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ClimaECO – BA-Controller KNX BAC/S
Webinar – Competence Center Europe – Building Automation

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ClimaECO: Building Automation Controller BAC/S

Agenda

Building Automation Controller BAC/S – Situation and Realisation

Hardware Controller and IO-Modules

Software CODESYS and Automation Builder

Demonstration: Implementation in Automation Builder and ETS

Documentation and Training
ClimaECO: ABB i-bus® KNX HVAC Solutions

Management & Automation

Central HVAC Automation
- Heating/ Cooling Circuit Controllers
  - HCC/S
- Boiler/ Chiller Interface
  - BCI/S
- Building Automation Controller KNX
  - BAC/S

HVAC Room Automation

Application Controllers
- AC/S

User Operation

Controllers
- ClimaECO Sensors
  - SBS/U
- Room Control Units
  - SAR/A and SAF/A
- Fan Coil Controllers
  - FCC/S
- Valve Drive Controllers
  - VC/S
- Split Unit Gateway
  - SUG/U
- Air quality sensor
  - LGS/A

A holistic HVAC Building Automation System, over 30 new devices
ClimaECO: ABB i-bus® KNX HVAC Solutions

Principle

Management

Generation

Distribution

Consumption

Conventional RCU* or KNX RTC*

Fan Coil Unit

Fan Coil Unit

Optional: Building Automation Controller KNX

Application Controller AC/S 1.x.1

Automation functions, Control of BCI and HCC/S, Programmable logic, Automation Modules, WebUI, Communication to Management level

BACnet

To further distribution circuits

Setpoint Valve 0-10 V, Pump on/off, Status, Flow and return flow temp.

Setpoint Valve 0-10 V, Pump on/off, Status, Flow and return flow temp.

Boiler/Chiller Interface BCI/S 1.1.1

Heating/Cooling Circuit Controller HCC/S 2.x.x.1

Fan Coil Controller FCC/S 4.x.x.1

Pump on/off, Status, Flow and return flow temp.

Control Valve/fan Setpoint, Status, etc.

Setpoint, Status, etc.

Setpoint, Status, etc.

* Room Control Unit
* Room Temperature Controller

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At a glance …

**Flexible IO-Modules**

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

**Freely Programmable**

Easy creation and reuse of Automation Software by standardized Programming Language

**Seamless Solution**

Everything in one System based on KNX and ETS
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 worldwide 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)
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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)
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
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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
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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**

**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
**System Topology**

The BAC/S1.5.1 Building Automation Controller is a standard KNX device with ETS Application and KNX communication via KNXnetIP 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.
BAC-Modules (IO-Modules)

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

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

- Further modules and Interfaces from the complete range possible, see www.abb.com/plc
- Up to 10 modules can be connected to one module
- Modules delivered with connection terminals
- Products are available
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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**
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**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
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
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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)
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
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**
**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
- Firmware update of the Building Automation Controller
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
Training

Practical training is essential

- Hardware Building Automation Software BAC/S plus Modules
- Software BAC Engineering Software BCE/Z 1.1 (ABB Automation Builder)
- Integration into KNX with ETS

Trainings will be offered in 2019
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Technical Documents

www.abb.com/KNX
→ Product category
  → Heating, Ventilation, Air Conditioning
  → BAC/S ...

– Product Information
– Engineering Guide
– Template Project
– ETS Application
– DCA Automation Builder
– BAC Engineering Software BCE/Z 1.1

Detailed product information for BAC/S1.5.1

Download for Central HVAC Controllers

Available documents:

- Software (ETSAPP) [XX] BAC/S1.5.1 DCA Automation Builder
  Summary: Version 1.0.0
  German, English, Spanish, French, Italian, Dutch, Polish, Russian
- Software (EXE) [XX] BAC/S1.5.1 Engineering Software V1.1.2
  Summary: ABB Automation Builder Version 1.1.2 for BAC/S1.5.1 Building Automation Controller KNX
  Danish, German, English, Spanish, French, Italian, Dutch, Norwegian, Polish, Russian, Swedish, Turkish, Chinese
- Software (PROJECT) [XX] BAC/S1.5.1 Templateproject for ABB Automation Builder V1.1.2
  Summary: Templateproject for ABB Automation Builder Version 1.1.2 (BCE/21.2)
  German, English, Spanish, French, Italian, Dutch, Polish, Russian
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Next Webinar

**KNX LED Dimmer**

New KNX LED Dimmer:

- Advantages, USPs and the most important functions like templates, free-adjustable dimming curve correction or logical functions

Wednesday 5th December 2018

- Morning 09:00 am Europe Time (Berlin, UTC + 1h)
- Afternoon 03:00 pm Europe Time (Berlin, UTC + 1h)
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