

ClimaECO – Fan Coil Controller FCC/S, Room Control Unit SAF/A, ClimaECO Sensor

Boards:

Outputs: Capital letters

Inputs: small letters

Exercise:

With the Fan Coil Controller FCC/S and the Room Control Unit SAF/A room temperature control is to be created.



Parameterize the following functions in the ETS (Block Application parameters):

- Controller
- Basic Stage Heating Fan coil unit: Water heating Coil
- Basic Stage Cooling Fan coil unit: Water cooling Coil
- Type of Heating/Cooling System: 2-pipe, means heating and cooling via valve output A!

3.3.7 Training FCC/S1.3.2.1 Fan Coil Controller,0-10V,0- > Application > Application parameters	
General	<div>Device function <input checked="" type="radio"/> Controller <input type="radio"/> Actuator device</div>
+ Manual operation	The device is used with an internal controller that can control the fan coil unit and other heating/cooling systems in the same room.
- Application	KNX analog room control units in Slave mode can be used for operation.
Caution! A change to the parameterization in this section will result in an ETS reset after download	
Application parameters	
Device function	
- Temperature controller	
- Temperature controller	
Basic-stage heating	Fan coil unit: Water heating coil
Basic-stage cooling	Deactivated
Basic-stage heating	Fan coil unit: Water cooling coil
Basic-stage cooling	Deactivated
Type of heating/cooling system	<input checked="" type="radio"/> 2-pipe <input type="radio"/> 4-pipe
Heating/Cooling changeover	Via object only
Caution! A change to the parameterization in this section will result in an ETS reset after download	
+ Setpoint manager	
Actuate basic-stage heating via	Internal output A (valve)
+ Monitoring and safety	
Actuate basic-stage cooling via	Internal output A (valve)

Setpoint adjustment:

3.2.7 Training FCC/S1.3.2.1 Fan Coil Controller,0-10V,0- > Setpoint adjustment > Setpoint adjustment

General	Connect analog room control unit to physical device input a <input type="radio"/> No <input checked="" type="radio"/> Yes
+ Manual operation	
+ Application	Maximum setpoint increase <input type="text" value="3"/> K
+ Temperature controller	Maximum setpoint reduction <input type="text" value="3"/> K
+ Setpoint manager	Note: For the temperature sensor used in the analog room control unit, please parametrize the input (b-d) as follows: Temperature sensor -> NTC -> NTC 10-02
+ Monitoring and safety	The setpoint output of the analog room control unit (terminal a) must be connected to device input a.
+ Valve A	
+ Valve B	
+ Fan output	
+ Relay output	
- Setpoint adjustment	

Setpoint adjustment

Input b: (for temperature sensor of Room Control Unit SAF/A)

3.2.7 Training FCC/S1.3.2.1 Fan Coil Controller,0-10V,0- > Input b > Input b

<div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">General</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Manual operation</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Application</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Temperature controller</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Setpoint manager</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Monitoring and safety</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Valve A</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Valve B</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Fan output</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Relay output</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Setpoint adjustment</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">+ Input a</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">- Input b</div>	<div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">Input</div> <div style="padding: 2px;">Temperature sensor type</div> <div style="padding: 2px;">NTC-type</div> <div style="padding: 2px;">Temperature offset</div> <div style="padding: 2px;">Cable error compensation</div> <div style="padding: 2px;">Filter</div> <div style="padding: 2px;">Send temperature value</div> <div style="padding: 2px;">Value is sent from a change of</div>	<div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">Temperature sensor ▼</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">NTC ▼</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">NTC 20 [0...+100°C] ▼</div> <div style="border-bottom: 1px solid black; padding: 2px;">0</div> <div style="text-align: right; padding-right: 5px;">K</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">None ▼</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">Inactive ▼</div> <div style="background-color: #f0f0f0; padding: 2px; border-bottom: 1px solid black;">On change ▼</div> <div style="border-bottom: 1px solid black; padding: 2px;">1</div> <div style="text-align: right; padding-right: 5px;">K</div>
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Input b

The setpoints are set as follows, with a dead zone between heating and cooling:

3.2.7 Training FCC/S1.3.2.1 Fan Coil Controller,0-10V,0- > Setpoint manager > Setpoint manager		
General	Operating modes	Comfort, Standby, Economy, Building Protection
Manual operation	Operating mode after bus voltage recovery, ETS download and reset	Comfort
Manual operation	Comfort heating setpoint = Comfort cooling setpoint	<input checked="" type="radio"/> No <input type="radio"/> Yes
Application	Setpoint specification and adjustment	<input checked="" type="radio"/> Absolute <input type="radio"/> Relative
Application parameters	Comfort heating setpoint	21 °C
Device function	Standby heating setpoint	19 °C
Temperature controller	Economy heating setpoint	17 °C
Temperature controller	Comfort cooling setpoint	24 °C
Basic-stage heating	Standby cooling setpoint	27 °C
Basic-stage cooling	Economy cooling setpoint	29 °C
Setpoint manager	Setpoint for frost protection (building protection, heating)	7 °C
Setpoint manager	Heat protection setpoint (building protection, cooling)	35 °C

Program input d as standard binary input for switching between Heating and Cooling:

3.3.7 Training FCC/S1.3.2.1 Fan Coil Controller,0-10V,0- > Input d > Input d

General	Input	Binary signal input
+ Manual operation	Maximum dead time: 200 ms	
+ Application	Distinction between long and short operation	<input checked="" type="radio"/> No <input type="radio"/> Yes
+ Temperature controller	Open contacts: Event 0 Close contacts: event 1	
+ Setpoint manager	Activate minimum signal duration	<input checked="" type="radio"/> No <input type="radio"/> Yes
+ Monitoring and safety	1-bit group object "Disable input d"	<input checked="" type="radio"/> No <input type="radio"/> Yes
+ Valve A	Reaction on event 0	Off
+ Valve B	Reaction on event 1	On
+ Fan output	Internal connection	<input checked="" type="radio"/> No <input type="radio"/> Relay output
+ Relay output	Send status value	<input checked="" type="radio"/> On change <input type="radio"/> On change and cyclically
+ Setpoint adjustment	Scan input after download, ETS reset and bus voltage recovery	<input type="radio"/> No <input checked="" type="radio"/> Yes
+ Input a		
+ Input b		
+ Input c		
- Input d		

Input d

Assign Group object Heating/Cooling changeover of Fan Coil Controller with switch object input d:

87	Heating/Cooling changeover	Channel - Controller	Heating/Cooling Change over	6/3/8	1 bit
67	Switch	Channel - Input d	Heating/Cooling Change over	6/3/8	1 bit

ABB i-bus tool

Start the ABB i-bus tool and connect to the Fan Coil Controller FCC/S via the physical address.

- Simulation of the room temperature via the potentiometer 'Room Temperature'
- Change the setpoint via rotary knob on the room control unit SAF/A
- Change of fan speed/Auto mode via 2nd knob on the room control unit SAF/A

Test the different functions in heating and cooling mode:

Heating:

- Low room temperature → Pointer indicator for valve position and fan speed moves to the right
- High room temperature → Pointer indicator for valve position and fan speed moves to the left again

Cooling:

- High room temperature → Pointer indicator for valve position and fan speed moves to the right
- Low room temperature → Pointer indicator for valve position and fan speed moves to the left again

Check the indication instruments for valve and fan in the dead zone (no heating, no cooling).

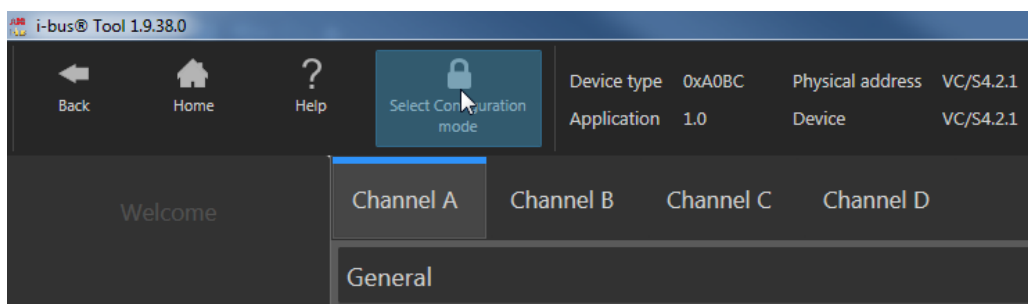
When heating or cooling, try to adjust the room temperature so that the indication instruments are in a middle position.

Take a look at the variable values for room temperature, setpoint and control value channel A in the i-bus tool.

Approach setpoint and room temperature and observe the control value, it should approach zero.

Change fan speed manually at the Room Control Unit at check on the pages input and output the behavior of FCC/S

Activate the configuration mode in the i-bus tool:

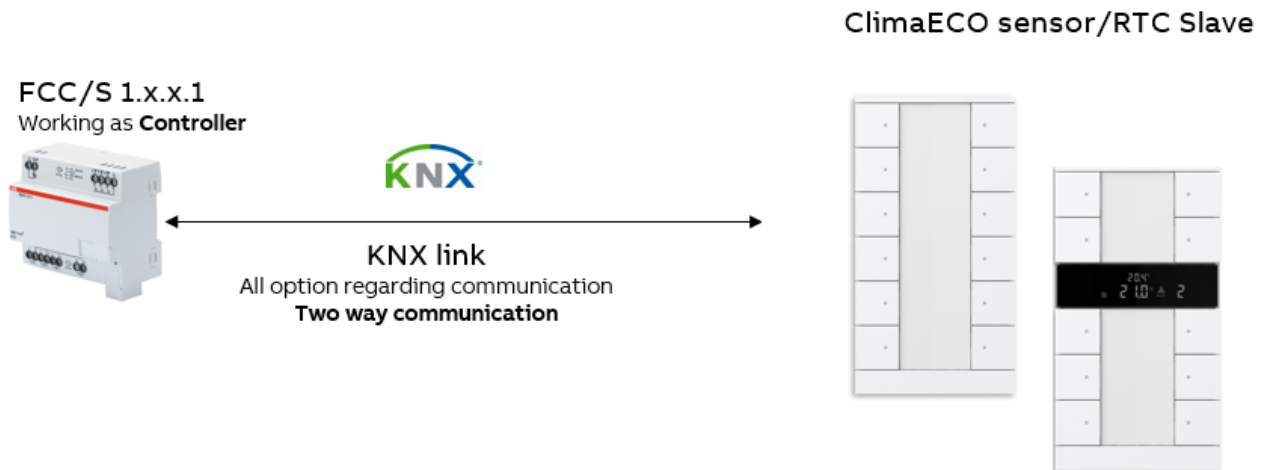


- Manually change the setpoint temperature and control value in the i-bus tool and test whether valve and fan work correctly

The i-bus tool can also be used at any time in further exercises for testing or viewing.

Please note: The simultaneous access of ETS and i-bus Tool via a USB interface is not possible.

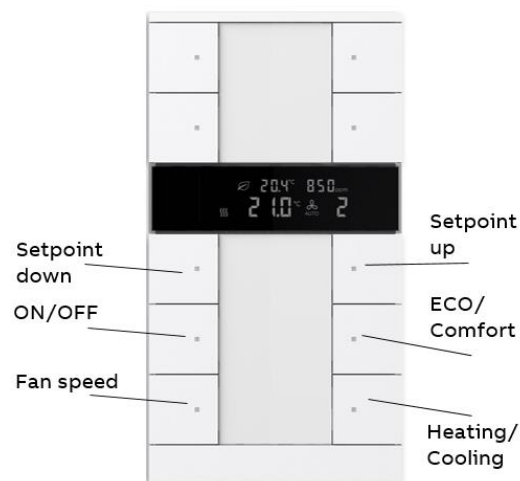
Fan Coil Controller as Controller and ClimaECO Sensor as Slave



FCC/S works as a controller, ClimaECO sensor SBC/U10.0 works as a slave. Due to the Master/Slave concept with the Master- and Slave objects in unified RTC it is relatively easy to assign the right group objects. Both heating and cooling with a Fan Coil Unit shall be implemented.

Remark: To save time you can use the already existing project 'ClimaECO sensor (Slave) with FCCS (Master) where ClimaECO Sensor and Fan Coil Controller is already preprogrammed.

Following functionality is required, operated by ClimaECO sensor:



Adjustment ClimaECO Sensor as Slave:

5.1.1 SLAVE: SBC/U10.0 HVAC/CO2 device, 10gang BE > RTC > General

+ Device settings	Device function	Slave device
+ Primary function	Additional functions/objects	<input type="radio"/> no <input checked="" type="radio"/> yes
- RTC	Delay time for read telegrams after reset (s)	5
General		

Adjustment FanCoil Controller as Master

5.1.2 CONTROLLER: FCC/S1.3.2.1 Fan Coil Controller,0-10V > Application > Application parameters

General	Device function	<input checked="" type="radio"/> Controller <input type="radio"/> Actuator device
+ Manual operation	The device is used with an internal controller that can control the fan coil unit and other heating/cooling systems in the same room.	
- Application	KNX analog room control units in Slave mode can be used for operation.	
Application parameters		

Main parameter adjustments in FCC/S under Application Parameter:

- Heating and Cooling
- 2-pipe system
- Actuate basic stage heating/cooling via internal output A (2-pipe system)
- Temperature input via group object (from ClimaECO sensor)

5.1.2 MASTER: Fan Coil Controller FCC/S1.3.2.1 Fan C > Application > Application parameters

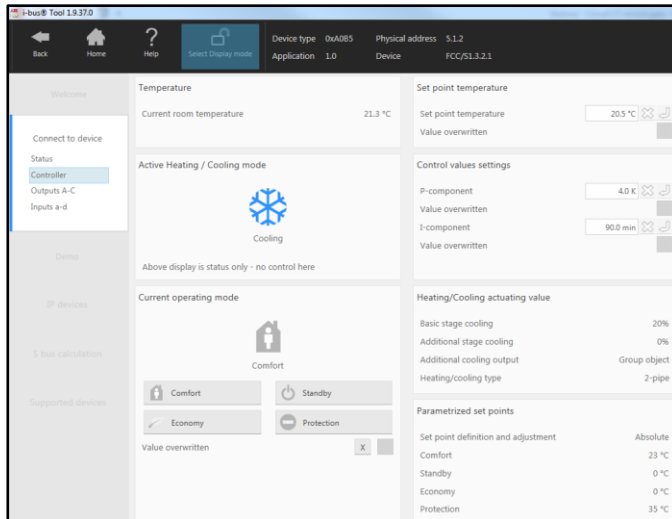
General	Device function: <input checked="" type="radio"/> Controller <input type="radio"/> Actuator device
Manual operation	The device is used with an internal controller that can control the fan coil unit and other heating/cooling systems in the same room.
Application	KNX analog room control units in Slave mode can be used for operation.
Caution! A change to the parameterization in this section will result in an ETS reset after download	
Application parameters	Basic-stage heating: Fan coil unit: Water heating coil
	Additional-stage heating: Deactivated
	Basic-stage cooling: Fan coil unit: Water cooling coil
	Additional-stage cooling: Deactivated
	Type of heating/cooling system: <input checked="" type="radio"/> 2-pipe <input type="radio"/> 4-pipe
	Heating/Cooling changeover: Via object only
Caution! A change to the parameterization in this section will result in an ETS reset after download	
	Actuate basic-stage heating via: Internal output A (valve)
	Actuate basic-stage cooling via: Internal output A (valve)
	Window status input: Via physical device input
Note: Configure in 'Input' parameter window	
	Dew point status input: Deactivated
	Fill level sensor input: Deactivated
	Temperature input: Via group object
	Number of temperature input objects: <input checked="" type="radio"/> 1 <input type="radio"/> 2

Assignment of group addresses:

Both Master and Slave have the same group object names, which have to be linked with each other:

Master: Controller FCC/S				Slave: ClimaECO sensor			
5.1.2 MASTER: Fan Coil Controller FCC/S1.3.2.1 Fan C				5.1.1 SLAVE: ClimaECO Sensor SBC/U10.0 HVAC/CO2 d			
107	Current HVAC operating mode	Channel - Controller	1 byte	2	Input DS: Date	Date	8/1/50 3 bytes
106	Controller HVAC status (master)	Channel - Controller	1 byte	3	Input DS: Time	Time	8/1/51 3 bytes
105	Controller RH+CC status	Channel - Controller	2 bytes	8	Input DS: Units switchover		1 bit
104	Confirm fan speed (master)	Channel - Controller	1 byte	21	Input RTC: On/off confirmation (Slave)	Confirm ON/OFF	8/1/2 1 bit
103	Request fan speed (master)	Channel - Controller	1 byte	22	Output RTC: Actual temperature	Actual Temperature	8/1/24 2 bytes
102	Confirm fan manually (master)	Channel - Controller	1 bit	25	Output RTC: Fault, actual temperature (slave)		1 bit
101	Request fan manually (master)	Channel - Controller	1 bit	28	Output RTC: Normal operating mode (Slave)	Operating Mode	8/1/25 1 byte
99	Confirm setpoint adjustment (master)	Channel - Controller	2 bytes	29	Input RTC: Override operating mode (Master/Slave)		1 byte
98	Request setpoint adjustment (master)	Channel - Controller	2 bytes	30	Input RTC: Window contact (master/slave)	Window Contact	8/1/27 1 bit
97	Setpoint display (master)	Channel - Controller	2 bytes	31	Input RTC: Presence detector (master/slave)		1 bit
96	Confirm On/Off (master)	Channel - Controller	1 bit	36	Input RTC: Fan coil manual confirmation (Slave)	Confirm fan manually	8/1/33 1 bit
95	Request On/Off (master)	Channel - Controller	1 bit	47	Input RTC: Condensation/fill level alarm (Master/Slave)		1 bit
94	Setpoint reached	Channel - Controller	1 bit	48	Output RTC: On/off request (slave)	Request ON/OFF	8/1/1 1 bit
89	Reset manual setpoint adjustment	Channel - Controller	1 bit	54	Input RTC: Setpoint display (slave)	Set point Display	8/1/22 2 bytes
88	Base setpoint	Channel - Controller	2 bytes	55	Output RTC: Request setpoint (slave)	Request Set point	8/1/20 2 bytes
87	Heating/Cooling changeover	Channel - Controller	1 bit	56	Input RTC: Confirm setpoint (slave)	Confirm Set point	8/1/21 1 bit
86	Activate minimum control value (basic lo.	Channel - Controller	1 bit	57	Output RTC: Heating/cooling request (slave)	Heating/Cooling Changeover	8/1/13 1 bit
85	Status Cooling	Channel - Controller	1 bit	58	Output RTC: Request fan speed level manual (slave)	Request fan manually	8/1/32 1 bit
84	Status Heating	Channel - Controller	1 bit	59	Output RTC: Request fan speed level (slave)	Request fan Speed	8/1/10 1 byte
83	Presence detector (master/slave)	Channel - Controller	1 bit	60	Input RTC: Confirm fan speed level (slave)	Confirm Fan Speed	8/1/11 1 byte
81	Operating mode override (master)	Channel - Controller	1 byte	62	Input RTC: Controller status HVAC (slave)	HVAC Status	8/1/30 1 byte
80	Operating mode normal (master)	Channel - Controller	1 byte				
79	Current setpoint	Channel - Controller	2 bytes				
76	External temperature 1	Channel - Controller	2 bytes				

Test the functions in ABB i-bus Tool by connecting with FCC/S:

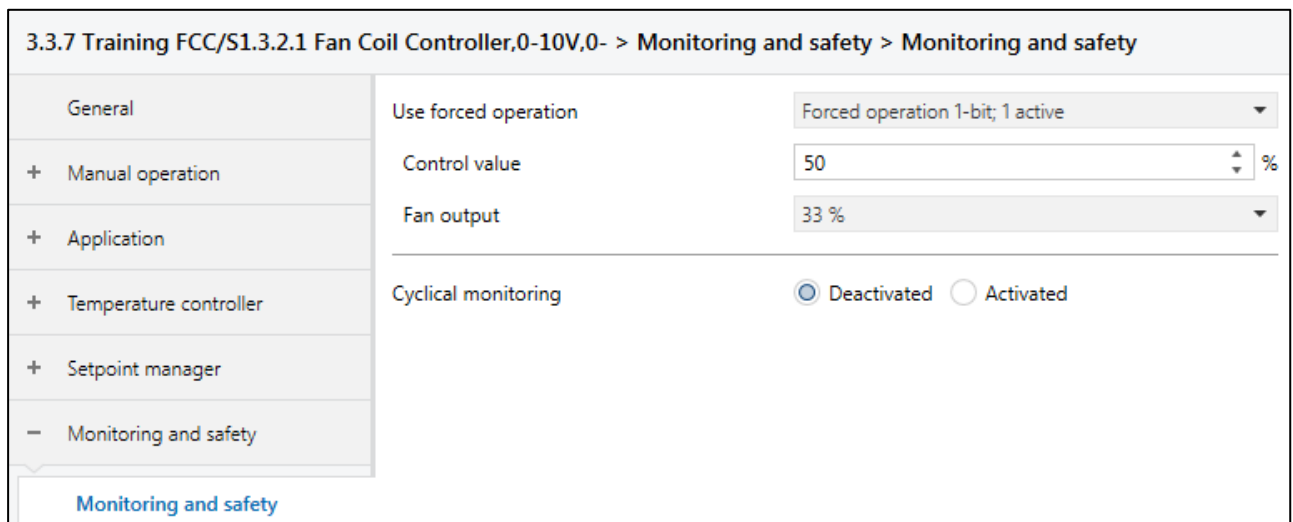


Check and change further functions in ClimaECO Sensor:

- Display settings
- Additional LED functions
- Primary function (Function executed by pressing any button in case of disabled device, e.g. ceiling light)

Further functions in the Fan Coil Controller

1. Function forced operation, program it as 1 bit with 50% control value and fan output 33%. Forced operation should e.g. be active when the boiler or chiller is faulty and will be executed in this exercise via the binary input d or an external KNX pushbutton.



By using a common group address, establish the connection between input d or a KNX pushbutton and the object forced operation channel A.

Check the function using i-bus tool and the pointer instruments.

2. Function Window contact, program input d as a window contact. When the window is open, the valve should be closed.

Note: To prevent assignment of group addresses and to set the controller to frost or heat protection, adjust the parameters as follows:

3.3.7 Training FCC/S1.3.2.1 Fan Coil Controller,0-10V,0- > Application > Application parameters

General	Device function <input checked="" type="radio"/> Controller <input type="radio"/> Actuator device The device is used with an internal controller that can control the fan coil unit and other heating/cooling systems in the same room. KNX analog room control units in Slave mode can be used for operation.
+ Manual operation	
- Application	
Application parameters	Caution! A change to the parameterization in this section will result in an ETS reset after download Basic-stage heating Fan coil unit: Water heating coil ▼ Additional-stage heating Deactivated ▼ Basic-stage cooling Fan coil unit: Water cooling coil ▼ Additional-stage cooling Deactivated ▼ Type of heating/cooling system <input checked="" type="radio"/> 2-pipe <input type="radio"/> 4-pipe Heating/Cooling changeover Via object only
Device function	
+ Temperature controller	
+ Setpoint manager	
- Monitoring and safety	
Monitoring and safety	Caution! A change to the parameterization in this section will result in an ETS reset after download Actuate basic-stage heating via Internal output A (valve) ▼ Actuate basic-stage cooling via Internal output A (valve) ▼ Window status input Via physical device input ▼
+ Valve A	
+ Valve B	
+ Fan output	

Check the function with i-bus tool, setpoint heating has to be 7 degrees (frost protection), setpoint cooling 35 degrees (heat protection)

3. Function elektrical heater in FanCoil

Instead of the water-driven heating, an electrical heater is installed in the Fan Coil unit and will be switched via relay output D.

The parameters for basic heating must be changed accordingly:

5.5.2 FCC/S1.1.2.1 Fan Coil Controller, PWM, 3-speed, manual operation, MDRC > Application > Application parameters

General	Device function	<input checked="" type="radio"/> Controller <input type="radio"/> Actuator device
+ Manual operation	The device is used with an internal controller that can control the fan coil unit and other heating/cooling systems in the same room. KNX room devices in Slave mode can be used for operation.	
- Application	Basic heating stage	Fan coil unit: electric heater (in fan coil unit)
Application parameters	Additional heating stage	Deactivated
Device function	Basic cooling stage	Deactivated
+ Temperature controller	Actuate basic heating stage via	<input checked="" type="radio"/> Internal relay output <input type="radio"/> Group object
+ Setpoint manager	Switch relay output independently of fan speed (including when fan = 0)	<input type="radio"/> No <input checked="" type="radio"/> Yes

Parameter 'Switching of the relay independent of the fan stage' = **no** avoids running electrical heater without active fan (Risk of overheating and fire)

If **yes**, the group object switch relay appears

If **no**, relay is only on in case of running fan and only status object visible.

Finally test the function together with ABB i-bus tool.