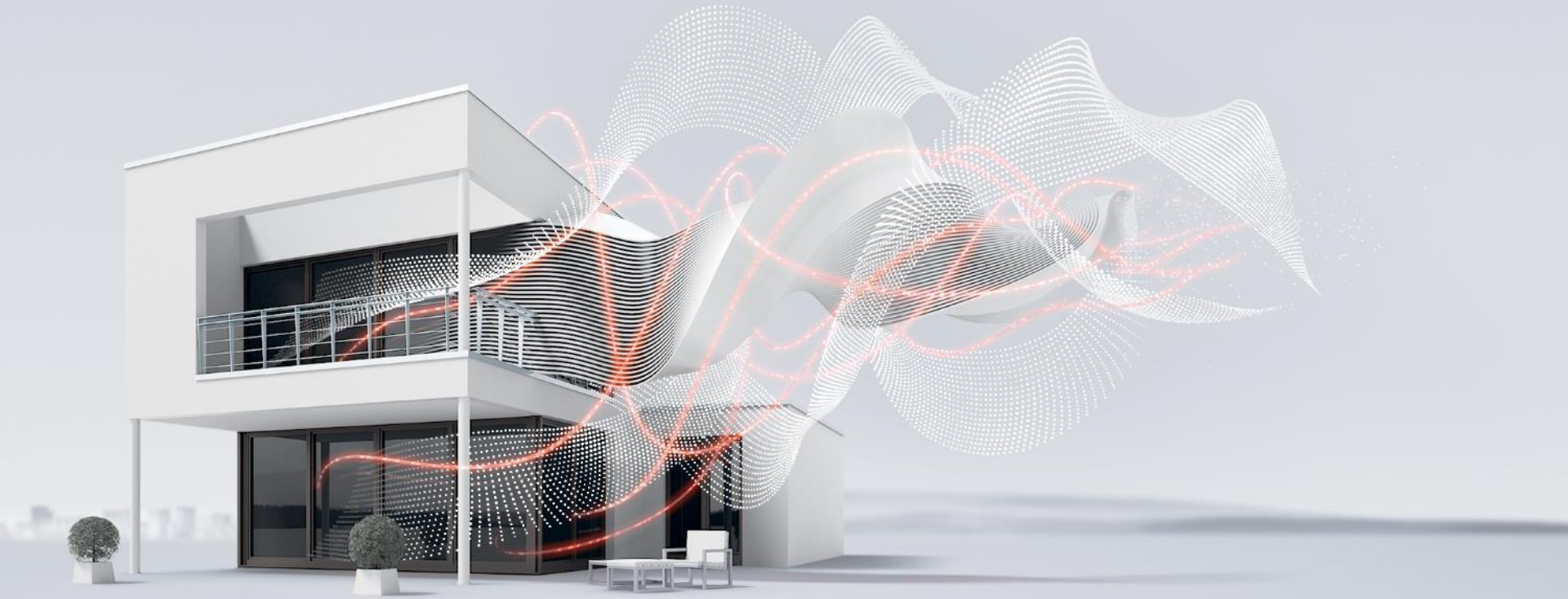


JUNE 2017

Webinar KNX Sensors commercial Buildings

BU EPBP GPG Building Automation

Carolina Bachenheimer-Schaefer, Thorsten Reibel, Jürgen Schilder & Ilija Zivadinovic
Global Application and Solution Team

KNX Sensors for commercial Buildings

Agenda

- Push buttons with integrated temperature sensor
- Push button coupler for conventional rockers and ocean®
- Room temperature controller with integrated inputs, CO_2 and humidity sensor and controller
- Motion sensor

KNX Sensors for commercial Buildings

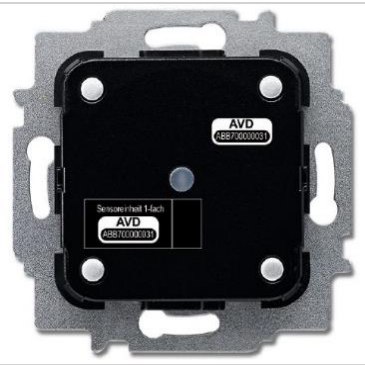
Motivation and Objectives

- A KNX product range specially adjusted to functional buildings
- Range consists of compact devices including bus coupler
- Powerful but easy to handle native ETS application
- Rockers with different ABB designs available
- Integration of conventional ABB switches
- New area of application: Measurement of CO_2 and humidity concentrations in rooms
- Version for BS (British Standard) available
- Cost efficient solution

KNX Sensors for commercial Buildings

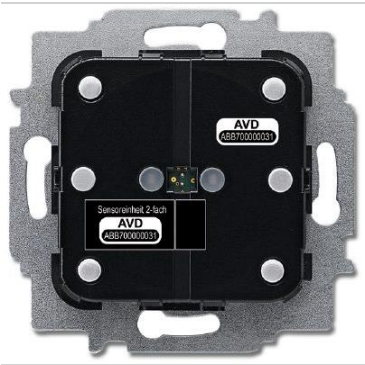
Overview

Operation sensors



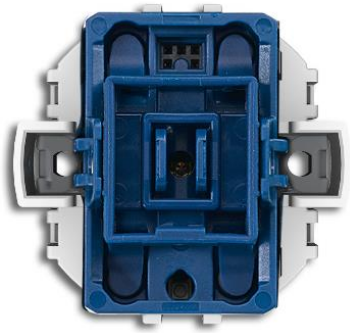
Push-button coupler 1/2-gang

- integrated temperature sensor



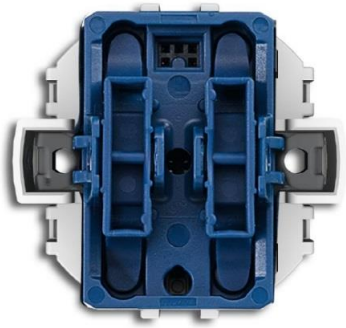
Push-button coupler 2/4-gang

- integrated temperature sensor



Push-button coupler 1/2-gang

- For conventional 1-gang rocker switches
- For ocean®



Push-button coupler 2/4-gang

- For conventional 2-gang rocker switches
- For ocean®

KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06) and 2/4 gang (6108/07)

Functionality

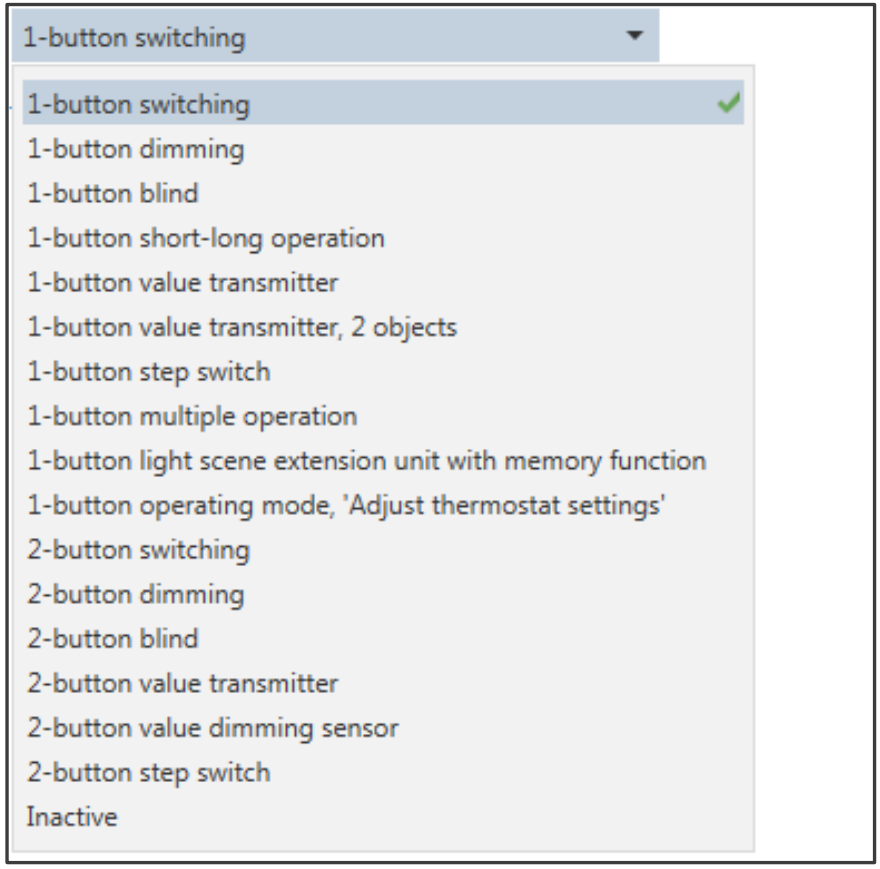
- One or two rockers for up to two/four functions
- Primary function
- For contacting rockers of different ABB designs, colours with/without icons (like free@home) including British Standard (BS)
- Rockers with middle position and two contacts
- Bus connection via enclosed terminal block
- Integrated temperature sensor
- LED with colour concept (yellow=lighting, blue=blind, orange=RTC, magenta=scene and white=neutral/no function assigned) or standard illumination red/green
- Application for ETS4 and 5, comprehensive functionality

KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06) and 2/4 gang (6108/07)

ETS

- From 1-button operation (independent function each button of a rocker) or 2-button operation (one function per rocker)
- Further adjustable functions known from other inputs or push buttons like dimming, multiple operation, value sender and more

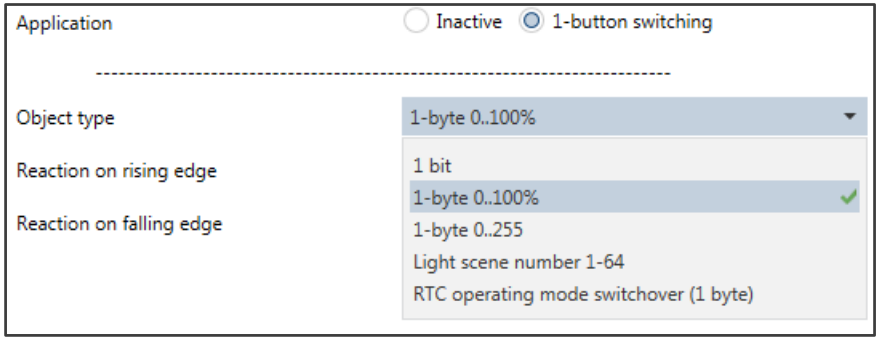


KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06) and 2/4 gang (6108/07)

ETS

- Primary function
  - It is the function carried out when any button is actuated **and** the device is disabled
  - 1-button switching is possible, with the following data types to be sent out:
    1 bit, 1 byte, light scene number, RTC operating mode
  - Independent values for pressing the button (rising edge) or releasing the button (falling edge) possible
  - Example: When the cleaning staff enters the office rooms during the night the primary function is active at all buttons to turn on the ceiling light only. Standard function is not working



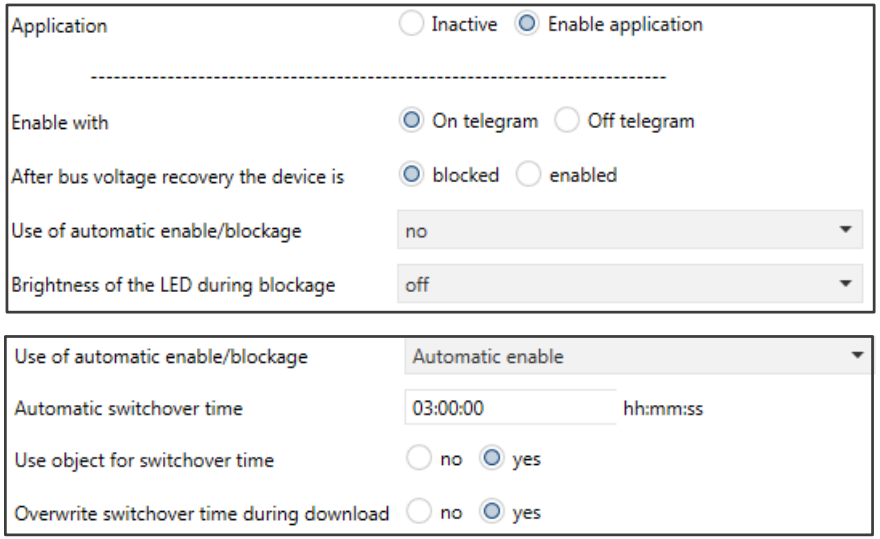
KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06) and 2/4 gang (6108/07)

ETS

– Enable function
  - Allows to activate/deactivate the whole push button via telegram or in case of bus voltage recovery **and** can activate the primary function
  - With automatic enable/blockage a time can be defined after which the function is off again
  - Time can be changed via telegram
  - LED during blockage can be off, dark or bright

  - Example: In a festival hall after start of an event local push buttons will be deactivated



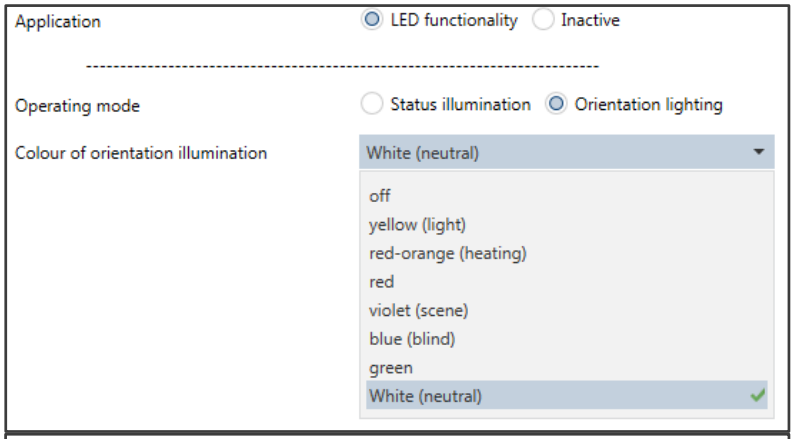
KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06) and 2/4 gang (6108/07)

ETS

- LED
  - LED with 7 colours either as orientation or status
  - For status 5 zones adjustable to have different colours depending on values
  - Zone 1: Value 0 %
  - Zone 2: Value between 1 % and x %
  - Zone 3: Value between x % and y %
  - Zone 4: Value between y % and 99 %
  - Zone 5: Value 100 %

  - Example: Depending on CO_2 concentration in the conference room different LED colours are visible from green to red



KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06) and 2/4 gang (6108/07)

ETS

- LED extended parameter
  - **Day/Night Mode** (two different brightness levels)
  - ON telegram LED on group object → "bright"; OFF telegram → "dark"
  - Example: At 10 pm telegram is sent to all LED's in sleeping rooms to go to "dark" mode
  - **Storage function light scene**
  - LED will blink for 3 s if a scene storage telegram is received on the 1-byte object "Scene storage"
  - **Alarm function**
  - LED flashes with ON telegram on group object "Alarm", with OFF telegram the LED is off

LED1: Day/Night mode	Input	1 bit
LED1: Alarm	Input	1 bit
LED1: Scene storage	Input	1 byte

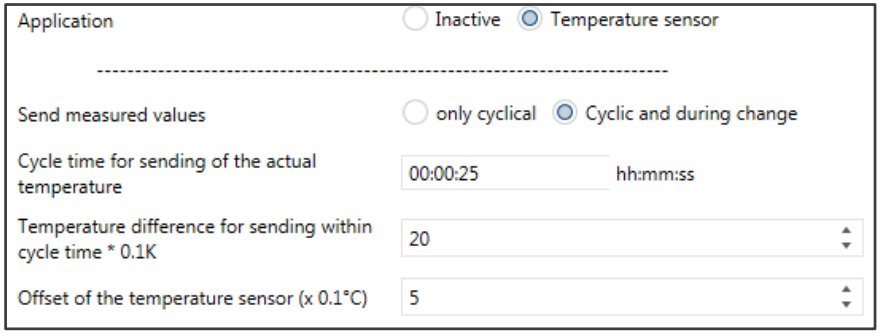
KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06) and 2/4 gang (6108/07)

ETS

– Room temperature sensor
  - Integrated temperature sensor to send room temperature on KNX for further processing
  - Value can be transmitted cyclically or in case of adjustable change
  - Offset allows to adjust the value in the event of not precise measurement

  - Example: Room temperature sensor together with external controller functionality in Logic Controller ABA/S 1.2.1 for room temperature control
  - Example: Room temperature measurement in addition to the controller for more precise detection

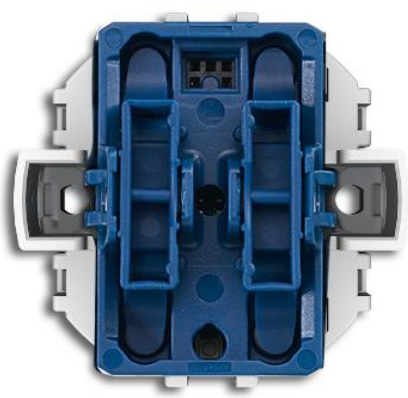


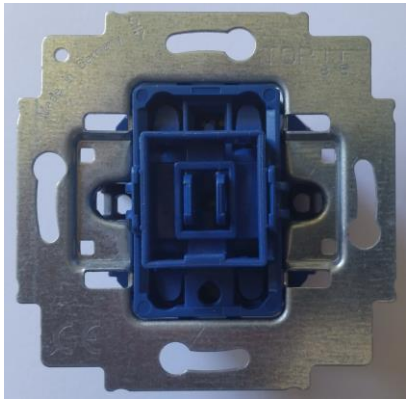
KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06-AP) and 2/4 gang (6108/07-AP)

Functionality

- For integration of conventional 1 gang/ 2 gang rocker switches
- Rocker with middle position
- Enclosed mounting plate for the following ranges: Busch-Duro 2000® SI/SI Linear, Reflex SI/SI Linear, future® linear, alpha, solo®, Busch-axcent®, carat® and pure stainless steel
- For inserting in the ocean® surface-mounted housing without mounting plate
  - Outdoor installation: Temperature range - 5 …+45° Celsius !
- 2 gang version: Integrated two-colour status LED (red, green, off)
- 4 gang version without LED



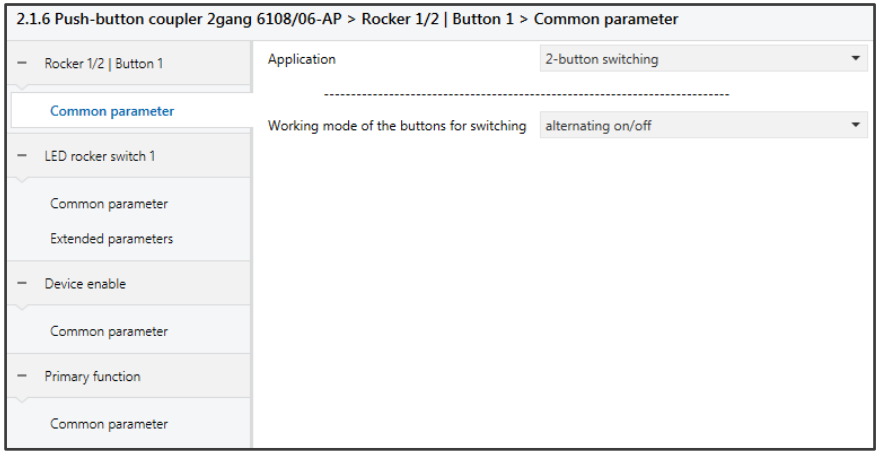


KNX Sensors for commercial Buildings

Push-button coupler 1/2 gang (6108/06-AP) and 2/4 gang (6108/07-AP)

ETS

- ETS application like push-button coupler 2/4 gang flush mounted except the following:
  - No LED colour concept
  - No Day/Night Mode for LED
  - No integrated temperature sensor



KNX Sensors for commercial Buildings

Overview - Detectors

Movement and Presence detectors

Watchdog standard

- 4 channels
- Integrated bus coupler

Presence detectors

- Basic and Premium
- Mini and regular (different in detection area)

Watchdog Sky

- Basic
- Installation height up to 12 m

Presence Corridor

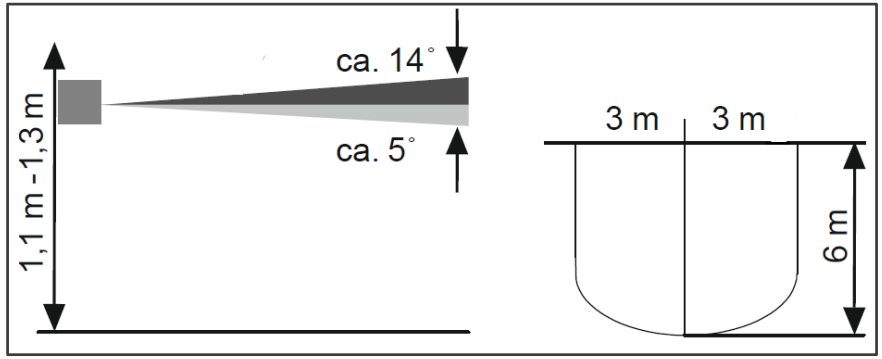
- Basic and Premium
- Rectangular detection area

KNX Sensors for commercial Buildings

Busch-Watchdog sensor with integrated bus coupler 6122/10

Functionality

- Movement Detector with up to 4 channels
- Bus connection via enclosed terminal block
- Integrated KNX bus coupler
- Different ABB designs and colours available (like free@home)

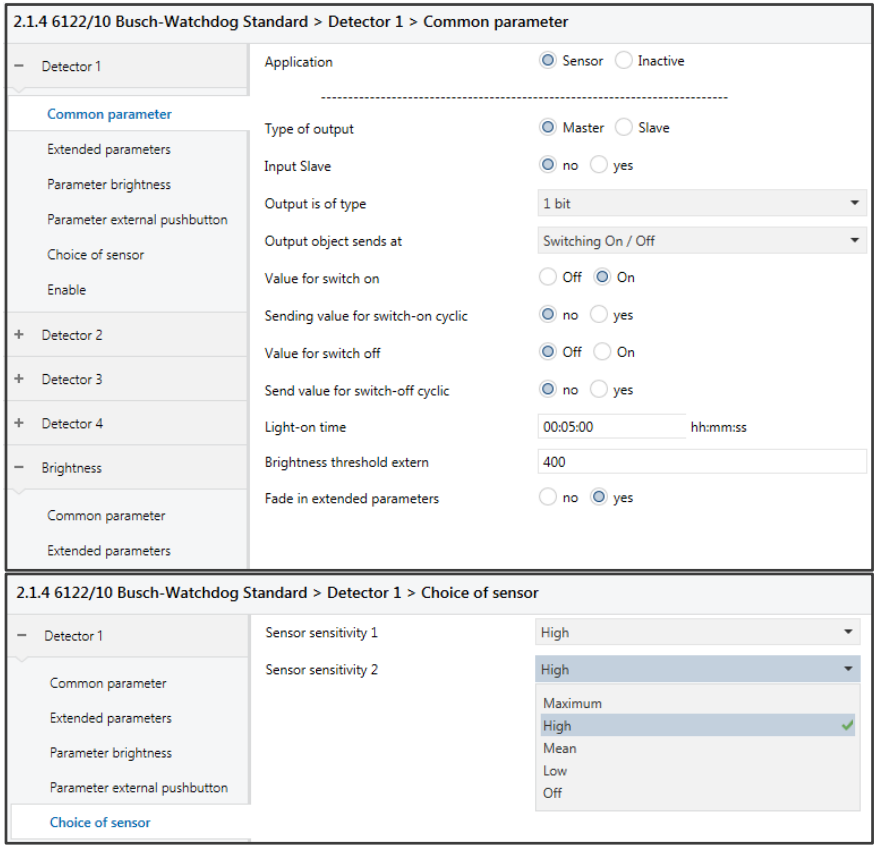


KNX Sensors for commercial Buildings

Busch-Watchdog sensor with integrated bus coupler 6122/10

ETS

- Powerful functionality with all known possibilities from other ABB's movement/presence detectors
  - 4 channels with individual parameters (e.g. for lighting, HVAC and monitoring)
  - Master/Slave (e.g. for multiple sensors in a corridor)
  - 2 sensors with adjustable sensitivity (off, low, mean, high maximum, e.g. to compensate interfering heat sources)
  - External push button to 'operate' the sensor (e.g. to switch on the light, motion sensor switches off automatically)
  - …



KNX Sensors for commercial Buildings

Overview

Room Temperature Controller

6108/18

- internal temperature sensor

6109/18

- 5x universal inputs
- internal temperature sensor

6109/28

- 5x universal inputs
- internal temperature sensor
- CO_2/humidity controller
- Air pressure sensor
- Auto calibration

KNX Sensors for commercial Buildings

Overview

Room Temperature Controller

6109/05

- Room temperature controller only

6109/08

- 5x universal inputs
- internal temperature sensor

KNX Sensors for commercial Buildings

Room Temperature Controller 6108/18

Functionality

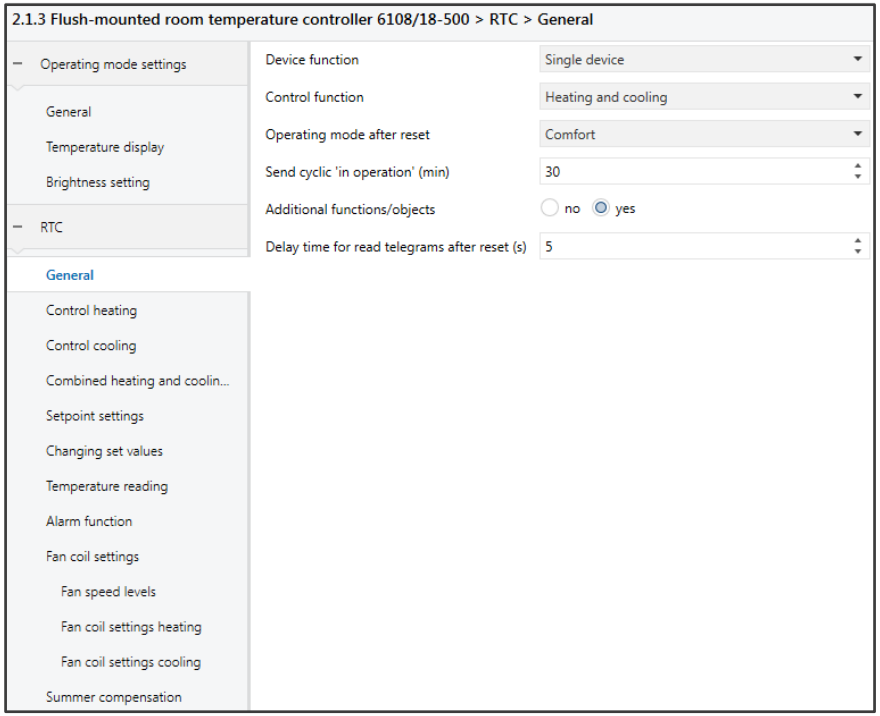
- Control element with room thermostat function for controlling heating and cooling application, either ventilation and fan-coil actuators
- LCD Display showing operation mode and temperature (Setpoint/Room temperature)
- Buttons to operate:
  - Setpoint adjustment
  - Fan Speed/Auto-Mode
  - Switchover heating/cooling
  - On/Off (long operation)
  - ECO-Mode (increased setpoint cooling, decreased setpoint heating, fan speed limitation)

KNX Sensors for commercial Buildings

Room Temperature Controller 6108/18

ETS

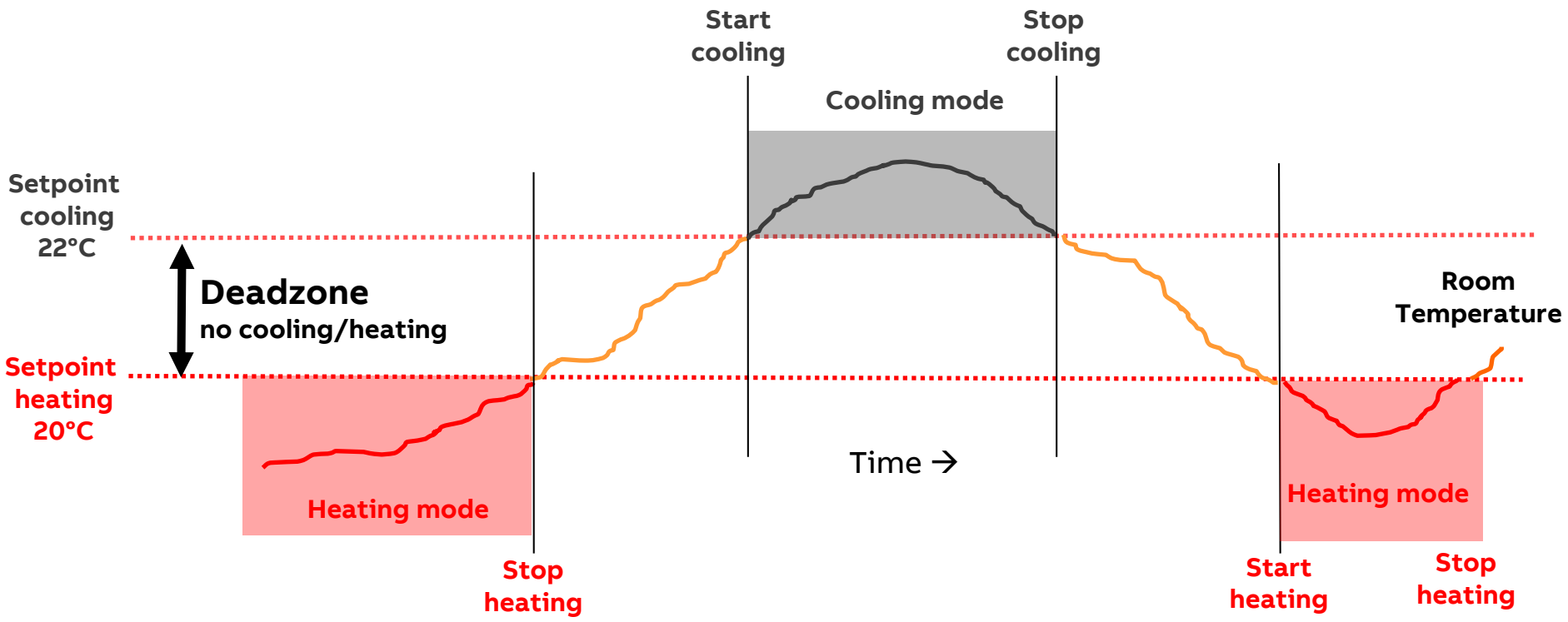
- Application based on ABB's unified RTC concept
- It is the same software concept, providing the user with the same function for all devices → easier to commission and operate
- Uniform Master Slave concept → easy implementation of more than one RTC's in a room
- One set point mode → easier to program, easier to operate for the user (Alternatively two set point mode with dead zone parametrisable)
- Additional stage for heating and cooling with individual parameters as an independent second control circuit (e.g. basic floor heating) → more flexibility



KNX Sensors for commercial Buildings

Room Temperature Controller

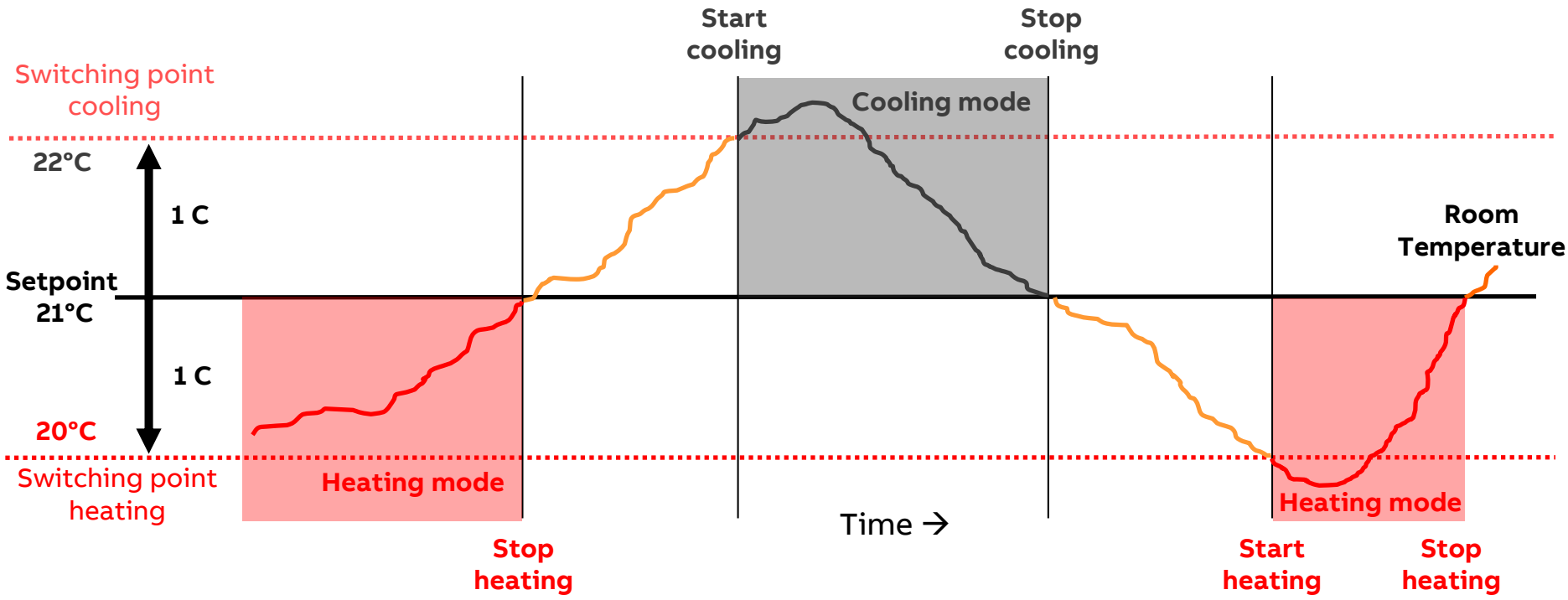
Two Setpoint Mode



KNX Sensors for commercial Buildings

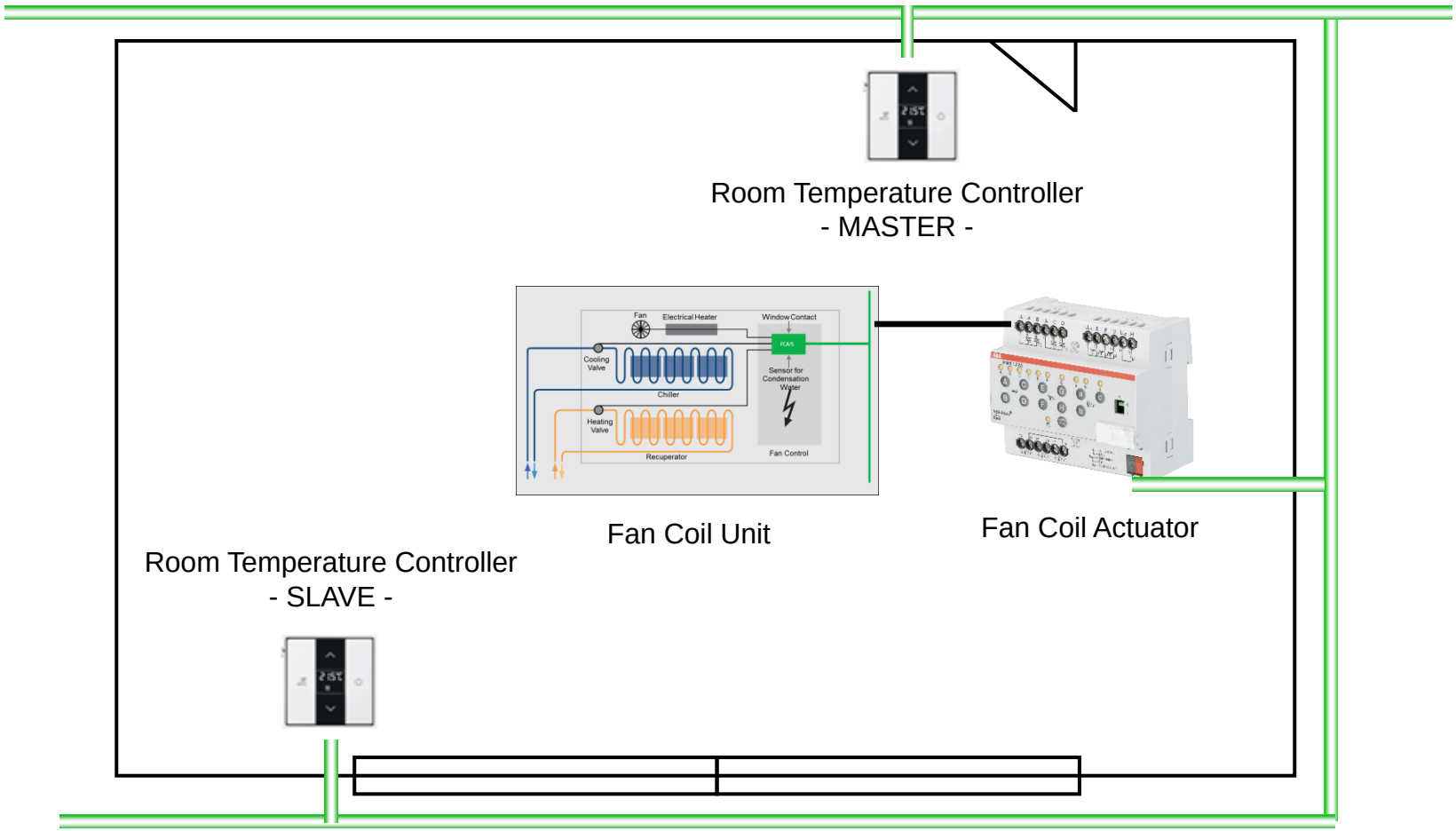
Room Temperature Controller

One Setpoint Mode



KNX Sensors for commercial Buildings

Master - Slave



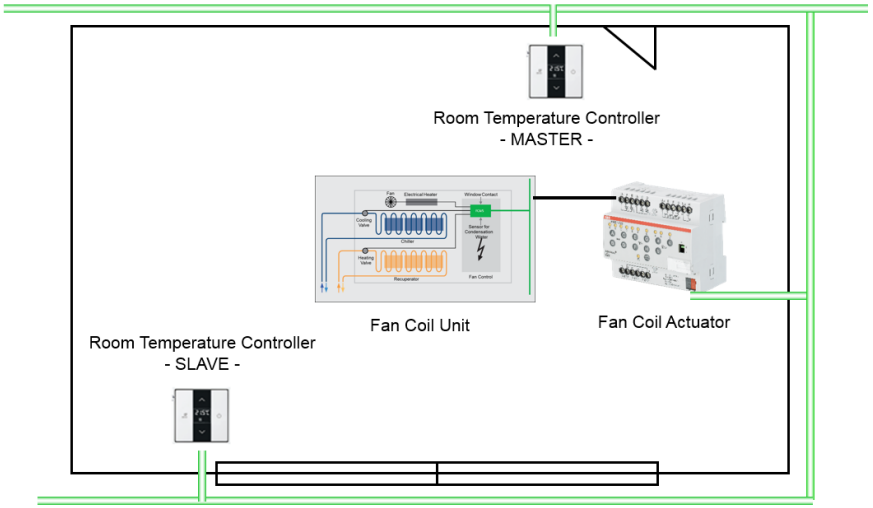
KNX Sensors for commercial Buildings

Room Temperature Controller

Master - Slave

- **Single device** Stand alone operation / application in a single room
- **Master device** At least two RTCs in use. One defined as Master and the second (and further if required) as an additional operating and display element (Slave). The Master is to be connected according to the designated communication objects with the slave. The Master is responsible for the temperature control
- **Slave device(s)** The Slave is to be connected according to the designated communication objects with the Master. The Slave uses the room temperature controller functions of the master

→ Synchrone indication and operation between Master and Slave devices



KNX Sensors for commercial Buildings

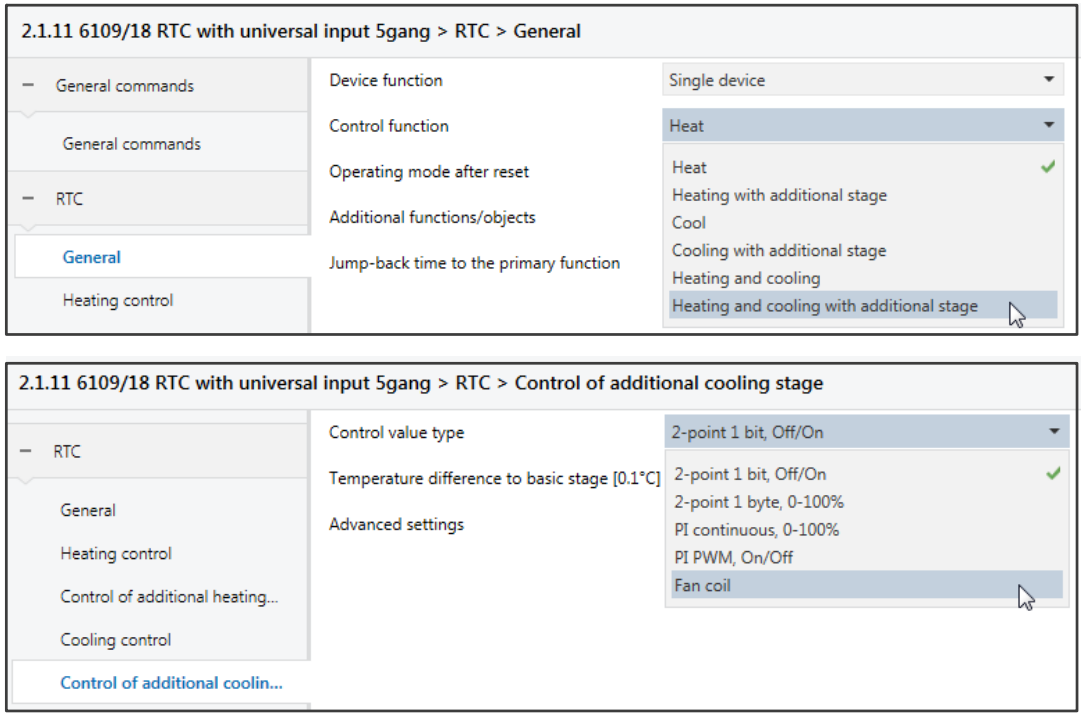
Room Temperature Controller 6108/18

Additional Heating/Cooling

An additional stage allows to run a separate heating/cooling circuit

- Example: Room with cooling ceiling (basic stage) and classical fan coil unit as additional stage

- For more information look at Webinar ‘Application Fan Coil unit – Part 2’ January 2016 in our T&Q database

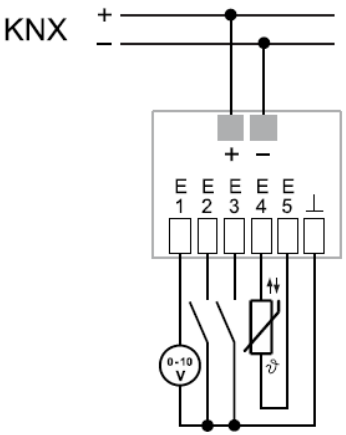


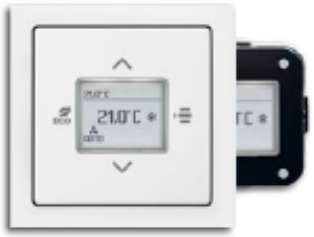
KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/18

Functionality

- Control element with room thermostat function for controlling heating and cooling application, either ventilation and fan-coil actuators
- Universal input with max. of 5 binary inputs
  - 4 binary inputs and 1 analogue input for sensors with external power supply 1-10 V/0-10 V
  - 2 binary inputs and 1 analogue input for sensors with external power supply 1-10 V/0-10 V or an external temperature sensor without power supply PT1000 / T6226 (Accessory free@home panel 4.3)





KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/18

ETS

- Application like room temperature controller 6108/18
- Additionally: Universal input with 5 inputs
  - Option 1: E1 – E5 binary inputs
  - Option 2: E1 analogue input, E2 – E5 binary inputs
  - Option 3: E1 – E3 binary inputs, E4/5 for external temperature sensor
  - Option 4: E1 analogue input, E2 – E3 binary inputs, E4/5 for external temperature sensor

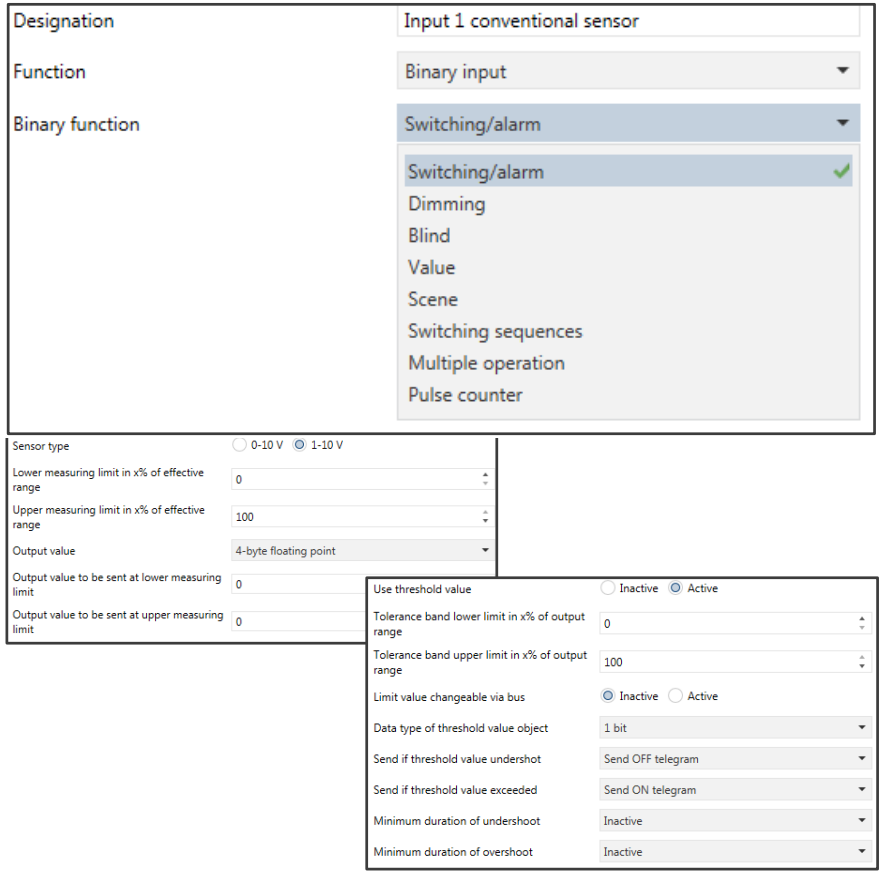
Terminal	Binary	Temperature sensor	0 to 10 V	1 to 10 V
E1	X	—	X	X
E2	X	—	—	—
E3	X	—	—	—
E4	X	X	—	—
E5	X		—	—
E6 (GND)	—	—	—	—

KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/18

ETS

- Binary Inputs:
  - Known functions from other binary inputs
- Analogue inputs:
  - Known functions from other analogue inputs, e.g. two threshold with hysteresis, filter, adjustable measuring limits, …
  - 0…10 V or 1…10 V Signals



KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/18

ETS

- Temperature sensor:
  - PT1000 / T6226 (Accessory free@home panel 4.3) connectable
  - Functions like line fault compensation (length or resistance) or temperature offset

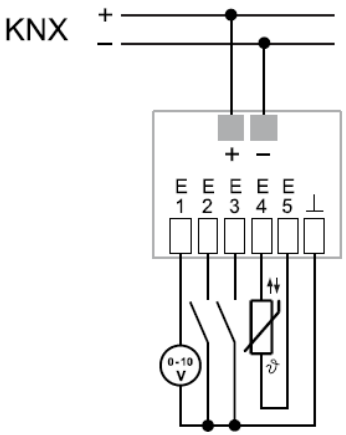
Temperature sensor type	Pt1000 / 6226/T
Temperature offset in K	0,0
Line fault compensation	Length
Line length, single distance ... in m	10
Cross-section of the busbar, value * 0.01 mm2	100
Filters	Medium (mean of 16 measurements)
Send output value	Cyclic
Output value is sent, every	5 seconds
Enable object 'Disable'	Inactive / Active

KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/28

Functionality

- Control element with room thermostat, functions like 6109/18
- Additionally:
  - CO_2 sensor and controller
  - Relative humidity sensor and controller
  - Temperature sensor
  - Dew point sensor
  - Air pressure sensor
- Automatic calibration of CO_2 measurement when KNX voltage is connected
  - After Reset or bus voltage failure automatic calibration starts again
- To be installed in windproof switch box

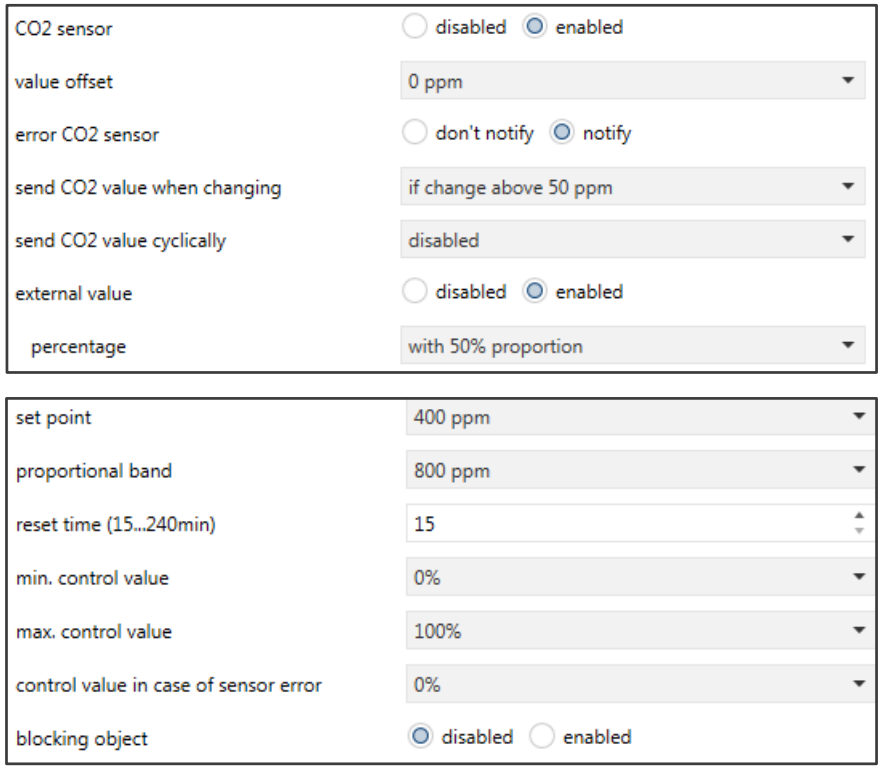


KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/28

ETS

- CO_2 sensor and controller
  - Measurement between 390 ppm and 10000 ppm
  - Notification in case of sensor error
  - Value offset for adaption
  - Integration of external value with 10 … 100 % proportion
- CO_2 control with 1/2/3 step control or PI control
  - Step control with thresholds and hysteresis
  - PI control with setpoint, P-coefficient, integral time and min./max. control values

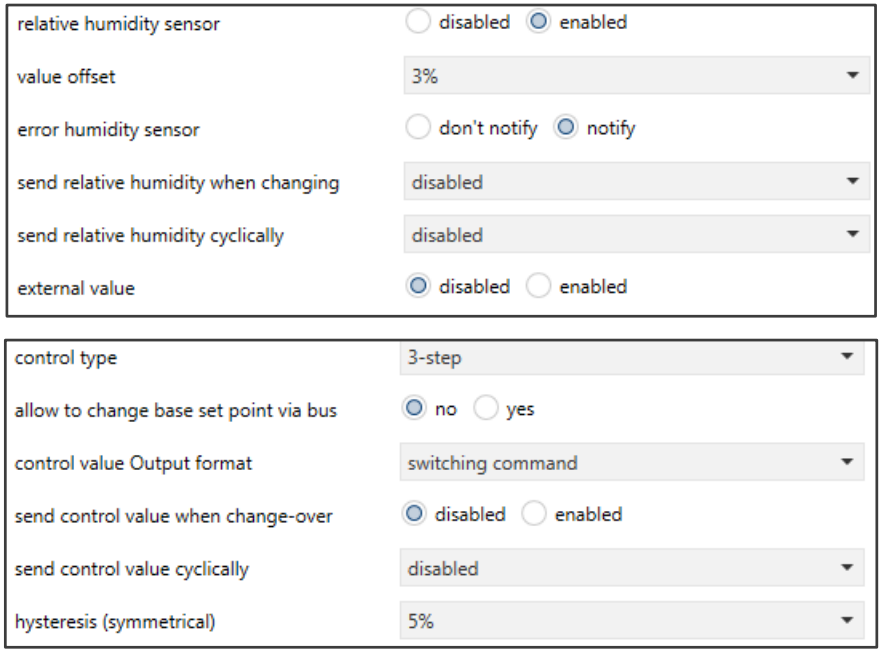


KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/28

ETS

- Relative humidity sensor and controller
  - Measurement between 0 and 100 %
  - Notification in case of sensor error
  - Value offset for adaption
  - Integration of external value with 10 … 100 % proportion
- Relative humidity control with 1/2/3 step control or PI control
  - PI control with setpoint, P-factor, integral time and min./max. control values
  - Step control with thresholds and hysteresis

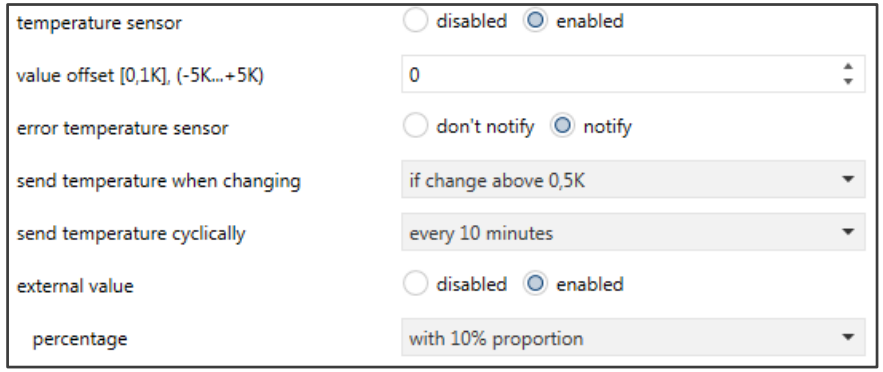


KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/28

ETS

- Additional temperature beside integrated room temperature controller
  - Measurement between 0° and 35° Celsius
  - Notification in case of sensor error
  - Value offset for adaption
  - Integration of external value with 10 … 100 % proportion

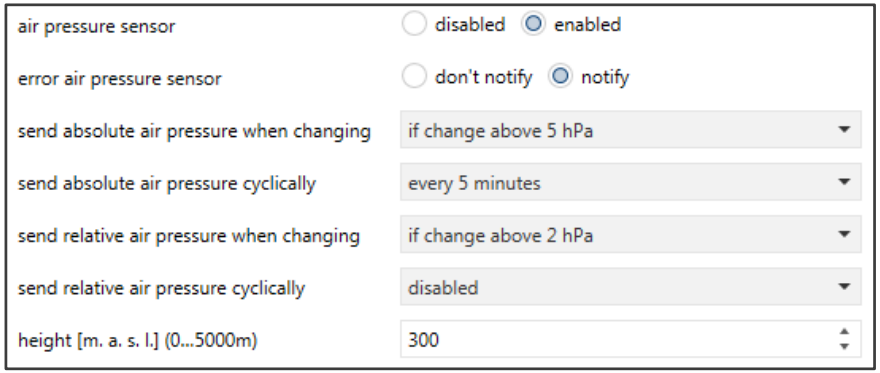


KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/28

ETS

– Air pressure sensor
  - Absolute and relative air pressure between 300hPa and 1100 hPa
    (relative air pressure related to height)
  - Notification in case of sensor error
  - Height of the location for relative air pressure

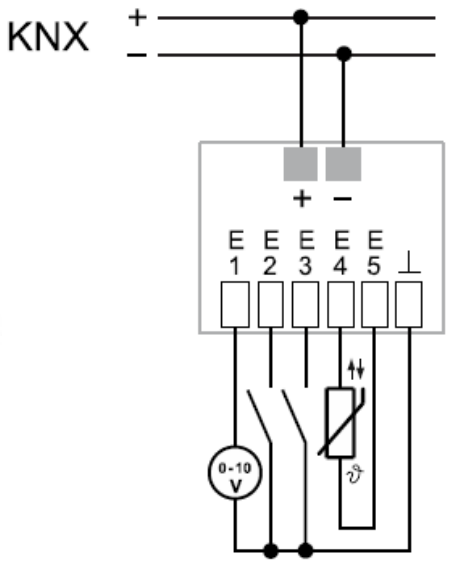


KNX Sensors for commercial Buildings

Room Temperature Controller with 5 gang universal input 6109/05

Functionality

- Device with room thermostat and inputs like 6109/18 but …
- **no** internal temperature sensor
- **no** display and buttons to operate
- For invisible installation in a wall box
- Room temperature either via connected sensor to the input or via KNX telegram

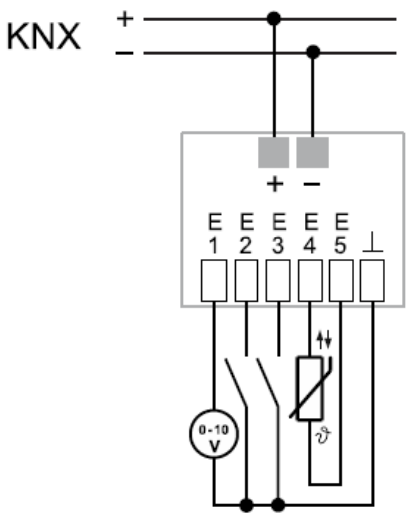


KNX Sensors for commercial Buildings

Room Temperature Controller object range with 5 gang universal input 6109/08

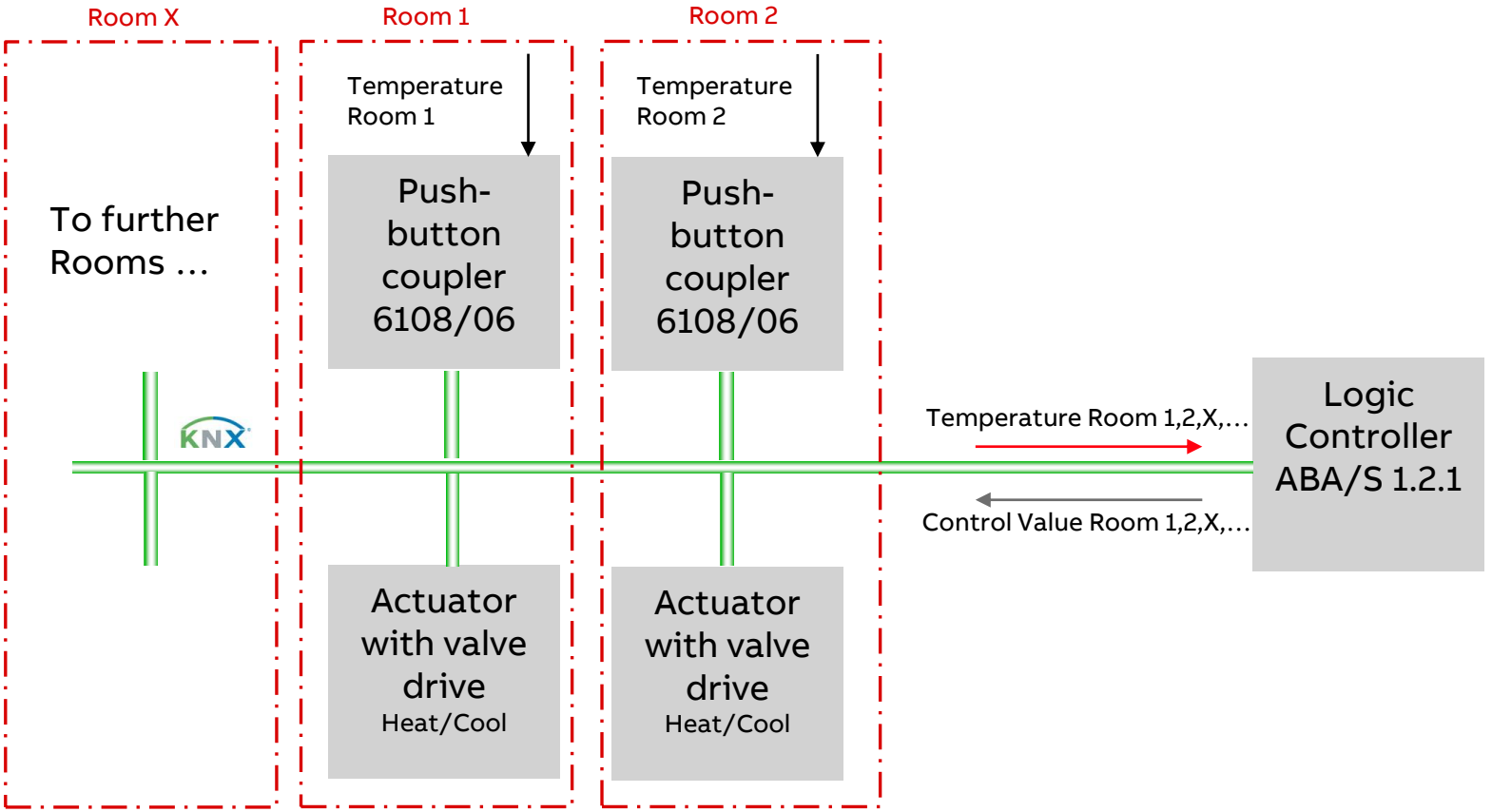
Functionality

- Device with room thermostat and inputs like 6109/18 but …
- **no** display and buttons to operate
- For flush mounting in a wall box
- To be used with a cover plate 2114-xxx or 6541-xxx



KNX Sensors for commercial Buildings

Push button coupler 6108/06 with Room Temperature Control



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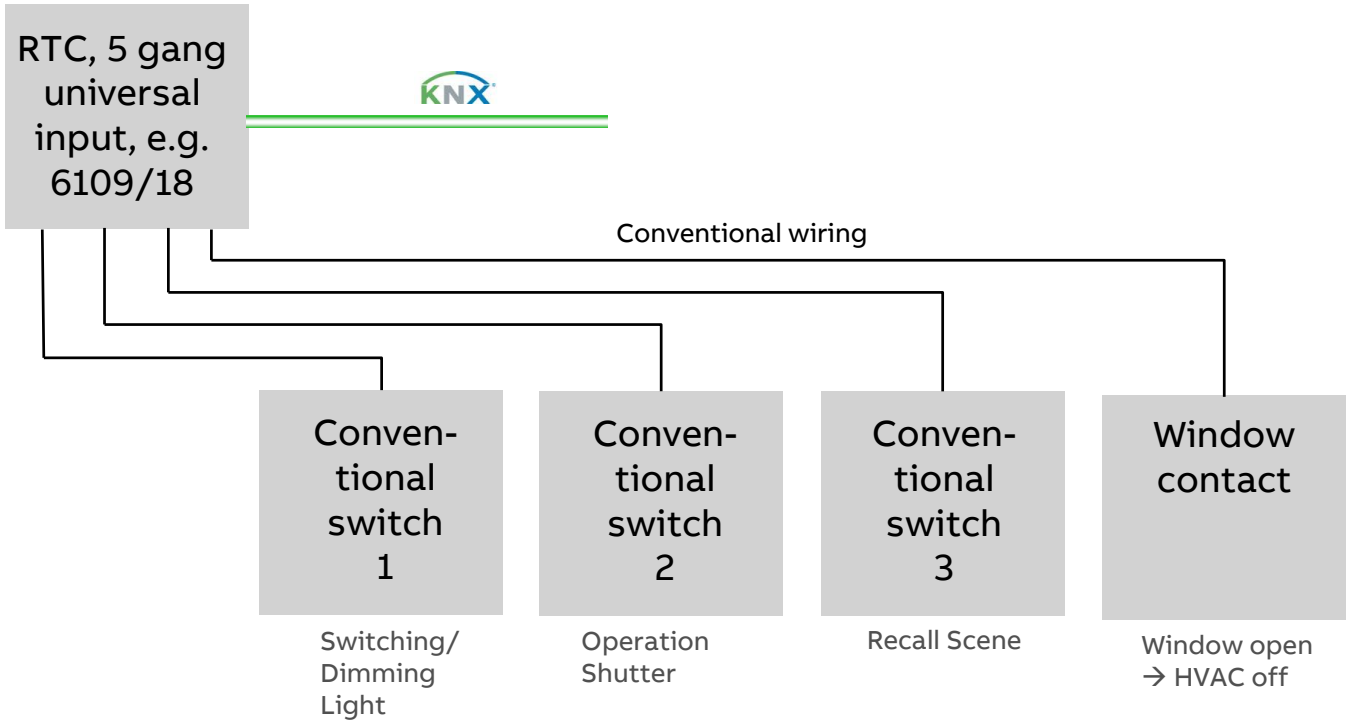
RTC with 5 gang universal input plus additional conventional switches/contact



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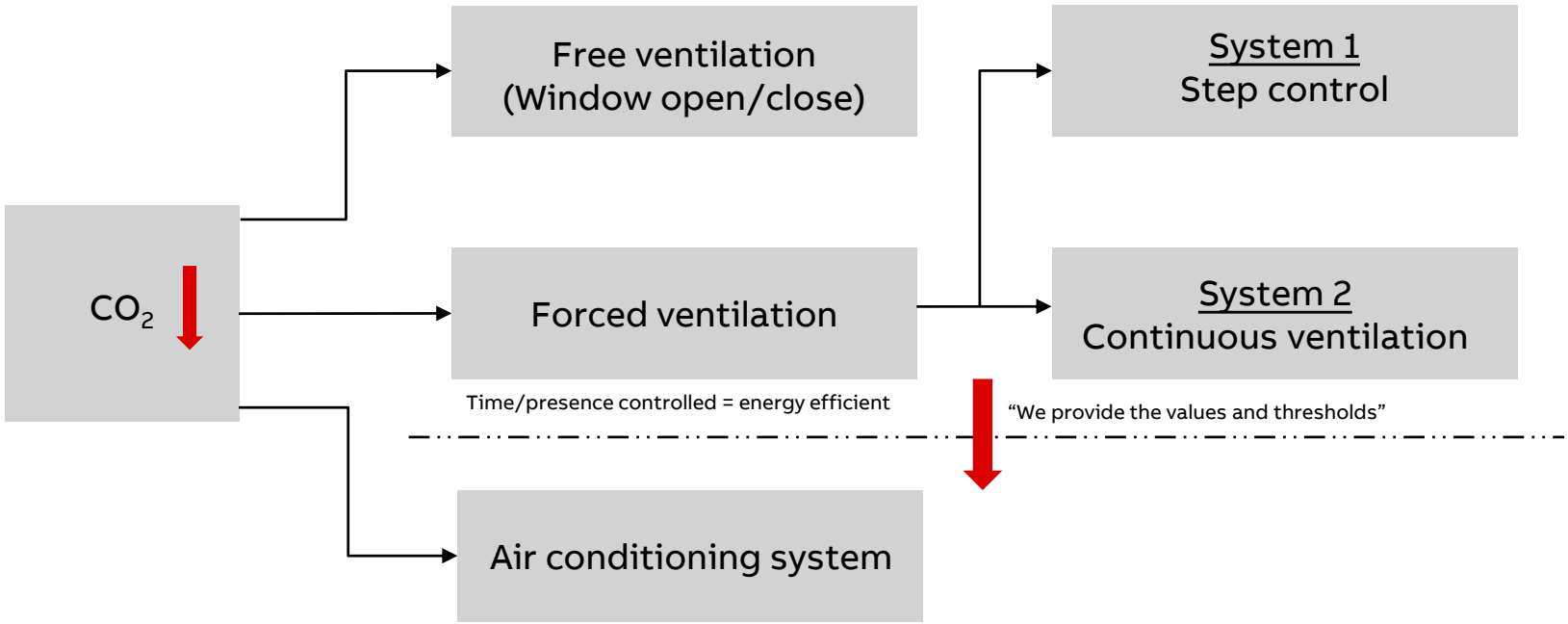
Application CO_2



"Task of the planner of the HVAC system !"

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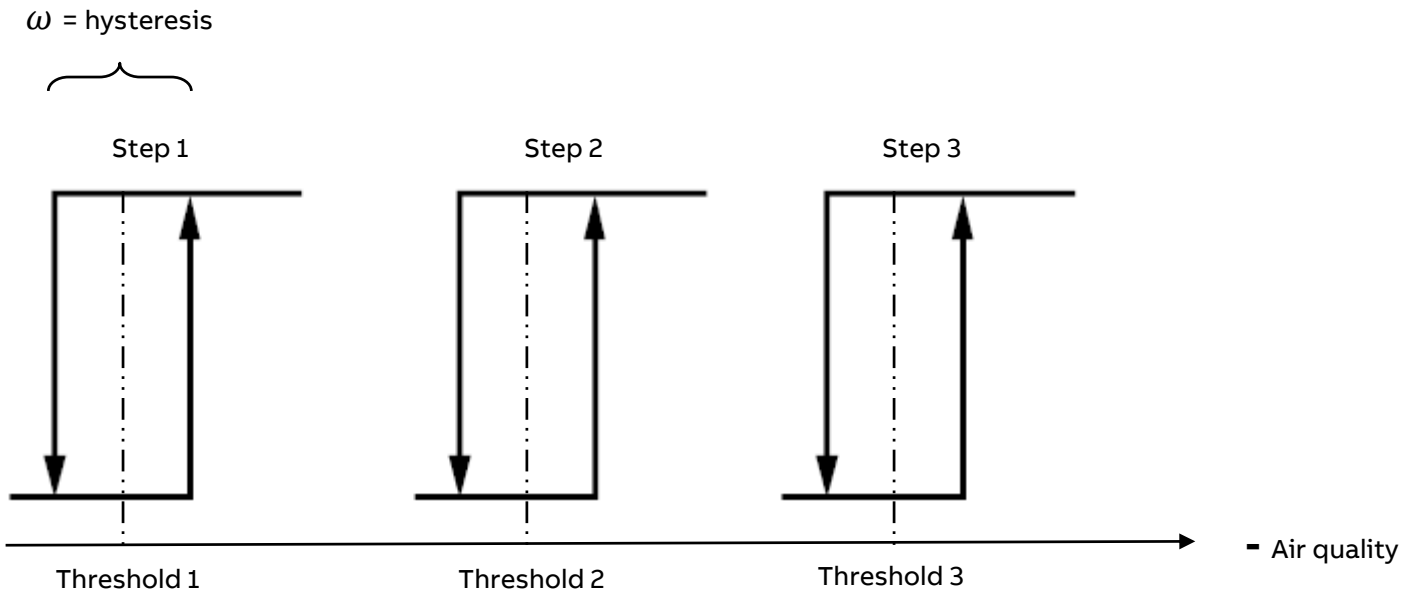
System 1: Ventilation with step control



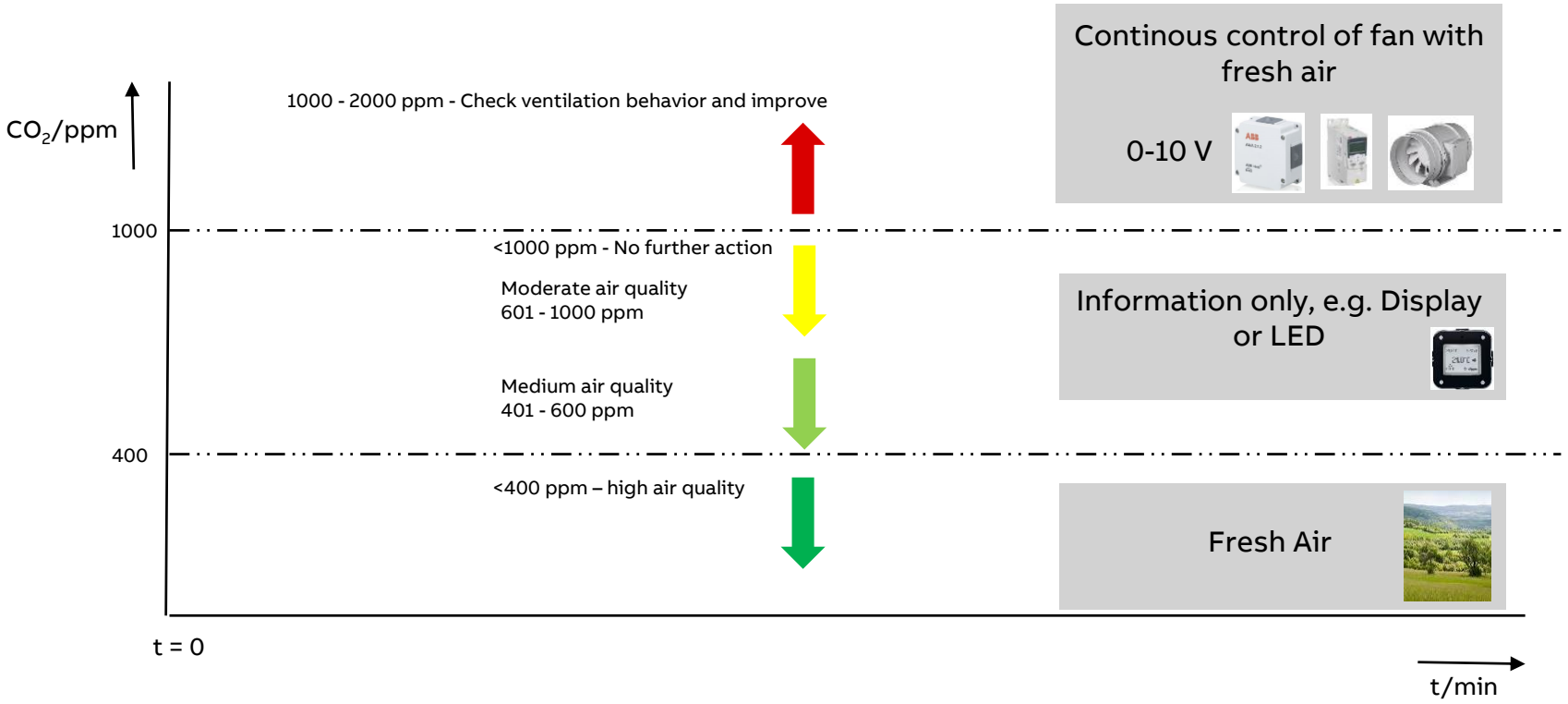
If the air quality is deteriorated, the system is switched on at the first ventilation stage

2nd ventilation stage is turned on in a further deterioration of air quality

3rd ventilation stage is turned on in a further deterioration of air quality

RTC with CO2/humidity sensor/controller

System 2: Continuous Control



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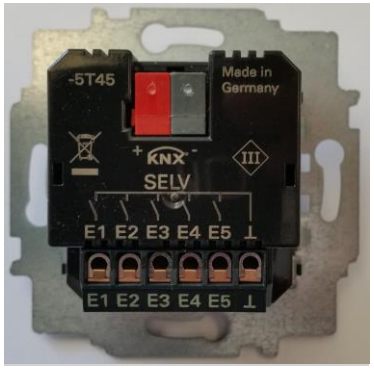
Bus Connection Terminals

Push-button coupler 6108/06 AP and 07 AP, Room temperature controller 6108/18

- Small and grey bus connection terminal

Bus connection terminal

- 2 wires per pole



Room temperature controller 6109/18 and 28, push-button coupler 6108/06 AP and 07 AP

- Standard red/black bus connection terminal

Bus connection terminal

- 4 wires per pole

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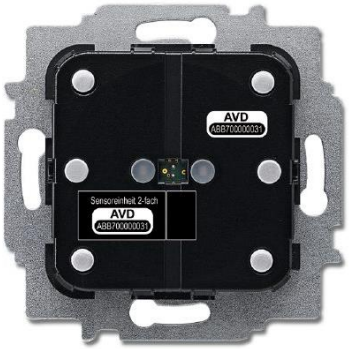
Parts to be ordered

Main Element



Part 1

– e.g. Push-button coupler 2-gang 6108/07

Operating Element

Part 2

– e.g. Rocker 2-gang left with ‘Scene’ icon and Rocker 2-gang right with ‘Dimmer‘ icon

Frame

Part 3

– e.g. solo® 1-fold, chrome, matt

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Overview – Devices for BS (British Standard)

Watchdog and Push-buttons

Watchdog

- 6122/10-**BS**-500

Push-button coupler 1/2 gang

- 6108/06-**BS**-500

Push-button coupler 2/4 gang

- 6108/07-**BS**-500

Room temperature controller

- 6108/18-**BS**-500

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Overview

Technical data

Program	FM room temperature controller				
					
	6108/18 6108/18-85	6109/18	6109/28	6109/08	6109/05
Control element					
Standard function	–	–	–	–	–
Additional function	–	–	–	–	–
Indication					
Display	■	■	■	–	–
Actual temperature display	■	■	■	–	–
Status display via text and/or ICON	–	■	■	–	–
RTC					
Manual operation	■	■	■	–	–
Heating and/or cooling with/without additional stage	■	■	■	■	■
Fan coil	■	■	■	■	■
Master/slave	■	■	■	master only	master only
Basic load	■	■	■	■	■
Internal and/or external actual temperature sensor	■	■	■	■	external only
Internal actual temperature sensor	■	■	■	■	■
Air quality					
CO_2	–	–	■	–	–
Humidity	–	–	■	–	–
Air pressure	–	–	■	–	–
Universal input/binary input					
Switching/alarm	–	■	■	■	■
Dimming	–	■	■	■	■
Blind	–	■	■	■	■
Value	–	■	■	■	■
Scene	–	■	■	■	■
Switching sequences	–	■	■	■	■
Multi	–	■	■	■	■
Pulse counter	–	■	■	■	■
Universal analogue input e.g. external sensors					
0–10 V (external)	–	■	■	■	■
1–10 V (external)	–	■	■	■	■
Upper/lower threshold value	–	■	■	■	■
Universal input of external temperature sensor (PT1000 or 6226/T)					
Actual temperature sensor	–	■	■	■	■
Temperature limiter	–	■	■	■	■
ABB					
basic55®	■	■	■	■	–
future® linear	■	■	■	■	–
alpha exclusive/nea	–	■	■	■	–
Busch-axcent®	■	■	■	■	–
solo®	■	■	■	■	–
pure stainless steel	■	■	■	■	–
carat®	■	■	■	■	–
ocean®	–	–	–	–	–
All Weather 44	–	–	–	–	–

KNX Sensors for commercial Buildings

Overview

Technical data

Program	FM Watchdog with integrated bus coupler	FM push-button coupling unit with integrated bus coupler				
						
	6122/10 6122/10-85-500	6108/06 6108/06-85 1/2gang	6108/07 6108/07-85 2/4gang	6108/60 6-fold KNX sensor	6108/06-AP 1/2gang	6108/07-AP 2/4gang
KNX function						
Switching, rocker switch total	–	■	■	■	■	■
Switching, rocker switch left/right	–	■	■	–	■	■
Dimming, rocker switch total	–	■	■	■	■	■
Dimming, rocker switch left/right	–	■	■	–	■	■
Blind, rocker switch total	–	■	■	■	■	■
Venetian blind, rocker switch total left/right	–	■	■	–	■	■
Short-long operation, rocker switch left/right	–	■	■	–	■	■
Value sender, rocker switch total	–	■	■	■	■	■
Value sender, rocker switch left/right	–	■	■	–	■	■
Value dimming sensor, rocker switch total	–	■	■	■	■	■
Red/green LED status illumination (red/green/off)	–	–	–		1 LED	–
RGB LED function illumination + status illumination	–	One LED per rocker switch	One LED per rocker switch	–	–	–
Setting the RTC operating mode	–	■	■	–	■	■
Value sender, 2 objects, rocker switch left/right	–	■	■	–	■	■
Light scene extension unit with light scene memory function	–	■	■	■	■	■
Level switch, rocker switch total	–	■	■	■	■	■
Level switch, rocker switch total left/right	–	■	■	–	■	■
Multiple operation, rocker switch left/right	–	–	–	–	–	–
IR remote control channels (up to 5 channels)	–	–	–	–	–	–
Room temperature controller only						
Temperature reading	–	■	■	■	–	–
RTC settings	–	–	–	■ (only as slave)	–	–
Illuminated display	–	–	–	–	–	–
Fan coil operation for heating and cooling	–	–	–	■ (only as slave)	–	–
Logic function (including light scenes)	■	–	–	–	–	–
Busch-Watchdog 4 channels	■	–	–	–	–	–
ABB						
basic55®	–	■	■	■	■	■
future® linear	■	■	■	■	■	■
alpha exclusive/nea	–	–	–	■	■	■
Busch-axcent®	■	■	■	■	■	■
solo®	■	■	■	■	■	■
pure stainless steel	■	■	■	■	■	■
carat®	■	■	■	■	■	■
ocean®	–	–	–	–	■	■
All Weather 44	–	–	–	–	■	■

- 6 functions (switching, dimming, blinds, scenes)
- RTC operation (slave)
- Display with icons and text

- Available August 2017

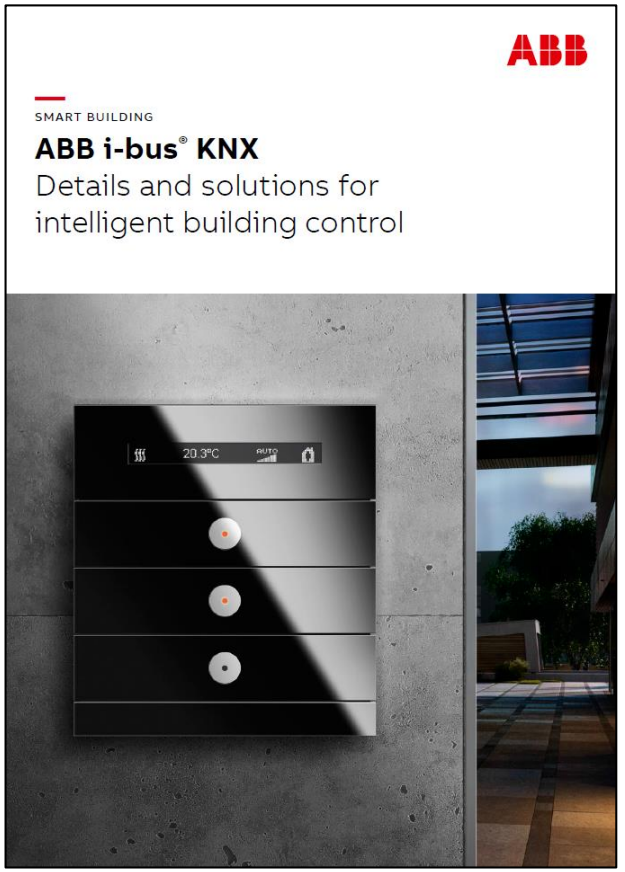
KNX Sensors for commercial Buildings

Marketing Material

Brochure

Overview KNX sensors and displays

Link



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Training & Qualification

KNX Certified Training

Certified KNX Courses in Heidelberg

- Advanced Course 17th to 21st July
- Tutor Course 09th to 13th October

And many more training courses in the calendar “International Training Dates 2017”

KNX Sensors for commercial Buildings

Next Webinar

Visualisation, Display and Signalling

Wednesday 26th July 2017

- Morning 09:00 am Europe Time (Berlin, UTC + 2h)
- Afternoon 03:00 pm Europe Time (Berlin, UTC + 2h)

- Busch-ComfortTouch®
- Busch-SmartTouch® 7“
- Busch-ControlTouch®

* Topic is subject to change

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