

BUILDING AUTOMATION COMPETENCE CENTER EUROPE

ClimaECO – Valve Drive Controller VC/S and Room Control Unit SAF/A

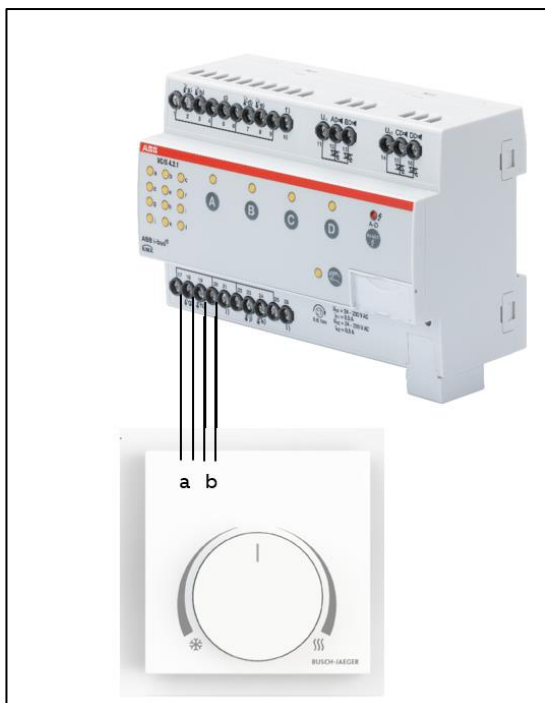
Boards:

Outputs: Capital letters

Inputs: small letters

Exercise:

With the Valve Drive Controller VC/S and the Room Control Unit SAF/A room temperature control is to be created.



Parameterize the following functions for channel A in the ETS.

Block Application parameters:

- Controller
- Basic Stage Heating: Convector
- Basic Stage Cooling: deactivated

3.3.11 Training VC/S4.2.1 Valve Drive Controller,manual o > Channel A > Application parameters	
General	Channel function <input checked="" type="radio"/> Controller channel <input type="radio"/> Actuator channel
+ Manual operation	Channel is used with internal controller to control heating/cooling systems in the same room. KNX analog room control units in Slave mode can be used for operation.
- Channel A	
Application parameters	Caution! A change to the parameterization in this section will result in an ETS reset after download
Channel function	Basic-stage heating <input type="text" value="Convector (e.g. radiator)"/>
+ Temperature controller	Additional-stage heating <input type="text" value="Deactivated"/>
Setpoint manager	Basic-stage cooling <input type="text" value="Deactivated"/>

Block Valve output A:

- Valve output channel A: Open/Close Signal

3.3.11 Training VC/S4.2.1 Valve Drive Controller,manual o > Channel A > Valve output A	
General	Valve output <input type="text" value="Open/Close signal"/>
+ Manual operation	Valve drive operating principle, de-energized <input checked="" type="radio"/> Closed <input type="radio"/> Open
- Channel A	
Application parameters	Open if control value greater than or equal to <input type="text" value="1"/> %
Channel function	Valve drive opening/closing time <input type="text" value="10"/> s
+ Temperature controller	Send status values <input type="text" value="After a change or on request"/>
Setpoint manager	Enable manual valve override <input checked="" type="radio"/> No <input type="radio"/> Yes
Monitoring and safety	
Valve output A	Valve purge <input type="text" value="Deactivated"/>

Setpoint adjustment channel A:

3.2.11 Training VC/S4.2.1 Valve Drive Controller,manual o > Channel A > Setpoint adjustment

General	Connect analog room control unit to physical device input <input type="radio"/> No <input checked="" type="radio"/> Yes
+ Manual operation	
- Channel A	
Application parameters	
Channel function	
+ Temperature controller	
Setpoint manager	
Monitoring and safety	
Valve output A	
Setpoint adjustment	

Maximum setpoint increase 3 K
Maximum setpoint reduction 3 K

Note:

For the temperature sensor used in the analog room control unit, please parametrize the input b as follows:
Temperature sensor -> NTC -> NTC 10-02

The setpoint output of the analog room control unit (terminal a) must be connected to device input a.

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

3.2.11 Training VC/S4.2.1 Valve Drive Controller, manual o > Channel A > Input b

<div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">General</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">+ Manual operation</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">- Channel A</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">Application parameters</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">Channel function</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">+ Temperature controller</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">Setpoint manager</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">Monitoring and safety</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">Valve output A</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">Setpoint adjustment</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black;">Input a</div> <div style="background-color: #f0f0f0; padding: 2px 5px; border-bottom: 1px solid black; color: blue;">Input b</div>	<table style="width: 100%;"> <tr> <td style="width: 30%;">Input</td> <td style="width: 70%;">Temperature sensor ▼</td> </tr> <tr> <td>Temperature sensor type</td> <td>NTC ▼</td> </tr> <tr> <td>NTC type</td> <td>NTC 20 [0...+100 °C] ▼</td> </tr> <tr> <td>Temperature offset</td> <td>0 K</td> </tr> <tr> <td>Cable error compensation</td> <td>None ▼</td> </tr> <tr> <td>Filter</td> <td>Inactive ▼</td> </tr> <tr> <td>Send temperature value</td> <td>After a change ▼</td> </tr> <tr> <td>Value is sent from a change of</td> <td>1 K</td> </tr> </table>	Input	Temperature sensor ▼	Temperature sensor type	NTC ▼	NTC type	NTC 20 [0...+100 °C] ▼	Temperature offset	0 K	Cable error compensation	None ▼	Filter	Inactive ▼	Send temperature value	After a change ▼	Value is sent from a change of	1 K
Input	Temperature sensor ▼																
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Value is sent from a change of	1 K																

ABB i-bus tool

Start the ABB i-bus tool and connect to the Valve Drive Controller via the physical address.

- Simulation of the room temperature via the potentiometer 'Room Temperature'
- Changing the setpoint via rotary knob on the Room Control Unit SAF/A

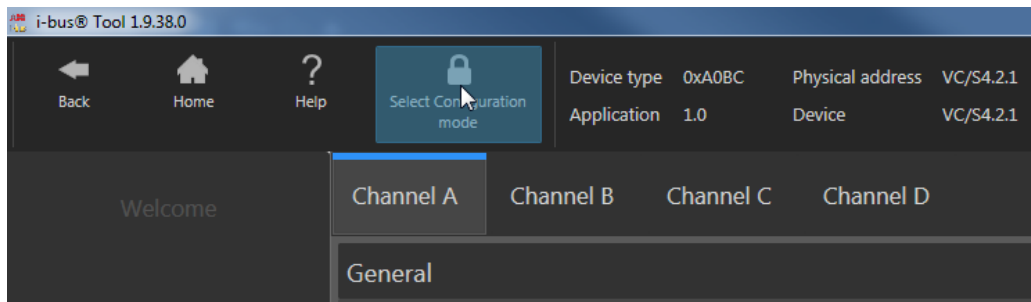
Test the different functions:

- low room temperature → valve open (red LED on)
- high room temperature → valve closed (red LED off)

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

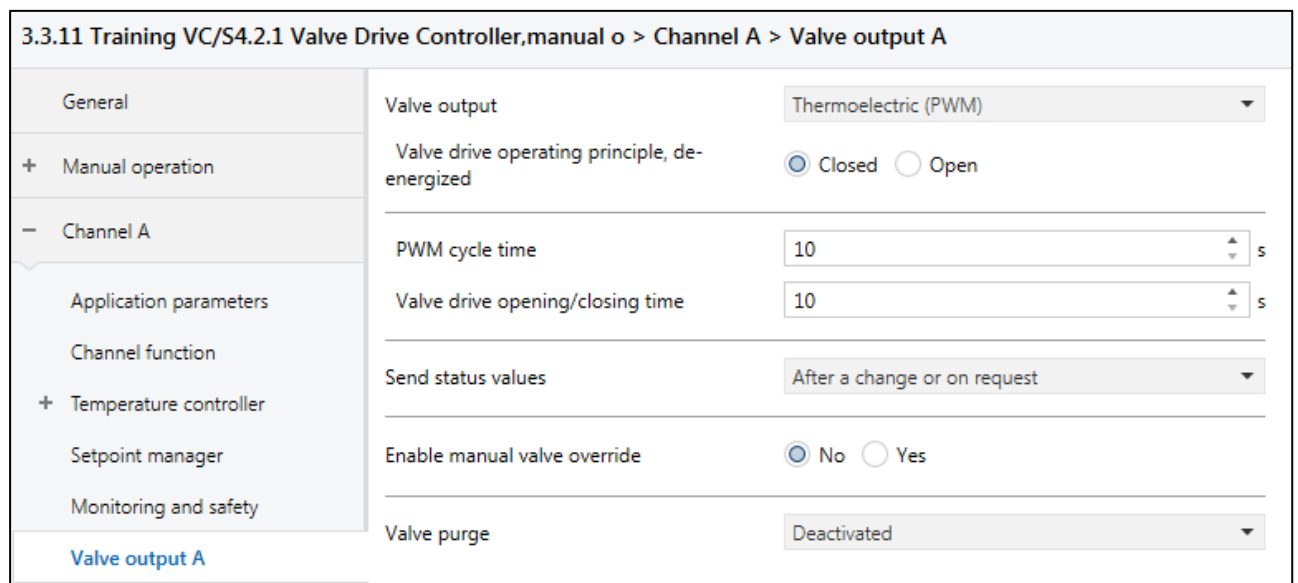
- Approach setpoint and room temperature and observe the control value.

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 the valve with the LED works correctly.

In the ETS, change the setting of the valve output to Pulse Width Modulation (PWM) with cycle time 10 s, valve drive opening/closing time also 10s:



Set the setpoint and room temperature so that a control value of approx. 50% results and check whether the opening and closing time of the valve is approx. 50% each.

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.

Further functions in the Valve Drive Controller

1. Forced operation function, program as 1 bit with valve position 30%. The forced operation should e.g. be active when the boiler is faulty, it will be executed in this exercise via the binary input d of channel B or an external KNX pushbutton.

3.3.11 Training VC/S4.2.1 Valve Drive Controller, manual o > Channel A > Monitoring and safety

General	Use forced operation	Forced operation, 1 bit; 1 active
+ Manual operation	Control value	30 %
- Channel A	Cyclical monitoring	<input checked="" type="radio"/> Deactivated <input type="radio"/> Activated
Application parameters		
Channel function		
+ Temperature controller		
Setpoint manager		
Monitoring and safety		

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 with the LED on the board.

2. Function Window contact, program input c 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 protection, adjust the parameters as follows:

Application parameters	Basic-stage heating	Convector (e.g. radiator)
Channel function	Additional-stage heating	Deactivated
+ Temperature controller	Basic-stage cooling	Deactivated
Setpoint manager	Caution! A change to the parameterization in this section will result in an ETS reset after download	
Monitoring and safety	Actuate basic-stage heating via	<input checked="" type="radio"/> Internal channel output (valve) <input type="radio"/> Group object
Valve output A	Window contact input	Via physical device input
Setpoint adjustment		

3. Function temperature limit sensor for underfloor heating:

Set input e (channel B) as temperature sensor via PT1000:

3.2.11 Training VC/S4.2.1 Valve Drive Controller,manual o > Channel B > Input e

General	Input	Temperature sensor
+ Manual operation	Temperature sensor type	PT1000 [-30...+110 °C]
+ Channel A	Temperature offset	0 K
- Channel B	Cable error compensation	None
Application parameters	Filter	Inactive
Channel function	Send temperature value	After a change
+ Temperature controller	Value is sent from a change of	1 K
Setpoint manager		
Monitoring and safety		
Valve output B		
Setpoint adjustment		
Input d		
Input e		

Under Basic heating, set the temperature limitation to 30 degrees as follows:

3.2.11 Training VC/S4.2.1 Valve Drive Controller, manual o > Channel A > Temperature controller > Basic-stage heating

General	Basic-stage heating control value type	PI continuous (0...100%)	
+ Manual operation	P-proportion	1.5	K
	I-proportion	100	Min
- Channel A	Extended settings	<input type="radio"/> No <input checked="" type="radio"/> Yes	
Application parameters	Control value difference for sending control value	5%	
Channel function	Send control value cyclically (0 = cyclical sending disabled)	15	Min
- Temperature controller	Max. control value	100	%
Basic-stage heating	Min. control value (basic load)	0	%
Setpoint manager	Activate temperature limitation	<input type="radio"/> No <input checked="" type="radio"/> Yes	
Monitoring and safety	Limit temperature	30	°C
Valve output A	Limit-temperature hysteresis	1	K
Setpoint adjustment	I-proportion with temperature limitation	<input checked="" type="radio"/> Freeze <input type="radio"/> Reset	
Input a	Input for temperature limit sensor	Via group object	
Input b			

Assign group addresses:

86	Basic-stage heating limit temperature	Channel A - Controller	Temp Limit	3/4/6
112	Temperature	Channel B - Input e	Temp Limit	3/4/6

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

What happens to the control value when the temperature limitation is exceeded?

Option: Valve Drive Controller as Actuator

Change the parameterization of the VC/S so that the device works only as an actuator:

3.2.11 Training VC/S4.2.1 Valve Drive Controller, manual o > Channel A > Application parameters		
General	Channel function	<input type="radio"/> Controller channel <input checked="" type="radio"/> Actuator channel
+ Manual operation	The channel is used as a pure actuator and receives its control values from a controller (e.g. analog room control unit).	
- Channel A	Caution! A change to the parameterization in this section will result in an ETS reset after download	
Application parameters	Basic-stage heating	<input type="radio"/> Deactivated <input checked="" type="radio"/> Activated
Channel function	Basic-stage cooling	<input type="radio"/> Deactivated <input checked="" type="radio"/> Activated
Monitoring and safety	Type of heating/cooling system	2-pipe
Valve output A	Toggle heating/cooling	Only via object

Use a normal KNX Room Temperature Controller 6138/11 as controller and implement the same functions and tests with the i-bus tool as described above.

Please note: Physical address of 6138/11 is already programmed with 1.1.101, please don't change.

