BACnet Performance Products
EXACTLOGIC

ExactLogic BACnet Communicating Zone Damper EXL01710 Sequence Datasheet

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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 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

Fan Speeds

This application has only one fan speed. This leaves mode 0, 1, or 2 (AV-62) as the only applicable modes.

When the fan speed is in AUTO, the zone damper will turn on the fan when it receives and occupied command or a continuous command via BV-69.

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 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.

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.

Night Overrride

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 though 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.

Installation

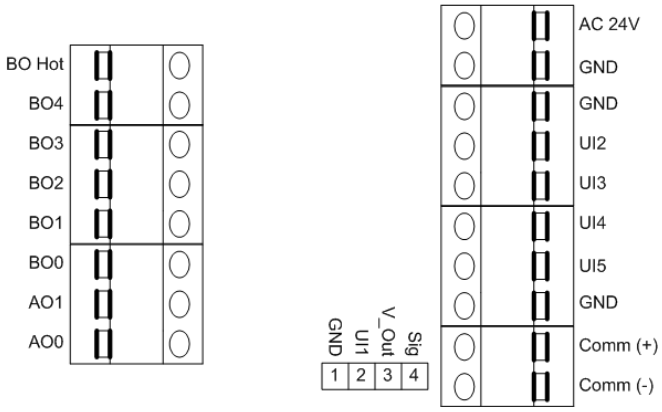

Fig. 4

*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
BO0	Fan
BO1	Heating Command
BO2	Cooling Command
BO3	Damper Open
BO4	Damper Close
AO0	Damper Signal 0-10 Vdc 0-100%
AO1	

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	Analog Input 01	Reading of the external input 1 in counts. 0-1024	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	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	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 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) +	R	74.0°F/23.5°C

		AV-93 (Cooling Offset)		
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	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	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 Control 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	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.		
AV-21	Analog Value 021			
AV-22	Analog Value 022			
AV-23	Analog Value 023			
AV-24	Analog Value 024			
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	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			
AV-37	Analog Value 037			
AV-38	Analog Value 038			
AV-39	Analog Value 039			
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	Analog Value 044			
AV-45	Output Minimum	Used to scale the analog output. This is the minimum voltage the AO will output. (i.e. 2-10V valve or damper)	R/W	0V
AV-46	Damper Deadband	The deadband used to determine when to open or close the damper	R/W	5%
AV-47	Damper Motor Time	The amount of time to open the damper from 0% open to 100% open	R/W	90 sec
AV-48	Analog Value 048			
AV-49	Analog Value 049			
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	0%
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	0%
AV-54	Analog Value 054			
AV-55	Analog Value 055			
AV-56	Analog Value 056			
AV -57	Analog Value 057			
AV-58	Analog Value 058			
AV-59	Pseudo 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	Room 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	Clg Offset	The offset from Room Setpoint used to calculate the Occupied Cooling SP	R/W	1.0°F
AV-70	Htg Offset	The offset from Room Setpoint used to calculate the Occupied Heating SP	R/W	1.0°F
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-100	Analog Value 100	Internal thermister 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	R/W	

		the present value. The AV description holds the descriptor to display		

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	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	Heating Command	Digital output for heating control	R/W	OFF
BO-2	Cooling 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	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	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	Binary Value 011			
BV-12	Binary Value 012			
BV-13	Binary Value 013			
BV-14	Night Heat	The zone has been unoccupied for a minimum of	R	OFF

	Request Status	10 minutes, and the below the Night Heat Setpoint.		
BV-15	Night Cool Request Status	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	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-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	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 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	OFF
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	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	Binary Value 050			
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	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	Binary Value 057			
BV-58	Binary Value 058			
BV-59	Binary Value 059			
BV-60	Binary Value 060			
BV-61	Binary Value 061			
BV-62	Binary Value 062			
BV-63	Binary Value 063			
BV-64	Binary Value 064			
BV-65	Binary Value 065			
BV-66	Disable Unit	Used by user to override all output off	R/W	OFF
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 or run continuously. OFF = Cycle, ON = Continuous.	R/W	OFF
BV-70	Reserved	This point is reserved for internal zone damper use and its value cannot be changed	R	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	Binary Value 072			
BV-73	Binary Value 073			
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 thermister 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 descriptor	R/W	OFF