

HEIDELBERG, MAY 2022

# ClimaECO – Room climate control with ventilation and air quality

Practical Learning Session – Building Academy Smart Buildings

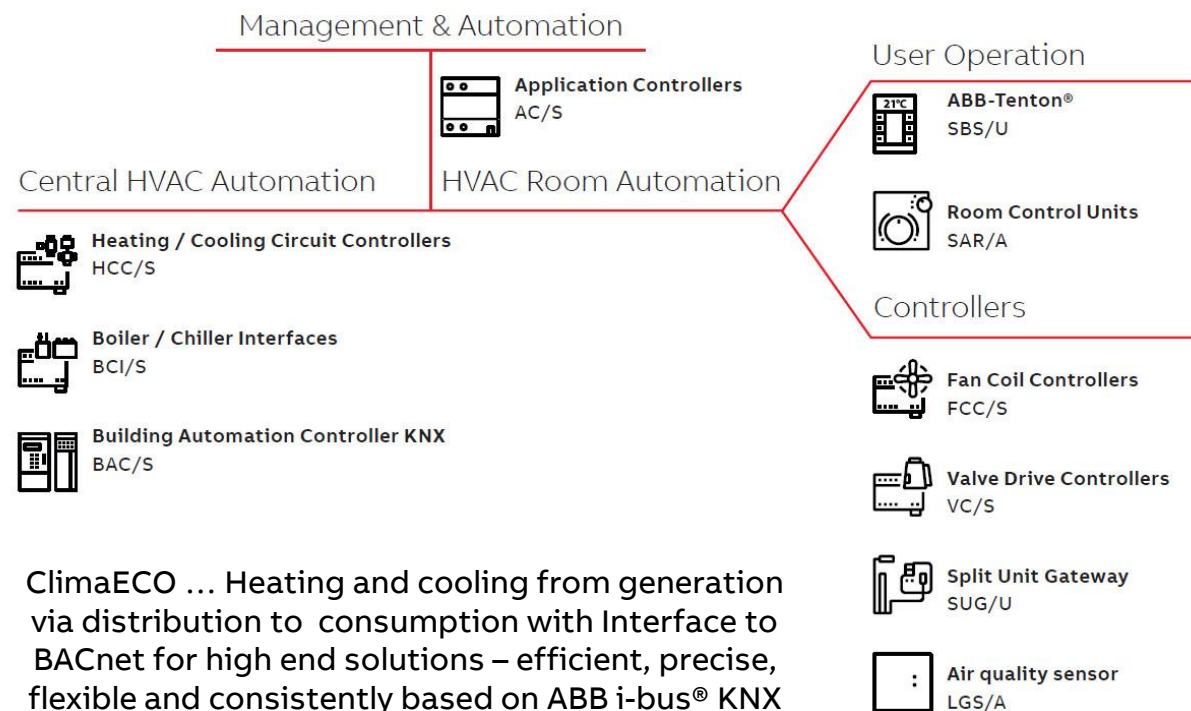
Thorsten Reibel & Juergen Schilder

# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### ClimaECO – Intelligent HVAC solutions with ABB i-bus® KNX

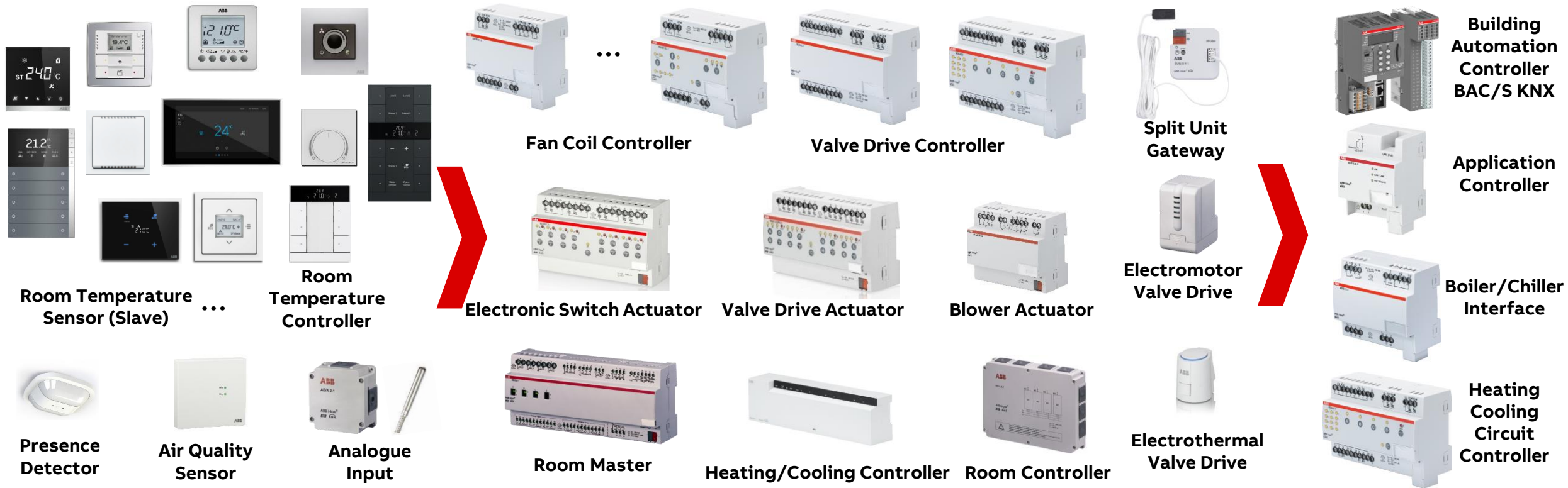
- ClimaECO is the holistic heating, ventilation and air-conditioning (HVAC) automation solution based on ABB i-bus® KNX
- A solution that seamlessly integrates room automation, distribution, central HVAC functions, management and automation into one system – a significant step towards increasing energy efficiency and reducing operational costs
- ABB's ClimaECO portfolio includes
  - ClimaECO® Sensors SBx/U and Room Control Units SAx/A
  - Valve Drive Controllers VC/S
  - Fan Coil Controller FCC/S
  - Heating/ Cooling Circuit Controllers HCC/S
  - Boiler/ Chiller Interface BCI/S
  - Application Controllers AC/S with Interface to BACnet
  - Building Automation Controller KNX BAC/S
- Slides & videos of Webinars, Learning Sessions → [T&Q Database](#)



# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

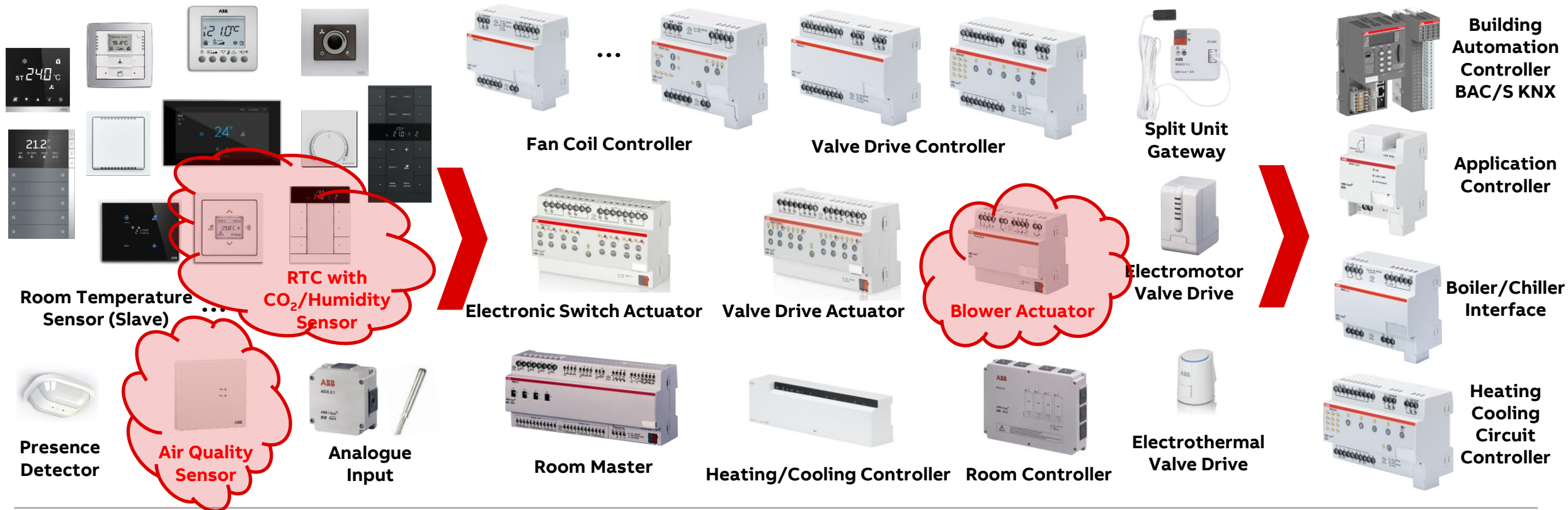
### Overview ABB i-bus® KNX HVAC Range



# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### Overview ABB i-bus® KNX HVAC Range





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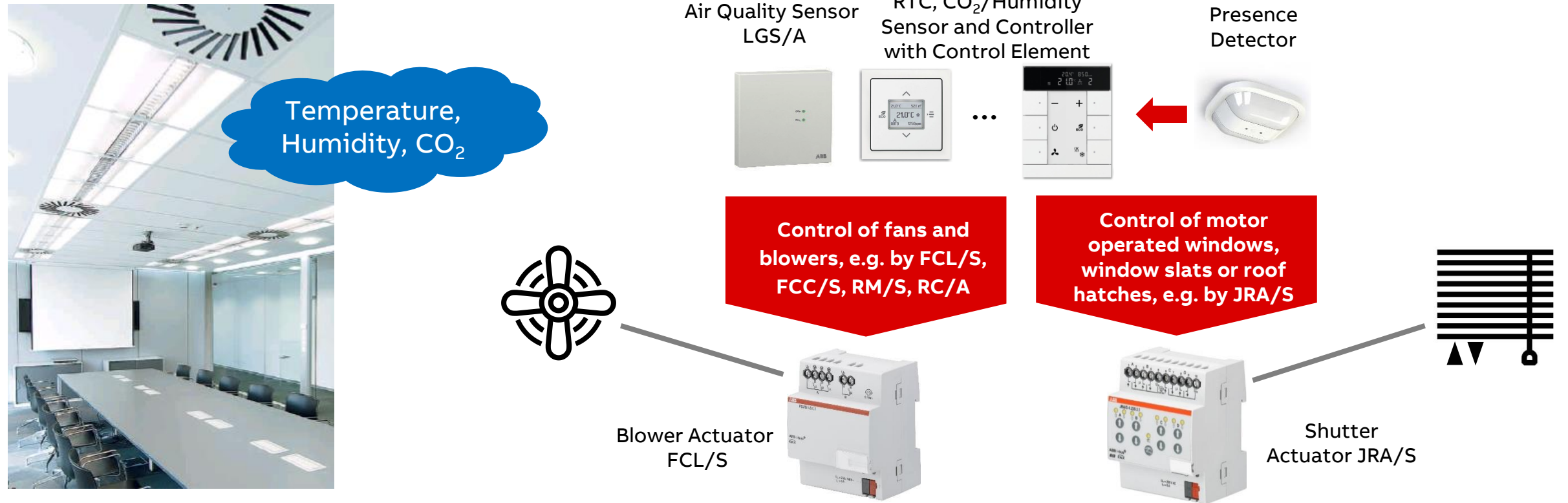
# ClimaECO – Room climate control with ventilation and air quality

Practical Learning Session

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## Practical Learning Session

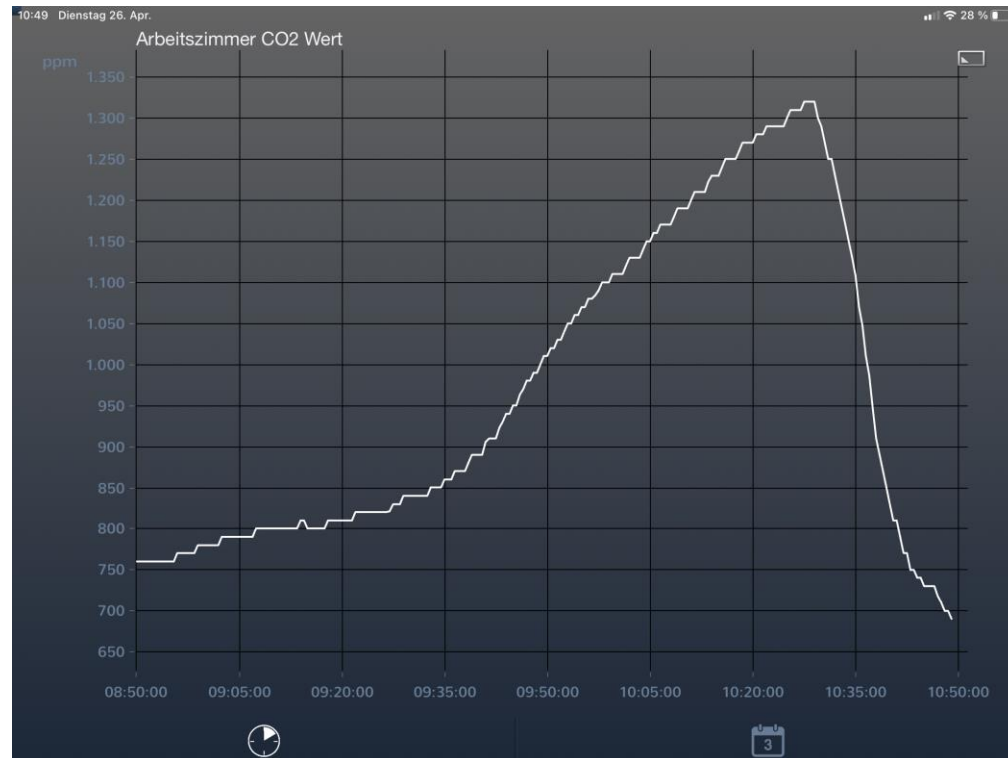
### Overview room air quality: CO<sub>2</sub> and humidity sensor with Blower Actuator FCL/S and Shutter Actuator JRA/S



# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### Example: Measuring of CO<sub>2</sub> and relative humidity at home in my office



# ClimaECO – Room climate control with ventilation and air quality

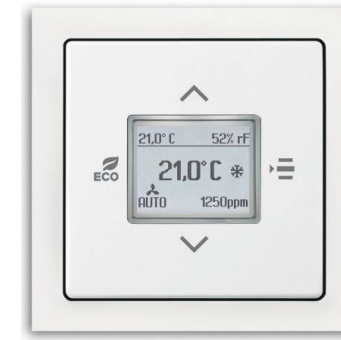
## Practical Learning Session

### Introduction air quality sensors

- An air quality sensor is used to measure the room temperature as well as the CO<sub>2</sub> concentration and the humidity in the room
- Based on these information it's possible to implement a room temperature control and also air quality control via ventilation
- CO<sub>2</sub> and relative humidity controller type:
  - Single-, two- and three stage (e.g. Switch Actuator SA/S)
  - PI (e.g. Blower Actuator FCL/S)
- Additionally, the measured values can be used to display them in the visualization as information for the room user
- The display/LEDs on front of the device can be used to show the room user an indication of the air quality



Air Quality Sensor with  
Room Temperature  
Controller  
LGS/A 1.2



Room temperature  
controller with  
CO<sub>2</sub>/Humidity sensor  
6109/28



Control element ABB  
Tenton® with room  
temperature controller  
function and  
CO<sub>2</sub>/Humidity sensor  
SBC/U x.0.1

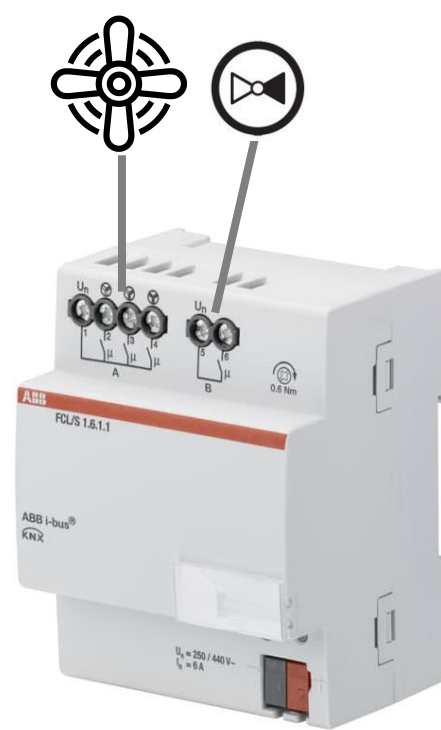


# ClimaECO – Room climate control with ventilation and air quality

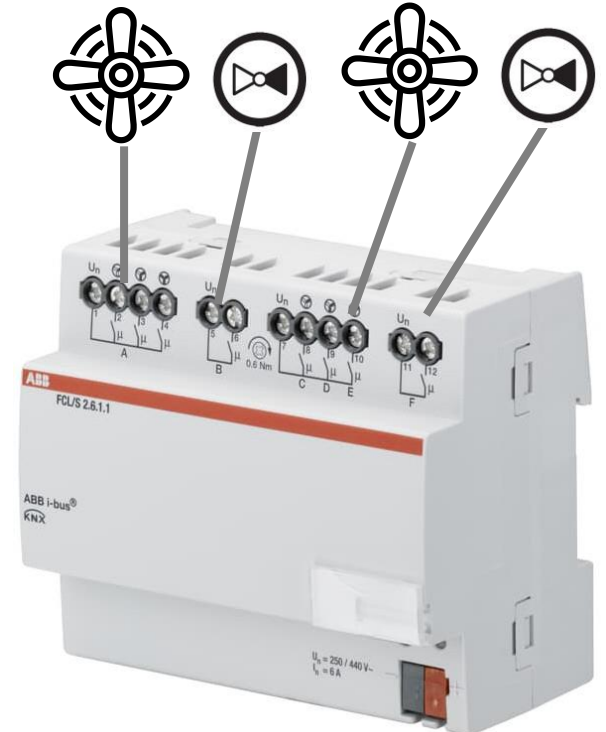
## Practical Learning Session

### Blower Actuator FCL/S x.6.1.1

- A Blower Actuator is used in ventilation applications
- It is a compact device that serves the following functions:
  - Controlling fans and blowers
  - Switching loads (e.g. blower main switch, damper or valve)
- Outputs that are not being used for fan functions can be used as switch actuators for switching electrical loads
- The Blower Actuator
  - Controls a single-phase fan with up to three fan speeds via a changeover or step switch
  - Ensures that no two fan speeds can be switched on simultaneously (changeover control)
  - Receives its control value via the ABB i-bus® KNX, e.g. from an air quality sensor



FCL/S 1.6.1.1

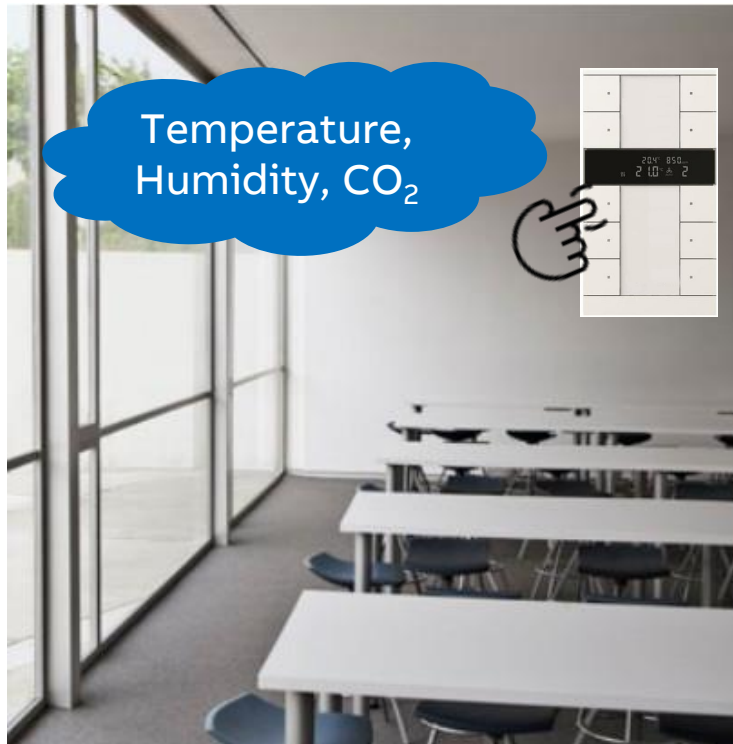


FCL/S 2.6.1.1

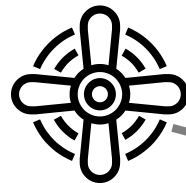
# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

**Example “Room air quality”: CO<sub>2</sub> and humidity sensor with controller and Blower Actuator FCL/S to control a fan**



RTC, CO<sub>2</sub>/Humidity  
Sensor and Controller  
with Control Element



### Direct Operation

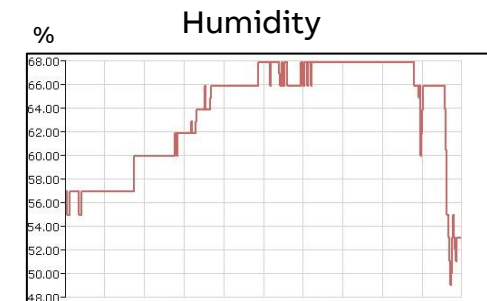
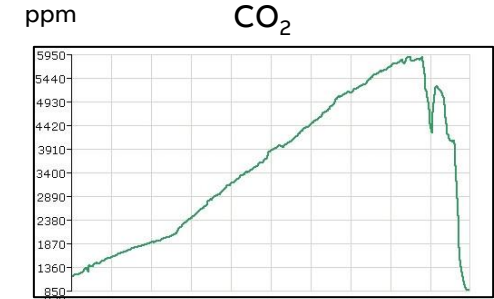
Fan speed Byte  
Fan speed Bit  
Fan speed up/down

### Automatic Control

Control value  
0 .. 100%



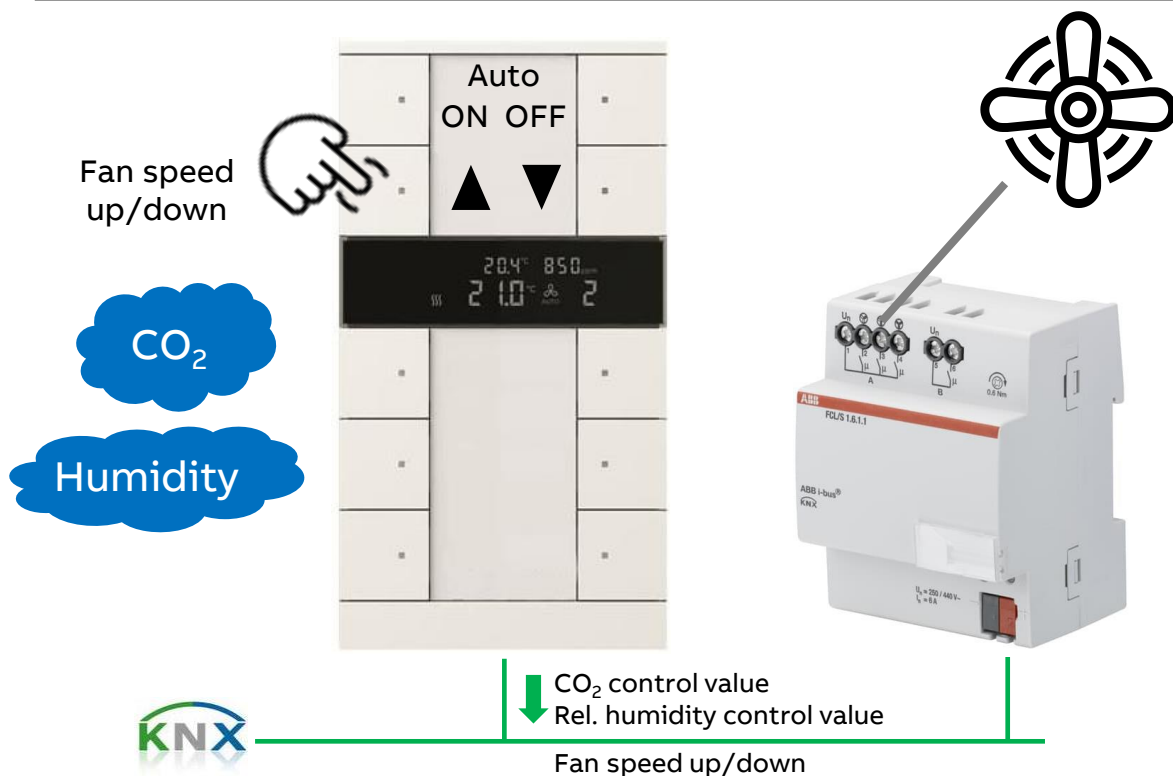
Blower Actuator  
FCL/S



# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### Direct Operation and Automatic Control of a Blower Actuator via control element ABB Tenton® with 2 control values (CO<sub>2</sub>/Humidity)

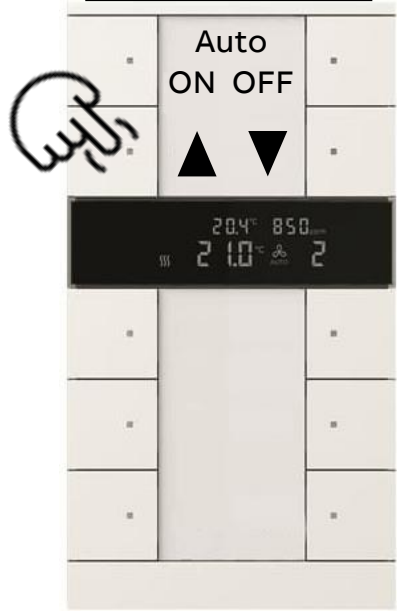


1.1.4 FCL/S1.6.1 Blower Actuator, 1f, 6 A, MDRC > - Automatic control				
General	Object value "Automatic On/Off" switch on to the automatic <input checked="" type="radio"/> 1 <input type="radio"/> 0			
Enable outputs A...B	Threshold value OFF <-> speed 1 in % [1...100] 10			
A: Fan	Threshold value speed 1 <-> speed 2 in % [1...100] 30			
- Status messages	Threshold value speed 2 <-> speed 3 in % [1...100] 70			
- Automatic control	Hysteresis threshold value in % +/- [0...20 %] 5			
- Direct operation	Minimum dwell period in fan speed in s [0...65,535] 0			
Number of control value inputs		<input type="radio"/> 1 <input checked="" type="radio"/> 2		
select by...		<input checked="" type="radio"/> Largest value <input type="radio"/> Communication object "Control value A/B"		
Num	Name	Object Function	Length	Data Type
14	Fan A	Fan speed up/down	1 bit	step
26	Fan A	Automatic ON/OFF	1 bit	enable
29	Fan A	Control value A	1 byte	percentage (0..100%)
30	Fan A	Control value B	1 byte	percentage (0..100%)

# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### Direct Operation and Automatic Control



### Control element ABB Tenton®

- S1/S2: Switching (1-bit "ON - OFF")
- L1: LED status
- L2: LED status
- S3/S4: Switching (1-bit "ON - OFF")
- ...
- CO2: Control value (1-byte "0...100%")
- CO2: Value (2-bytes "ppm")
- ...
- RH: Control value (1-byte "0...100%")
- RH: Relative humidity value (2-bytes "humidity")
- ...

### Blower Actuator FCL/S

- ...
- Fan A – Automatic ON/OFF
- Fan A – Status Automatic
- Fan A – Fan speed up/down
- ...
- Fan A Control value A
- Fan A Control value B
- ...
- Fan A Status Fan ON/OFF
- Fan A Status Fan speed
- Fan A Status Fan speed 1
- Fan A Status Fan speed 2
- Fan A Status Fan speed 3
- Fan A Status Byte Mode
- ...



# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### (3) Direct Operation and Automatic Control of a Blower Actuator via control element ABB Tenton® with 2 control values (CO<sub>2</sub>/Humidity)

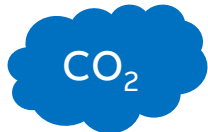
#### Practical demonstration

- Simulation of CO<sub>2</sub> and rel. humidity values
- Control element ABB Tenton® uses only external measured (=simulated) values

External measured value ☐ inactive ☒ active

Component Only use external measured value

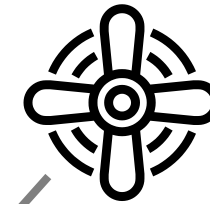
Simulation of  
700...1,800 ppm



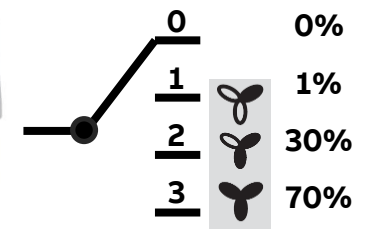
Simulation of  
30%... 100%



ABB Tenton®  
SBC/U



FCL/S 1.6.1.1



Thresholds  
control value

CO<sub>2</sub> control value  
Rel. humidity control value  
Fan speed up/down





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Practical Learning Session

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## Practical Learning Session

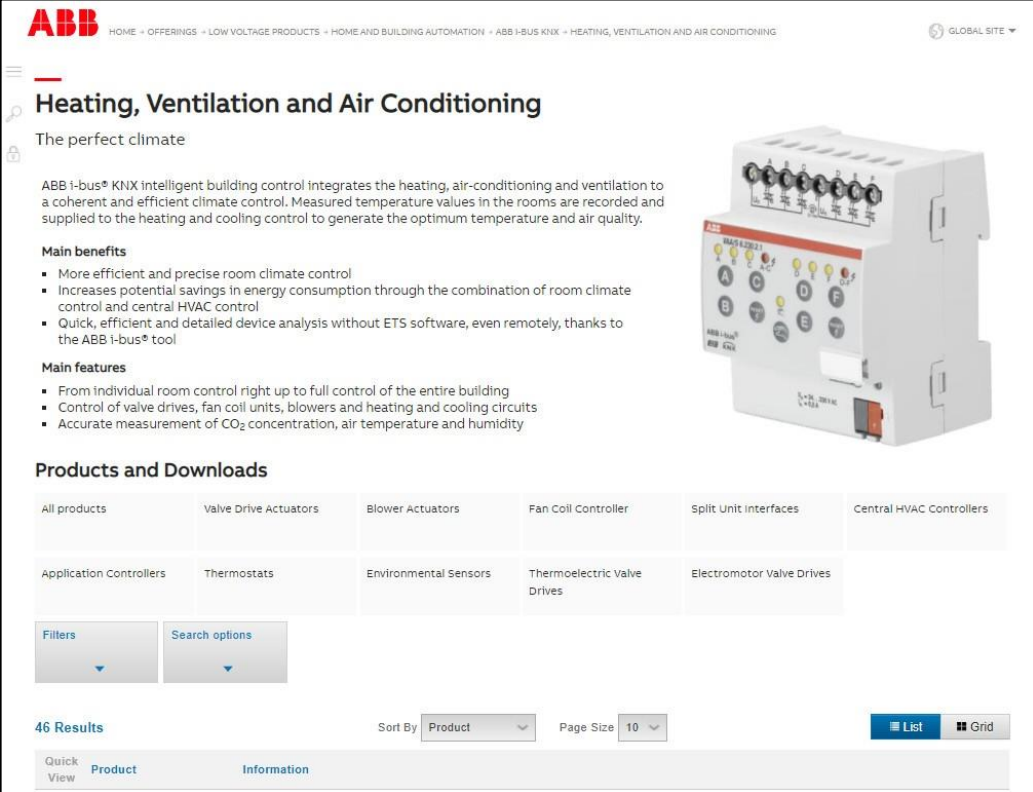
### Homepage

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

→ Products and Downloads

→ Heating, Ventilation and Air Conditioning

- ETS Application
- ABB i-bus® Tool
- Product Manual
- Engineering Guides
- Installation and Operating Instructions
- Specification Text
- ...



**ABB** HOME • OFFERINGS • LOW VOLTAGE PRODUCTS • HOME AND BUILDING AUTOMATION • ABB i-BUS KNX • HEATING, VENTILATION AND AIR CONDITIONING GLOBAL SITE

### Heating, Ventilation and Air Conditioning

The perfect climate

ABB i-bus® KNX intelligent building control integrates the heating, air-conditioning and ventilation to a coherent and efficient climate control. Measured temperature values in the rooms are recorded and supplied to the heating and cooling control to generate the optimum temperature and air quality.

**Main benefits**

- More efficient and precise room climate control
- Increases potential savings in energy consumption through the combination of room climate control and central HVAC control
- Quick, efficient and detailed device analysis without ETS software, even remotely, thanks to the ABB i-bus® tool

**Main features**

- From individual room control right up to full control of the entire building
- Control of valve drives, fan coil units, blowers and heating and cooling circuits
- Accurate measurement of CO<sub>2</sub> concentration, air temperature and humidity

**Products and Downloads**

All products	Valve Drive Actuators	Blower Actuators	Fan Coil Controller	Split Unit Interfaces	Central HVAC Controllers
Application Controllers	Thermostats	Environmental Sensors	Thermoelectric Valve Drives	Electromotor Valve Drives	

Filters Search options

46 Results Sort By Product Page Size 10 List Grid

Quick View Product Information

# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

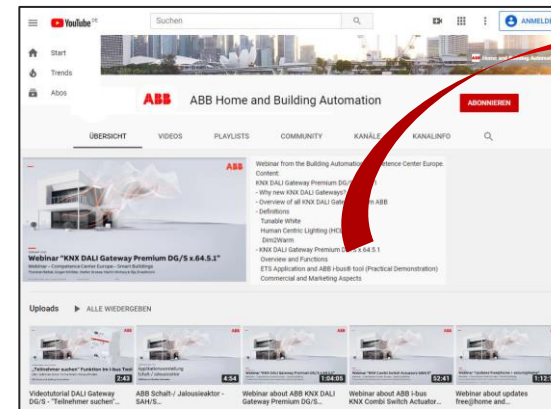
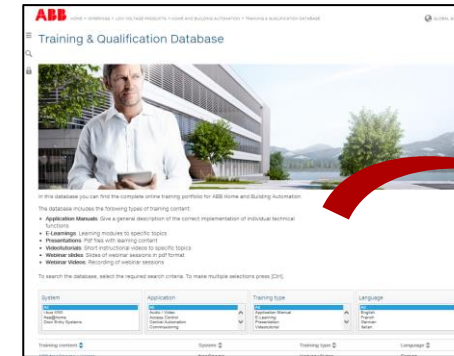
### Training Material

#### Training & Qualification Database

- The database contains extensive training content
  - Webinar, Learning Sessions, ... slides and videos
  - Presentations
  - Video tutorials
  - and more ...
- <https://go.abb/ba-training>
- [www.abb.com/knx](http://www.abb.com/knx) (→ Services & Tools → Training and Qualification → Training Database)

#### YouTube

- Channel “ABB Home and Building Automation”
  - <https://www.youtube.com/user/ABBibusKNX>



# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### Software Repository

- Excel list in German and English
- Link to general product information
- Search for a KNX product and the corresponding software (firmware, ETS application) will be displayed
- Current firmware of Welcome IP and free@home devices
- A direct download of this software is possible via a link
- Historical ETS applications can also be downloaded (database for ETS App “Reconstruction Tool”)
- [www.abb.com/KNX](http://www.abb.com/KNX)
  - Additional materials
  - Downloads for KNX
  - Software Repository



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Enter either product type, product ID or device type of the product you are searching for.

Select your language: English

Search Criterion: DG/SL1

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General Product Information					
Product ID	Product Type	Product Name	Device Type	History	Website
2CDG110026R0011	DG/SL1	DG/SL1 DALI Gateway, 1-fold, MDRC	A019	<a href="#">Release Note</a>	<a href="#">Link</a>

Current Software Versions				
Software	Version	Application Name	Release Date	Download
ETS3	1.1c	Dim Slave Light Scenes Dynamic 1f/1.1c	01.01.2014	<a href="#">Link</a>
ETS4 / ETS5	1.1c	Dim Slave Light Scenes Dynamic 1f/1.1c	01.01.2014	<a href="#">Link</a>
Firmware	1.3	Software Tool	29.06.2009	<a href="#">Link</a>
I-bus® Tool	1.9.45.0	ABB I-bus® Tool	01.06.2021	<a href="#">Link</a>

Obsolete Software Versions				
Software	Version	Application Name	Release Date	Download
ETS3	1.0	Dim Slave Light Scenes Dynamic 1f	04.07.2006	<a href="#">Link</a>
ETS3	1.0a	Dim Slave Light Scenes Dynamic 1f	01.05.2007	<a href="#">Link</a>
ETS4 / ETS5	1.0a	Dim Slave Light Scenes Dynamic 1f	01.05.2007	<a href="#">Link</a>
ETS3	1.1	Dim Slave Light Scenes Dynamic 1f	16.03.2011	<a href="#">Link</a>
ETS4 / ETS5	1.1	Dim Slave Light Scenes Dynamic 1f	16.03.2011	<a href="#">Link</a>
ETS3	1.1a	Dim Slave Light Scenes Dynamic 1f	08.06.2011	<a href="#">Link</a>
ETS4 / ETS5	1.1a	Dim Slave Light Scenes Dynamic 1f	08.06.2011	<a href="#">Link</a>
ETS3	1.1b	Dim Slave Light Scenes Dynamic 1f	01.03.2013	<a href="#">Link</a>
ETS4 / ETS5	1.1b	Dim Slave Light Scenes Dynamic 1f	01.03.2013	<a href="#">Link</a>

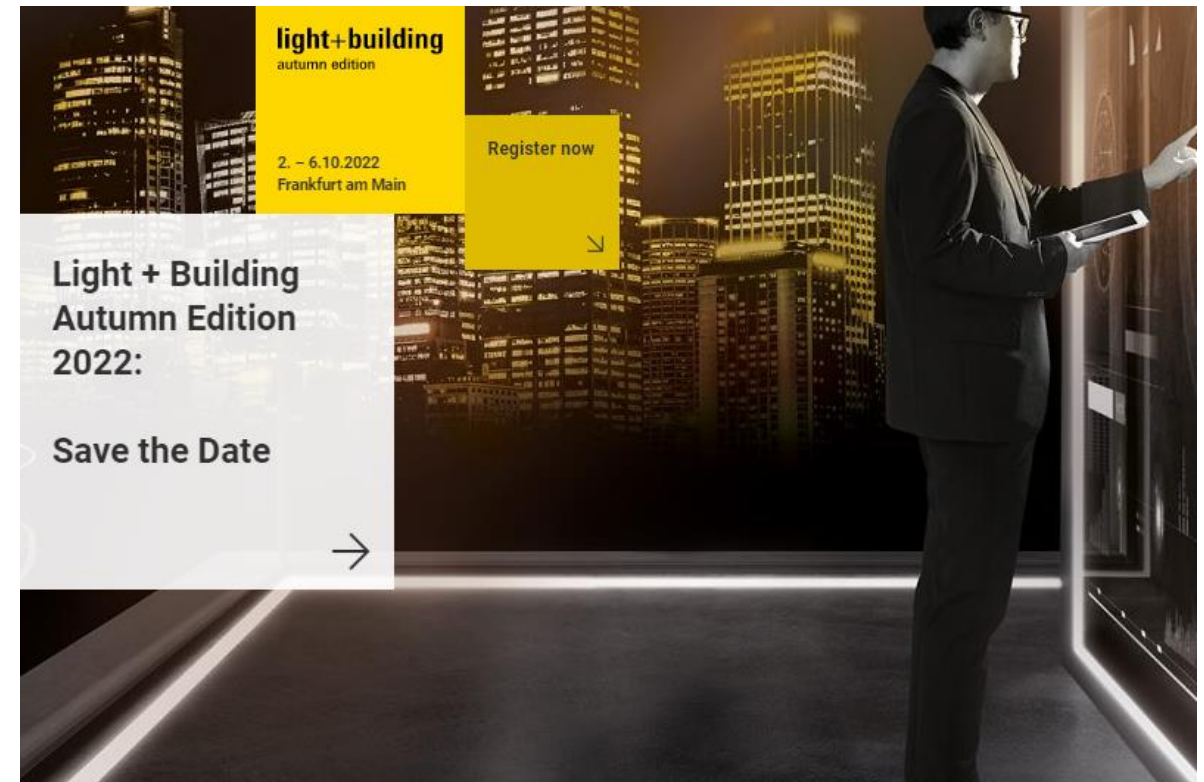
# ClimaECO – Room climate control with ventilation and air quality

## Practical Learning Session

### Light + Building Autumn Edition in October 2022

#### Onsite + digital: here we go

- At Light + Building the industry presents every two years the latest products for the fields of lighting, electrical engineering and home and building automation
- Light + Building opens in Frankfurt from 2<sup>nd</sup> to 6<sup>th</sup> October 2022
- The new Light + Building Digital Extension will also be available at the same time and beyond
- We plan our participation in general as a hybrid event, so that customers can join remotely
- You will find ABB and BUSCH-JAEGER booth in the NEW hall 12.0





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