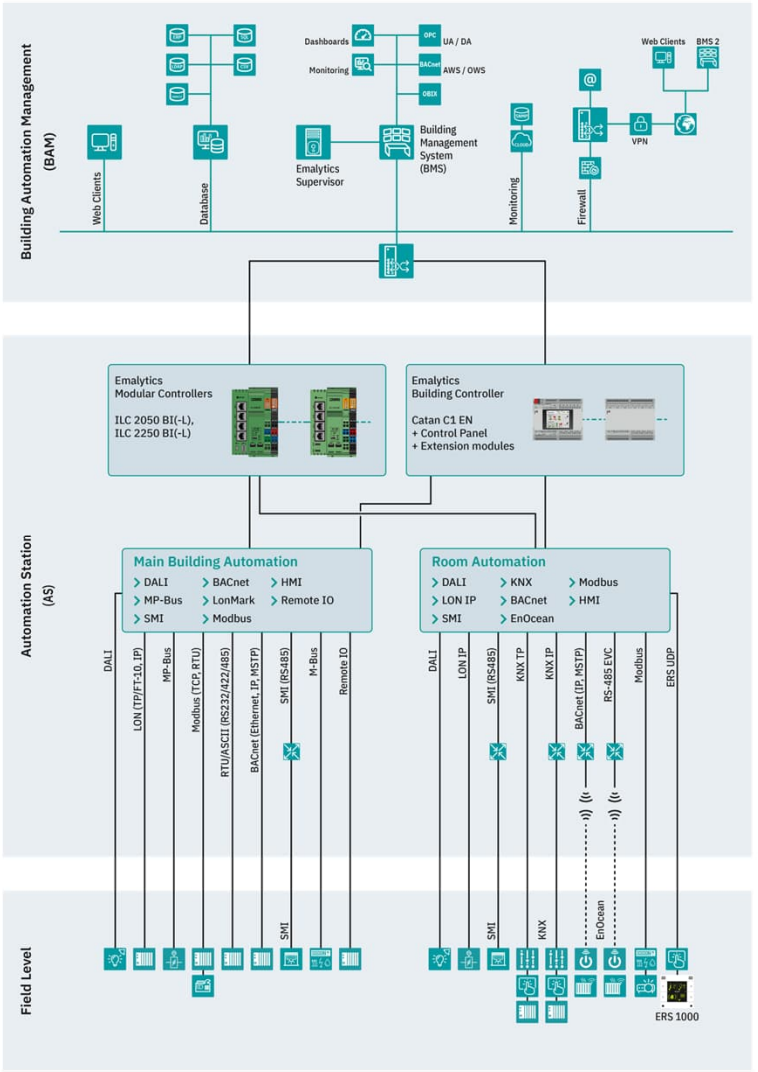
Emalytics Controller – Catan family

Emalytics Framework

Emalytics Controller – Topology



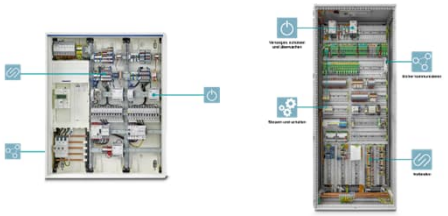




One Stop Shop

Emalytics Framework

One Stop Shop

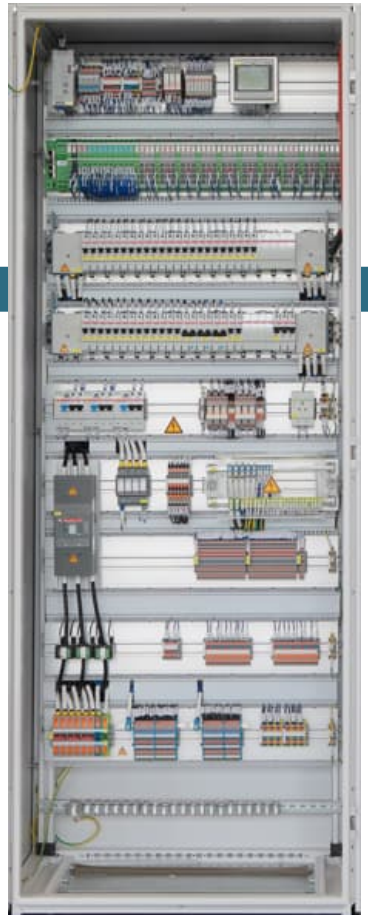
Portfolio Automation	Portfolio Infrastructure	E-Mobility	Services
			 
Room Automation	Terminals	Charge controller	Efficiency in cabinet building
HVAC	Interface, Relays, Network technology	Charging and load management	Cyber Security concepts
Energy Management	Power suplies, e.g. STEP POWER	Billing services fleet management	Maintenance and Support
Cloud Services	Energie Meter e.g. EMPRO	HMI	Consulting and Planning
EM View (BMS)	Labeling / Tools	Plugs, e.g. Type 2 etc.	Training and Certificates
Technical Monitoring	Surge protection	Charging cable	ESG – Decarbonization

Emalytics Framework

Emalytics Framework

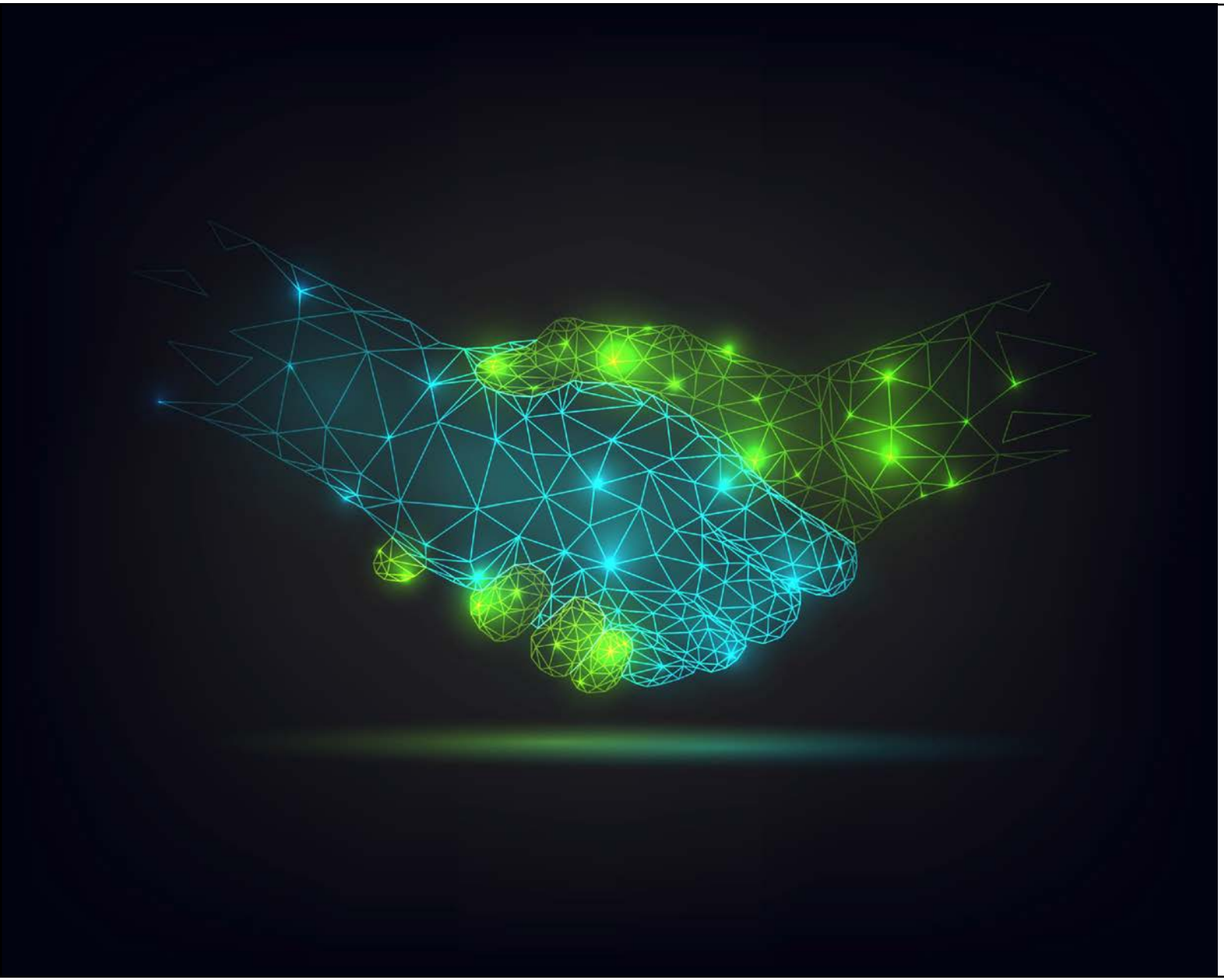
One Stop Shop

Portfolio / Product Lines



Key Product Lines

Catan, ILC 2X50 BI, Emalytics (based on Niagara)	Network Technology	Security	Cabinet Efficiency, Combinations	Terminal Blocks, Tools and Marking	Power Reliability



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Building Technologies

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