

# ExactLogic BACnet Communicating Zone Damper EXL01710 Sequence Datasheet



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DataSheet Rev 1.12.312/4.3  
June 19, 2020

## Operating Sequence

### Standard Occupied

During normal occupied operation the display will show the current room temperature. The first press of either right pair of keys will show the current room setpoint. Additional presses will adjust the setpoint up or down by 0.5 degrees. The zone damper keypad will time out after 5 seconds without a key press, and the display will switch back to displaying the room temperature.

The left pair of keys allows for the adjustment of the fan speed. The current mode is shown with the first key press; additional key presses will show the adjustment to the mode. AV-62 is used to select the number of fan speeds, and AV-63 will show what speed the fan is currently set to. Refer to the table below for the values of AV-62 (Fan Mode Status) and AV-63 (Fan Speed Status)

AV-62	Mode
0	AUTO Only
1	AUTO-ON
2	OFF-AUTO-ON
3	OFF-1-2-AUTO
4	OFF-1-2-3-AUTO

AV-63	Fan Speed
0	OFF
1	Fan Speed 1
2	Fan Speed 2
3	Fan Speed 3
4	AUTO
5	ON

### Internal/External Thermistor Control

The thermostat control sequence can use the internal thermistor or an external thermistor connected to AI-2. Setting BV-67 to OFF (default) the thermostat will use the internal thermistor. Setting BV-67 to ON the control sequence will use the external thermistor.

The current controlling temperature is located at AV-20. This value will be displayed on the LCD of the thermostat and should be used on any workstation displays.

### Control Sequence – Heat / Cool

The occupancy of the thermostat is controlled by BO-5. When active the thermostat will maintain its occupied setpoint. The deadband is controlled by the cooling/heating offset (default 1 degree). The damper control signal is controlled by the heating or cooling signals. The proper signal is selected based on 'Warm Air in Duct' (BV-8) via BACnet or by a Discharge Air Sensor. With an optional Discharge Air Sensor, the 'Warm Air in Duct Status' (BV-18) decision can be made locally. This allows the thermostats to operate on a standalone mode. The 'Local Warm Air in Duct SP' (AV-44) is used to trigger the 'Warm Air in Duct Status' (BV-18) when using a Discharge Air Sensor. The heating and cooling signals can be scaled, allowing for different damper positions in the heating and cooling modes. The heating signal can be scaled using AV 50 and AV-51. The cooling signal can be scaled using AV-52 and AV-53.

Digital Heat/Cool outputs are controlled by the heat or cooling signals. When the signal is above 15% the output will turn on, when the signal goes below 5% the output will turn off. There is a 3 minute minimum on/off delay to prevent short cycling.

### Standard Unoccupied

During unoccupied operation the thermostat will continue to display the room temperature. When in an unoccupied state pressing one of the right pair of keys will display a message indicating the zone damper is in night mode, preventing the setpoint from being adjusted. To adjust the room setpoint when unoccupied the thermostat must be set to night override.

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## Control Sequence

When in the unoccupied mode, the zone will be controlled by the unoccupied cooling/heating setpoints. The fan and cooling/heating will operate the same as the occupied control sequence.

## Vacancy

If a room is known to be vacant, vacant setpoints can be used to override the unoccupied setpoints. By setting BV-70, a room will be controlled by the vacant cooling/heating setpoints (AV-64/65).

## Night Override

Set the night override by pressing one of the left pair of keys. The display will switch to allow the user to set the night override time. Additional presses of the keys will adjust the time up or down by 0.5 hour increments. The night override can be increased up to the override limit set at AV-73, the default is 5 hours. When the zone damper is in night override, the first press of one of the left pair of keys will display the override time remaining. Additional key presses will add/subtract 0.5 hours to the time that was remaining. When the timer reaches zero the zone damper will return to the unoccupied mode.

In the night override mode, the right pair of keys can be used to adjust the room setpoint. The zone damper keypad will time out after 5 seconds without a key press, and the display will switch back to displaying the room temperature.

The zone damper can be set to night override by writing a value to AV-74 through BACnet. The value can not exceed the night override limit set at AV-73. If the night override time is set higher than the limit, the night override timer will be set to the limit. The night override limit default is 5 hours.

If the zone is commanded to the occupied mode while in night override, the override timer will be cleared to zero and the zone will enter the occupied mode.

## Control Sequence

When the thermostat is in the override mode, the room will be controlled by the occupied cooling/heating setpoints. The fan and cooling/heating stages will operate the same as the occupied control sequence.

Note: There is no fan control in the override mode. The fan will run in the AUTO mode.

## Vacancy

If a room is known to be vacant, vacant setpoints can be used to override the unoccupied setpoints. By setting BV-70 to active, a room will be controlled by the vacant cooling/heating setpoints (AV-64/65).

## Motion/Humidity Option Card

The Motion/Humidity Option Card can be used for Motion Only, Humidity Only, or Motion/Humidity together. In order to use the Motion Sensor (either stand alone or with Humidity), BV-64 must be set to ACTIVE. The Humidity Sensor can be enabled by setting AV-31 to 4. These settings will automatically provide the required voltage to power the sensors. The motion sensor status will show on BI-1. Once the motion sensor does not sense motion, the delay at AV-81 is used to delay the ACTIVE to INACTIVE command to the Scheduled Occupied command at BO-5, priority array entry 10. The Humidity value is shown on AI-1. The Humidity Sensor will automatically be scaled by setting AV-31 to 4.

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## ***Disabling of the Splash, Setup Menu, or Field Service Mode***

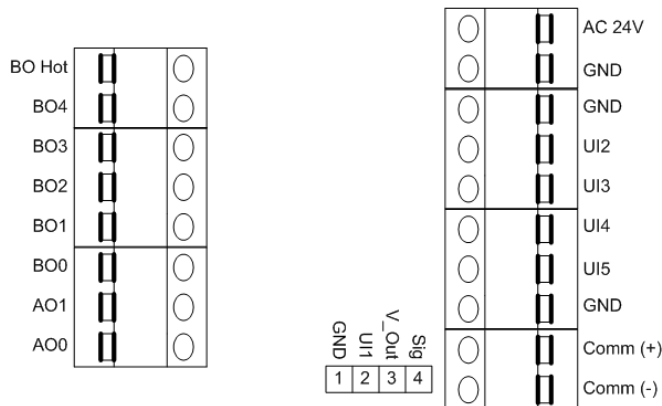
When the thermostat is installed in a public location there may be times when the setup of the thermostat will need to be disabled to prevent tenants from changing the configuration while still giving them access to change the setpoints and control after hours modes. The following points have been added to allow this:

BV-57 = Setting ACTIVE will disable the "EXACTLOGIC" splash display after key presses

BV-58 = Setting ACTIVE will disable access to the Setup Menu where the Network/MAC/Baud Rate/etc are set

BV-59 = Setting ACTIVE will disable access to the Field Service Mode where Time/Schedule/Setpoints/etc are set

# Installation



- AC 24V ..... 24VAC/DC Hot
- GND ..... Neutral/Ground
- GND ..... Neutral/Ground
- UI2 ..... Universal Input 2
- UI3 ..... Universal Input 3
- UI4 ..... Universal Input 4
- UI5 ..... Universal Input 5
- GND ..... Neutral/Ground
- Comm (+) ..... Network Positive Line
- Comm (-) ..... Network Negative Line
- BO Hot ..... Com, 24VAC Hot for relays\*
- BO4 ..... Relay 5 Output, 24VAC/DC
- BO3 ..... Relay 4 Output, 24VAC/DC
- BO2 ..... Relay 3 Output, 24VAC/DC
- BO1 ..... Relay 2 Output, 24VAC/DC
- BO0 ..... Relay 1 Output, 24VAC/DC
- AO1 ..... Analog Output 1, 0-10V
- AO0 ..... Analog Output 0, 0-10V

Fig. 4

\*Note: Thermostat Common Relay point (BO Hot) usually 24VAC/DC or R

- 1 ..... Neutral/Ground
- 2 ..... Universal Input 1
- 3 ..... Analog Output 2
- 4 ..... Reserved

# Output Wiring

Output/Label	Function
<b>BO0</b>	Fan
<b>BO1</b>	Heating Command
<b>BO2</b>	Cooling Command
<b>BO3</b>	Damper Open
<b>BO4</b>	Damper Close
<b>AO0</b>	Damper Signal 0-10 Vdc 0-100%
<b>AO1</b>	

## Reserved BACnet Points

The following are points reserved by the zone damper for operation.

### Analog Inputs

Instance	Object Name	Description	Read/Write	Default
AI-0	Room Temp	Reading of the internal thermistor in counts. 0-1024	R	variable
AI-1	Humidity	Reading from the Humidity sensor add-on card	R	variable
AI-2	Ext. Room Temp	Optional external room temperature input	R	variable
AI-3	Discharge Air Temperature	Reading of the Discharge Air Sensor in counts. 0-1024	R	variable
AI-4	Analog Input 04	Reading of the external input 4 in counts. 0-1024	R	variable
AI-5	Analog Input 05	Reading of the external input 5 in counts. 0-1024	R	variable

### Analog Outputs

Instance	Object Name	Description	Read/Write	Default
AO-0	Damper Signal	Damper 0-10V output	R/W	0.0
AO-1	Analog Output 01	0-10V output	R/W	0.0
AO-2	Analog Output 02	Variable 0-14VDC, 150mA output	R/W	0.0

### Analog Values

Instance	Object Name	Description	Read/Write	Default
AV-0	Mode of Operation	The mode that the zone damper is currently in. 0 = Heat Mode 1 = Cool Mode 2 = Idle 3 = Afterhours 4 = Unoccupied Idle 5 = Unoccupied Heat Mode 6 = Unoccupied Cool Mode	R	4
AV-1				
AV-2				
AV-3				
AV-4	Current Htg SP	The setpoint that controls heating. If the room temperature goes below this setpoint the zone damper will enter heating mode.	R	60.0°F/16°C
AV-5	Current Clg SP	The setpoint that controls cooling. If the room temperature goes above this setpoint the zone damper will enter cooling mode.	R	80.0°F/27°C
AV-6	Heating SP	The setpoint used for heating during occupied mode. This setpoint is calculated by AV-90 (Current SP) – AV-94 (Heating Offset)	R	72.0°F/22.5°C
AV-7	Cooling SP	The setpoint used for cooling during occupied mode. This setpoint is calculated by AV-90 (Current SP) + AV-93 (Cooling Offset)	R	74.0°F/23.5°C
AV-8	Heating Signal	Heating signal status before being scaled	R	0%
AV-9	Cooling Signal	Cooling signal status before being scaled	R	0%
AV-10				

AV-11				
AV-12				
AV-13				
AV-14				
AV-15	Htg Damper Signal	The scaled heating signal used for damper control	R	0%
AV-16	Clg Damper Signal	The scaled cooling signal used for damper control	R	0%
AV-17	Damper Signal	The heating or cooling signal used to determine the damper position. The point "Warm Air in Duct", BV-8, determines which signal to use.	R	0%
AV-18				
AV-19				
AV-20	Room Temp	Selected from either AI-0 or AI-2. BV-67 is used for selection. This is the value displayed on the LCD of the thermostat and should be used to display the temperature on any workstation display.		
AV-21				
AV-22				
AV-23				
AV-24				
AV-25	Damper % Open	Percentage that the damper is open, 0-100%	R	0%
AV-26	Cooling Deviation	The difference in the zone temperature from cooling setpoint		Varies
AV-27	Heating Deviation	The difference in the zone temperature from heating setpoint		Varies
AV-28	Deviation from SP	The difference in the zone temperature from setpoint, determined by whether the zone is heating or cooling	R	Varies
AV-29	Zone Scan	Numerical representation to tell the mode the zone is in. Used for workstation graphics (100 = Full Heat, -100 = Full Cool)	R	0%
AV-30	AI-0 Setup	Parameter used to set the input type. 0 = counts 1 = temperature 2 = 4-20mA 3 = 0-5V 4 = 0-10V 5 = pulse	R	1
AV-31	AI-1 Setup	See AV-30	R	0
AV-32	AI-2 Setup	See AV-30	R	1
AV-33	AI-3 Setup	See AV-30	R	1
AV-34	AI-4 Setup	See AV-30	R	0
AV-35	AI-5 Setup	See AV-30	R	0
AV-36				
AV-37				
AV-38				
AV-39				
AV-40	Heating Kp	Proportional constant for Heating PI Loop	R/W	12
AV-41	Heating Ki	Integral Constant for Heating PI Loop	R/W	1
AV-42	Cooling Kp	Proportional constant for Cooling PI Loop	R/W	12
AV-43	Cooling Ki	Integral Constant for Cooling PI Loop	R/W	1
AV-44	Local Warm Air in Duct SP	Setpoint used to trigger the Warm Air in Duct Signal (BV-18), when using a local DAT Sensor.	R/W	70°F
AV-45	Output Minimum	Used to scale the analog output. This is the minimum voltage the AO will output. (i.e. 2-10V valve	R/W	0V



		or damper)		
AV-46	Damper Deadband	The deadband used to determine when to open or close the damper	R/W	5%
AV-47	Damper Time	The amount of time to open the damper from 0% open to 100% open	R/W	90 sec
AV-48				
AV-49				
AV-50	Max Heating Signal	Maximum damper position on the heating mode	R/W	100%
AV-51	Min Heating Signal	Minimum damper position on the heating mode	R/W	20%
AV-52	Max Cooling Signal	Maximum damper position on the cooling mode	R/W	100%
AV-53	Min Cooling Signal	Minimum damper position on the cooling mode	R/W	20%
AV-54				
AV-55				
AV-56				
AV-57				
AV-58	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	1.6
AV-59	Ave Time Base	Factor used to average the room temperature. A small number will allow the room temperature to change faster over time. A large number will cause the room temperature to change slower over time.	R	100
AV-60	Calibration Offset	The calibration offset for the internal thermistor.	R	variable
AV-61	Space Alarm Offset	This offset +/- the Current Cooling/Heating SP is used to determine if the space is too warm/cold, and set an alarm if necessary.	R/W	5.0°F
AV-62	# of Fan Speeds	Select the number of fan speeds for a multispeed fan. 0 = Auto Only 1 = AUTO - ON 2 = Off - AUTO - ON 3 = Off-1-2-AUTO 4 = Off-1-2-3-AUTO	R/W	0
AV-63	Current Fan Speed	The fan speed the thermostat is currently running. 0 = OFF 1 = Fan Speed 1 2 = Fan Speed 2 3 = Fan Speed 3 4 = AUTO 5 = ON	R	4
AV-64	Vacant Clg SP	Used in Hotel Mode. When a room is known vacant, the setpoint can be set below the unoccupied setpoint.	R/W	85.0°F
AV-65	Vacant Htg SP	Used in Hotel Mode. When a room is known vacant, the setpoint can be set below the unoccupied setpoint.	R/W	55.0°F
AV-66	Space Setpoint	The occupied room setpoint	R/W	73.0°F
AV-67	Occupied SP Hi Limit	The maximum occupied room setpoint allowed.	R/W	85.0°F
AV-68	Occupied SP Lo Limit	The minimum occupied room setpoint allowed	R/W	55.0°F
AV-69	Cooling Offset	The offset from Room Setpoint used to calculate the Occupied Cooling SP	R/W	1.0°F
AV-70	Heating Offset	The offset from Room Setpoint used to calculate the	R/W	1.0°F



		Occupied Heating SP		
AV-71	Unoccupied Clg SP	The cooling setpoint used when the thermostat is unoccupied.	R/W	80.0°F
AV-72	Unoccupied Htg SP	The heating setpoint used when the thermostat is unoccupied.	R/W	60.0°F
AV-73	After Hours Limit	The maximum hours the thermostat is allowed to run during afterhours time. Setting this will set the thermostat to occupied operation. (0-99.9 hrs)	R/W	5.0 hrs
AV-74	After Hours Timer	The current amount of afterhours time left.	R	0.0 hrs
AV-75	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	1
AV-76	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-77	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-78	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-79	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-80	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-81	Motion OFF Delay	The amount of time to delay the ON->OFF transition of the motion sensor occupied command after no motion is detected	R/W	900 sec
AV-82	Setpoint Inc/Dec	Setpoint Increment / De-increment Value for Setpoint adjustment at the room thermostat	R/W	.5
AV-83				
AV-84				
AV-100	Analog Value 100	<b>Internal thermistor display descriptor.</b> The present value is automatically transferred. The AV description holds the descriptor to display.	R	variable
AV-101	Analog Value 101	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display.	R/W	
AV-102	Analog Value 102	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-103	Analog Value 103	<b>Discharge Air Temperature</b> descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-104	Analog Value 104	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-105	Analog Value 105	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-106	Analog Value 106	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-107	Analog Value 107	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-108	Analog Value 108	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	

AV-109	Analog Value 109	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-110	Analog Value 110	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-111	Analog Value 111	Display descriptor. Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	
AV-112	Analog Value 112	<b>Outside Air Display descriptor.</b> Transfer the value to display to the present value. The AV description holds the descriptor to display	R/W	

## Binary Inputs

Instance	Object Name	Description	Read/Write	Default
BI-0	Binary Input 00		R	
BI-1	Motion	Motion sensor status from the add-on card	R	
BI-2	Binary Input 02		R	
BI-3	Binary Input 03		R	
BI-4	Binary Input 04		R	
BI-5	Opt. Occupied Relay	Optional occupancy relay input	R	

## Binary Outputs

Instance	Object Name	Description	Read/Write	Default
BO-0	Fan	Digital output for fan control	R/W	OFF
BO-1	Heat Command	Digital output for heating control	R/W	OFF
BO-2	Cool Command	Digital output for cooling control	R/W	OFF
BO-3	Damper Open	Digital output to open the zone damper	R/W	OFF
BO-4	Damper Close	Digital output to close the zone damper	R/W	OFF
BO-5	Scheduled Occupied	Logical point only. Used for scheduling purposes. INACTIVE is unoccupied.	R/W	OFF

## Binary Values

Instance	Object Name	Description	Read/Write	Default
BV-0	Bad Room Sensor	Alarm for a bad internal thermister	R	OFF
BV-1	H/C Mode	Sequence point to show analog heating or cooling. OFF = Cooling ON = Heat	R	OFF
BV-2				
BV-3				
BV-4				
BV-5				
BV-6				
BV-7				
BV-8	Warm Air in Duct	Use to determine if a heating mode is allowed	R	OFF
BV-9	Space Alarm Delay	Delay used to prevent a space alarm after receiving an occupied command. The delay is 7200 sec	R	OFF
BV-10	Program Status	Used to determine if the sequence was loaded correctly on a BACnet Restore or power up.	R	OFF
BV-11				
BV-12				
BV-13				
BV-14	Night Heat Request	The zone has been unoccupied for a minimum of 10 minutes, and the below the Night Heat Setpoint.	R	OFF
BV-15	Night Cool Request	The zone has been unoccupied for a minimum of 10 minutes, and the below the Night Cool Setpoint.	R	OFF
BV-16	Night Heat/Cool Request	BV-14 or BV-15 is ACTIVE, triggering the fan to start for unoccupied heat/cooling.	R	OFF
BV-17				
BV-18	Warm Air in Duct Status	Set ACTIVE by BV-8 or by use of an optional Discharge Air Sensor. Local DAT SP is AV-44.	R	OFF
BV-19				
BV-20				
BV-21				
BV-22	Too Warm Status	Status of the Too Warm Alarm before checking the Space Alarm Delay	R	OFF
BV-23	Too Cool Status	Status of the Too Warm Alarm before checking the Space Alarm Delay	R	OFF
BV-24	Space To Warm Alarm	The space temperature has been below the Room Set point (AV-90) – Space Alarm Offset (AV-82) for at least 7200 seconds.	R	OFF
BV-25	Space To Cool Alarm	The space temperature has been above the Room Set point (AV-90) + Space Alarm Offset (AV-82) for at least 7200 seconds.	R	OFF
BV-26				
BV-27				
BV-28				
BV-29				
BV-30				
BV-31				
BV-32				
BV-33				
BV-34				

BV-35				
BV-36				
BV-37				
BV-38				
BV-39				
BV-40	Occupied Status	The status of this point switches the zone dampers occupancy settings. ON when the zone damper is in Occupied Setpoint Mode or After Hours Mode.	R	OFF
BV-41	Opt. Start Warmup	A Warmup command has been sent to the zone damper. When ON the zone damper will switch to occupied settings.	R/W	OFF
BV-42	Opt. Start Cooldown	A Cooldown command has been sent to the zone damper. When ON the zone damper will switch to occupied settings.	R/W	OFF
BV-43	Occ Set point Mode	The zone damper has been commanded occupied via BO-5, or a Warmup/Cooldown command has been sent via BV-41/BV-42.	R	ON
BV-44	After Hours Status	The zone damper has been set to after hours mode. When ON the zone damper will switch to occupied settings.	R	OFF
BV-45	Reserved	This point is reserved for internal zone damper use and its value cannot be changed	R	OFF
BV-46				
BV-47				
BV-48				
BV-49	Update Descriptors	When ON descriptor changes are sent to the thermostats LCD, this point will auto reset to OFF.	R/W	OFF
BV-50				
BV-51	BI for Occupancy	ON = BI-5 will be used to indicate zone occupancy OFF = BI-5 is not used for occupancy	R/W	OFF
BV-52				
BV-53				
BV-54				
BV-55				
BV-56				
BV-57	Disable Splash	When ACTIVE, the "EXACTLOGIC" splash will not show after key presses	R/W	OFF
BV-58	Disable Setup Menu	When ACTIVE, there will be no access to the Setup Menu where the Network/MAC/Baud Rate is set	R/W	OFF
BV-59	Disable FSM Menu	When ACTIVE, there will be not access to the Field Service Mode where the Time/Schedule/Point Access is set	R/W	OFF
BV-60				
BV-61				
BV-62				
BV-63				
BV-64	Enable Motion	When ACTIVE, the power to the Motion add-on card is set to the proper voltage	R/W	OFF
BV-65				
BV-66	Disable Unit	Used by user to override all output off	R/W	OFF
BV-67	Room Temp	When OFF, the internal thermistor is selected for	R/W	OFF

	Select	the control sequence. When ON, an external thermistor attached to AI-2 is selected for control of the sequence		
BV-68	Backlight Off/On	When ON the LCD backlight will remain on	R/W	OFF
BV-69	Fan Op Mode	Controls if the fan will cycle or run continuously. OFF = Cycle, ON = Continuous.	R/W	OFF
BV-70	Room Vacant Status	When ON the thermostat will run on Vacant Heating/Cooling setpoints, AV-64/AV-65.	R/W	OFF
BV-71	C/F	Sets the zone damper to display temperatures in Celsius or Fahrenheit. This point is set through the setup menu. ON = F, OFF = C	R	ON
BV-72				
BV-73				
BV-74	Hotel Mode	This point is reserved for internal zone damper use and its value cannot be changed	R	OFF
BV-100	Binary Value 100	Enable internal thermistor descriptor	R/W	ON
BV-101	Binary Value 101	Enable descriptor	R/W	OFF
BV-102	Binary Value 102	Enable descriptor	R/W	OFF
BV-103	Binary Value 103	Enable Discharge Air Sensor descriptor	R/W	OFF
BV-104	Binary Value 104	Enable descriptor	R/W	OFF
BV-105	Binary Value 105	Enable descriptor	R/W	OFF
BV-106	Binary Value 106	Enable descriptor	R/W	OFF
BV-107	Binary Value 107	Enable descriptor	R/W	OFF
BV-108	Binary Value 108	Enable descriptor	R/W	OFF
BV-109	Binary Value 109	Enable descriptor	R/W	OFF
BV-110	Binary Value 110	Enable descriptor	R/W	OFF
BV-111	Binary Value 111	Enable descriptor	R/W	OFF
BV-112	Binary Value 112	Enable outside air descriptor	R/W	OFF