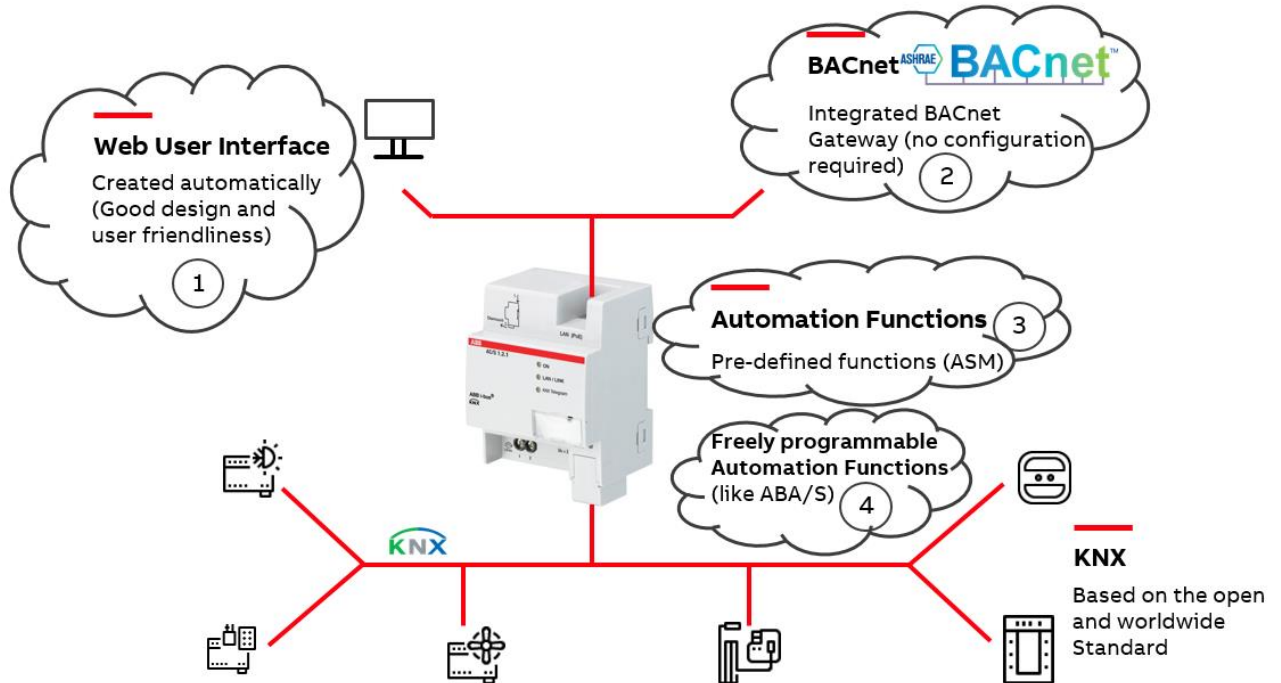


# ClimaECO – Applications Controller AC/S


## Application Controller AC/S 1.x.1



## Exercise:

The following functions are to be created with the Application Controller AC/S 1.2.1:

1. Create **ASM (Application Specific Module) Room** with Fan Coil and with the already programmed functions in Fan CoilController FCC/S and ClimaECO sensor SBC/U

 Room 1

Room setpoint: 20.0 °C

Room temperature: 20.0 °C

- a. Select the room ASM and parametrize the HVAC hardware (FanCoil Unit) and which values shall be shown and operated in WebUI:

Parameters	
General	
Name	School Director
Description	
Reinstall	<input checked="" type="checkbox"/>
Interfaces	
Room setpoint temper...	Display+set (slave) DP...
Room setpoint temper...	Absolute setpoint tem...
Controller On/Off	Display+set (slave)
Heating/cooling opera...	Display
Operating mode	Display
Window status	<input checked="" type="checkbox"/>
Presence detector	<input checked="" type="checkbox"/>
Rel. humidity	<input checked="" type="checkbox"/>
CO2 value	<input checked="" type="checkbox"/>
Fan coil unit	2-pipe heating/cooling
Fan coil unit, additiona...	None
Fan coil unit, fresh air...	None
Fan coil unit, fan speed	Display+set (slave) DP...
Fan coil unit, type of fan	Continuous fan 0...100%
Fan coil unit, dew poin...	<input type="checkbox"/>
Fan coil unit, level sens...	<input type="checkbox"/>
Radiator	None
Floor heating	None
Cooling ceiling	None
Split unit	<input type="checkbox"/>

- b. Assign group addresses between the objects of Controller (Example: FCC/S) and the objects of the ASM in the AC/S:

#### AC/S 1.2.1 (Example):

67	Input: Fan coil unit, fan manual confirm (slave)	School Director	Confirm fan manually	8/1/33	1 bit
66	Input: Fan coil unit, fan speed confirm (slave)	School Director	Confirm Fan Speed	8/1/11	1 byte
62	Input: Heating/cooling operating type	School Director	Heating/Cooling Changeover	8/1/13, 6/3/8	1 bit
44	Input: Fan coil unit, valve	School Director	Status control value heating	8/1/50, 8/1/51	1 byte
60	Input: On/Off confirm (slave)	School Director	Confirm ON/OFF	8/1/2	1 bit
5	Input: Actual room temperature	School Director	Actual Temperature	8/1/24	2 bytes
6	Input: Setpoint temperature display (slave)	School Director	Set point Display	8/1/22	2 bytes
27	Output: Fan coil unit, fan speed request (slave)	School Director	Request fan Speed	8/1/10	1 byte
40	Input: Operating mode	School Director	Operating Mode Scheduler	6/3/9	1 byte
41	Output: Fan coil unit, fan manual request (slave)	School Director	Request fan manually	8/1/32	1 bit
43	Input: Window status	School Director	Window Contact	8/1/27	1 bit
61	Output: On/Off request (slave)	School Director	Request ON/OFF	8/1/1	1 bit
46	Input: Presence detector (Slave)	School Director	Presence School Director	8/1/60	1 bit
48	Input: Rel. humidity	School Director	Humidity tenton	8/1/41	1 byte
45	Input: CO2 value	School Director	CO2 tenton	8/1/42	2 bytes
58	Output: Setpoint temperature request (slave)	School Director	Request Set point	8/1/20	2 bytes
59	Input: Setpoint temperature confirm (slave)	School Director	Confirm Set point	8/1/21	2 bytes

#### FCC/S 1.3.2.1 (Example):

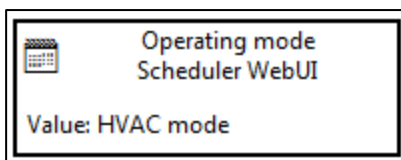
83	Presence detector (master/slave)	Channel - Controller	Presence School Director	8/1/60	1 bit
85	Status Cooling	Channel - Controller			1 bit
86	Activate minimum control value (basic load)	Channel - Controller			1 bit
87	Heating/Cooling changeover	Channel - Controller	Heating/Cooling Changeover	8/1/13, 6/3/8	1 bit
89	Reset manual setpoint adjustment	Channel - Controller			1 bit
94	Setpoint reached	Channel - Controller			1 bit
95	Request On/Off (master)	Channel - Controller	Request ON/OFF	8/1/1	1 bit
96	Confirm On/Off (master)	Channel - Controller	Confirm ON/OFF	8/1/2	1 bit
97	Setpoint display (master)	Channel - Controller	Set point Display	8/1/22	2 bytes
98	Request setpoint adjustment (master)	Channel - Controller	Request Set point	8/1/20	2 bytes
99	Confirm setpoint adjustment (master)	Channel - Controller	Confirm Set point	8/1/21	2 bytes
101	Request fan manually (master)	Channel - Controller	Request fan manually	8/1/32	1 bit
102	Confirm fan manually (master)	Channel - Controller	Confirm fan manually	8/1/33	1 bit
103	Request fan speed (master)	Channel - Controller	Request fan Speed	8/1/10	1 byte
104	Confirm fan speed (master)	Channel - Controller	Confirm Fan Speed	8/1/11	1 byte
105	Controller RHCC status	Channel - Controller			2 bytes
106	Controller HVAC status (master)	Channel - Controller	HVAC Status	8/1/30	1 byte
107	Current HVAC operating mode	Channel - Controller			1 byte
108	Comfort heating setpoint	Channel - Controller			2 bytes
109	Comfort cooling setpoint	Channel - Controller			2 bytes
110	Economy heating setpoint	Channel - Controller	New Setpoint Economy	6/0/7	2 bytes
111	Economy cooling setpoint	Channel - Controller			2 bytes
112	Standby heating setpoint	Channel - Controller	New Setpoint Standby	6/0/9	2 bytes
113	Standby cooling setpoint	Channel - Controller			2 bytes
84	Status Heating	Channel - Controller			1 bit
114	Building protection heating setpoint	Channel - Controller	New Setpoint Building Protection	6/0/8	2 bytes
115	Building Protection cooling setpoint	Channel - Controller			2 bytes
80	Operating mode normal (master)	Channel - Controller	Operating Mode Scheduler	6/3/9	1 byte
79	Current setpoint	Channel - Controller	Current Set point	8/1/23	2 bytes
76	External temperature 1	Channel - Controller	Actual Temperature	8/1/24	2 bytes
75	Actual temperature	Channel - Controller			2 bytes
72	Status Control value Basic-stage cooling	Channel - Controller	Status control value heating	8/1/50	1 byte
70	Status Control Value Basic-stage heating	Channel - Controller	Status control value cooling	8/1/51	1 byte

- b. **Programm Application Controller via ETS** and access the device via ABB i-bus tool or in a browser with IP address of AC/S (read out via Device Info in ETS)

Login: - Username: admin  
- Password: Admin123

Check in WebUI the functions.

2. Create **ASM Operating Mode scheduler WebUI**: Change between comfort and standby in one room via time program



- a. Assign Group addresses to objects in AC/S. The same group address can be used which already connects the objects in Master (FCC/S) and slave (ClimaECO sensor)

AC/S output operating mode scheduler:

36	Output: State	Operating mode Scheduler WebUI	Operating Mode Scheduler	6/3/9
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AC/S Room ASM:

36	Output: State	Operating mode Sche...	Operating Mode Scheduler	6/3/9
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FCC/S:

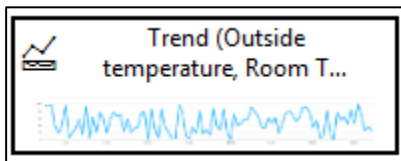
80	Operating mode normal (master)	Channel - Controller	Operating Mode Scheduler	6/3/9
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ClimaECO sensor:

58	Output	RTIC: Normal operating mode (slave)	Operating Mode Scheduler	6/3/9
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- b. Check in WebUI the functions by changing the operating mode for the actual day to standby. In the room view it will be shown.  
Important: Time and date have to be synchronized in AC/S with actual data. Use the group objects for date and time in AC/S to send via group monitor in ETS the correct values

3. **ASM Trend:** Record outside temperature (simulated via potentiometer Return Flow temperature HCC/S) and fan speed of the room with fan coil control:



- a. Parametrize the number of channels, how often data shall be recorded and define the data point type:

Parameters	
<b>General</b>	
Name	Trend (Outside temperature,
Description	
Reinstall	<input checked="" type="checkbox"/>
<b>Interfaces</b>	
Range	Every 5 seconds of the... ▼
Number of trends	4 ▼
<b>Trend1</b>	
Name	Outside Temperature
Main data point type	9.xxx [2-byte float value] ▼
Data point type	9.001 [temperature (°C)] ▼
<b>Trend2</b>	
Name	Control Value Class room1
Main data point type	1.xxx [1-bit] ▼
Data point type	1.* ▼

- b. Take an ASM value to provide outside temperature to the AC/S:

	Outside temperature
Value: temperature (°C)	

c. Parametrize the ASM value as follows:

Parameters	
<b>General</b>	
Name	Outside temperature
Description	
Reinstall	<input checked="" type="checkbox"/>
<b>Interfaces</b>	
Template	Freely configurable ▼
ASM socket	Output ▼
WebUI	Display ▼
KNX	Input from KNX ▼
BACnet	Readable by BACnet ▼
Main data point type	9.xxx [2-byte float value] ▼
Data point type	9.001 [temperature (°C)] ▼
Use value after restart	Last value ▼
Read value at startup	<input type="checkbox"/>
<b>Initial values</b>	
Initial value	0 °C

d. Assign group address between the object of AC/S and HCC/S (take output return flow temperature with PT1000 to simulate outside temperature):

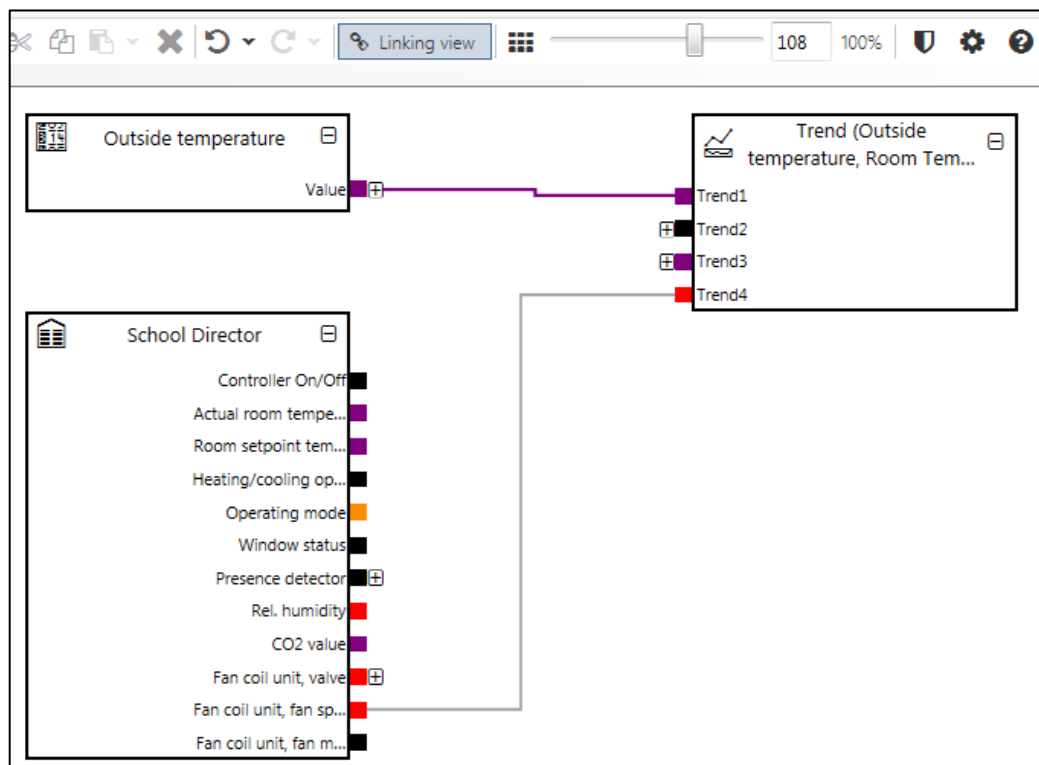
Value ASM outside temperature:

37	Input: Value	Outside temperature	Outside Temperature	6/3/0
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HCC/S:

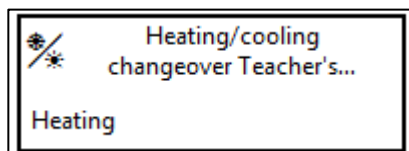
39	Return flow temperature	Channel A - Input b	Outside Temperature	6/3/0
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- e. Use 'Linking view' in AC/S to connect the values to the trend. If possible use internal connection, e.g. for control value FCC/S available from ASM Room:



- f. Check in WebUI the functions by opening the ASM Trend. Adjust the x-axis with 15 min., change the values and reopen the ASM Trend to see the new values.

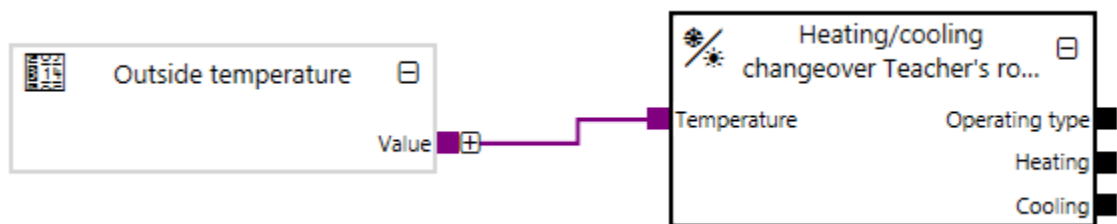
4. **ASM Heating Cooling Change over** for room with Fan Coil and heating/cooling function.  
Target is to switch between heating/cooling depending on outside temperature.



- a. Adjust the parameter:

Parameters	
<b>General</b>	
Name	Heating/cooling changeover
Description	
Reinstall	<input checked="" type="checkbox"/>
<b>Interfaces</b>	
Change over based on	Outside temperature
Cooling if greater than	24.0 °C
Heating if less than	17.0 °C
<b>Initial values</b>	
Initial value	Heating

- b. Connect in linking view outside temperature with ASM Heating/Cooling change over



- c. Assign group addresses to all objects:

AC/S:

17	Output: Operating type	Heating/cooling changeover Teacher's room and School Director	Heating/Cooling Change over	6/3/8
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FCC/S:

87	Heating/Cooling cha... Channel - Controller	Heating/Cooling Change over	6/3/8
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ClimaECO sensor:

57	Output	RTC: Heating/cooling request (slave)	Heating/Cooling Change over	6/3/8
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- d. Check in WebUI the functions by changing the outside temperature via potentiometer return flow HCC/S and monitor it in the ASM Room.



6. Option: (Minimum 2 rooms should be created)

**ASM Heating/Cooling Distribution Circuit** for HCC/S.

One function of this ASM is the evaluation of the maximum control value of all connected rooms to adjust the best flow temperature (Room involvement)

 Heating distribution circuit
Setpoint: 60 °C
Supply temp.: 60 °C
Return temperature: 40 °C
Valve 85%

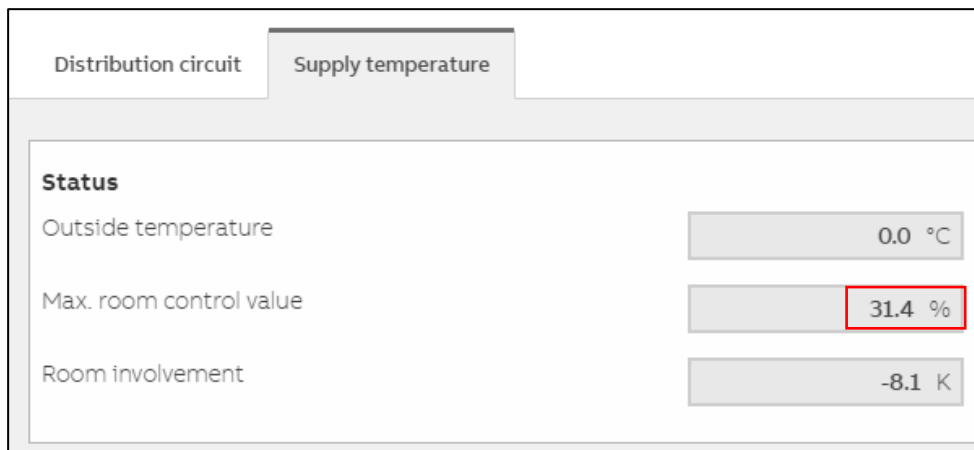
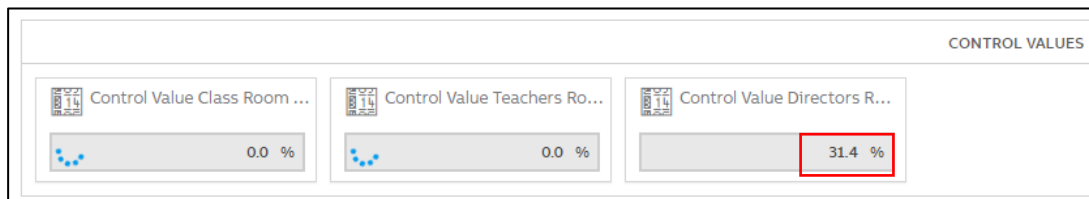
a. Adjust the parameters:

Parameters	
<b>General</b>	
Name	Heating distribution circuit
Description	
Reinstall	<input checked="" type="checkbox"/>
<b>Supply setpoint temperature</b>	
Supply temperature co...	<input checked="" type="checkbox"/>
Supply setpoint tempe...	Calculated weather... ▼
Calculation formula	Custom ▼
Max. supply temperat...	80 °C
Room involvement	<input checked="" type="checkbox"/> <b>The control value of all valves of this heating distribution circuit must be connected to the ASM input socket!</b>
Increase supply tempe...	5 K
Decrease supply temp...	-10 K
Optimum room contro...	80 %
Controller proportiona...	30 %
Room involvement cal...	00:00:00
Switch off if no room...	<input type="checkbox"/>
Custom supply temper...	<input type="button" value="Edit"/>
Enable heating distrib...	<input type="checkbox"/>
<b>Pump</b>	
Double pump	<input type="checkbox"/>
Override by WebUI	<input type="checkbox"/>
Pump display operatin...	<input checked="" type="checkbox"/>
Pump display pump fa...	<input checked="" type="checkbox"/>
Display pump repair s...	<input checked="" type="checkbox"/>
<b>Valve</b>	
Valve type	3-way valve (mixing... ▼
Status Valve purge	<input type="checkbox"/>
Valve override disable/...	<input type="checkbox"/>

- b. In 'Linking view' control values of each Room ASM will be linked to the input Room control values of the ASM for HCC/S. The integrated MAX - evaluation considers only the maximum control value of all connected rooms.



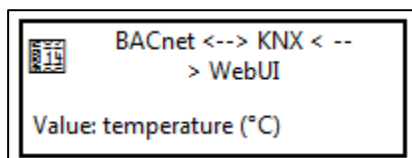
c. Observe the situation in WebUI by adjusting different control values:



## 7. BACnet Interface

A communication between KNX and BACnet shall be established as an individual datapoint. Communication in both directions, means value shall be read- and writable by BACnet. In addition the value can be shown in WebUI:

a. Take an ASM Value with 2 Byte float value and parametrize it as follows:



Parameters	
<b>General</b>	
Name	BACnet <--> KNX <--> Web
Description	
Reinstall	<input checked="" type="checkbox"/>
<b>Interfaces</b>	
Template	Freely configurable
ASM socket	Output
WebUI	Display+set
KNX	Input + output
BACnet	Read + writable by BA...
Main data point type	9.xxx [2-byte float value]
Data point type	9.001 [temperature (°C)]
Use value after restart	Initial value
Send value to KNX by...	1 °C
Send cyclically values t...	<input checked="" type="checkbox"/>
Send cyclically values t...	01:00:00
Read value at startup	<input type="checkbox"/>
<b>Initial values</b>	
Initial value	0 °C

As real value take e.g. flow temperature for Heating Cooling Circuit Controller and assign group address:

In-/Output: Value	BACnet <--> KNX <--> WebUI	6/3/0	2 bytes
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b. Check in WebUI, KNX and BACnet the value which has to change in parallel

The screenshot displays the ABB AC/SL2.1 Application Controller interface. The top navigation bar shows the current view is 'KNX/WEBUI/BACNET'. The main area is divided into two panes. The left pane, titled 'Objekte', lists the objects in the system, including 'Value KNX / BACnet / WebUI Value' with a value of 2.24 °C. The right pane, titled 'Analog Value', shows the configuration for the selected object. The 'Object Identifier' is set to 'AnalogValue' and the 'Object Name' is 'Value KNX / BACnet / WebUI Value'. The 'Present Value' is 2.24, and the 'Units' are '[52, DegreesC]'. The 'Status Flags' are set to 'InAlarm', 'Fault', and 'Overridden'. The 'Reliability' is set to 'Reliability [0, NoFaultDetected]'. The 'Event State' is set to 'Normal'. The bottom pane shows the 'Diagnostics' window with a table of events.

#	Time	Service	Flags	Prio	Source Add	Source Name	Destination	Destination Name	Route Type	DPT	Info
1	3/9/2018 10:21:08.236	from bus		Low	7.6.20	A5/54.113 Analogue Input, 4-fol.	3/3/3	New group address	6	GroupValueW...	9.001 tem... 18 °C   2.24 °C

- c. To see values on BACnet a BACnet viewer is needed, e.g.
- BACeye free version with no change of values, only reading:  
<http://www.baceye.com/kostenlos-testen>
  - Yet Another BACnet Explorer (available on Internet, no experiences from ABB)