ExactLogic BACnet Communicating Thermostat
EXL01655 Sequence Datasheet

Make Up Air Unit Building Pressure control with General Exhaust and Paint Booth Interlock

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Rm Temp
73.9°F

DataSheet Rev 1.12.310.1.0
April 27,2020

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1

Standard Occupied

During normal occupied operation, (scheduled operation, override operation or Paint Booth interlock operation) output BO-0 will be ON and the display will show the current outside air temperature and the building pressure. The first press of either right pair of keys will show the current outside heat enable setpoint. Additional presses will adjust the setpoint up or down by +/- 1 degrees (adjustable with AV-82). The thermostat keypad will time out after 5 seconds without a key press, and the display will switch back to displaying the outside air 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 (0 or 1 only), and AV-63 will show what speed the fan is currently set to (0-Off, 4-Auto or 5-On only). Refer to the table below for the values of AV-62 (Fan Mode Status) and AV-63 (Fan Speed Status)

AV-62	Mode		AV-63	Fan Speed
0	AUTO-ON		0	OFF
1	OFF-AUTO-ON		1	N/A
2	N/A		2	N/A
3	N/A		3	N/A
4	N/A		4	AUTO
5	N/A		5	ON

Outside Air Temperature Control (Winter Mode)

The thermostat control sequence uses the Outside Air Temperature to enable the Winter mode when the Outside Air Temperature is below the Enable setpoint which is adjustable at the ExactLogic thermostat or by adjusting AV-66, AV-67 limits the maximum setpoint (default of 70°F) and AV-68 limits the minimum setpoint (default 40°F)

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 – Heating

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 heating offset (default 1 degree). As the outside temperature drops below the heating setpoint the Winter Heating output, BO-1 will be on.

Control Sequence – Cooling

There is no cooling sequence.

Note: All digital outputs have a 180 second ON/OFF anti-short cycle.

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2

Standard Unoccupied

During unoccupied operation the thermostat will continue to display the outside 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 outside setpoint when unoccupied the thermostat must be set to night override.

Control Sequence

During unoccupied mode the Make Up Air Unit will not operate.

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

The thermostat can be set to a 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 12 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 Winter Mode will be controlled by the occupied outside cooling/heating setpoints. The fan and cooling and heating 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 Continuous mode.

Fan Interlock

The Exhaust Fan operates by turning on BO-2 anytime the Make Up Air Unit is on except if the Paint Booth Exhaust Status is ON (input BI-4).

Paint Booth Interlock

The Make Up Air Unit will be commanded ON whenever the Paint Booth Exhaust Status is ON (input BI-4).

Building Pressure Control

The Make Up Air Unit Variable Frequency Drive will modulate to maintain the building differential pressure setpoint (AV-45 adjustable) as sensed at AI-3 (+.5" WC to -.5" WC with a 4-20 mA signal).

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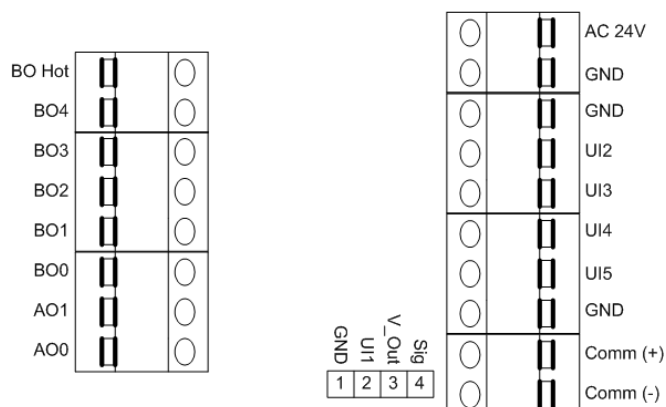*HumeraTech is the exclusive U.S. distributor for ExactLogic products*
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3

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/Input Wiring

Output/Label	Output Use
BO0	MAU Fan
BO1	MAU Heat Enable (Winter Switch)
BO2	General Exhaust Fan
BO3	
BO4	
AO0	
AO1	Modulating MAU Volume 2-10Vdc

Input/Label	Input Use
UI0	Internal Space Temperature
UI1	Internal Humidity Sensor Option
UI2	Outside Air Temperature
UI3	Building Pressure
UI4	Paint Booth Run Interlock
UI5	

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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	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	OAT	Outside Air Temperature - Required	R	variable
AI-3	Building Pressure	Building Pressure – Required	R	variable
AI-4				
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	Analog Output 0		R/W	
AO-1	Supply Fan Speed	2-10V output for Modulating the Supply Fan	R	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				
AV-2	Bldg Pressure	Building Pressure (+/- .5" WC)	R	0
AV-3	Scaled Input	Internal Use	R	500
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	49.0°F
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	51.0°F
AV-6	Occupied Heating SP	The setpoint used for heating during occupied mode. This setpoint is calculated by AV-90 (Current SP) – AV-94 (Heating Offset)	R	49.0°F
AV-7	Occupied Cooling SP	The setpoint used for cooling during occupied mode. This setpoint is calculated by AV-90 (Current SP) + AV-93 (Cooling Offset)	R	51.0°F

AV-8	Heating Signal	Current heating signal as a percent	R	0%
AV-9	Cooling Signal	Current cooling signal as a percent	R	0%
AV-10	Building Pressure	Building Pressure with Averaging	R	0
AV-11	Display Bldg Press	Internal Use	R	10000
AV-12				
AV-13				
AV-14				
AV-15				
AV-16				
AV-17				
AV-18				
AV-19				
AV-20	OA Temp	Outside Air Temperature. 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				
AV-22				
AV-23				
AV-24				
AV-25				
AV-26				
AV-27				
AV-28				
AV-29				
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	2
AV-34	AI-4 Setup	See AV-30	R	1
AV-35	AI-5 Setup	See AV-30	R	0
AV-36				
AV-37				
AV-38				
AV-39				
AV-40				
AV-41				
AV-42				
AV-43				
AV-44				
AV-45	Bldg Press SP	Building Pressure Setpoint	R/W	-.02

AV-46				
AV-47				
AV-48				
AV-49				
AV-50	Calibration Offset	Calibration Offset is used to adjust the sensor Zero reading	R/W	0
AV-51				
AV-52	BP Ki	Building Pressure PI controller Ki factor	R/W	200
AV-53	BP Kp	Building Pressure PI controller Kp factor	R/W	30
AV-54				
AV-55				
AV-56				
AV -57				
AV-58				
AV-59	Avg Time Base	Factor used to average the outside 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/W	100
AV-60	Calibration Offset	Internal Sensor Calibration Factor	R/W	0
AV-61				
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	5
AV-64				
AV-65				
AV-66	OA Heat Enable SP	Outside Air Heat Enable Setpoint	R/W	50
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	Cooling Offset from Room Setpoint	R/W	1
AV-70	Heating Offset	Heating Offset from Room Setpoint	R/W	1
AV-71	Unocc Cooling SP	The Cooling Setpoint while Unoccupied	R/W	115
AV-72	Unocc Heating SP	The Heating Setpoint while Unoccupied	R/W	45
AV-73	After Hours Limit	The Maximum time for the After Hours Timer	R/W	12.0 H
AV-74	After Hours Timer	The time remaining on the After Hours Timer	R/W	0

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7

AV-75	Analog Value 075			
AV-76	Analog Value 076			
AV-77	Analog Value 077			
AV-78	Analog Value 078			
AV-79	Analog Value 079			
AV-80	Analog Value 080			
AV-81	Analog Value 081			
AV-82	Analog Value 082			
AV-83	Splash Descriptor	Splash Descriptor	R	0
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	Outside Air Temperature for display	R	Variable
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	Building Pressure for display	R/W	Variable
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	

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Binary Inputs

Instance	Object Name	Description	Read/Write	Default
BI-0			R	
BI-1	Motion	Motion sensor status from the optional add-on card	R	
BI-2			R	
BI-3			R	
BI-4	Paint Booth Status	Status of the Paint Booth – Sets Occupied Mode	R	
BI-5	Binary Input 05		R	

Binary Outputs

Instance	Object Name	Description	Read/Write	Default
BO-0	MAU Enable	Makeup Air Unit Enable	R/W	OFF
BO-1	Winter Enable	Winter Mode Enable	R/W	OFF
BO-2	Exhaust Fan	General Exhaust Fan Enable	R/W	OFF
BO-3				
BO-4				
BO-5	Scheduled Occupied	Logical point only. Used for scheduling purposes. OFF is unoccupied.	R/W	ON

Binary Values

Instance	Object Name	Description	Read/Write	Default
BV-0				
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				
BV-9				
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	Fan Status			
BV-15	Low Fan Request			
BV-16	Med Fan Request			
BV-17	High Fa Request			
BV-18	Binary Value 018			

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9

BV-19				
BV-20	Fan Request Heat			
BV-21	Fan Request Cool			
BV-22	Too Warm Status			
BV-23	Too Cool Status			
BV-24	Space To Warm Alarm			
BV-25	Space To Cool Alarm			
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 thermostats occupancy settings. When ON, the thermostat is in Occupied Setpoint Mode or After Hours Mode.	R	ON
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	ON
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				
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				
BV-52				
BV-53				
BV-54				
BV-55				
BV-56				
BV-57	Disable Splash	Disables the Splash Screen	R/W	OFF
BV-58	Disable Setup Menu	Disables the Setup Menu	R/W	OFF
BV-59	Disable FSM Menu	Disables the Field Service Menu	R/W	OFF
BV-60				
BV-61				
BV-62				
BV-63				
BV-64	Enable Motion	Reserved – used with optional motion sensor	R	OFF
BV-65				
BV-66	Disable Unit	Disables all outputs from the Thermostat	R/W	OFF
BV-67	Room Temp Select			
BV-68	Backlight On	Turns the Backlight ON	R/W	OFF
BV-69	Fan Operation Mode			
BV-70				
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				
BV-73				
BV-74				

BV-100	Binary Value 100	Enable internal thermistor descriptor	R/W	OFF
BV-101	Binary Value 101	Enable descriptor	R/W	ON
BV-102	Binary Value 102	Enable descriptor	R/W	OFF
BV-103	Binary Value 103	Enable descriptor	R/W	ON
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

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11