ClimaECO: ABB i-bus® KNX HVAC Solutions
Product information
2018-09-17
ClimaECO: ABB i-bus® KNX HVAC Solutions
Short product overview and main applications
ClimaECO: ABB i-bus® KNX HVAC Solutions

Main Applications

Room Solutions
A complete room automation solution for all types of commercial buildings

Building Solutions
A holistic automation solution for small to medium commercial buildings
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Main Applications

HVAC Segments

- Holistic Solution from Central HVAC (Energy Production and Distribution) to Room Automation (Energy Consumption) and the controlling Management and Automation to run the Building economic.
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Main Applications

Product Types

ClimaECO covers all customer requirements and experiences by a

• Preconfigured Application Specific Devices which gives the ability to expand customers their business from lighting control to a complete HVAC Automation Solution

• Freely programmable Controllers based on open Standards for continues use of customers HVAC Automation Libraries and Projects as well for simple integration of 3rd party Libraries. For a holistic Solution without Gateways which includes the Design Orientatated Room Devices.
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Main Applications

Building Types

A holistic Solution for small to medium commercial Buildings like

- Offices
- Schools
- Public Buildings
- Hospitality
- Shops
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Portfolio Overview of new Products

Management & Automation

- **Application Controllers**  
  - AC/S

Central HVAC Automation

- **Heating/ Cooling Circuit Controllers**  
  - HCC/S
- **Boiler/ Chiller Interfaces**  
  - BCI/S
- **Building Automation Controller KNX**  
  - BAC/S

HVAC Room Automation

User Operation

- **ABB ClimaECO Sensors**  
  - SBS/U
- **Room Control Units**  
  - SAR/A

Controllers

- **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
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Portfolio Overview: new User Operation Products

**ABB ClimaECO sensor Range**

An entire range of KNX Room Operation Units optimized for commercial applications
- Variants with Air Quality Sensor
- Can be flush or surface mounted
- No additional power supply required

**SAR/A & SAF/A Room Control Units**

Simple, cost efficient Room Temperature Control Units connecting directly to FCC/S Fan Coil or VC/S Valve Controllers
- No power supply required
- Easy installation / no commissioning
- Optimal price / performance
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Portfolio Overview: new HVAC Room Automation Products

**SUG/U Split Unit Gateway**
- Simple integration of Air Conditioning Split Units into KNX installations via emulation of infrared remote control signals
- Pre-programmed with the IR control codes of major split unit manufacturers
- Compact format for simple installation

**FCC/S Fan Coil Controllers**
- Control of the complete spectrum of Fan Coil Units.
  - Successor to the FCA/S series.
  - With integrated Room Temperature Controller
  - Support of variable 0-10V fans
  - Support of 6-way valves

**VC/S Valve Drive Controllers**
- Valve control for radiator, floor heating and cooling ceiling applications.
  - With integrated Room Temperature Controller
  - Integrated inputs for sensors
  - In addition to VAA/S Product Range
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Portfolio Overview: new HVAC Room Automation Products

Measuring of room temperature, CO2 concentration and humidity.
- With integrated Room Temperature Controller
- Indication of CO2 and relative humidity level via LED
- Integrated dew point calculation
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Portfolio Overview: new Central HVAC Automation Products

### HCC/S Heating/ Cooling Circuit Controllers

- Control of Distribution Circuits for Heating or Cooling based on the room demand.
  - For 3-point or 0-10V Valve Drives
  - Support for double-pumps
  - Inputs for all required sensors

### BCI/S Boiler/ Chiller Interfaces

- For interfacing to the controllers of self-contained Heating Boilers or Chillers to monitor and control them.
  - Interfacing by standard analogue signals
  - Pump switching
  - Also support for heat pumps

### BAC/S Building Automation Controller KNX

- Advanced freely-programmable KNX Building Automation Controller
  - Easy creation and reuse of Automation Software by IEC 61131-3 Programming Languages in ABB Automation Builder with base on established Codesys Software
  - Seamless integrated in KNX and ETS
  - Modular extension of In-/ Outputs
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Portfolio Overview: new Management & Automation Products

**AC/S Application Controllers**

Run predefined Automation Modules for a holistic HVAC Automation Solution from Central HVAC to Room. For example Heat Demand Calculation, Schedules and Trends Logs. With WebUI for Operation.

- Own Automation Modules can be created by a graphical Logic Editor
- Variant with embedded KNX-BACnet Gateway for integration of KNX into BACnet Systems
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Portfolio Overview – ClimaECO is part of out todays ABB i-bus® KNX portfolio

ClimaECO: established portfolio
HVAC and user operation

- Valve Drive Actuator
- Blower Actuator
- Thermoelectric valve drive
- Electro motoric valve drive
- Analog Outputs
- Analog Inputs
- User operation: e.g. Prion, Solo etc.

Presence detection, Lighting and switching

- Presence detectors
- Dali Gateways
- Dimmer Actuators
- Switch Actuators

Weather sensor, Logic and Room automation

- Logic Controller
- Time receiver GPS
- Time switch
- Room Controller
- Room Master
- Weather station/sensor
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Market view
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Trends

- Simplicity
- Holistic approach for whole HVAC System is required to guarantee highest energy efficiency classes. See EN 15232 and LEED
- Incessant move to open Standards

“The trend is that the end users request BACnet and KNX more than LonWorks”

Source: Frost & Sullivan, Study “European Building Automation Systems Market” 2013
Green buildings

- A trend in functional buildings are so-called green buildings
- Among other things, green buildings are characterized by a high resource efficiency in the areas of energy, water and materials, while, at the same time, damaging effects on health and the environment were reduced.

- With ClimaECO and ABB ClimaECO Sensors, we are able to make a considerable contribution to the reduction of the energy costs,
- supported by the measurement of CO2 and humidity for better air quality inside the buildings.
A holistic Solution from Central HVAC to Room Automation is mandatory to reach the efficiency class A with up to 30% energy savings according to EN 15232. Similar for LEED
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Value Proposition

ClimaECO offers a holistic Automation solution for HVAC applications in modern buildings from Central HVAC to Room.

**Cost Saving**
ClimaECO solutions save time and effort during planning, integration and maintenance while increasing energy efficiency in buildings measurably.

**Secure Investment**
ABB possess a global footprint combined with local presence and is the reliable partner for project developers, investors and building owners. ClimaECO solutions are based on open and standardized technologies thus eliminating the threat of single sourcing and reducing system dependencies.

**Sales Channel Commitment**
ABB, as a product solution supplier, works hand-in-hand with its traditional market partners in design, distribution and installation. A notable difference to other ‘turn key’ competitors.

**Fits to your requirements**
We offer our customers the suitable solution regardless if they already are in the field of HVAC Automation or want to expand their business from lighting control.
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Detailed product information
## ClimaECO: ABB i-bus® KNX HVAC Solutions

**Detailed product information**

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<th>ABB ClimaECO sensor range</th>
<th>SUG/U Split Unit Gateway</th>
<th>LGS/A Air quality sensor with RTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please see Product Information of the ABB ClimaECO sensor range</td>
<td>Please see <a href="new.abb.com/products/2CDG110207R0011">new.abb.com/products/2CDG110207R0011</a></td>
<td>Please see <a href="new.abb.com/products/2CDG120059R0011">new.abb.com/products/2CDG120059R0011</a></td>
</tr>
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FCC/S Fan Coil Controller

Detailed product information
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FCC/S 1.x.y.1 Fan Coil Controller

For all types of Fan Coil Unit we have a suitable controller – for comfortable air conditioning of the room

- Actuator with inputs and integrated controller
- Use stand alone or with room control unit
- Connection of analog room control unit possible
- The right device for each application
- Support of continues fan and 6-way valves
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FCC/S 1.x.y.1 Product Range

- FCC/S 1.1.x.1
- FCC/S 1.2.x.1
- FCC/S 1.3.x.1
- FCC/S 1.4.1.1
- FCC/S 1.5.x.1
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FCC/S 1.x.y.1 Functionality of a Fan Coil Controller

**Outputs**
- Control of heating and cooling valves (PWM, 3-Point, Open/Close or 0-10V)
- Control of fan drives (1-3 stage or continues fan)
- Control of electrical heater

**Inputs**
- Measurement of room temperature
- Detection of dew point/tray level
- Detection of window status
- Connection of analog Room operation units
<table>
<thead>
<tr>
<th>Function/Device</th>
<th>FCC/S 1.1.x.1</th>
<th>FCC/S 1.2.x.1</th>
<th>FCC/S 1.3.x.1</th>
<th>FCC/S 1.4.1.1</th>
<th>FCC/S 1.5.x.1</th>
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<tbody>
<tr>
<td>Integrated Room temperature controller (unified RTC)</td>
<td>X</td>
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<td>Valve Control</td>
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<tr>
<td>PWM</td>
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<td>X (1)</td>
<td>X (2)</td>
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<tr>
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<td>X (1)</td>
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<td>0-10V</td>
<td>-</td>
<td>X (2)</td>
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<td>Control of 6-way valves</td>
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<td>2-pipe system</td>
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<td>4-pipe system</td>
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<td>3-stage fan (5A)</td>
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<td>Continues fan</td>
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<td>Relay output for electrical heater (16A)</td>
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<tr>
<td>Variant with keypad</td>
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<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>Variant without keypad</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
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FCC/S 1.1.y.1 Technical Data II

**FCC/S 1.1.2.1**  **FCC/S 1.1.1.1**

1. Label carrier
2. KNX programming LED (red)
3. KNX programming button
4. KNX connection
5. Cover cap
6. Inputs (a, b, c, d)
7. Valve output A
8. Valve output B
9. Fan output
10. Additional Relays
11. Button/LED switch valve output
12. Buttons/LED open/close valve output
13. Button/LED open/close relays output
14. Button/LED switch fan speed
15. Button/LED activate manual operation
16. LED status display inputs

FCC/S 1.1.2.1 2CDG 110 211 R0011 2CDG 110 210 R0011

Relay Fan
Valve drive control: PWM/Motoric
Additional Relay for electrical heater
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FCC/S 1.2.y.1 Technical Data II

1. Label carrier
2. KNX programming LED (red)
3. KNX programming button
4. KNX connection
5. Cover cap
6. Inputs (a, b, c, d)
7. Valve output A
8. Valve output B
9. Fan output
10. Additional Relays
11. Button/LED switch valve output
12. Buttons/LED open/close valve output
13. Button/LED open/close relays output
14. Button/LED switch fan speed
15. Button/LED activate manual operation
16. LED status display inputs

FCC/S 1.2.2.1
2CDG 110 213 R0011
2CDG 110 212 R0011

Relay Fan
Valve drive control: 0-10 V
Additional Relay for electrical heater
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FCC/S 1.3.y.1 Technical Data II

1. Label carrier
2. KNX programming LED (red)
3. KNX programming button
4. KNX connection
5. Cover cap
6. Inputs (a, b, c, d)
7. Valve output A
8. Valve output B
9. Fan output
10. Additional Relays
11. Button/LED switch valve output
12. Buttons/LED open/close valve output
13. Button/LED open/close relays output
14. Button/LED switch fan speed
15. Button/LED activate manual operation
16. LED status display inputs

0-10 V Fan
Valve drive control: 0-10 V
Additional Relay for electrical heater
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FCC/S 1.4.1.1 Technical Data II

FCC/S 1.4.1.1

1. Label carrier
2. KNX programming LED (red)
3. KNX programming button
4. KNX connection
5. Cover cap
6. Inputs (a, b, c, d)
7. Valve output A
8. Fan output

FCC/S 1.4.1.1
2CDG 110 209 R0011

Relay Fan
Valve drive control: PWM
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FCC/S 1.5.y.1 Technical Data II

1. Label carrier
2. KNX programming LED (red)
3. KNX programming button
4. KNX connection
5. Cover cap
6. Inputs (a, b, c, d)
7. Valve output A
8. Valve output B
9. Fan output
10. Additional Relays
11. Button/LED switch valve output
12. Buttons/LED open/close valve output
13. Button/LED open/close relays output
14. Button/LED switch fan speed
15. Button/LED activate manual operation
16. LED status display inputs

FCC/S 1.5.2.1
FCC/S 1.5.1.1

0-10 V Fan
Valve drive control: PWM/motoric
Additional Relay for electrical heater
## ClimaECO: ABB i-bus® KNX HVAC Solutions

### FCC/S 1.x.y.1 Functions

<table>
<thead>
<tr>
<th>General Functions</th>
<th>Temperature Controller</th>
<th>Outputs</th>
<th>Inputs</th>
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</thead>
<tbody>
<tr>
<td>• Application based parameterization</td>
<td>• Direct use of control values with the internal outputs</td>
<td>• Valve Control</td>
<td>• Inputs for</td>
</tr>
<tr>
<td>• Use as controller or actuator device</td>
<td>• Output of control values via KNX to use for other devices in the same room</td>
<td>• Selection of Valve type</td>
<td>• Temperature</td>
</tr>
<tr>
<td>• Connection of room sensors</td>
<td>• Application based pre-selection of controller type</td>
<td>• Support of 6-way valves</td>
<td>• Window contact</td>
</tr>
<tr>
<td>• Window contact</td>
<td>• Fan Coil Unit</td>
<td>• Opening/Closing time</td>
<td>• Level sensor</td>
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<tr>
<td>• Dew point sensor</td>
<td>• Electrical Heater</td>
<td>• Manual Valve Overwrite</td>
<td>• Dew point sensor</td>
</tr>
<tr>
<td>• Level sensor</td>
<td>• Floor Heating</td>
<td>• Valve Purge</td>
<td>• Binary signals</td>
</tr>
<tr>
<td>• Window contact</td>
<td>• Cooling Ceiling</td>
<td>• Fan control</td>
<td>• Analog room control</td>
</tr>
<tr>
<td>• Forced operation</td>
<td>• Radiator</td>
<td>• Number of fan stages/fan voltage area</td>
<td></td>
</tr>
<tr>
<td>• Monitoring of input values</td>
<td>• Free configuration</td>
<td>• Run-on behavior</td>
<td></td>
</tr>
<tr>
<td>• Temperature</td>
<td>• 2-point controller</td>
<td>• Limitations</td>
<td></td>
</tr>
<tr>
<td>• Operating mode</td>
<td>• PI-controller</td>
<td>• Automatic control in dependence of control value</td>
<td></td>
</tr>
<tr>
<td>• Heating/Cooling mode</td>
<td>• Basic load</td>
<td>• Relay output</td>
<td>• Direct use of connected sensors in the controller</td>
</tr>
<tr>
<td>• Dew point sensor</td>
<td>• Temperature limitation</td>
<td>• For electrical heater</td>
<td></td>
</tr>
<tr>
<td>• Level sensor</td>
<td>• Integrated Setpoint Manager</td>
<td>• As free relay output</td>
<td></td>
</tr>
<tr>
<td>• Window contact</td>
<td></td>
<td></td>
<td>• Master/Slave concept of unified RTC integrated</td>
</tr>
</tbody>
</table>
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FCC/S 1.x.y.1 Commissioning and Diagnostics

FCC/S 1.x.y.1
Standard KNX Twisted Pair devices
• Commissioning via ETS
Integration in ABB i-bus® Tool for diagnostics and commissioning support
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FCC/S 1.x.y.1 Use cases

**Applications**

- 2- and 4-pipe Fan Coil Unit applications
- Energy efficiency through use of continues fans (0-10 V) or low cost solution for multi stage fans
- Flexibility by having a dedicated device for all valve drives
  - Thermoelectric valves (PWM)
  - Open/Close valves
  - Analog valves (0-10V)
  - 6-way valves (0-10)
- Stand-alone operation without a room control unit

The FCC/S is used for the control of fan coil units. It supports the control of two heating and two cooling stages (for each a basic stage and additional stage) with the internal controller. Via the outputs of the device two valve drives (FCC/S 1.4.1.1 only one) can be controlled for the use with two of the heating or cooling stages.

An additional 16 A relay output can be used for one of the heating stages or as independent relay output. Depending on the device it is possible to control 3-stage fans or a continues fan with the fan output.

Via the 4 inputs of the device, room sensors, such as temperature sensors, window contacts, dew point sensors or level sensor, can be connected to the device. Additional it is possible to connect one analog room control unit (SAR/A or SAF/A) to the inputs of the device.

Possible applications to use the device are:

- Residential buildings in combination with every ABB room control unit e.g. the new ClimaECO sensors, Solo or Tacteo
- Commercial buildings in combination with a KNX room control unit or with the new analog room control units (SAR/A and SAF/A)
- Public buildings without any local user operation (e.g. schools, theaters etc.)
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VC/S Valve Drive Controller

Detailed product information
ClimaECO: ABB i-bus® KNX HVAC Solutions

VC/S 4.x.1 Valve Drive Controller

One controller containing all functionality for the control of floor heating, cooling ceiling and radiator – for a reliable solution

- Actuator with inputs and integrated controller
- Use stand alone or with room control unit
- Connection of analog room control unit possible
- 4 independent channels
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VC/S 4.x.1 Product Range

VC/S 4.2.1

VC/S 4.1.2
Control of heating and cooling valves (PWM or Open/Close) for

- Cooling ceiling
- Floor heating
- Radiator

**Inputs**
- Measurement of room temperature
- Detection of dew point/tray level
- Detection of window status
- Connection of analog Room operation units

**Outputs**
- Control of heating and cooling valves (PWM or Open/Close) for
## VC/S 4.x.1 Technical Data I

<table>
<thead>
<tr>
<th>Function/Device</th>
<th>VC/S 4.1.1</th>
<th>VC/S 4.1.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Room temperature controller (unified RTC)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Number of channels</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Control of PWM valves per channel</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Inputs for sensors per channel</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Inputs for analog Room control unit per channel</td>
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<td>1</td>
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<tr>
<td>Module width</td>
<td>8</td>
<td>8</td>
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<tr>
<td>Keypad</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>
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VC/S 4.x.1 Technical Data II

VC/S 4.1.2
1. Label carrier
2. KNX programming button
3. KNX programming LED (red)
4. KNX connection
5. Cover cap
6. Inputs (a, b, c, d, e, f)
7. Inputs (g, h, i, j, k, l)
8. Valve output (A, B, C, D)
9. Button/LED Reset /Failure valve output (A…D)
10. Button/LED activate manual operation
11. LED status display inputs (a, b, c, d, e, f, g, h, i, j, k, l)
12. Button/LED switch/status display valve outputs

VC/S 4.1.1

VC/S 4.2.1
2CDG 110 217 R0011

VC/S 4.1.1
2CDG 110 216 R0011
### ClimaECO: ABB i-bus® KNX HVAC Solutions

#### VC/S 4.x.1 Functions

<table>
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<td>• Temperature</td>
</tr>
<tr>
<td>• Connection of room sensors</td>
<td>• Application based pre-selection of controller type</td>
<td>• Opening/Closing time</td>
<td>• Window contact</td>
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<tr>
<td>• Window contact</td>
<td>• Floor Heating</td>
<td>• Manual Valve Overwrite</td>
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<td>• Radiator</td>
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<td>• Binary signals</td>
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<tr>
<td>• Forced operation</td>
<td>• Fan Coil Unit</td>
<td></td>
<td>• Analog room control unit</td>
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<tr>
<td>• Monitoring of input values</td>
<td>• Electrical Heater</td>
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<td>• Temperature</td>
<td>• Free configuration</td>
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<td></td>
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<tr>
<td>• Operating mode</td>
<td>• 2-point controller</td>
<td></td>
<td></td>
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<tr>
<td>• Heating/Cooling mode</td>
<td>• PI-controller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Dew point sensor</td>
<td>• Basic load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Level sensor</td>
<td>• Temperature limitation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Window contact</td>
<td>• Integrated Setpoint Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Window contact</td>
<td></td>
<td></td>
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</tr>
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</table>

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October 29, 2019

Slide 41
ClimaECO: ABB i-bus® KNX HVAC Solutions
VC/S 4.x.1 Commissioning and Diagnostics

VC/S 4.x.1

Standard KNX Twisted Pair devices
• Commissioning via ETS
Integration in ABB i-bus® Tool for diagnostics
Possible Applications

All heating and cooling systems for
- Radiator
- Floor heating
- Cooling ceiling

Applications

Control of 4 independent rooms, each with its own controller

The VC/S is a 4-channel device used for the control of radiator, floor heating or cooling ceiling applications.

It supports the control of two heating and two cooling stages (for each a basic stage and additional stage) with the internal controller for each channel. Via the outputs of each channel one valve drive can be controlled for the use with one of the heating or cooling stages. Via the 3 inputs of each channel, room sensors, such as temperature sensors or window contacts/dew point sensors or level sensor, can be connected to the device. Additional it is possible to connect one analog room control unit (SAR/A or SAF/A) to the inputs of the channel.

Each channel of the device operates independently from the other channels.

Possible applications to use the device are:
- Residential buildings in combination with every ABB room control unit e.g. the new ClimaECO sensors, Solo or Tacteo
- Commercial buildings in combination with a KNX room control unit or with the new analog room control units (SAR/A and SAF/A)
- Public buildings without any local user operation (e.g. schools, theaters etc.)
ClimaECO: ABB i-bus® KNX HVAC Solutions
SARA + SAFA Detailed product information
ClimaECO: ABB i-bus® KNX HVAC Solutions

SAR/A Room temperature control element and SAF/A Room temperature and FanCoil control element

Cost efficient solution for user operation in the room – giving flexibility to installer and room user

- Control element for FCC/S Fan Coil Controller or VC/S Valve Drive Controller
- With integrated temperature sensor
- For surface mounting
- Rotary elements with pleasant haptic
### ClimaECO: ABB i-bus® KNX HVAC Solutions

**Product Range**

<table>
<thead>
<tr>
<th>SAR/A 1.0.1-24</th>
<th>SAF/A 1.0.1-24</th>
</tr>
</thead>
</table>

![Image of SAR/A 1.0.1-24](image1.png)

![Image of SAF/A 1.0.1-24](image2.png)
Possible Applications

Room temperature and/or Fan control element for:

- the manual Fan speed adjustment (0 up to 3 Steps)
- manually control of the temperature set point
- slim design
- Low cost temperature control unit
- Room temperature measurement

- Commercial buildings in combination with a FCC/S Fan Coil Controller or VC/S Valve Drive Controller
ClimaECO: ABB i-bus® KNX HVAC Solutions

SAR/A & SAF/A Technical Data II

SAR/A1.0.1-24

<table>
<thead>
<tr>
<th>SAR/A1.0.1-24</th>
<th>SAF/A1.0.1-24</th>
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</thead>
<tbody>
<tr>
<td>2CKA 006 134 A0346</td>
<td>2CKA 006 134 A0348</td>
</tr>
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<td>Color: studio white</td>
<td>Color: studio white</td>
</tr>
<tr>
<td>Availability: July</td>
<td>Availability: July</td>
</tr>
</tbody>
</table>
ClimaECO: ABB i-bus® KNX HVAC Solutions
HCC/S Heating/Cooling Circuit Controllers
Detailed product information
Demand based control of the distribution circuit – for maximum energy savings in the HVAC system

- Actuator with inputs and integrated controller
- Control of mixing valve and pump
- 2 independent channels
- Control of 2 single or 1 double pump circuits
ClimaECO: ABB i-bus® KNX HVAC Solutions

HCC/S 2.1.y.1 Product Range

**HCC/S 2.1.2.1**

**HCC/S 2.1.1.1**
ClimaECO: ABB i-bus® KNX HVAC Solutions

HCC/S 2.2.y.1 Product Range

- HCC/S 2.2.2.1
- HCC/S 2.2.1.1
ClimaECO: ABB i-bus® KNX HVAC Solutions

HCC/S 2.x.y.1 Functionality of a Heating/Cooling Circuit Controller

- Measurement of flow temperature
- Control and monitoring of circuit pump
- Control of 3-way mixing valve
- Measurement of return flow temperature

Heating/Cooling Distribution Circuit

Boiler/Chiller

Distributor
Collector
<table>
<thead>
<tr>
<th>Function/Device</th>
<th>HCC/S 2.1.x.1</th>
<th>HCC/S 2.2.x.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated temperature controller for heating or cooling mixing circuit</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Number of channels</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Valve control type</td>
<td>0-10V</td>
<td>3-Point (motoric)</td>
</tr>
<tr>
<td>Inputs for sensors per channel</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Inputs for temperature measurement</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Inputs for pump status</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Pump output per channel</td>
<td>1 (5A)</td>
<td>1 (5A)</td>
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<tr>
<td>Module width</td>
<td>8</td>
<td>8</td>
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<tr>
<td>Version with Keypad</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Version without Keypad</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
ClimaECO: ABB i-bus® KNX HVAC Solutions

HCC/S 2.1.y.1 Technical Data II

HCC/S 2.1.2.1

1. Label carrier
2. KNX programming button
3. KNX programming LED (red)
4. KNX connection
5. Cover cap
6. Relais output (Pump) CH A
7. Temperature inputs CH A
8. Binary inputs (Pump) CH A
9. Valve output CH A
10. Relais output (Pump) CH B
11. Temperature inputs CH B
12. Binary inputs (Pump) CH B
13. Valve Output CH B

HCC/S 2.1.1.1

1. Label carrier
2. KNX programming button
3. KNX programming LED (red)
4. KNX connection
5. Cover cap
6. Relais output (Pump) CH B
7. Temperature inputs CH B
8. Binary inputs (Pump) CH B
9. Valve output CH B
10. Relais output (Pump) CH A
11. Temperature inputs CH A
12. Binary inputs (Pump) CH A
13. Valve Output CH A

Valve drive control: 0-10 V

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ClimaECO: ABB i-bus® KNX HVAC Solutions

HCC/S 2.2.y.1 Technical Data II

**HCC/S 2.2.2.1**

1. Label carrier
2. KNX programming button
3. KNX programming LED (red)
4. KNX connection
5. Cover cap
6. Relais output (Pump) CH A
7. Temperature inputs CH A
8. Binary inputs (Pump) CH A
9. Valve output CH A
10. Relais output (Pump) CH B
11. Temperature inputs CH B
12. Binary inputs (Pump) CH B
13. Valve Output CH B

**HCC/S 2.2.1.1**

15. Cover cap
16. Relais output (Pump) CH A
17. Temperature inputs CH A
18. Binary inputs (Pump) CH A
19. Valve output CH A
20. Manual operation

Valve drive control: 3-Point

HCC/S 2.2.2.1
2CDG 110 221 R0011

HCC/S 2.2.1.1
2CDG 110 220 R0011
### General Functions
- Application based parameterization
- Use as controller or actuator device
- Forced operation
- Monitoring of input values
  - Temperature
  - Setpoint temperature
  - Heating/Cooling mode
  - Pump status
- Double Pump Mode

### Heating/Cooling Circuit Controller
- Direct use of control values with the internal outputs
- Output of control values via KNX
- Pre-selection of controller type
  - Fast
  - Middle
  - Slow
- Free configuration
- PI-controller
- Basic load
- Temperature limitation
- Safety shutdown temperature

### Outputs
- Valve Control
- Opening/Closing time
- Manual Valve Overwrite
- Valve Purge
- Pump control
- In dependence of valve control value
- Manual pump overwrite
- In double pump modus
  - Switch-over time
  - Automatic (time) switch-over
  - Automatic change in case of failure

### Inputs
- Inputs for
  - Flow temperature
  - Return flow temperature
  - Pump status
  - Pump failure
  - Pump repair switch
  - Binary signals
- Direct use of connected sensors in the controller
ClimaECO: ABB i-bus® KNX HVAC Solutions
HCC/S 2.x.y.1 Commissioning and Diagnostics

HCC/S 2.x.y.1
Standard KNX Twisted Pair devices
- Commissioning via ETS
Integration in ABB i-bus® Tool for diagnostics
Possible Applications

- Control of 2 independent heating or cooling circuits
- Control of 1 heating or cooling circuit with a double pump
- Commercial buildings with a water based heating or cooling distribution system
- Adaptation of the flow temperature based on demand

The HCC/S is a 2-channel device used for the control of heating or cooling circuits. It supports the control of a heating or cooling stages with the internal controller for each channel.

Via the outputs of a channel one valve drive for a mixing valve can be controlled. Via 2 inputs the flow and return flow temperature of the controlled circuit are measured and used in the controller. A relay output is used for the pump control and three additional inputs for the status monitoring of the pump. The controller can operate the circuit as heating or cooling circuit or as heating and cooling circuit with changeover.

Each channel of the device operates independently from the other channel. Via channel bundling it is also possible to control heating or cooling circuits with double pump applications.
ClimaECO: ABB i-bus® KNX HVAC Solutions
BCI/S Boiler/Chiller Interface
Detailed product information
ClimaECO: ABB i-bus® KNX HVAC Solutions

BCI/S 1.1.1 Boiler Chiller Interface

Easy Integration of Boiler and Chiller into KNX – securing a energy efficient and reliable HVAC System

- Standard interface to boiler and chiller
- Control of circuit pump
- Monitoring of temperature and pump status
- No interference with internal safety functions of Boiler or Chiller
ClimaECO: ABB i-bus® KNX HVAC Solutions
BCI/S 1.1.1 Product Range
ClimaECO: ABB i-bus® KNX HVAC Solutions

BCI/S 1.1.1 Functionality of a Boiler/Chiller Interface

- Set point transfer to Boiler/Chiller
- Measurement of flow temperature
- Control and monitoring of circuit pump
- Measurement of return flow temperature
## BCI/S 1.1.1 Technical Data I

<table>
<thead>
<tr>
<th>Function/Device</th>
<th>BCI/S 1.1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td>1</td>
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<tr>
<td>Interface to Boiler/Chiller</td>
<td>0-10V &amp; Relays (5A)</td>
</tr>
<tr>
<td>Inputs for sensors</td>
<td>5</td>
</tr>
<tr>
<td>Inputs for temperature measurement</td>
<td>2</td>
</tr>
<tr>
<td>Inputs for pump status</td>
<td>3</td>
</tr>
<tr>
<td>Inputs for Boiler/Chiller status</td>
<td>2</td>
</tr>
<tr>
<td>Pump output</td>
<td>1 (5A)</td>
</tr>
<tr>
<td>Module width</td>
<td>6</td>
</tr>
</tbody>
</table>
**ClimaECO: ABB i-bus® KNX HVAC Solutions**

**BCI/S 1.1.1 Technical Data II**

**BCI/S 1.1.1**

1. Label carrier
2. KNX programming button
3. KNX programming LED (red)
4. KNX connection
5. Cover cap
6. Binary inputs (c, d, e, f, g)
7. Relay output A (Pump)
8. Relay output B (Boiler/Chiller)
9. Boiler (Heat Generator)/Chiller
10. Analog Output C (Set point transfer to Boiler/Chiller)
11. Temperature input (a, b)

**BCI/S 1.1.1**

2CDG 110 222 R0011
<table>
<thead>
<tr>
<th>General Functions</th>
<th>Heating/Cooling Circuit Controller</th>
<th>Outputs</th>
<th>Inputs</th>
</tr>
</thead>
</table>
| • Application based parameterization  
• Forced operation  
• Monitoring of input values  
  • Setpoint temperature  
  • Heating/Cooling mode | • Receiving set points via KNX  
• Output of set point values to the Boiler/chiller  
• Adaption of Voltage output area  
• Temperature limitation  
• Safety shutdown temperature | • Boiler/Chiller set point  
• Absolute or relative temperature adjustment  
• Adaption of output voltage  
• Pump control  
• In dependence of set point value  
• Manual pump overwrite | • Inputs for  
  • Flow temperature  
  • Return flow temperature  
  • Pump status  
  • Pump failure  
  • Pump repair switch  
  • Boiler/Chiller status  
  • Boiler/Chiller failure  
  • Binary signals |
ClimaECO: ABB i-bus® KNX HVAC Solutions

BCI/S 1.1.1 Commissioning and Diagnostics

BCI/S 1.1.1

Standard KNX Twisted Pair devices
• Commissioning via ETS
Integration in ABB i-bus® Tool for diagnostics
Possible Applications

- Commercial buildings with a water based heating or cooling distribution system
- Reduction of the flow temperature based on demand
- Interfacing to Boiler and Chiller in KNX systems

The BCI/S is used as interface between the KNX system and a boiler or chiller. Via a relay output and an analog output (0…10V) the set point temperature is transferred from KNX to the boiler/chiller and the clearance for the boiler/chiller is given. With an additional relay output it is possible to control a pump and monitor it via 3 status inputs. The flow and return flow temperature can be measured and sent on the KNX bus.

This device has no internal controller, it only sends the set point temperature to the boiler/chiller and they then adjust the flow temperature with their internal controller. By this it’s also secured that there is no interference with the internal safety mechanisms of the boiler or chiller unit.

The calculation and adjustment of the set point temperature needs to be done in another device (e.g. AC/S or a Building Management System)
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BAC/S 1.5.1 Building Automation Controller KNX

An advanced Automation Controller with familiar programming which is seamlessly integrating Room Automation whereby your engineering and maintenance effort is reduced.
ClimaECO: ABB i-bus® KNX HVAC Solutions

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
ClimaECO: ABB i-bus® KNX HVAC Solutions

BAC/S 1.5.1 Building Automation Controller KNX

Freely Programmable

- Advanced Programming based on standardized IEC 61131-3 Programming Languages in ABB Automation Builder with base 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
ClimaECO: ABB i-bus® KNX HVAC Solutions

BAC/S 1.5.1 Building Automation Controller KNX

**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
ClimaECO: ABB i-bus® KNX HVAC Solutions

BAC/S 1.5.1 Building Automation Controller KNX

Route to Market

- Dedicated Product Offering which is developed for the Building Automation Market
- Ready-to-run in KNX Systems
- 1x Controller and 5x IO-Modules
- Only available by ABB Building Automation Sales Channel
- With Training and Support by Building Automation Sales Channel

- If desired the generic ABB PLC Product Offering can be supplemented. Supplied by ABB Industrial Automation Sales
  For more details see www.abb.com/plc
- Additional IO-Module Types and Sizes
- Different Controller Sizes with more Interface like BACnet available. These controllers are not shipped as ready-to-run in KNX Systems. A additional KNX License and commissioning effort is required
ClimaECO: ABB i-bus® KNX HVAC Solutions

BAC/S 1.5.1 Building Automation Controller KNX

Dedicated Building Automation IO-Modules

**Digital Input Module**
- 16x Digital Input
- 100-240 V AC

**Digital In-/Output Module**
- 8x 24 V DC Digital Input
- 8x 120/240 V, 2 A, Relay Output

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

**Analog In-/Output Module**
- 4x Analog Input
- 2x Analog Output
- 0...10V, -10...+10 V, 0...20 mA, 4...20 mA

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

ABB PLC Product Portfolio is compatible and can be connected. Support of 24 V AC in preparation.
Customers

Focus for this Product are customers which already use advanced / IEC-61131 based Controllers for HVAC Automation and have thus already Automation Software Projects and Libraries they can reuse.

For this Product customers are not in focus which are new to the field of HVAC or have no experience in advanced Automation Controllers.

Related expectations

- The Customers want only one Partner which supply him all components from Automation Controller to Room Automation based on open standards
- The customers want to get a seamless system from Automation Controller to Room Level with low engineering effort
- The customers want to migrate their existing Automation Software Libraries from previous Projects with only small effort to the new Solution. For example from Wago or Beckhoff Controllers
ClimaECO: ABB i-bus® KNX HVAC Solutions

USP

• Only ABB offers a complete and seamless Product Portfolio from Automation Controllers to Room Automation based on open and standardized Solutions
  • Based on standardized KNX Bus
  • Based on standardized Programming Languages IEC 61131-3 and well established Codesys Engineering Software.
ClimaECO: ABB i-bus® KNX HVAC Solutions
AC/S 1.x.1 Application Controller: Detailed Product Information
ClimaECO: ABB i-bus® KNX HVAC Solutions

AC/S 1.x.1 Application Controller

Links all your System Parts to a holistic Solution to reach your Costs and Energy Efficiency Objectives
ClimaECO: ABB i-bus® KNX HVAC Solutions

AC/S 1.x.1 Application Controller

Web User Interface
Created automatically

BACnet
Integrated Zero Configuration BACnet Gateway

Automation Functions
Pre-defined and as well freely programmable Automation Functions

KNX
Based on the open and worldwide Standard
ClimaECO: ABB i-bus® KNX HVAC Solutions

AC/S 1.x.1 Application Controller: Functions

**Automation Functions**

- Predefined Automation Modules for a holistic HVAC Automation Solution from Central HVAC to Room Automation. Helps you to meet your Energy Efficiencies Objectives like EN 15232 or LEED
- Time Switch
- KNX Time Master by NTP (Internet) or BACnet
- Trend Log: Record up to one year for easy maintenance
- Freely Programmable Logic to solve your challenges in your Projects
- Easy Logic development with simulation on Device or offline
- This decentral Solution is much more reliable compared to run automation functions on PC based SCADA or BMS Systems

**Predefined Modules**

- Room HVAC
- Room Set Points
- Heating Distribution Circuit
- Cooling Distribution Circuit
- Boiler / Heat Producer
- Chiller
- Heating / Cooling Changeover
- ON/OFF Scheduler
- HVAC Mode Scheduler
- Temperature Scheduler
- Trend Log
- Generic Value
- Link
Web User Interface

- The Web User Interface is automatically created based on the selected Automation Modules and is predefined. It is not freely customizable.
- As simple User Interface for small Projects.
- In addition to SCADA / BMS Systems in big Projects as backup Interface for commissioning and maintenance.
- Optimized for Desktop Computers, Laptops and as well for Tablets with touch operation.
ClimaECO: ABB i-bus® KNX HVAC Solutions
AC/S 1.x.1 Application Controller: Functions

BACnet

- Integrated KNX-BACnet Gateway to link the KNX System with the Building Management System (BMS)
- Bi-directional Data Exchange between KNX Twisted Pair (TP) and BACnet/IP
- No BACnet Knowledge required. Fully integrated in ETS.
- Zero Configuration: predefined BACnet Objects in the Automation Modules
- Generic BACnet Objects with wide range of supported Data Point Types
- BACnet Calendar and Schedule: Set your Schedule by BACnet. The execution of the schedule is done reliable by the AC/S Application Controller. As well BACnet Clock to KNX
- Each BACnet Object Value can be displayed and set by Web User Interface
- BACnet/IP Server with the BACnet Device Profile “Advanced Application Controller (B-AAC)” and up to 500 BACnet Objects.
- BACnet Features BBMD/Foreign Device, Notification Class
- BACnet BTL Tests ongoing
ClimaECO: ABB i-bus® KNX HVAC Solutions

AC/S 1.x.1 Application Controller: Functions

**KNX**

- Fully integrated in ETS. No external Software required
- Reliable KNX Twisted Pair (TP) Connection
- Fast ETS Download over Ethernet (IP)
### Ordering

<table>
<thead>
<tr>
<th>Brand</th>
<th>Product</th>
<th>Ident number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABB</td>
<td>AC/S1.1.1 Application Controller, Basic, MDRC</td>
<td>2CDG110205R0011</td>
</tr>
<tr>
<td>ABB</td>
<td>AC/S1.2.1 Application Controller, BACnet, MDRC</td>
<td>2CDG110206R0011</td>
</tr>
</tbody>
</table>

Basic Version is without integrated KNX-BACnet Gateway
ClimaECO: ABB i-bus® KNX HVAC Solutions

AC/S 1.x.1 Application Controller: Technical Data

**Device**

1. Label carrier
2. Programming LED
3. Programming button
4. KNX TP connection
5. Cover cap
6. Power supply connection
7. LAN/PoE Connection (KNX Download, Web User Interface, BACnet)
8. ON LED
9. LAN/LINK LED
10. KNX Telegram LED
11. Reset Button

**Technical Data**

- Up to 500 Automation Modules with 2000 KNX Group Objects and 500 BACnet Objects in total
- Freely Programmable Logic with up to 1000 Logic-Elements, 200 In-/Outputs and 30 Web-Elements
- Clock Sync over KNX, BACnet or NTP (Internet)
- ETS Version 5.6.3 or higher
- The Device Configuration App (DCA) for AC/S Application Controller has to be installed from the KNX Online Shop. This is free of charge
- Power Supply
  - 24 V AC/DC
  - PoE (IEEE 802.3af class 2)
- 4 MW MDRC