

ExactLogic BACnet Communicating Thermostat

EXL01625 Sequence Datasheet

Fan Coil with Modulating H/C and PO-PC H/C



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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.

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 – Fan Start

There are two modes that can be configured to start the fan via BV-69. When BV-69 is INACTIVE the fan will be started by schedule (BO-5), after hour's setback, or by a night heating/cooling call. When BV-69 is active the fan will start by the heating or cooling signals. There is a configurable setpoint for heating (AV-45) and cooling (AV-46) that can be used to determine at what percentage the fan should start.

Control Sequence – Heat / Cool

Heating and Cooling achieved using power open/close or two staged digital outputs or by modulating analog outputs, which are tied to the heating/cooling signals.

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 in the unoccupied mode, the room will be controlled by the unoccupied cooling/heating setpoints. The fan and cooling/heating stages 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 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 return to the unoccupied mode.

In 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 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 the limit. The night override limit default is 5 hours.

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

Humidity Option Card

With the humidity option card installed the Humidity Sensor can be enabled by setting AV-31 to 4. These settings will automatically provide the required voltage to power the sensor. The Humidity value is shown on AI-1 and will automatically be scaled.

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

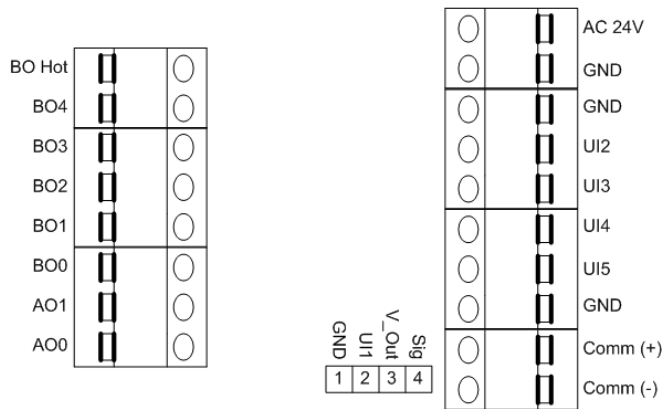


Fig. 4

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

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

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

Output Wiring

Output/Label	Function – Modulating	Function - Staged
BO0	Fan	Fan
BO1	Cooling Valve Open	Stage 1 Cooling
BO2	Cooling Valve Close	Stage 2 Cooling
BO3	Heating Valve Open	Stage 1 Heating
BO4	Heating Valve Close	Stage 2 Heating
AO0	Heating 0-10 Vdc 0-100%	Heating 0-10 Vdc 0-100%
AO1	Cooling 0-10 Vdc 0-100%	Cooling 0-10 Vdc 0-100%

Reserved BACnet Points

The following are points reserved by the thermostat for operation.

Analog Inputs

Instance	Object Name	Description	Read/Write	Default
AI-0	Space 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	Analog Input 03	Reading of the external input 3 in counts. 0-1024	R	variable
AI-4	Condensate Sensor	Condensate safety sensor	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	Radiation	0-10V output for control of heating	R/W	0.0
AO-1	Cooling	0-10V output for control of cooling	R/W	0.0
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	60.0°F/16°C
AV-5	Current Clg SP	The setpoint that controls cooling. If the room temperature goes above this setpoint the thermostat 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-66 (Current SP) – AV-70 (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-66 (Current SP) + AV-69 (Cooling Offset)	R	74.0°F/23.5°C
AV-8	Heat Signal (%)	Current heating signal as a percent	R	0%
AV-9	Cool Signal (%)	Current cooling signal as a percent	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	Analog Value 015			
AV-16	Analog Value 016			
AV-17	Analog Value 017			
AV-18	Analog Value 018			
AV-19	Analog Value 019			
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.	R	variable
AV-21	Analog Value 021			
AV-22	Analog Value 022			
AV-23	Analog Value 023			
AV-24	Heating Valve % Open	The percentage open that the heating valve has been commanded.	R/W	0%
AV-25	Cooling Valve % Open	The percentage open that the cooling valve has been commanded.	R/W	0%
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	1
AV-31	AI-1 Setup	See AV-30	R	0
AV-32	AI-2 Setup	See AV-30	R	0
AV-33	AI-3 Setup	See AV-30	R	0
AV-34	AI-4 Setup	See AV-30	R	0
AV-35	AI-5 Setup	See AV-30	R	0
AV-36	Analog Value 036		R/W	0
AV-37	Analog Value 037		R/W	100
AV-38	Analog Value 038		R/W	0
AV-39	Analog Value 039		R/W	100
AV-40	Analog Value 040		R/W	0
AV-41	Analog Value 041		R/W	100
AV-42	Analog Value 042		R/W	0
AV-43	Analog Value 043		R/W	100
AV-44	Analog Value 044			
AV-45	Heating % for Fan	The heating signal percentage that is required to command the fan ON.	R/W	10%

AV-46	Cooling % for Fan	The cooling signal percentage that is required to command the fan ON.	R/W	10%
AV-47	Filter Alarm SP	The number of runtime hours the filter can run before triggering an alarm	R/W	3000 hrs
AV-48	Heating Valve Deadband	The deadband used to determine when to open or close the damper	R/W	5%
AV-49	Heating Valve Motor Time	The amount of time to open the damper from 0% open to 100% open	R/W	90 sec
AV-50	Heating Kp	Proportional constant for Heating PI Loop	R/W	12
AV-51	Heating Ki	Integral Constant for Heating PI Loop	R/W	1
AV-52	Cooling Kp	Proportional constant for Cooling PI Loop	R/W	12
AV-53	Cooling Ki	Integral Constant for Cooling PI Loop	R/W	1
AV-54	Cooling Valve Deadband	The deadband used to determine when to open or close the damper	R/W	5%
AV-55	Cooling Valve Motor Time	The amount of time to open the damper from 0% open to 100% open	R/W	90 sec
AV-56	Filter Runtime	The amount of runtime hours for the filter	R	0 hrs
AV -57	Fan Runtime	The amount of runtime hours for the fan	R	0 hrs
AV-58	Reserved	Reserved for thermostat use only. Do not write to this point.	R	1.6
AV-59	Space Temp Average 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/2.5°C
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	4
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 Cooling SP	When a room is known vacant, the setpoint can be set below the unoccupied setpoint.	R/W	85.0°F
AV-65	Vacant Heating SP	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 High Limit	The maximum occupied room setpoint allowed.	R/W	85.0°F/30.0°C
AV-68	Occupied SP Low Limit	The minimum occupied room setpoint allowed	R/W	55.0°F/13.0°C
AV-69	Clg Offset	The offset from Room Setpoint used to calculate the Occupied Cooling SP	R/W	1.0°F/0.5°C

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	Unoccupied Clg SP	The cooling setpoint used when the thermostat is unoccupied.	R/W	80.0°F/27.0°C
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	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	Binary Input 01		R	
BI-2	Binary Input 02		R	
BI-3	Binary Input 03		R	
BI-4	Condensate Sensor	Optional condensate sensor input	R	
BI-5	Opt. Occupied Relay	Optional occupancy relay input	R	

Binary Outputs

Instance	Object Name	Description	Read/Write	Default
BO-0	Fan	Output for Fan Control	R/W	OFF
BO-1	Cooling Valve Open/Stage 1	Output to open the cooling valve or control stage 1	R/W	OFF
BO-2	Cooling Valve Close/Stage 2	Output to close the cooling valve or control stage 2	R/W	OFF
BO-3	Heating Valve Open/Stage 1	Output to open the heating valve or control stage 1	R/W	OFF
BO-4	Heating Valve Close/Stage 2	Output to close the heating valve or control stage 2	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 thermistor	R	OFF
BV-1	H/C Mode	Sequence point to show analog heating or cooling. OFF = Cooling ON = 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/W	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	Unoccupied Heating Request	Unoccupied heating request	R	OFF
BV-15	Unoccupied Cooling Request	Unoccupied cooling request	R	OFF
BV-16	Unoccupied Heating Status	Unoccupied heating request command	R	OFF
BV-17	Unoccupied Cooling Status	Unoccupied cooling request command	R	OFF
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 Cool Alarm before checking the Space Alarm Delay	R	OFF
BV-24	Space To Warm 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-25	Space To Cool Alarm	The space temperature has been below the Room Set point (AV-66) - Space Alarm Offset (AV-91) for at least 7200 seconds.	R	OFF
BV-26	Binary Value 026			
BV-27	Binary Value 027			
BV-28	Filter Alarm	The filter runtime has exceeded the filter runtime setpoint (AV-47)	R	OFF
BV-29	Condensation Alarm Enable	Turning on enables condensation alarm	R/W	OFF
BV-30	Condensation Alarm NO/NC	Controls whether Condensation Alarm is Normally Open when On or Normally Closed when Off	R	OFF
BV-31	Condensate Alarm	Condensation Alarm On = Condensate is Present	R	OFF
BV-32	Heating Type Select	Selects Mod. Floating Point / Power Open/close for BO-3 & BO-4. ON=Open/Close	R/W	OFF
BV-33	Cooling Type Select	Selects Mod. Floating Point / Power Open/close for BO-1 & BO-2. ON=Open/Close	R/W	OFF
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 after hours mode. When ON the thermostat will switch to occupied settings.	R	OFF
BV-45	Reserved	Reserved for thermostat use only. Do not write to this point.	R	
BV-46	Binary Value 046			
BV-47	Binary Value 047			
BV-48	Binary Value 048			
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	Staged Heating Select	0-50% heating signal will use the radiation as stage 1 heat. 50-100% heating signal will use the heating value as stage 2 heat.	R/W	OFF
BV-51	BI for Occupancy	ON = BI will be used to indicate zone occupancy OFF = BI is not used for occupancy	R/W	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	Binary Value 066			
BV-67	Room Temp Select	When OFF, the internal thermistor is selected for the control sequence. When ON, an external thermistor attached to AI-2 is selected for control of the sequence	R/W	OFF
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 on by heating/cooling signal or by schedule. OFF = Schedule, ON = H/C Signal	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 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	Hotel Mode	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