ABB GPG Building Automation, November 2016

ABB i-bus® KNX
Logic Controller ABA/S 1.2.1
The new Logic Controller is an extremely powerful device for almost unlimited customized logic functions.

It can easily and reliably accommodate altered or extended functionality requests during construction or usage of the building.

The Logic Controller opens new application for the KNX systems (e.g. HVAC)
Logic Controller ABA/S 1.2.1

What’s new?

- One device for all solutions providing you the certainty that all requirements can be covered
- Up to 3000 function elements (ABL/S: 140)
- Extensive logic functions, like
  - Mathematics
  - Calendar and timers
  - Room temperature control
- Simulation (offline and online)
- Composite function blocks
- IP interface for fast programming
- Simple Web Server for editing values
Introduction

Planning

Installation

Commissioning
What is a Logic Controller?

- A Logic Controller provides numerous functions like logic, timer, mathematical functions, PID controller.
- It works more as a superior intelligence to implement powerful solutions with sensors and actuators in KNX building automation.

Why do we need a Logic Controller?

- The functional requirements are growing continuously in intelligent buildings, not always feasible with the existing KNX devices, but can be covered by the Logic Controller efficiently.
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Device technology - Hardware

Logic Controller ABA/S 1.2.1
- Modular installation device (MDRC)
- Width: 4 MW
- Power supply:
  - 24 V DC or PoE (LAN connection)
- Bus connection terminal behind cover
- LAN connection
  - PoE (Power supply), WebUI, Download Application, Monitor
- LEDs (ON, LAN/Link, KNX telegram)
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Device technology - Hardware

LED’s

**ON**
- Flashes slowly while the system is booting or Logic engine stopped
- Lit up continuously when the system has been initialized permanently
- Flashes rapidly when an error has occurred in the logic processing or the logic processing was stopped

**LAN/LINK**
- Lit up continuously when the auxiliary voltage is present and the router is connected to an IP network
- Flashes with data traffic via LAN

**Telegram**
- When booting is complete, lit up continuously when the auxiliary voltage is present and the router is connected to KNX
- Flashes with data traffic via KNX/TP
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Device technology - Software

- **Functional Element**: Any type which is available
- **KNX IN/Outputs**: Group Objects
- **Group Addresses**: each address counts, also identical
- **Web UI**: Input and indication of values via Web browser

<table>
<thead>
<tr>
<th>Description</th>
<th>Maximum Number</th>
</tr>
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<td>3000</td>
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<td>Web UI In/Outputs</td>
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</table>
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Device technology – Software ETS

In/Outputs, Function Elements positioned via drag and drop

Grid

Properties (Parameter) of a Block

Help for selected element and online manual

Menu and Functions Worksheet
Simulation

Comment

Function Element

Input

Output

Properties

Select

Mathematics

Addition

Multiplication

Subtraction

Division

Function Elements

Eng/In

Out/Eng

Input

Output

Help for selected element and online manual

Simulation

Comment

Properties

Parameter

Control triggers c. OK

Additional information

Title

Description

Version

Author

Keywords

License agreement

Introduction
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

Device technology - Software

- Application for ETS4 and ETS5 (not ETS3 any more!)
- Application fully integrated in ETS, no separate software required
- User friendly graphical environment in ETS

- Optional: Accessing selected functions via Web UI, only web browser needed, covering partly typical i-bus tool functionality (Simulation and testing)
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Device technology - Software

- **Integration in the i-bus® Tool**
- Detection of connected Logic Controller with display of data
  - Device Name, Firmware
  - IP Data: IP address, MAC address
- Firmware update possible

- Operation and test via ETS Plug in and Web UI
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

Function Elements

- **KNX I/O**
  - 1 bit
  - 2 bit
  - 4 bit
  - 1 byte unsigned
  - 1 byte signed
  - 2 byte unsigned
  - 2 byte signed
  - 2 byte float
  - 4 byte unsigned
  - 4 byte signed
  - 4 byte float
  - Color
  - Date
  - Time
  - Date/Time

- **Internal Markers**
  - Marker Input
  - Marker Output

- **Bit logic**
  - AND
  - OR
  - XOR
  - NOT
  - ONE-HOT

- **Comparison**
  - Greater Than
  - Lower Than
  - Equal
  - Not Equal
  - Greater or Equal
  - Lower or Equal

- **Select**
  - Minimum/Maximum
  - Multiplexer, 2 to 1
  - Multiplexer, n-fold
  - Gate
  - Filter

- **Mathematics**
  - Addition
  - Multiplication
  - Subtraction
  - Division
  - Modulo

- **Timers and Delay**
  - Delay
  - Staircase Light
  - Calendar, simple
  - Calendar

- **Conversion**
  - Numeric Converter
  - Flip Flops
  - RS Flip Flop

- **Counter**
  - Up Counter

- **Control**
  - PID Controller

**Layout**
- ABC Comment
- Rectangle
- Line
- Own function blocks
  - Splitter 1-byte to 8 bits
  - Splitter 2-byte in 1-byte
- Imported
  - Fahr. to Cel.,

**Introduction**
The Logic Controller allows to create own Function Blocks.

These Composite Function Blocks can be saved and imported into other projects.

If required, they even can be protected against unauthorized access.
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Offline Simulation
### ABB i-bus® KNX Logic Controller ABA/S 1.2.1

#### WebUI

<table>
<thead>
<tr>
<th>Index</th>
<th>Name</th>
<th>Value</th>
<th>Data Sub Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Room 1 temperature</td>
<td>20.5</td>
<td>9.*</td>
</tr>
<tr>
<td>2</td>
<td>Room 2 temperature</td>
<td>21.0</td>
<td>9.*</td>
</tr>
<tr>
<td>3</td>
<td>Start heating at</td>
<td>05:15:00</td>
<td>10.* [hh:mm:ss]</td>
</tr>
</tbody>
</table>

- 60 In- or Outputs accessible via WebUI for operation or overwritten of values, e.g. change of a comparison value or change of parameter of a PID controller

- Please note: Not comparable with a visualisation
Logic Controller ABA/S 1.2.1
Benefits I

+ **Graphical programming interface** in ETS software environment without the need to install additional software avoiding additional maintenance effort and group address depreciation

+ Comprehensive list of function elements for all typical building applications allowing to serve diverse project requirements with a single device

+ It is possible to create self-defined function blocks. They can be stored and reused in future projects saving time and enhancing reliability

+ WebUI for changing and displaying values
Logic Controller ABA/S 1.2.1

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Logic Controller ABA/S 1.2.1

Benefits II

+ **Inbuilt simulator** facilitates efficient and reliable commissioning on the project’s site. All functions can be tested before going live ensuring a safe operation.

+ Current live state of the logic can be monitored in real-time facilitating troubleshooting and diagnostics.

+ Short power failures (< 1min) will be bridged by the internal energy buffer thus the previous system state can be restored after voltage recovery.

+ Fast download of application program by utilizing LAN interface saving time during commissioning.
Logic Controller ABA/S 1.2.1
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Logic Controller – Launch Concept
Complete Range for Logic Control

<table>
<thead>
<tr>
<th>Logic Module</th>
<th>Application Unit Logic</th>
<th>Application Unit Time</th>
<th>Logic Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM/S 1.1</td>
<td>ABL/S 2.1</td>
<td>ABZ/S 2.1</td>
<td>ABA/S 1.2.1</td>
</tr>
<tr>
<td>149.50 €</td>
<td>599 €</td>
<td>438.50 €</td>
<td>699 €</td>
</tr>
</tbody>
</table>

**Important:** Logic Controller ABA/S 1.2.1 does not replace any existing device handling logic, time functions or other superior intelligent functions!
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

- Introduction
- Planning
- Installation
- Commissioning
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

Hardware

- From the installation point of view the Logic Controller is easy to plan
- No classical in/outputs to be observed
- Power supply 24 V DC or PoE
- Space in DB (4MW)

<table>
<thead>
<tr>
<th>Technical data (extract)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary voltage (required)</td>
<td>24 V DC (-15% / +20%) or PoE (IEEE 802.3 af class 1) 3.0 W max.</td>
</tr>
<tr>
<td>Power loss</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td></td>
</tr>
<tr>
<td>Auxiliary voltage</td>
<td>60 mA typical or 120 mA peak current &lt; 10 mA</td>
</tr>
<tr>
<td>Current consumption KNX</td>
<td></td>
</tr>
<tr>
<td>Connection terminals</td>
<td>Screw terminals</td>
</tr>
<tr>
<td>Tightening torque</td>
<td>Max. 0.6 Nm</td>
</tr>
<tr>
<td>KNX connection</td>
<td>Bus connection terminal</td>
</tr>
<tr>
<td>LAN connection</td>
<td>10/100 BaseT, IEEE 802.3 via RJ45 plug</td>
</tr>
<tr>
<td>Temperature range in operation (T1)</td>
<td>- 5 °C ... + 45 °C</td>
</tr>
<tr>
<td>Storage</td>
<td>- 25 °C ... + 55 °C</td>
</tr>
<tr>
<td>Transport</td>
<td>- 25 °C ... + 70 °C</td>
</tr>
<tr>
<td>Atmospheric pressure</td>
<td>Atmosphere up to 2,000 m</td>
</tr>
<tr>
<td>Maximum air humidity</td>
<td>95%, no condensation allowed</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP 20 according to DIN EN 60 529</td>
</tr>
<tr>
<td>Protection class</td>
<td>II according to DIN EN 51 140</td>
</tr>
<tr>
<td>Overvoltage category</td>
<td>III according to DIN EN 60 664-1</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2 according to DIN EN 60 664-1</td>
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</table>
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Software

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- Is a ABA/S necessary or possible to use other solutions like ABL/S 2.1?
- Planning concerning software and capacity
  - Which functions?
  - Directly available or to be created?
  - How many?
- Often one device is sufficient due to the big number of functions per device
- In case of known comprehensive functionality (quantity) more than one ABA/S might be required
Decentralized installation to reduce bus traffic can be considered.

Practically, the number of KNX Datapoints will be the limit (500 KNX IO’s).

In case of expected but in the planning phase not yet known functionality a Logic Controller should be budgeted already.

Please note: Commissioning can take some time, to be considered (Costs and time).

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ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Software

Summary for Planner:

The Logic Controller ABA/S 1.2.1 is with its extraordinary capability for almost every functional requirement the right choice.

Simple installation, clear and user friendly commissioning with graphical environment in the ETS, a dedicated hardware for the task it was made for with direct connection to KNX TP in the line ensures a successful implementation and a well running solution.
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

- Introduction
- Planning
- Installation
- Commissioning
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

Installation

- The device is suitable for installation in distribution units or small housings on a 35 mm mounting rail according to EN60715 (any position)
- Accessibility of the device for the purpose of operation, testing, visual inspection, maintenance and repair must be ensured
- Power supply (if not PoE): 24 V DC via screw terminals
- The connection to the KNX is implemented using the supplied bus connection terminal
- The connection to the IP network is established using an RJ 45 plug
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Installation

Thanks to the new way to snap KNX devices from ABB on the rail in a distribution board especially dismounting is very simple without screwdriver and thus user friendly

- Snap onto mounting rail
- Remove from mounting rail
### ABB i-bus® KNX Logic Controller ABA/S 1.2.1

#### Display/Operating elements

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON (green)</td>
<td>ON</td>
<td>System has been initialized permanently</td>
</tr>
<tr>
<td></td>
<td>Flashing slowly</td>
<td>System is booting</td>
</tr>
<tr>
<td></td>
<td>Flashing quickly</td>
<td>Error has occurred in the logic processing or the logic processing was stopped</td>
</tr>
<tr>
<td>LAN / LINK (yellow)</td>
<td>ON</td>
<td>Auxiliary voltage is present and device is connected to an IP network</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>Data traffic via LAN</td>
</tr>
<tr>
<td>Telegram (yellow)</td>
<td>ON</td>
<td>Booting complete, auxiliary voltage present and device is connected to KNX</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>Data traffic via KNX/TP</td>
</tr>
<tr>
<td>Programming button</td>
<td>Press</td>
<td>Assignment of the individual address</td>
</tr>
<tr>
<td>Programming LED (red)</td>
<td>ON</td>
<td>The LED comes on when the Programming button is pressed, in order to assign a individual address</td>
</tr>
</tbody>
</table>
Introduction
Planning
Installation
Commissioning
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
First Steps

see First Steps in the online manual
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

i-bus® Tool

- For Firmware update or if IP data (e.g. IP address for Web UI access) is needed
- PC with i-bus® tool has to be linked via IP connection of ABA/S
- After Start of i-bus® tool click on ‘Connect’ and ‘IP devices’
- All supported ABB IP devices will be displayed
By selecting on the left side ‘ABA/S’ only this device will be shown with
- Name, Firmware (Status and version)
- IP Data: IP address, MAC address

Button ‘Detailed data’ gives more related information
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

i-bus® Tool

- Firmware update: In case of new firmware version an update is feasible with i-bus® Tool
- Update Information and option to download in i-bus® Tool
- The firmware update can be triggered † update † Start update
- For firmware update Logic Controller has to be linked via LAN connection

Note: In case of firmware update i-bus tool has to be started as administrator
ABB i-bus® KNX Logic Controller ABA/S 1.2.1

IP adjustments

- **Static IP address**
  - IP address, Subnet Mask and Default Gateway can be entered manually

- **Dynamic IP address**
  - IP address will be assigned automatically (DHCP)

- **LAN connection for**
  - PoE (Power supply), WebUI, Download Application, Monitor
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Download via IP connection

- ABA/S 1.2.1 has an integrated LAN interface for …
  - WebUI access
  - Supply via PoE
  - Monitor
  - Fast application download

- In case of comprehensive data to be downloaded it is recommended to use the LAN interface for direct download independent of the KNX bus cable
ABB i-bus® KNX Logic Controller ABA/S 1.2.1
Download via IP connection

- In order to avoid the KNX bus cable as a bottle neck download of application via ETS has to be carried out in IP Routing Mode

- In this case the network interface of the PC acts as an direct access to the Logic controller resulting in a quick download

- Please note: Download of physical address of ABA/S has to be done the classical way (USB or IP tunneling)