MAY 2018

ClimaECO – HVAC with ABB i-bus®KNX

Webinar – Competence Center Europe – Building Automation

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ClimaECO: ABB i-bus® KNX HVAC Solutions

Agenda

ClimaECO – Intro

Argumentation and Principle

Introduction into the Product Range

Links and Timetable
ClimaECO

by

ABB
ClimaECO?
ECOlogical Climate?
ECOnomical Climate?
Perhaps …
For sure!
Everybody needs …
Heating ...
and/or Cooling
Heating with ClimaECO
Boiler

Boiler Control

Heating Circuit Control

Room Climate Control

Floor Heating

Room Climate Control

Room Temperature?

Radiator

Room Temperature?
Boiler
Boiler Control
Heating Circuit Control

Room Climate Control
Room Temperature?
Floor Heating

Room Climate Control
Room Temperature?
Radiator
Boiler

Boiler Control

Heating Circuit Control

Automation, WebUI, BACnet Interface

Room Climate Control

Room Temperature?

Floor Heating

Room Climate Control

Room Temperature?

Radiator

60°C

35°C
Cooling with ClimaECO
Chiller

Chiller Control

Cooling Circuit Control

10° C

20° C

15° C

Cooling Ceiling

Room Climate Control

Room Climate Control

Fan Coil Unit

Room Temperature?

Room Temperature?
Chiller

Chiller Control

Cooling Circuit Control

Option
Building Automation Controller KNX

Automation, WebUI, BACnet Interface

Cooling Ceiling

Room Climate Control

22° C

Fan Coil Unit

15° C

Room Climate Control

21° C

10° C

20° C
ClimaECO …
Heating and Cooling
from Generation
via Distribution
to Consumption
with Interface to BACnet and Web
optional Building Automation Controller KNX (PLC) for High End Solutions
efficient, precise, flexible

and ...
consistently based on
supplied by ABB
What is ClimaECO?

ClimaECO is our campaign to highlight our HVAC Solutions inside the ABB i-bus® KNX System.

Our ClimaECO offering consists of the new developed Products and the established KNX HVAC range.

The ClimaECO focuses now on water based HVAC and will be extended by further Developments.
ClimaECO: ABB i-bus® KNX HVAC Solutions

Customer Value Proposition

Sales Channel Harmony
ABB as a product solution supplier presents no channel conflict to its partners as compared to notable ‘turn key’ competitors.

Secure Investment
ABB is a reliable partner especially for Investors and Building Owners as compared to the small / local supplier.
Solutions based purely on open and standardized technologies thus no single source and reducing system dependencies.

Cost Saving
During planning, integration, maintenance and by energy efficiency. Achievement of energy efficiency class A according to EN 15232 with up to 30 percent energy savings.
ClimaECO: ABB i-bus® KNX HVAC Solutions

Customer Value Proposition

**Consistent solution from Consumption to Generation**
Customers expect as much as possible from one provider, both in software, hardware and service like consulting by ABB.

**Sophisticated Hardware**
All necessary components from ABB made in Germany.

**Local Sales and worldwide Support**
ABB as an international company with it’s impeccable reputation, proven in numerous projects at different locations all over the world, can give the necessary assistance to implement HVAC solutions based upon ClimaECO from ABB.
Building Automation
Positioning ClimaECO

![Diagram of Building Automation Levels]

- **Management Level**
  - BMS

- **Automation Level**
  - AC/S
    - Time
    - Logic
    - Controller
    - etc.

- **Field Level**
  - ClimaECO
    - KNX
      - Light
      - Blinds
      - etc.
    - Sensors
    - Actuators
      - HVAC
      - Devices for other Applications

*Application Controller including BACnet Interface (Option)*
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
- 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

Availability: July – October 2018

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

Principle Heating with Radiator
ClimaECO: ABB i-bus® KNX HVAC Solutions

Principle Cooling with Fan Coil Unit

Management

Generation

Distribution

Consumption

BACnet

Chiller

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

Boiler/Chiller Interface BCI/S 1.1.1

Fan Coil Unit

Conventional RCU* or KNX RTC*

* Room Control Unit

* Room Temperature Controller

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Slide 45
Fan Coil Controller FCC/S 1.x.x.1

Fan Coil Unit in principle
**Fan Coil Controller FCC/S 1.x.x.1**

Introduction

**Motivation – New Features**

- Most comprehensive product family for controlling all kind of Fan Coil Units in the KNX market → 9 Components!
- Electrothermal and motor valve drives
  - 2 electronic outputs
- 0-10 V valve drives
  - 2 x 0-10 V outputs
- 1, 2, or 3 step fan
- 0 - 10 V fan
- All combinations of digital and analogue fan and valve control
- Integrated room temperature controller for conventional Room Control Units (RCU)
Fan Coil Controller FCC/S 1.x.x.1

Introduction

Motivation – New Features

- Parametrizable as actuator or controller/actuator
- With and without manual operation
- 4 inputs for digital and analogue signals (PT100, PT1000, KTY, NTC, NI 1000) and connection of conventional Room Control Unit (Setpoint and room temperature)
- Control of 6-way valves
- Control of VAV flaps (Variable Air Volume)
- ABB i-bus tool support
- With and without manual operation
- Budget variant (FCC/S 1.4.1.1) with one valve output (2 step or PWM), no additional switch contact and no manual operation
- Existing Fan Coil Actuators FCA/S will be replaced
- Availability: July 2018
Family FCC/S 1.x.x.1

- **FCC/S 1.1.1.1**: 3-step Fan, PWM 2-fold
- **FCC/S 1.2.1.1**: 3-step Fan, Valve 0-10 V
- **FCC/S 1.2.2.1**: 3-step Fan, Valve 0-10 V, man. Op.
- **FCC/S 1.3.1.1**: Fan 0-10 V, Valve 0-10 V
- **FCC/S 1.3.2.1**: Fan 0-10 V, Valve 0-10 V, man. Op.
- **FCC/S 1.5.1.1**: Fan 0-10 V, PWM 2-fold
- **FCC/S 1.5.2.1**: Fan 0-10 V, PWM 2-fold, man. Op.
- **FCC/S 1.4.1.1**: 3-step Fan, PWM 1-fold (no additional switch contact)
Fan Coil Controller FCC/S 1.x.x.1

Assignment Controller - Actuator

FCC/S 1.x.x.1
Parametrized as: ACTUATOR

FCC/S 1.x.x.1
Parametrized as: CONTROLLER
Valve Drive Controller VC/S 4.x.1

Valve control in principle
Valve Drive Controller VC/S 4.x.1

Introduction

Motivation – New Features

- Two devices with four channels for valve control
- Electrothermal valve drives with four channels
- With and without manual operation
- 12 inputs (digital and analogue, 3 each channel) for temperature measurement, dew point sensor, window contact, etc.
- Integrated room temperature controller for conventional Room Control Units (RCU)
- Parametrizable as actuator or controller/actuator
- Existing Valve Drive Actuators will be not replaced

- Availability: August 2018
Valve Drive Controller VC/S 4.x.1
Assignment Controller - Actuator

VC/S 4.x.1
Parametrized as: ACTUATOR

Analogue Inputs
(Setpoint/Room temperature)

Not applicable

... KNX RTC

VC/S 4.x.1
Parametrized as: CONTROLLER

Analogue Inputs
(Setpoint/Room temperature)

... Temperature sensor

... Room Control Unit SAR/A
or temperature sensor
with direct link to input of VC/S
Room Control Unit SAR/A and SAF/A

Introduction

Motivation – Features

- Conventional (non KNX!) operating element for room temperature control (RCU)
- Works together with Controller in FCC/S or VC/S
- Lower in price
- to be competitive in projects with demands for this solution
- Simple and cost efficient user interface but powerful system behind

- Two devices:
  - SAR/A with set point control for radiators, floor heating and cooling ceiling
  - SAF/A with set point and fan speed control for fan coil units
- Integrated temperature sensor
- White color
- Surface mounted
**Room Control Unit SAR/A and SAF/A**

**Introduction**

**Example: Connection FCC/S**

- **4 wires required**
  - 2 wires for setpoint input A (mandatory)
  - 2 wires for room temperature
    - optional, can come also from another sensor, e.g. KNX presence detector
  - Fan speed signal detection via different resistor levels on setpoint wires in addition to the resistance of the temperature sensor

- **Availability: July 2018**
ClimaECO sensors
New Range of KNX sensors

Introduction

– New range of push button sensors and room temperature controller created together with the project ClimaECO

– Complete product range:
  • Control element 8-fold and 12-fold with integrated temperature sensor
  • Control element with RTC slave 6- and 10-fold
  • Control element with RTC 6- and 10-fold
  • Control element with RTC 6- and 10-fold plus CO$_2$ and humidity sensor and controller

– User friendly with an good User Interface-design for the devices with display
– Labelling with icons and/or text via an web-tool by the customer himself
– All devices with an mechanical anti theft protection
ClimaECO sensors

New Range of KNX sensors

Introduction

- Installation in every country in the world (VDE, BS, NEMA, Australian brackets, etc.)
- Sensors can be installed/mounted in a flush mounted box or separate surface mounted box
- Unified RTC concept
- Available in studio white (-84)
- Native ETS application for ETS4 and ETS5
- Values and icons are shown on a white illuminated display
- Status LED’s with day and night mode
- Status LED’s with ABB color concept
- No frame required

- Availability: August 2018
Why Heating Cooling Circuits in a HVAC System?

In a heating/cooling system the hot/cold water has to be distributed to various units in a building.

Units can be separate flats in a residential building, individual departments/shops in a commercial building, particular circuits for radiator or floor heating/cooling ceiling and more

Requirements of these units: individual consumption and measurement, different water temperature and pressure, turn off of the circuit (pump off and valve closed) and more

A Heating Cooling circuit Controller together with the valve, pump and temperature sensors can handle these requirements

→ For a holistic approach HCC/S 2.x.x.1 from ABB based on KNX
Heating Cooling Circuit Controller HCC/S 2.x.x.1

Introduction

Motivation – New Features

- Control of Heating/Cooling Circuits
- Control of mixing valve/3-way valve:
  - 0 - 10 V motor
  - 3 point motor
- Control of single/double pump of the heating cooling circuit
- 2 Channels
- Measurement of flow- and return flow temperature
- Binary inputs for status information of the pump

- Availability: August 2018
Boiler/Chiller Interface BCI/S 1.1.1

Introduction

Why Boiler/Chiller in a HVAC System?

In a heating/cooling system hot/cold water has to be generated with the right amount and temperature to be distributed to various circuits/units in a building.

A boiler or chiller produces the tempered water but has to be controlled depending on the demand of the total heating/cooling system.

→ For a holistic approach Boiler Chiller Interface BCI/S 1.1.1 from ABB based on KNX
### Boiler/Chiller Interface BCI/S 1.1.1

#### Introduction

**Motivation – New Features**

- Control of a Boiler/Chiller and the main pump
- Control of necessary water temperature (set point) in the boiler/chiller via 0-10V
- Turn on/off of boiler/chiller
- Turn on/off of pump of the main heating/cooling circuit
- Measurement of flow- and return flow temperature
- No controller inside, it's an interface, therefore no interference with the internal safety mechanism of the boiler or chiller unit
- The main intelligence (especially to provide the right control value) is located in the Application Controller AC/S (ASM's Boiler Heat generator and Chiller)
- Availability: August 2018
Application Controller AC/S 1.x.1

Why Application Controller in a HVAC System?

In a heating/cooling system a superior intelligent unit is required for numerous tasks

Functions like controller capability, collecting and processing data, mathematical functions, interfacing, calculation of control values or displaying and setting of states via web browser belong to it

Device needs connection to KNX and Ethernet, but has no physical In- and Outputs

As in many HVAC systems BACnet is used, therefore an optional BACnet interface is essential

→ For a holistic approach AC/S 1.x.1 with or without BACnet interface from ABB based on KNX
Application Controller AC/S 1.x.1

Principle

AC/S 1.1.1
Automation Interfacing

WebUI
Operation Display

IP

TP

KNX
Devices
RTC, FCC/S,
HCC/S, BCI/S, ...

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Application Controller AC/S 1.x.1

Principle

- BACnet
  - HVAC Operation Display
- AC/S 1.2.1
  - Automation Interfacing
- WebUI
  - Operation Display
- KNX
  - Devices: RTC, FCC/S, HCC/S, BCI/S, …
Application Controller AC/S 1.x.1

Introduction

Motivation – New Features

- Control of the complete HVAC system from consumption to generation
- Managing the boiler/chiller
- Managing the Heating/Cooling circuit control
- Necessary for a consistent solution of a HVAC system completely with ABB i-bus KNX which is demanded from customers and in projects

- Availability: September 2018
Application Controller AC/S 1.x.1

Introduction

1. Web User Interface
   Created automatically (Good design and user friendliness)

2. Integrated BACnet Gateway (no configuration required)

3. Automation Functions
   Pre-defined functions (ASM)

4. Freely programmable Automation Functions
   (like ABA/S)

KNX
Based on the open and worldwide Standard
ClimaECO

Application Controller and WebUI

Fresh air damper
Control value: 0 %

Ceiling cooling
Control value: 0 %

Split unit
- Split unit: Off
- Fan: 100 %
- Operation mode: Auto

Radiator
Control value: Off

Floor heating
Control value: Off

Room set point
- Room temperature: 6 °C
- Air quality: 0 ppm
- Humidity: 0 %

Fan coil unit
- Fan speed: Manual
- Cooling: 0 %
- Additional heating: 0 %

Dew Point Alarm
State

LevD Sensor Alarm
State

Predator

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Application Controller AC/S 1.x.1

Introduction

1. Web User Interface
   - Created automatically
   - Good design and user friendliness

2. BACnet
   - Integrated BACnet Gateway (no configuration required)

3. Automation Functions
   - Pre-defined functions (ASM)
   - Freely programmable Automation Functions (like ABA/S)

4. KNX
   - Based on the open and worldwide Standard
Application Controller AC/S 1.x.1

Communication in all Directions → KNX - WebUI - BACnet
Application Controller AC/S 1.x.1

Introduction

1. Web User Interface
   Created automatically (Good design and user friendliness)

2. Integrated BACnet Gateway (no configuration required)

3. Automation Functions
   Pre-defined functions (ASM)

4. Freely programmable Automation Functions (like ABA/S)

5. KNX
   Based on the open and worldwide Standard
Motivation – New Features

Predefined Automation Modules
- **ASM → Automation Specific Modules**
- Represent specific functionality, can execute function by itself or together with other ASM’s e.g. room setpoints or heating/cooling circuit control
  - In- and/or outputs (sockets)
  - Parameters
  - Group objects
  - Linking view with sockets to be connected to KNX objects, WebUI, BACnet or other ASM’s
Application Controller AC/S 1.x.1

Introduction

1. Web User Interface
   Created automatically (Good design and user friendliness)

2. BACnet Gateway
   Integrated BACnet Gateway (no configuration required)

3. Automation Functions
   Pre-defined functions (ASM)

4. Freely programmable Automation Functions
   Based on the open and worldwide KNX Standard

KNX
Based on the open and worldwide Standard
Application Controller AC/S 1.x.1

Introduction

Motivation – New Features

ASM Automation: Freely programmable like Logic Controller
ABA/S 1.2.1
BAC/S 1.5.1 Building Automation Controller KNX

Introduction

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
Freely Programmable

- Advanced Programming based on standardized IEC 61131-3 Programming Languages in ABB Automation Builder based on established CODESYS Software
- Easy reuse of your existing CODESYS based Projects
- Easy use of 3rd Party IEC 61131-3 Automation Software Libraries

Visit www.abb.com/plc for more details to ABB Automation Builder
**BAC/S 1.5.1 Building Automation Controller KNX**

**Introduction**

**KNX**

- Seamless Solution from Automation Controllers to Room Automation. No Gateways and Integration Effort required
- Integrated in KNX and ETS
  - Built-in KNX Interface based on KNXnet/IP (Ethernet) to connect to the KNX IP-Router Backbone
  - The BAC/S is a standard KNX Device with Group Objects in ETS and physical KNX Address
  - Direct data exchange between the Engineering Software ABB Automation Builder and ETS
- Availability: October 2018
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Go-To-Market Timeline

Products

- Split Unit Gateway
  SUG/U (Aug 2017)
- Fan Coil Controller
  FCC/S
- Valve Drive Controller
  VC/S
- Climatic sensors
  SBS/U
- Heating/ Cooling Circuit Controller
  HCC/S
- Building/ Chiller Interface
  BCI/S
- Application Controller
  AC/S
- Building Automation Controller
  BAC/S
- Analog Room Control Units
  SAR/A & SAF/A

Nov 2017

- Kick-off
  (Sept 2017)

Dec 2017

- Light + Building 2018

Jan 2018

- Climatic Launch
  Kick-OFF Meeting

Feb 2018

Mar 2018

Apr 2018

May 2018

Jun 2018

Jul 2018

Aug 2018

Sep 2018

Oct 2018

- Air quality sensor with RTC
  LGS/A

- Application Controller
  AC/S
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Available content for ClimaECO

Available content ABB internal:
- Presentation ClimaECO (Overview)
- ABB-ClimaECO
- Specification Text (step by step)
  - FCC/S, VC/S, ABB-ClimaECO, AC/S (May 2018)
- Key Visual (Picture)
- Press Release
- Video – Questions and Answers

→ Link
Available content for ClimaECO

Available content external:

- Web Page: [www.abb.com/ClimaECO](http://www.abb.com/ClimaECO) (EN)
- Web Page: [www.abb.de/ClimaECO](http://www.abb.de/ClimaECO) (DE)

- Video on Youtube: “ClimaECO – Heating Ventilation and Air Conditioning with ABB i-bus® KNX”
  → [Link](http://www.youtube.com/watch?v=link)

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Training Timeline (Webinars)

- Webinar FCC/S, SAR/A + SAF/A, ClimaECO sensors
- Webinar VC/S, HCC/S, BCI/S
- Webinar AC/S
- Webinar BAC/S

- Webinar ClimaECO Introduction
- Webinar ClimaECO Introduction

- Light + Building 2018
- ClimaECO Launch Kick-OFF Meeting

2017

2018
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Training & Qualification Calendar 2018

In addition to the online modules and the traditional training programs offered by your local ABB sales team, we offer a variety of on-site trainings conducted by our specialists at different ABB training facilities.

In this Training & Qualification Calendar you can find the educational events that are taking place during 2018.

If you are interested in a training please click the “REGISTER HERE” button:

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

→ Training and Qualification
→ Training Calendar
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KNX Certified Training

Certified KNX Courses in Heidelberg
– Advanced Course 16th to 20th July
– Tutor Course 09th to 13th October

And many more training courses in the calendar “International Training Dates 2018”
www.abb.com/KNX or https://go.abb/BA-training

Certified KNX Basic Course
February 2018 in Heidelberg
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Next Webinar

**KNX Security Panel GM/A 8.1**

Wednesday 13\textsuperscript{th} June 2018

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

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

Smartphone App

Remote access via “MyBuildings portal”

Service functionality
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