

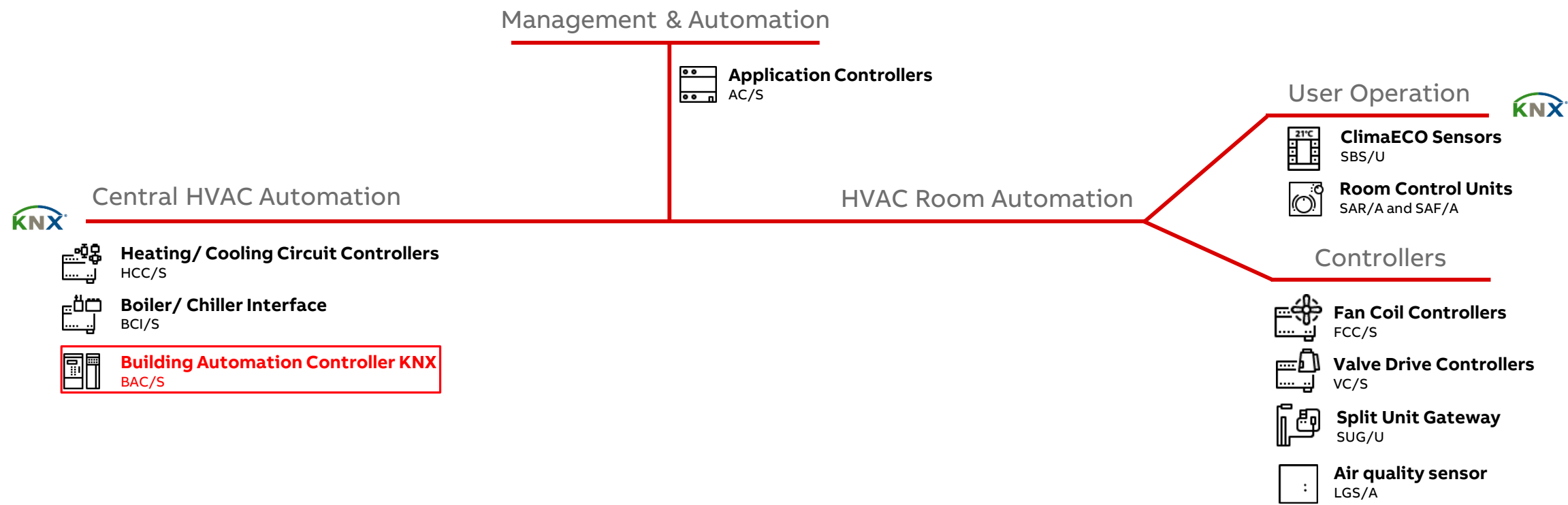
Training ClimaECO, 2020

# **BA-Controller KNX BAC/S 1.5.1**

ClimaECO

Thorsten Reibel, Competence Center Europe

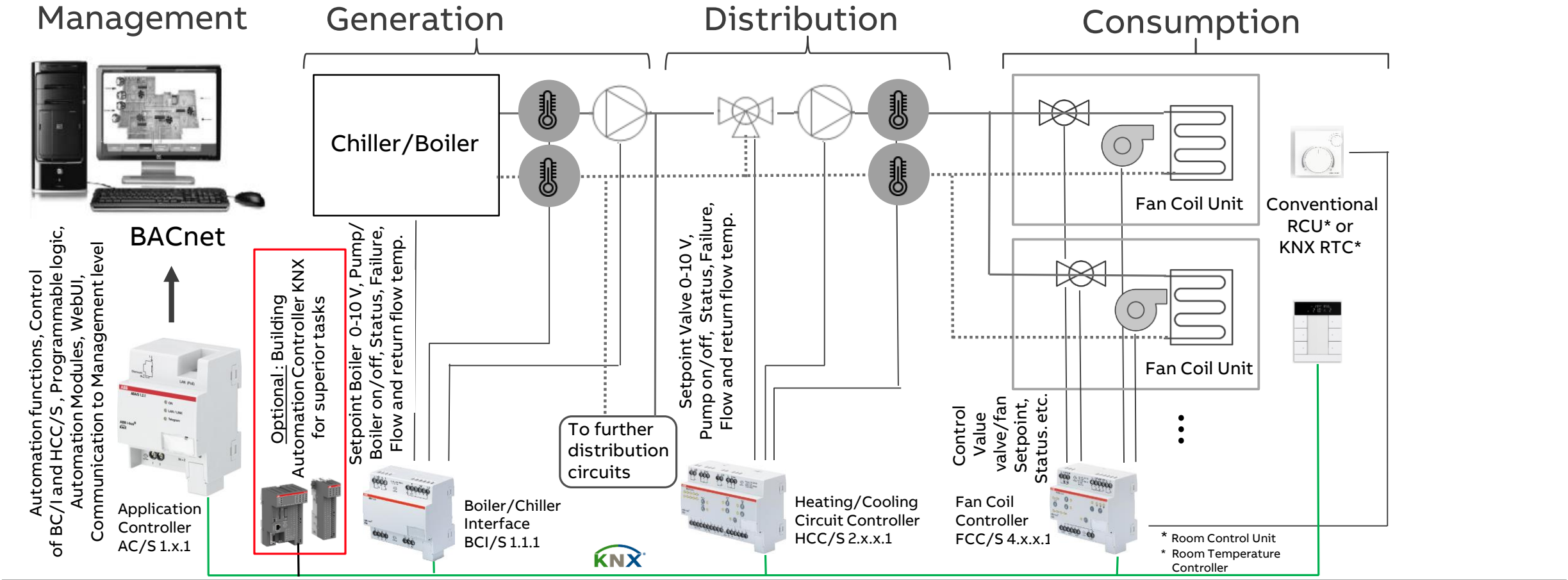
# ClimaECO: ABB i-bus® KNX HVAC Solutions



A holistic HVAC Building Automation System, over 30 new devices

# ClimaECO: ABB i-bus® KNX HVAC Solutions

## Principle

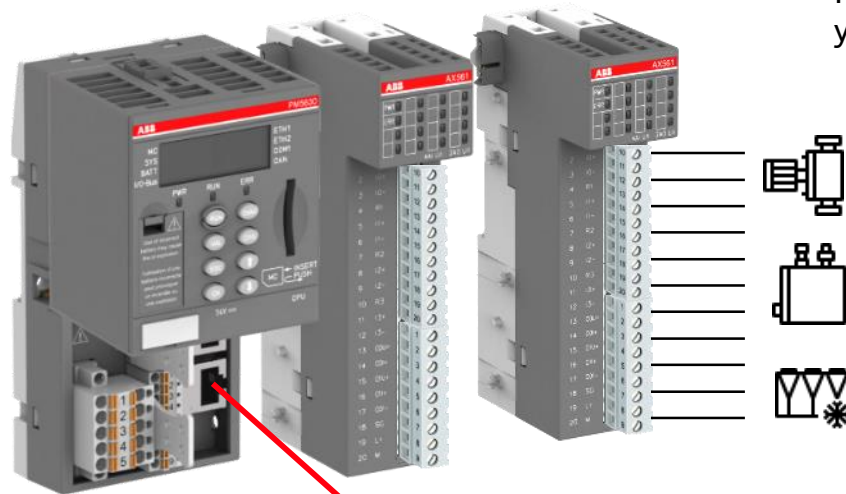


# ClimaECO: Building Automation Controller BAC/S 1.5.1

At a glance ...

## Freely Programmable

Easy creation and reuse of Automation Software by standardized Programming Language



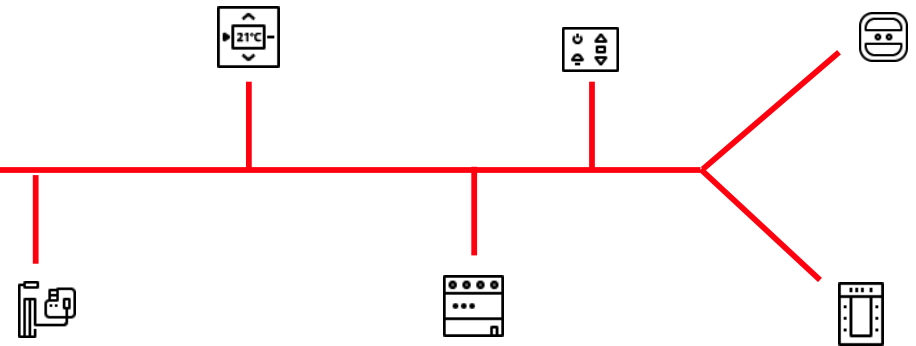
## Flexible IO-Modules

Pick the In- and Output Modules you need for your Application



## Seamless Solution

Everything in one System based on KNX and ETS



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Motivation

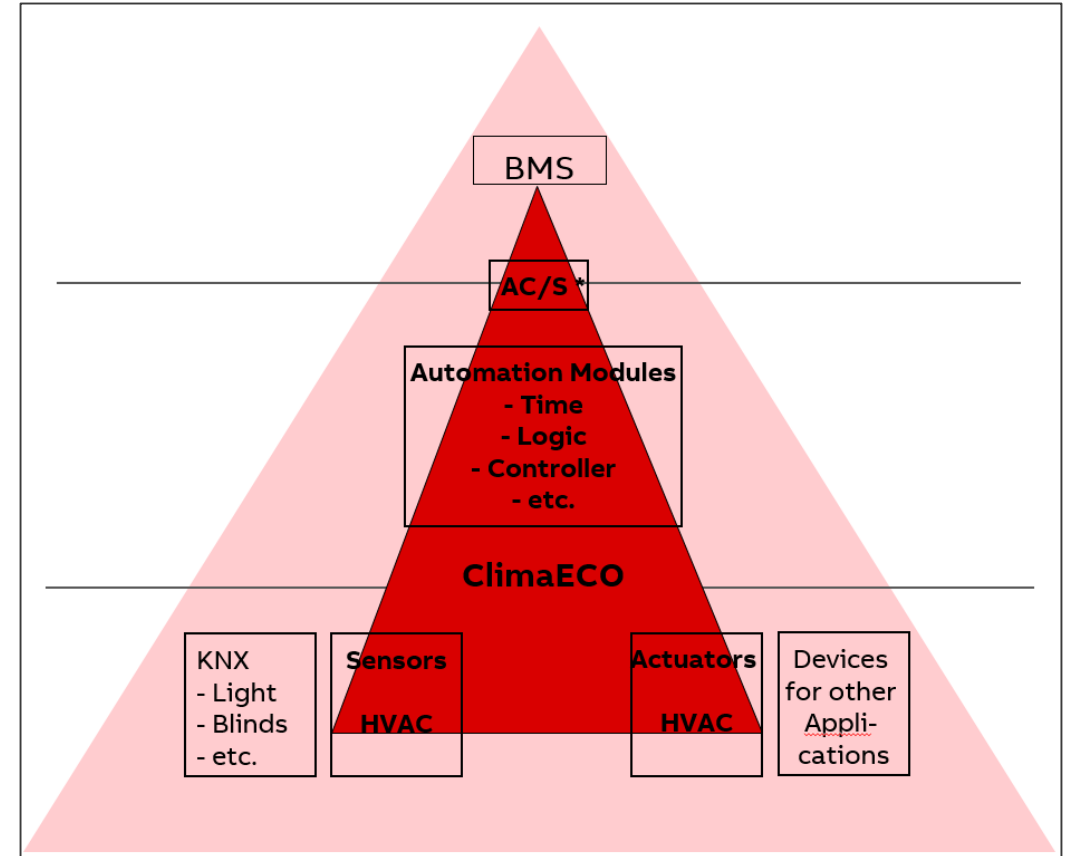
### Situation and Demand

In a powerful HVAC installation (ClimaECO) also customized solutions are required which cannot always be covered directly by dedicated hard- and software only

HVAC market world wide is individual and demands complete solutions to be provided by the supplier

The ClimaECO range including Application Controller AC/S is already prepared for many tasks and requirements in Building Automation and HVAC

- Sophisticated and user friendly field devices
- Necessary components for distribution and generation
- Predefined and freely programmable software functions
- WebUI - and BACnet interface
- Consistent offer based on an open protocol (KNX)



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Motivation

### Situation and Demand

Nevertheless there is a request from the market for more:

- Programming with different languages based on PLC technology to exceed the current KNX limits
- Usage of further external IO's and interfaces where it is useful
- Seamless Integration in KNX
- Usage of superior intelligence with proven hardware independent of already known ClimaECO components
- Usage of existing solutions from former projects
- Whole solution from one supplier from room automation up to sophisticated freely programmable automation
- Options for applications not yet directly implemented in ClimaECO, e.g. Air Handling Units (AHU)



ABB

#### ClimaECO

Questions and Answers about the new HVAC automation portfolio.



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Motivation

### Projects and Customers

Projects where ...

- ... PLC based solutions are required
- ... Further interfaces and/or external IO's are needed
- ... easy reuse of existing CODESYS based solutions is wanted
- ... System integrator is used and willing to work with this PLC based technology

Important conditions to be fulfilled by the customer

- Good Knowledge and experience in PLC-Programming and software CODESYS
- KNX knowledge



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Motivation

### Realisation

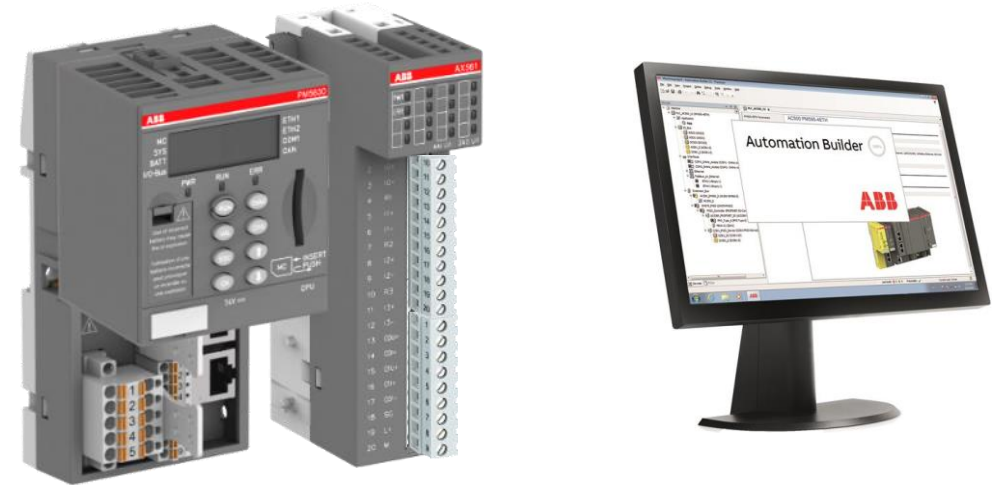
ABB is a supplier of complete PLC solutions for industrial applications

- Provision of existing hardware (Controller) from ABB, adapted with a KNX interface
- Provision of further extension modules
- Available as Building Automation products and supported via the known sales channel
- If necessary use of the ABB's complete PLC range and knowledge plus support

→ PLC Controller AC500 based hardware with integrated KNX interface called **Building Automation Controller BAC/S 1.5.1**

→ 6 different input and output modules

→ Engineering software based on Automation Builder from ABB





# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Controller

Hardware Building Automation Controller BAC/S 1.5.1 will be delivered completely in a box

It consists of three different parts based on ABB's PLC AC500 v3

- Processor Module PM5630-2ETH
- Terminal Base TB5600-2ETH
- PS5604-KNX: AC500 v3 IP KNX Runtime License

Controller is delivered including KNX-License and a pre-installed project in the Software Automation Builder which contains e.g. WebUI for activation of KNX programming mode



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Controller

Further features BAC/S1.5.1 Building Automation Controller

- Extension with up to 10 IO-modules possible (pluggable)
- Display for operation (e.g. activation KNX programming mode)
- 2 Ethernet network interfaces
- 1000 KNX group objects
- Supports of Modbus (RS-232/485 interface and TCP) and CAN protocol
- Web server with a freely configurable web interface for displaying and operating the system
- Existing AC500 v3 components can be in principle updated to be a Building Automation Controller BAC/S 1.5.1
  - Please note: v3 (version 3) is required!
- Product is available



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## System Topology

The BAC/S1.5.1 Building Automation Controller is a standard KNX device with ETS Application and KNX communication via KNXnet/IP protocol

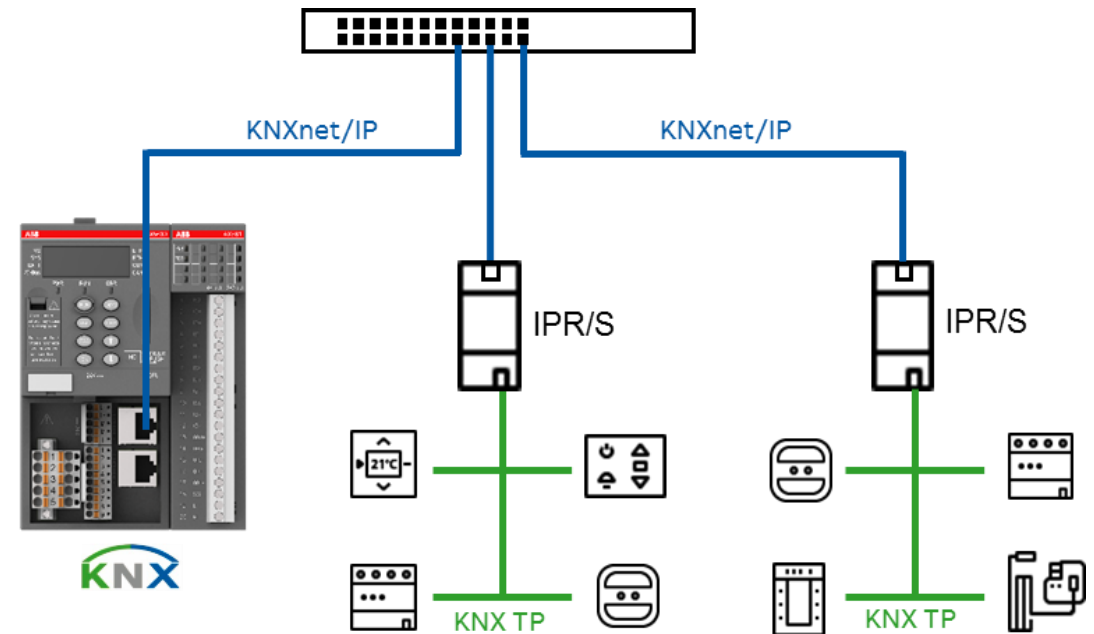
Typically installed on the area/main line, communicating via the KNX IP routers or interface to the TP-KNX devices

On delivery, the network interface Ethernet 1 is activated with the KNX communication and the web interface

The controller does not have a KNX twisted pair (TP) connection!

Important: This solution is made for central automation, it is not prepared for room automation replacing KNX field devices.

This would result in more installation- and engineering effort and finally in higher costs.



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## BAC-Modules (IO-Modules)

6 different BAC-Modules are available as accessory under the Building Automation range

Product	Order code
BCM/S16.2.0.1 BAC-Module, 16DI, 100-240V	2CDG120063R0011
BCM/S16.1.1 BAC-Module, 16DI/DO, 24V, 0.5A	2CDG120064R0011
BCM/S16.1.3.1 BAC-Module, 8DI 24V + 8DO Relay	2CDG120065R0011
BCM/S8.0.2.1 BAC-Module, 8DO, 230V, 0.3A	2CDG120066R0011
BCM/S6.5.5.1 BAC-Module, 4AI + 2AO, U/I	2CDG120067R0011
BCM/S2.6.0.1 BAC-Mod. 2AI, Temperature	2CDG120068R0011

- Further modules and Interfaces from the complete range possible, see [www.abb.com/plc](http://www.abb.com/plc)
- Up to 10 modules can be connected to one module
- Modules delivered with connection terminals
- Products are available



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## BAC-Modules (IO-Modules)

### BCM/S 16.2.0.1



16x Digital Input  
100-240 V AC

### BCM/S 16.1.1



16x Digital Input  
16x Digital Output  
24V , 0.5A

### BCM/S 16.1.3.1



8x 24 V DC Digital Input  
8x 120/240 V, 2 A, Relay  
Output

### BCM/S 8.0.2.1



8x Digital Output  
100-240 V AC, 0.3 A, Triac

### BCM/S 6.5.5.1



4x Analog Input  
2x Analog Output  
0...10V, -10...+10 V, 0...20 mA,  
4...20 mA

### BCM/S 2.6.0.1



2x Analog Input  
PT100, PT1000, Ni100,  
Ni1000, 150 Ω, 300 Ω

**ABB PLC Product Portfolio is compatible and can be connected**

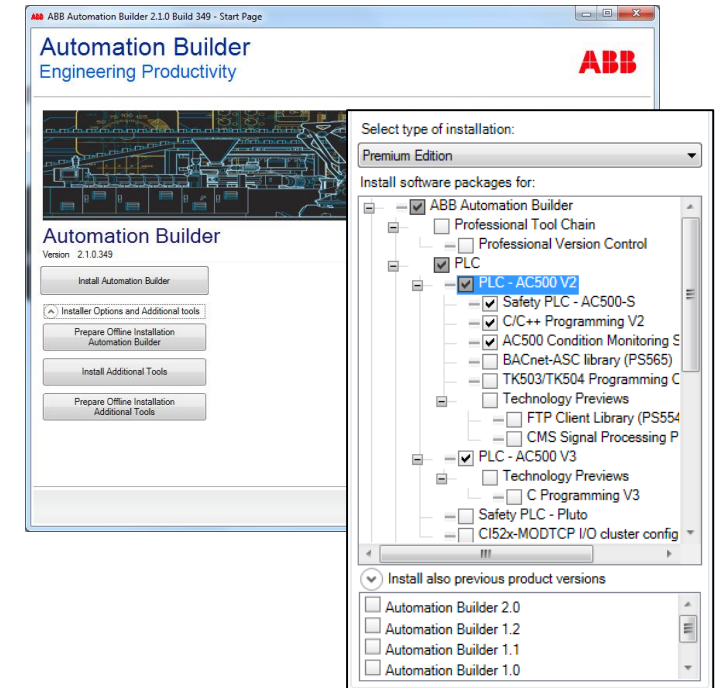
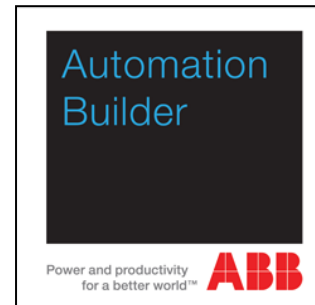


# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Automation Builder

Software tool for programming and administration of the Building Automation Controller BAC/S 1.5.1 based on CODESYS

- Single tool for application and system engineering
- Integrated virtual commissioning and simulation, system wide remote monitoring & optimization
- Support of all IEC 61131-3 languages
- Availability of system and application libraries
- Tree based PLC device and fieldbus configuration
- WebUI



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## BAC Engineering Software BCE/Z 1.1

License for the engineering software of the BAC/S Building Automation Controller KNX

- ABB Automation Builder 2.x license in the Building Automation variant
- This license is valid for a single computer and allows the programming of any number of BAC/S Building Automation Controllers
- Free 30 days trial license
- Afterwards full license has to be purchased
- Automation Builder version standard or premium can be used as well
- Download available on our homepage



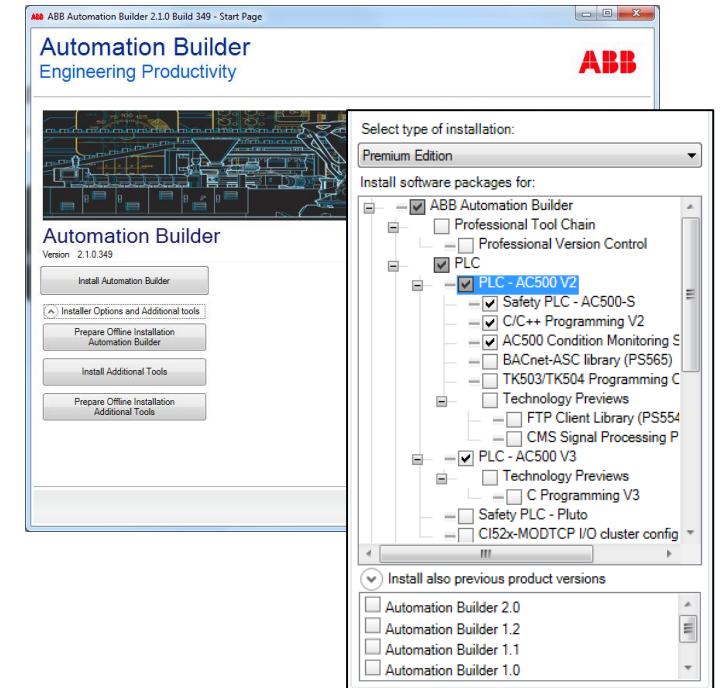
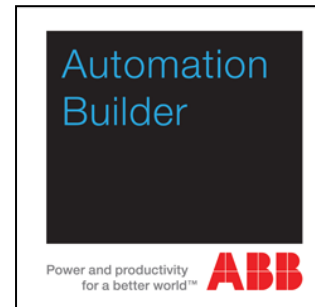
# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Software Libraries

The ABB Automation Builder is based on the established Software CODESYS and thus it can be easily extended by third-party IEC61131-3 software libraries, available also for Building Automation applications

Providers of such software libraries are, for example:

- HVAC Library by Pfänder [www.hvac-automation.com](http://www.hvac-automation.com)
- Oscat Library [www.oscat.de](http://www.oscat.de)



# ClimaECO: Building Automation Controller BAC/S 1.5.1

## CODESYS

CODESYS is a software platform for industrial automation technology

The platform is based on the CODESYS Development System, an IEC 61131-3 programming tool

The tool covers project engineering, programming, operation on workstations, as well as execution, debugging of application code on the controller or drive and evaluation of field devices

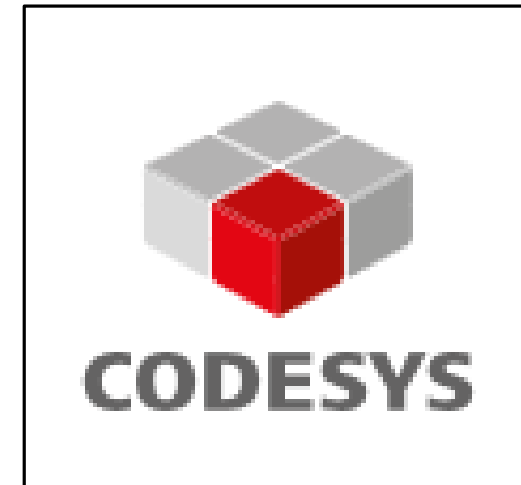
Millions of CODESYS-compatible devices

1000 different device types

More than 400 manufacturers

Tens of thousands of CODESYS end users, specialized and experienced in working with it

Homepage: [www.codesys.com](http://www.codesys.com)



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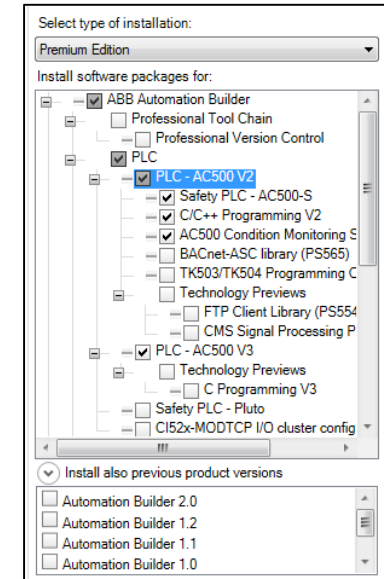
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# ClimaECO: Building Automation Controller BAC/S 1.5.1

## CODESYS

Device manufacturers use CODESYS for creating their own programmable and configurable automation components

- For ABB it is the software **Automation Builder**
- For the Building Automation Controller BAC/S 1.5.1 it is the **BAC Engineering Software BCE/Z 1.1**





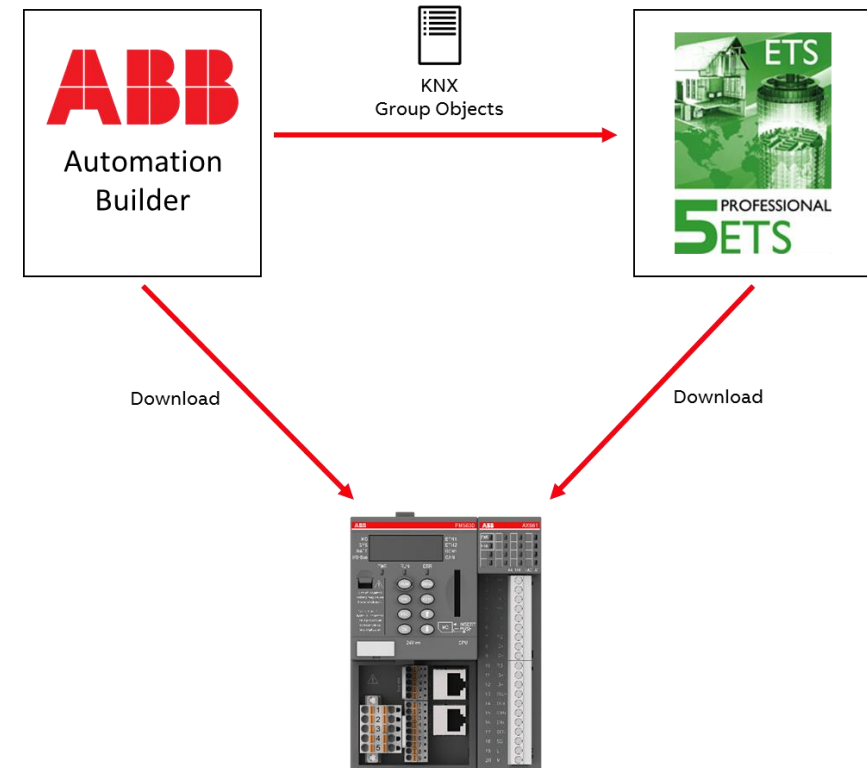
# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Practical Demonstration

Programming and commissioning of the Building Automation Controller BAC/S 1.5.1 is done with the software BAC Engineering Software BCE/Z 1.1 (ABB Automation Builder) and the ETS5

Configuration of the Building Automation Controller

- Creation of the automation program
- Configuration of the input and output modules
- Set the IP network settings
- Creation of the KNX group objects

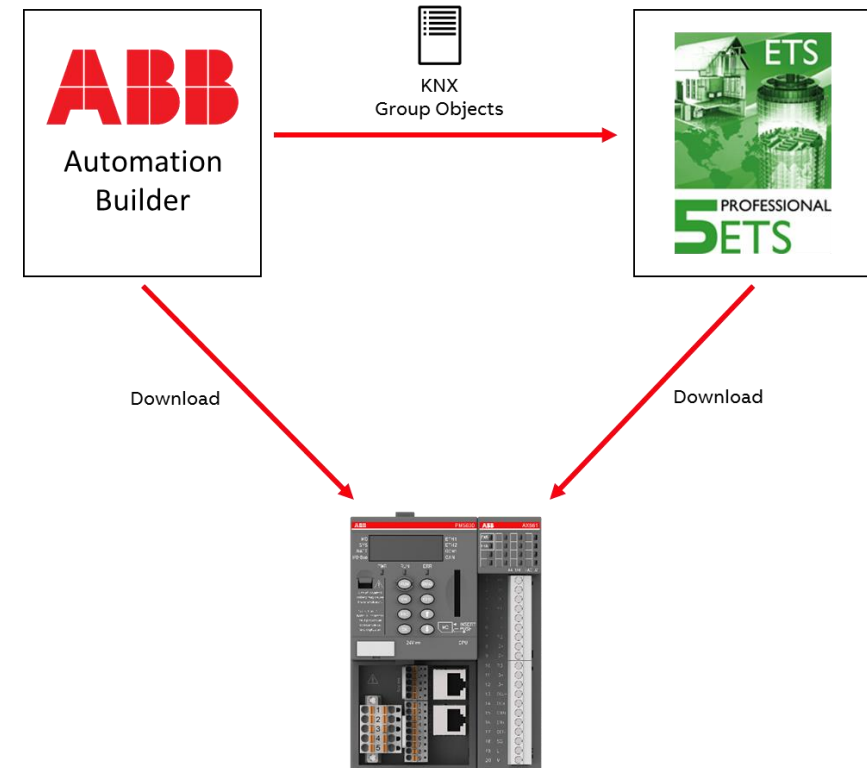


# ClimaECO: Building Automation Controller BAC/S 1.5.1

## Practical Demonstration

The linking of the Building Automation Controller with the other KNX devices takes place with the ETS5 Version 5.6.5 or higher

- Programming the physical KNX address of the Building Automation Controller
- Parameterizing the KNX send conditions of the Building Automation Controller
- Linking the KNX group objects of the Building Automation Controller with KNX group addresses of the other related KNX components
- Download of the KNX configuration to the Building Automation Controller (physical address and application)



# ClimaECO: ABB i-bus® KNX HVAC Solutions

## Technical Documents


[www.abb.com/KNX](http://www.abb.com/KNX)

→ Product category

→ Heating, Ventilation, Air Conditioning

→ BAC/S ...

- Product Information
- Engineering Guide
- Template Project
- ETS Application
- DCA AC/S Configuration App
- BAC Engineering Software BCE/Z 1.1

 PRODUCT-DETAILS GLOBAL SITE

### Detailed information for: BAC/S1.5.1







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Show all (11)		Software (.ETSAPP) [XX] BAC/S1.5.1 DCA Automation Builder Summary: Version 1.0.0.0 German, English, Spanish, French, Italian, Dutch, Polish, Russian - 2018-11-13 - 0,04 MB  ETSAPP
Application note (2)		
Data sheet (1)		
Movie (1)		Software (.EXE) [XX] BCE/Z1.1 BAC Engineering Software V2.1.2 Summary: ABB Automation Builder Version 2.1.2 for BAC/S1.5.1 Building Automation Controller KNX Danish, German, English, Spanish, French, Italian, Dutch, Norwegian, Polish, Russian, Swedish, Turkish, Chinese - 2018-10-10 - 3,60 MB  EXE
Presentation (2)		
Software (5) >		Software (.PROJECT) [XX] BAC/S1.5.1 Templateproject for ABB Automation Builder V 2.1.2 Summary: Templateproject for ABB Automation Builder Version 2.1.2 (BCE/Z1.1) German, English, Spanish, French, Italian, Dutch, Polish, Russian - 2018-10-10 - 0,27 MB  PROJECT

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