

ExactLogic BACnet Communicating Thermostat

EXL01643 Sequence Datasheet

Multi-Zone Unit Heater



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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 thermostat keypad will time out after 5 seconds without a key press, and the display will switch back to displaying the room temperature.

Control Sequence – Master/Slave Device

Each thermostat of this model can be configured as a Master or Slave device, by setting BV-50 to the correct value. The master and slave thermostats are used to connect up to 5 total areas in to one heating zone. Both master and slave devices will use its space temperature and current heating setpoint to create a 0 to 100% heating signal. Both devices will engage a heating command at BO-1 when the heating signal is greater than 5%. Master and slave devices each have a modulating output at AO-0 to control a Fan VFD. However, in a slave device this output is wired to an input on the master device. The master device will determine if its own heating signal or up to 4 slave device inputs have the highest heating signal. The master device will use the highest heating signal to command the Fan VFD.

Note: The master device requires the universal inputs to configured for 0-10 VDC. See the Installation Guide for more information on how to setup the inputs.

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 thermostat 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.

Control Sequence

When the occupancy is in the unoccupied condition, the room will be controlled by the unoccupied heating setpoint. The fan and heating stage will operate the same as the occupied control sequence.

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 increase by the keypad up to the override limit set at AV-73, the default is 5 hours. When the thermostat 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 thermostat will reenter unoccupied mode.

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

The

thermostat can be set into a night override by writing a value to AV-74 from a Workstation. The value cannot 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 the limit. The night override limit default is 5 hours.

If the thermostat is command occupied while in night override, the override timer will be cleared to zero and the thermostat will enter a normal occupied mode.

Control Sequence

When the thermostat is in the override mode, the room will be controlled by the occupied heating setpoint. The fan and heating stage 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.

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.

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

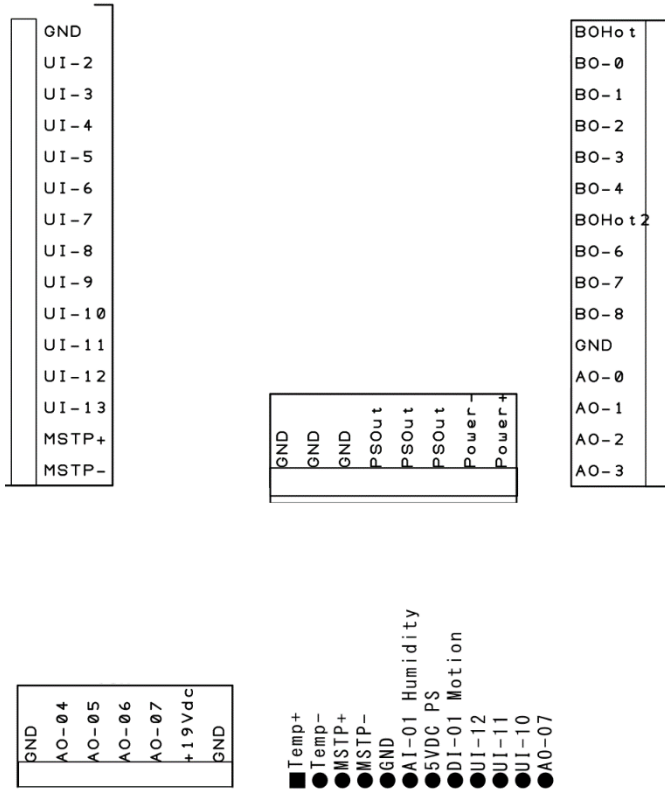


Fig. 4

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

*Note: AI-2 through AI-5 and BI-2 through BI-5 are wired to UI-2 through UI-5. Each universal Input can only be used as an AI or a BI

GND Neutral/Ground
 UI-2..... Universal Input 2
 UI-3..... Universal Input 3
 UI-4..... Universal Input 4
 UI-5..... Universal Input 5
 UI-6..... Universal Input 6
 UI-7..... Universal Input 7
 UI-8..... Universal Input 8
 UI-9..... Universal Input 9
 UI-10 Universal Input 10
 UI-11 Universal Input 11
 UI-12 Universal Input 12
 UI-13 Universal Input 13
 MSTP + Network Line Positive
 MSTP - Network Line Negative

BO Hot 24VAC/DC Input for Relays 1-5*
 BO-0..... Relay 1 Output, 24VAC/DC
 BO-1..... Relay 2 Output, 24VAC/DC
 BO-2..... Relay 3 Output, 24VAC/DC
 BO-3..... Relay 4 Output, 24VAC/DC
 BO-4..... Relay 5 Output, 24VAC/DC
 BO Hot 2 24VAC/DC Input for Relays 7-9*
 BO-6..... Relay 7 Output, 24VAC/DC
 BO-7..... Relay 8 Output, 24VAC/DC
 BO-8..... Relay 9 Output, 24VAC/DC
 GND Neutral/Ground
 AO-0..... Analog Output 0, 0-10V
 AO-1..... Analog Output 1, 0-10V
 AO-2..... Analog Output 2, 0-10V
 AO-3..... Analog Output 3, 0-10V

GND Neutral/Ground
 GND Neutral/Ground
 GND Neutral/Ground
 PSOut..... 24VAC/DC Hot
 PSOut..... 24VAC/DC Hot
 PSOut..... 24VAC/DC Hot
 Power - Neutral/Ground
 Power + 24VAC/DC Hot

GND Neutral/Ground
 AO-04..... Analog Output 4, 0-10V
 AO-05..... Analog Output 5, 0-10V
 AO-06..... Analog Output 6, 0-10V
 AO-07..... Analog Output 7, 0-10V
 +19Vdc..... 19V DC
 GND Neutral/Ground

Output Wiring

Output	Function
BO0	
BO1	Heat Enable
BO2	
BO3	
BO4	
AO0	Fan VFD Command 0-10 Vdc
AO1	

Input Wiring

Output	Function
UI2	Ext Heating Signal 1
UI3	Ext Heating Signal 2
UI4	Ext Heating Signal 3
UI5	Ext Heating Signal 4

Reserved BACnet Points

The following are points reserved by the thermostat for operation.

Analog Inputs

Instance	Object Name	Description	Read/Write	Default
AI-0	Internal Thermistor	Reading of the internal thermistor	R	variable
AI-1	Humidity	Reading from the Humidity sensor add-on card	R	variable
AI-2	Ext Htg Signal 1	Heating signal from slave zone, for fan speed cmd	R	variable
AI-3	Ext Htg Signal 2	Heating signal from slave zone, for fan speed cmd	R	variable
AI-4	Ext Htg Signal 3	Heating signal from slave zone, for fan speed cmd	R	variable
AI-5	Ext Htg Signal 4	Heating signal from slave zone, for fan speed cmd	R	variable

Analog Outputs

Instance	Object Name	Description	Read/Write	Default
AO-0	Fan VFD Command	0-10V output for control of heating	R/W	0.0
AO-1	Analog Output 1	0-10V output	R/W	10.0
AO-2	Analog Output 2	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 thermostat 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	Analog Value 001			
AV-2	Analog Value 002			
AV-3	Analog Value 003			
AV-4	Current Htg SP	The setpoint that controls heating. If the room temperature goes below this setpoint the thermostat will enter heating mode.	R	80.0°F
AV-5	Reserved	This point is reserved for internal thermostat use and its value cannot be changed		
AV-6	Heating SP	The setpoint used for heating during occupied time. This setpoint is calculated by AV-66 (Current SP) – AV-70 (Heating Offset)	R	72.0°F
AV-7	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-8	Heat Signal	Current heating signal as a percent	R	0%
AV-9	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-10	Analog Value 010			
AV-11	Analog Value 011			
AV-12	Analog Value 012			
AV-13	Analog Value 013			
AV-14	Analog Value 014			
AV-15	Hi Heating Signal	The highest heating signal chosen from the master thermostats and up to 4 slave thermostats	R	0%
AV-16	Lo Heating Signal	The lowest heating signal chosen from the master thermostats and up to 4 slave thermostats	R	0%
AV-17	Analog Value 017			
AV-18	Analog Value 018			
AV-19	Analog Value 019			
AV-20	Room Temp	Selected from either AI-2 or AI-0. 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.	R	varies
AV-21	Analog Value 021			
AV-22	Analog Value 022			
AV-23	Analog Value 023			
AV-24	Analog Value 024			
AV-25	Analog Value 025			
AV-26	Cooling Deviation	Number of degrees that the room temperature is away from the cooling setpoint	R	variable
AV-27	Heating Deviation	Number of degrees that the room temperature is away from the heating setpoint	R	variable

AV-28	Deviation from SP	Number of degrees that the room temperature is away from the room setpoint	R	variable
AV-29	Zone Scan	Numerical representation of the thermostats mode. 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/W	1
AV-31	AI-1 Setup	See AV-30	R/W	0
AV-32	AI-2 Setup	See AV-30	R/W	0
AV-33	AI-3 Setup	See AV-30	R/W	0
AV-34	AI-4 Setup	See AV-30	R/W	0
AV-35	AI-5 Setup	See AV-30	R/W	0
AV-36	Min VFD Signal	The minimum VFD signal sent to the output	R/W	25%
AV-37	Max VFD Signal	The maximum VFD signal sent to the output	R/W	100%
AV-38	Analog Value 038			
AV-39	Analog Value 039			
AV-40	Analog Value 040			
AV-41	Analog Value 041			
AV-42	Analog Value 042			
AV-43	Analog Value 043			
AV-44	Analog Value 044			
AV-45	Analog Value 045			
AV-46	Analog Value 046			
AV-47	Analog Value 047			
AV-48	Analog Value 048			
AV-49	Analog Value 049			
AV-50	Analog Value 050			
AV-51	Analog Value 051			
AV-52	Analog Value 052			
AV-53	Analog Value 053			
AV-54	Analog Value 054			
AV-55	Analog Value 055			
AV-56	Analog Value 056			
AV-57	Analog Value 057			
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	Cal 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	5.0/2.5
AV-62	# of Fan Speeds	Select the number of fan speeds for a multispeed fan. 0 = Auto Only 1 = AUTO - ON	R/W	4

		2 = Off - AUTO - ON 3 = Off-1-2-AUTO 4 = Off-1-2-3-AUTO		
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	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	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	Room Setpoint	The occupied room setpoint	R/W	73.0°F/23.0°C
AV-67	Occupied Sp Hi Limit	The maximum occupied room setpoint allowed.	R/W	85.0°F/30.0°C
AV-68	Occupied Sp Lo Limit	The minimum occupied room setpoint allowed	R/W	55.0°F/13.0°C
AV-69	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	1.0/0.5
AV-70	Htg Offset	The offset from Room Setpoint used to calculate the Occupied Heating SP	R/W	1.0°F/0.5°C
AV-71	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	0
AV-72	Unoccupied Htg SP	The heating setpoint used when the thermostat is unoccupied.	R/W	60.0°F/16.0°C
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	0
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	Analog Value 082			
AV-83	Analog Value 083			
AV-84	Analog Value 084			

AV-100	Analog Value 100	Internal thermistor display descriptor. . 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	Display 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	Outside Air Display descriptor. 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	Occupied Relay	Optional occupied relay	R	

Binary Outputs

Instance	Object Name	Description	Read/Write	Default
BO-0	Binary Output 00			OFF
BO-1	Heat Enabled	Output to enable heat from the system		OFF
BO-2	Binary Output 02			OFF
BO-3	Binary Output 03			OFF
BO-4	Binary Output 04			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 Sensor Alarm	Alarm for a bad internal thermistor	R	OFF
BV-1	Heat Mode	This zone has a request for heat	R	OFF
BV-2	Binary Value 002			
BV-3	Binary Value 003			
BV-4	Binary Value 004			
BV-5	Binary Value 005			
BV-6	Binary Value 006			
BV-7	Binary Value 007			
BV-8	Binary Value 008			
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	Binary Value 011			
BV-12	Binary Value 012			
BV-13	Binary Value 013			
BV-14	Binary Value 014			
BV-15	Binary Value 015			
BV-16	Binary Value 016			
BV-17	Binary Value 017			
BV-18	Binary Value 018			
BV-19	Binary Value 019			
BV-20	Binary Value 020			

BV-21	Binary Value 021			
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-66) – Space Alarm Offset (AV-61) for at least 7200 seconds.	R	OFF
BV-25	Space To Cool Alarm	The space temperature has been above the Room Set point (AV-66) + Space Alarm Offset (AV-61) for at least 7200 seconds.	R	OFF
BV-26	Binary Value 026			
BV-27	Binary Value 027			
BV-28	Binary Value 028			
BV-29	Binary Value 029			
BV-30	Binary Value 030			
BV-31	Binary Value 031			
BV-32	Binary Value 032			
BV-33	Binary Value 033			
BV-34	Binary Value 034			
BV-35	Binary Value 035			
BV-36	Binary Value 036			
BV-37	Binary Value 037			
BV-38	Binary Value 038			
BV-39	Binary Value 039			
BV-40	Occupied Status	The status of this point switches the thermostats occupancy settings. ON when the thermostat is in Occupied Setpoint Mode or After Hours Mode.	R	OFF
BV-41	Opt. Start Warmup	A Warmup command has been sent to the thermostat. When ON the thermostat will switch to occupied settings.	R/W	OFF
BV-42	Opt. Start Cooldown	A Cooldown command has been sent to the thermostat. When ON the thermostat will switch to occupied settings.	R/W	OFF
BV-43	Occ Set point Mode	The thermostat has been commanded occupied via BO-5, or a Warmup/Cooldown command has been sent via BV-41/BV-42.	R	OFF
BV-44	After Hours Status	The thermostat has been set to afterhours mode. When ON the thermostat will switch to occupied settings.	R	OFF
BV-45	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	OFF
BV-46	Binary Value 046			
BV-47	Binary Value 047			
BV-48	Binary Value 048			
BV-49	Update Descriptors	When ON any descriptor change will be sent the thermostats LCD, this point will auto reset to OFF.	R/W	OFF
BV-50	Master/Slave Select	OFF = Slave device, send the heating signal to analog output ON = Master Device, choose the highest heating signal from self and external inputs	R/W	OFF

BV-51	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	OFF
BV-52	Binary Value 052			
BV-53	Binary Value 053			
BV-54	Binary Value 054			
BV-55	Binary Value 055			
BV-56	Binary Value 056			
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	Binary Value 060			
BV-61	Binary Value 061			
BV-62	Binary Value 062			
BV-63	Binary Value 063			
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	Binary Value 065			
BV-66	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	OFF
BV-67	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	OFF
BV-68	Backlight Off/On	When ON the LCD backlight will remain on	R/W	OFF
BV-69	Reserved	This point is reserved for internal thermostat use and its value cannot be changed	R	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 thermostat to display temperatures in Celsius or Fahrenheit. This point is set through the setup menu. ON = F, OFF = C	R	ON
BV-72	Binary Value 072			
BV-73	Binary Value 073			
BV-74	Reserved	This point is reserved for internal thermostat 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 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
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