



# ZoneEase VAV Room Comfort Control Solution

## Contents

Protocol Implementation Conformance Statement - PICS	2
BACnet object description	4

## Protocol Implementation Conformance Statement – PICS

### General information

<b>Date:</b>	18. January 2018
<b>Vendor Name:</b>	BELIMO Automation AG
<b>Vendor ID:</b>	423
<b>Product Name:</b>	ZoneEase VAV
<b>Product Model Number:</b>	..V-BAC-..., e.g. LMV-BAC-001
<b>Applications Software Version:</b>	01.06.0200
<b>Firmware Revision:</b>	08.03.0002
<b>BACnet Protocol Revision:</b>	12
<b>Product Description:</b>	ZoneEase VAV Room Comfort Control Solution incl. VAV and CO2 Control

**BACnet Standard Device Profile:** BACnet Application Specific Controller (B-ASC)

### BACnet Interoperability Building Blocks supported:

Data Sharing - ReadProperty-B (DS-RP-B)  
 Data Sharing - ReadPropertyMultiple-B (DS-RPM-B)  
 Data Sharing - WriteProperty-B (DS-WP-B)  
 Data Sharing - WritePropertyMultiple-B (DS-WPM-B)  
 Data Sharing - COV-B (DS-COV-B)  
 Device Management - DynamicDeviceBinding-B (DM-DDB-B)  
 Device Management - DynamicObjectBinding-B (DM-DOB-B)  
 Device Management - DeviceCommunicationControl-B (DM-DCC-B)

<b>Segmentation Capability:</b>	No
<b>Data Link Layer Options:</b>	MS/TP master, baud rates: 9'600, 19'200, 38'400, 76'800, 115'200
<b>Device Address Binding:</b>	No static device binding supported
<b>Networking Options:</b>	None
<b>Character Sets Supported:</b>	ISO 10646 (UTF-8)
<b>Gateway Options:</b>	None
<b>Network Security Options:</b>	Non-secure Device

## PICS

(continued)

## Object processing

Object type	Optional properties	Writeable properties
Analog Input [AI]	Description COV Increment	COV Increment
Analog Output [AO]	Description COV Increment Relinquish Default	Present Value COV Increment
Analog Value [AV]	Description COV Increment	Present Value COV Increment
Binary Input [BI]	Description Active Text Inactive Text	
Binary Output [BO]	Description Active Text Inactive Text Relinquish Default	Present Value
Binary Value [BV]	Description Active Text Inactive Text	Present Value
Device	Description Location Active COV Subscriptions Max Master Max Info Frames Profile Name	Object Identifier Object Name Location Description APDU Timeout (0...60000) Number Of APDU Retries (0...10) Max Master (1...127) Max Info Frames (1...255)
Multi-state Input [MI]	Description State Text	
Multi-state Output [MO]	Description State Text Relinquish Default	Present Value
Multi-state Value [MV]	Description State Text	Present Value

- The device does not support the services CreateObject and DeleteObject.
- The specified maximum length of writable strings is based on single-byte characters.
  - Object name 32 char
  - Location 64 char
  - Description 64 char
- The HVAC application checks the ranges of the Present Value and the COV Increment of the Analog Objects. For this reason, there is the following behavior:
  - No error message, if the limits have been exceeded
  - Too high values are set to the range maximum
  - Too small values are set to the range minimum
- For Analog Value objects that are classified as read only, there is the following behavior:
  - HVAC application overwrites the present value that has been written with the Write Property Service.
  - In this case, no error message will be sent.
- The valid range of the Max Master property is 1...127. If the value 0 is written to the Max Master property, then the value will be automatically limited to the minimal value of the valid range, which is the value 1.

## Service processing

- The device supports the DeviceCommunicationControl services. No password is required.
- A maximum of 5 active COV subscriptions with a lifetime of 1...28800 sec. (8 hours) are supported.

## BACnet object description

Object Name	Object Type / Instance	Description Comment	Values	Values Default	COV Increment	COV Increment Default	Access
Device_Name	Device[x]	ZoneEase VAV Room Comfort Cnt. Solution incl. VAV and CO2 Cnt.					
RelPosDmp	AI[1]	Relative Damper Position in %	0...100	-	0.01...100	1	R
AbsPosDmp	AI[2]	Absolute Damper Position in degree	0...95	-	0.01...95	1	R
RelPosValve	AI[7]	Relative Position of modulating Reheat Valve in %	0...100	-	0.01...100	1	R
RelAirFlow	AI[10]	Relative Airflow in % based on Vmax	0...100	-	0.01...100	1	R
AbsAirFlow_m3h	AI[12]	Absolute Airflow in m3/h	0...99999	-	0.01...99999	1	R
AbsAirFlow_UnitSel	AI[19]	Absolute Airflow in selected unit → MV[121]	0...99999	-	0.01...99999	1	R
RmT_C	AI[20]	Room Temperature in degree C	4...40	-	0.01...40	1	R
DeltaP_Pa	AI[29]	Differential Pressure in Pa	-20...500	-	0.1...500	1	R
CO2Concentration	AI[61]	CO2 Concentration in ppm	0...9000	-	1...9000	10	R
SpAbsVAVAirFlow_UnitSel	AI[109]	Setpoint Absolute Airflow in selected unit (VAV App only) → MV[121]	0...99999	-	0.01...99999	100	R
SpAbsAirFlow_UnitSel	AI[110]	Setpoint Absolute Airflow (internally applied) in selected unit → MV[121]	0...9999	-	0.01...9999	1	R
OverrideValue	AO[10]	Override Control Value	0...9999	0	0.1...9999	10	C
BoostModeTime	AV[1]	Boost Mode Time	0...300	10	0.1...300	1	W
EcoModeHeatSpShift	AV[2]	ECO Mode Heating Setpoint Shift	0...8	4	0.1...8	1	W
EcoModeCoolSpShift	AV[3]	ECO Mode Cooling Setpoint Shift	0...8	4	0.1...8	1	W
TempCtrlPBand	AV[31]	Temperature Controller P-Band	0...100	2	0.01...100	1	W
TempCtrlTn	AV[32]	Temperature Controller Integral Time in s	0...3600	60	1...3600	1	W
DeadbandTemp	AV[33]	Deadband Temperature	0.1...5	1	0.1...5	1	W
CO2CtrlPBand	AV[34]	CO2 Controller P-Band (CO2 App only)	0...1000	0	1...1000	1	W
CO2CtrlTn	AV[35]	CO2 Controller Integral Time in s (CO2 App only)	0...3600	600	1...3600	1	W
DeadbandCO2	AV[36]	Deadband CO2 (CO2 App only)	0...500	100	1...500	1	W
SpRmTHL_C	AV[84]	High Limit for Room Temperature Setpoint in degree C	21...30	28	0.1...30	1	W
SpRmTLL_C	AV[85]	Low Limit for Room Temperature Setpoint in degree C	10...20	18	0.1...20	1	W
Vmin_m3h	AV[86]	Minimum Airflow in m3/h	0... Vmax_m3h	0	0.1... 99999	100	W
Vmax_m3h	AV[87]	Maximum Airflow in m3/h	0... Vnom_m3h	0	0.1... 99999	100	W
Vmin_UnitSel	AV[88]	Minimum Airflow in selected unit (Read only) → MV[121]	0... Vmax_UnitSel	-	0.1... 99999	100	R
Vmax_UnitSel	AV[89]	Maximum Airflow in selected unit (Read only) → MV[121]	0... Vnom_UnitSel	-	0.1... 99999	100	R
SpAbsVAVAirFlow_m3h	AV[102]	Setpoint Absolute Airflow in m3/h (VAV App only)	Vmin_m3h ... Vmax_m3h	0	0.01... 99999	100	W

SpRmT_C	AV[108]	Room Temperature Setpoint in degree C	SpRmTLL_C ... SpRmTHL_C	22	0.1...30	1	W
SpCO2	AV[111]	CO2 Setpoint in ppm (CO2 App only)	0...2000	1000	1... 2000	1	W
Vnom_m3h	AV[112]	Nominal Airflow in m3/h	0...99999	0	0.1... 99999	100	W
Vnom_UnitSel	AV[119]	Nominal Airflow in selected unit (Read only) → MV[121]	0...99999	-	0.1... 99999	100	R
TrunkNoCloud	AV[200]	BACnet Trunk Number Cloud	0...9999	0	1...9999	10	W

Object Name	Object Type / Instance	Description	Values	Default	Access
FrostModeState	BI[4]	Frost Mode State	0: inactive 1: active	-	R
Heater1State	BI[10]	Electrical Heater 1 / On-Off Valve State	0: Off 1: On	-	R
Heater2State	BI[11]	Electrical Heater 2 State	0: setting OFF 1: setting ON	-	R
FanState	BI[12]	Fan State	0: setting OFF 1: setting ON	-	R
RmOccupState	BI[15]	Presence Sensor State	0: not occupied 1: occupied	-	R
SyncStart	BO[2]	Start Sync procedure <i>(if write 1:startSynch -&gt; read MI[106] StatusActuator is State 3:sync in progress)</i>	0: no Sync 1: start Sync	0	C
Changeover	BV[1]	Winter / Summer Changeover (Warm / Cool Air from AHU)	0: Summer (Cooling) 1: Winter (Heating)	0	W
RUOpRights	BV[2]	Room Unit Operating Rights	0: room unit access disabled 1: room unit access enabled	1	W
SyncPos	BV[10]	Position for Sync	0: 0% (damper closed) 1: 100% (damper open)	1	W
OccupSensEn	BV[13]	Enable Occupancy Sensor	0: disabled 1: enabled	0	W
OffModeDmpPos	BV[21]	OFF Mode Damper Position	0: damper closed 1: damper controlled to Vmin	1	W

Object Name	Object Type / Instance	Description	Values	Default	Access
StatusSystem	MI[101]	Status VAV Standalone System	1: System OK 2: No valid Application selected 3: Room Temperature Sensor broken 4: Room Temperature out of range 5: dead band temperature not reached within defined time 6: CO2 sensor error 7: CO2 Value out of range 8: dead band CO2 not reached within defined time	-	R
StatusActuator	MI[106]	Status Actuator	1: Actuator OK 2: adaption in progress 3: sync in progress 4: motor stop 5: Actuator setpoint position cannot be reached (error) 6: flow with closed damper position 7: Actuator setpoint position cannot be reached (warning)	-	R
StatusMPBus	MI[108]	Status MP Bus and Devices	1: MP Bus OK 2: MP Bus not alive 3: MP Bus room unit/ceiling unit not alive 4: MP Bus I/O module not alive 5: MP Bus reheat valve not alive	-	R
StatusPressure	MI[109]	Status Pressure Sensor and Duct Static	1: Pressure OK 2: dP sensor error broken 3: dP sensor Out of range 4: dP sensor wrong connected/back flow detected 5: Not enough pressure from AHU	-	R
Override	MO[1]	Override Control (override control value as AO)	1: None 2: Open damper 3: Close damper 4: Airflow Vmax 5: Airflow Vmin 6: Airflow Vnom 7: MotorStop 8: Pos. damper in % 9: Airflow in % 10: Airflow in m3/h 11: Airflow in {unit sel} 12: Temp. SP in degree Celsius 13: CO2 SP in ppm	1	C
SystemMode	MV[1]	System Mode (Off, Active, ECO, Boost)	1: OFF 2: active 3: ECO 4: boost	2	W
ApplicationSel	MV[2]	Application Selection	1: no sel. 2: c 3: c or h 4: c+el. rh1 5: c+el. rh2 6: c+on/off rh 7: c+mod.rh 8: CO2 app 9: VAV app 10: c+p-f 11: c+p-f+el. rh1 12: c+p-f+el. rh2 13: c+p-f+rh 14: c+p-f+mod-rh 15: c+s-f 16: c or h+s-f 17: c+s-f+el. rh1 18: c+s-f+el. rh2 19: c+s-f+rh 20: c+s-f+mod-rh	1	W
PowerOnMode	MV[3]	Power On Mode	1: no action 2: Synchronization 3: Adaption	2	W
RUDisplaySet	MV[4]	Display Setting for Room Unit	1: Room temp. and setpoint display 2: Setpoint display only 3: room temperature only	1	W
UnitSelAirFlow	MV[121]	Unit Selection (Airflow)	1: m3/h 2: l/s 3: cfm	1	W

Access: R = Read, W = Write, C = Commendable with priority array