

# ExactLogic BACnet Communicating Thermostat



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## Initial Setup

A thermostat is initially configured with the following setup:

MSTP Network: 99  
MSTP MAC Address: 99  
Baud Rate: 76.8 Kbps  
Celsius/Fahrenheit: Fahrenheit

### 4 Button Setup

To change the setup of the thermostat, the menu must be accessed via the keypad buttons. By holding down the bottom pair of buttons together for 5 seconds, the display will change and ask for a password (Fig. 5). The password to access the menu is: top right, top right, top left, and bottom left. As each key is pressed, an “X” will show on the display. If the password is incorrect the display will show a message and exit the menu (Fig 6). Successfully entering the password will switch the display to the first menu item. To scroll through the menu, use the left pair of buttons. To change a setting, press the right pair of buttons. Pressing one of the right pair of buttons once will select the item to be changed. In order to change the value, a second key press is required.

### 6 Button Setup

To change the setup of the thermostat, the menu must be accessed via the keypad buttons. By holding down the bottom pair of buttons together for 5 seconds, the display will change and ask for a password (Fig. 5). The password to access the menu is: middle right, middle right, middle left, and bottom left. As each key is pressed, an “X” will show on the display. If the password is incorrect the display will show a message and exit the menu (Fig 6). Successfully entering the password will switch the display to the first menu item. To scroll through the menu, use the two lower left pair of buttons. To change a setting, press the two lower right pair of buttons. Pressing one of the lower right pair of buttons once will select the item to be changed. In order to change the value, a second key press is required.

To make faster adjustments holding the [down] key for 1 second (sets the down increment to 15) or 3 seconds (sets the down increment to 30) subsequently pressing the [down] key will subtract 15 or 30 for each press. If you then press the up key, it will set the down increment back to 1.

This also works for the [up] key.

To execute an adjustment from MAC = 99 to a MAC = 2 do the following:

- Enter the setup mode
- Select the MAC address setting
- Press and hold the [down] key for 3 seconds then release
- MAC address will change to 098
- Press and release the [down] key
- MAC = 068
- Press and release the [down] key
- MAC = 038
- Press and release the [down] key
- MAC = 008
- Press and release the [up] key (sets the down increment to 1)
- MAC = 009
- Press and release the [down] key 7 times
- MAC = 002

Once all changes have been made, the keypad waits for 5 seconds without a key press, and then the thermostat will reset itself. If no changes are made, the top pair of buttons (middle pair for 6 button setup) was not pressed, the thermostat will timeout with 5 seconds without a key press and return to showing the room temperature.

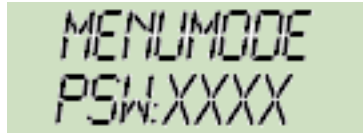


Fig. 5

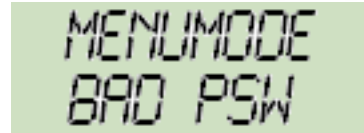


Fig. 6

## Field Service Mode

Field Service Mode is used to set commonly used setpoints, set the system date and time and set the standalone occupancy schedule when a BACnet system is not available.

### How to Enter the Field Service Mode 4 Button Setup

1. To enter Field Service Mode, hold down the left pair of buttons together for 5 seconds. The display will change and ask for a password (Fig. 5).
2. **The keypad password to access the menu is: top left, bottom right, top right, and bottom left.** As each key is pressed, an "X" will show on the display. If the password is incorrect the display will show a message and exit the menu (Fig 6).
3. Successfully entering the password will switch the display to the first menu item. To scroll through the menu, use the left pair of buttons.
4. To change a setting, press one of the right pair of buttons. Pressing one of the right pair of buttons once will select the item to be changed. In order to change the value, a second key press is required.

### How to Enter the Field Service Mode 6 Button Setup

1. To enter Field Service Mode, hold down the two bottom left pair of buttons together for 5 seconds. The display will change and ask for a password (Fig. 5).
2. **The keypad password to access the menu is: middle left, bottom right, middle right, and bottom left.** As each key is pressed, an "X" will show on the display. If the password is incorrect the display will show a message and exit the menu (Fig 6).
3. Successfully entering the password will switch the display to the first menu item. To scroll through the menu, use the two bottom left pair of buttons.
4. To change a setting, press one of the two bottom right pair of buttons. Pressing one of the right pair of buttons once will select the item to be changed. In order to change the value, a second key press is required.

Note: There is a 5 second keypad inactivity timeout. After the 5 seconds the main Field Service Menu will start. If another 5 seconds elapses without a key press, the thermostat will return to normal operation and display the room temperature.

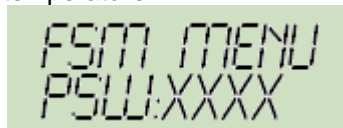


Fig. 5

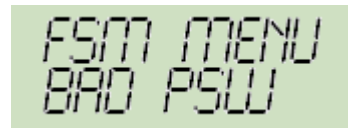


Fig. 6

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## ChangeSP Menu

The ChangeSP Menu allows you to change commonly used setpoints and configuration settings. Setpoints available for modification are as follows:

- Hi/Low Occupied Setpoint Limit
- Heating/Cooling Offset
- Unoccupied Heating/Cooling Set point
- Fan Speed
- Afterhours Limit
- Heat/Cool Enabled
- Occupied Command

Available Fan Speed Options:

- 0 = Auto Only (Default setting)
- 1 = AUTO - ON
- 2 = Off - AUTO - ON
- 3 = Off-1-2-AUTO
- 4 = Off-1-2-3-AUTO

## Set Time Menu

The System Time Menu allows you to change the Hour, Minute, Year, Month, and Day. Use the Left pair of buttons to cycle through these settings. Use the right pair of buttons to change the value of each setting. Pressing one of the right pair of buttons once will select the item to be changed. In order to change the value, a second key press is required.

## Set Schedule Menu (Set Schd)

The thermostat is equipped with a 7-day 4 event internal schedule. There are 2 occupied events and 2 unoccupied events for each day. Every day must have at least one event. If no event is set, an unoccupied event at 12:00 AM midnight will automatically be set.

Events 1 and 3 are occupied events and Events 2 and 4 are unoccupied events.

The right pair of keys will navigate through the events. A cursor will move from hours to minutes on each event to show which field is selected for modification. If no number is selected for the hours and minutes, then this event is blank and will not be used by the schedule. The hours are on a 12-hour time. I.e. 11:00 AM will roll over to 12:00 PM and 11:00PM will roll over to 12:00AM

The following examples show how to set the schedule for different times.

Occupied on Monday from 6AM to 6PM

Mon Evt1: 06:00 AM

Mon Evt2: 06:00 PM

Mon Evt3: blank

Mon Evt4: blank

Occupied on Monday from 6PM to Tuesday 6AM

Mon Evt1: 06:00 PM

Mon Evt2: blank

Mon Evt3: blank

Mon Evt4: blank

Tue Evt1: blank

Tue Evt2: 06:00 AM

Tue Evt3: blank

Tue Evt4: blank

Occupied on Monday from 6AM to 6PM and 10PM to Tuesday 6AM

Mon Evt1: 06:00 AM

Mon Evt2: 06:00PM

Mon Evt3: 10:00 PM

Mon Evt4: blank

Tue Evt1: blank

Tue Evt2: 06:00 AM

Tue Evt3: blank

Tue Evt4: blank

Once the schedule is set, the keypad waits for 5 seconds without a key press. After the 5 seconds, an option will display asking if the schedule should be enabled. Selecting "Y" will make the schedule active, selecting "N" will copy the schedule to internal memory but will not activate the schedule for use. If another 5 seconds elapses without a key press the thermostat will return to normal operation and display the room temperature.

## Display Descriptors

The display descriptors are used to display custom information such as input/output status or sensor values. Descriptor text is entered in the description field of AV-100 through AV-112. The value to display is entered into the present value field of the AV. The descriptors are enabled by BV-100 through BV-112.

Use the following format when entering Descriptors: XXXXXXXX,,YZ

### **Descriptor Text**

The Descriptor Text, depicted with the X's above, will be shown on the top line of the thermostats LCD. Each line consists of 8 letters, numbers or symbols. Letters can be upper or lower case and spaces can be used to center the text if it is less than 8 characters.

### **Descriptor Value**

The Descriptor Value, depicted by the Y and Z above, will be shown on the bottom line of the thermostats LCD. The Descriptor Text and Value must be separated by two (2) commas to display correctly.

Use the following information to set the Descriptor Value to display the desired value.

### **Display a Blank Line**

To have the bottom line blank use Z = 0. The value of Y is ignored.

### **Display a Number**

To display a number use Z = 1.

The value of Y will display the units for the number being displayed.

Y = 0 will display percentage (%)

Y = 1 will show temperature, the unit (°C/°F) is based on the value of BV-71

Y = 3 will show Amperes (A)

Any other values of Y will have no units shown.

### **Display a Digital Value**

To display a digital status use Z = 2. The value shown will be either 'Inactive' or 'Active' based on the present value of the AV.

### **Display BTUs**

To display a number in BTUs use Z = 3.

The value of Y will display the units for the number being displayed.

Y = 0 will display 'M' for 1,000's of BTUs (MBH)

Y = 1 will display "MM" for 1,000,000's of BTUs (MMBTU)

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## Display Air Flow

To display a number in air flow units use Z = 4.

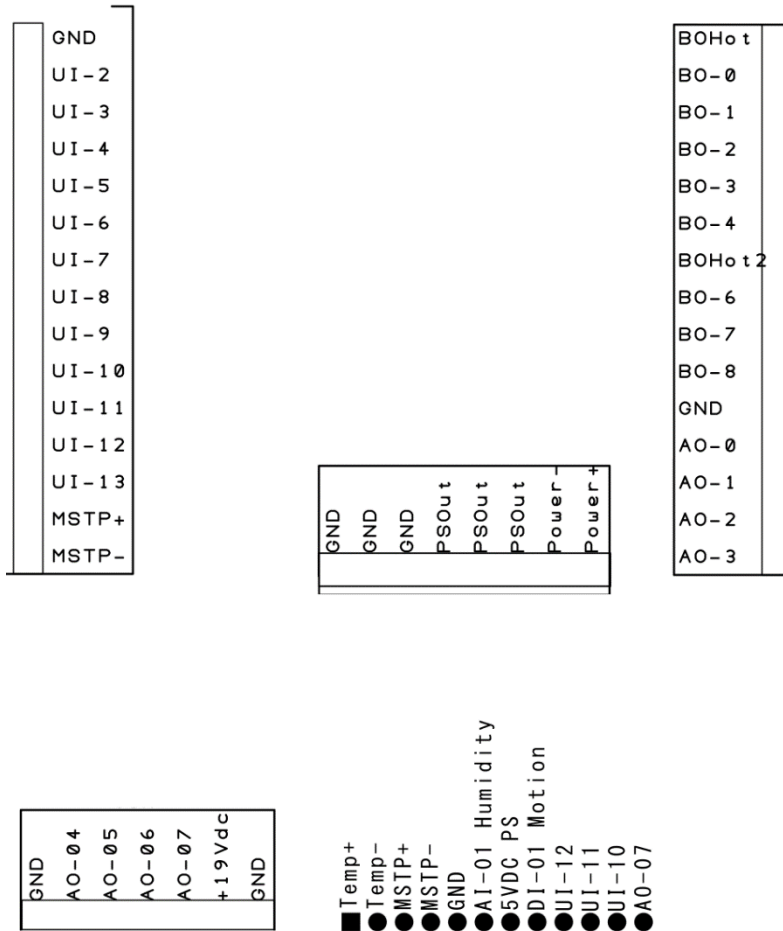
The value of Y will display the units for the number being displayed.

Y = 4 will display feet per minute (fpm)

Y = 5 will display cubic feet per minute (cfm)

**In order to update the descriptor changes you must turn BV-49 ACTIVE. This point will auto reset itself.**

# Input/Output Setup



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

Fig. 1

\*Note: BO Hot usually 24VAC/DC input for Relays or R

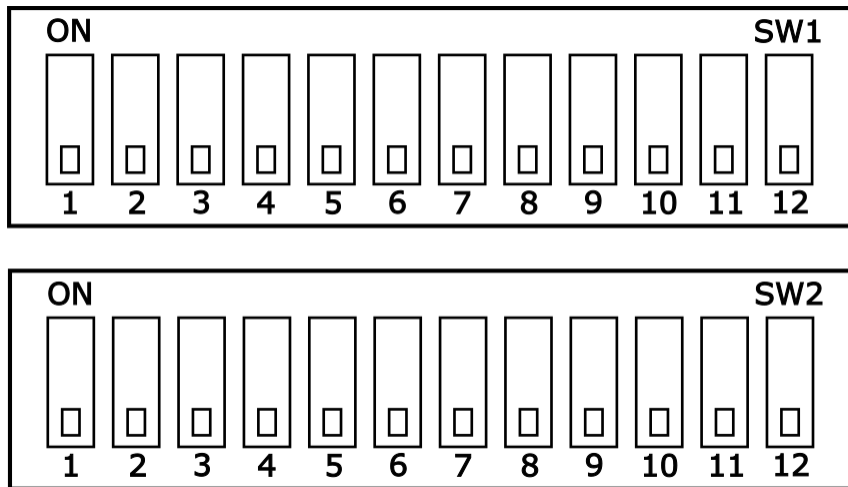
**\*\* Always connect the AC 24V wire last and make sure your power supply ground is connected with a single wire and no wire nuts disconnecting the common wire will damage the controller.**



## Universal Input Setup

The universal inputs are configured using the two 12-position DIP switches located in the top left corner of the thermostat, and a software setting at AV-30 through AV-35.

The DIP switch is used to configure UI-1 through UI-12. UI-0 is hardware configured to a dry contact/thermistor type input. UI-13 is hardware configured to a pulse only. Each input uses two switches to set the input type. See figure 2 below for the switches used for each input.



- AI-1: Switch 1 on SW1 & SW2
- UI-2: Switch 2 on SW1 & SW2
- UI-3: Switch 3 on SW1 & SW2
- UI-4: Switch 4 on SW1 & SW2
- UI-5: Switch 5 on SW1 & SW2
- UI-6: Switch 6 on SW1 & SW2
- UI-7: Switch 7 on SW1 & SW2
- UI-8: Switch 8 on SW1 & SW2
- UI-9: Switch 9 on SW1 & SW2
- UI-10: Switch 10 on SW1 & SW2
- UI-11: Switch 11 on SW1 & SW2
- UI-12: Switch 12 on SW1 & SW2

Fig. 2

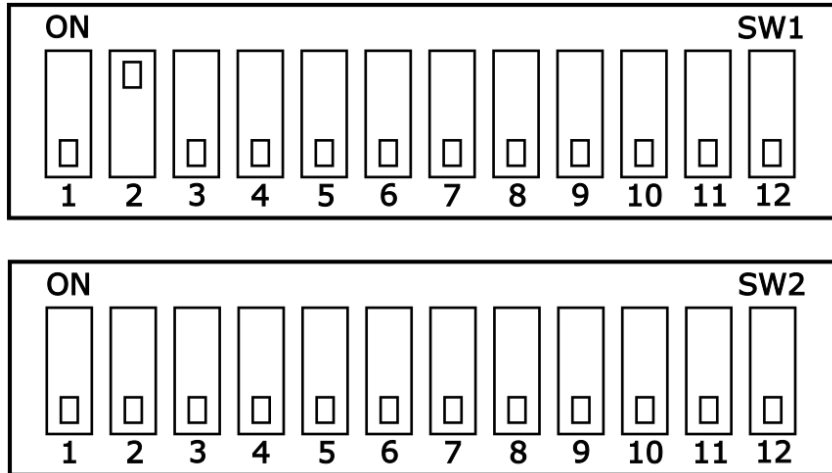
The universal inputs can be set up to read a dry contact, thermistor, 4-20mA, 0-5V, 0-10V, or pulse sensor. AV-30 through AV-35 are used to configure the input type for each universal input. Below is a list of the possible settings. AV-30 through 35 corresponds to AI-0 through AI-5.

AV-30	AI-0	0 = counts
AV-31	AI-1	1 = thermistor
AV-32	AI-2	2 = 4-20mA
AV-33	AI-3	3 = 0-5V
AV-34	AI-4	4 = 0-10V
AV-35	AI-5	5 = Pulse

## Analog Inputs

### *Dry Contact/External Thermistor*

If there is a dry contact or external thermistor used, set switch for the respective input, see figure 3\*. Sensor values will be sent to the present-value property of the Analog Input.



\*Note: Figure 3 shows the DIP switch setting for UI-2, to configure UI-3/4/5 set switch 3/4/5.

Fig. 3

## 4-20mA Input

The DIP switch setting for a 4-20mA input is OFF for both switches as seen in figure 4 below. Also, a 169 ohm resistor is required. The resistor is wired across the signals +/- terminals as seen in figure 5 below.

The input signal is scaled using the min-pres-value property (integers only), of the Analog Input Object, for the zero and max-pres-value for the range (integers only). The sensor value will be displayed on the present value property of the Analog Input. If you need to set the input for a sensor that is -.5 to +.5, set the input to -5 to +5 and adjust your setpoint accordingly.

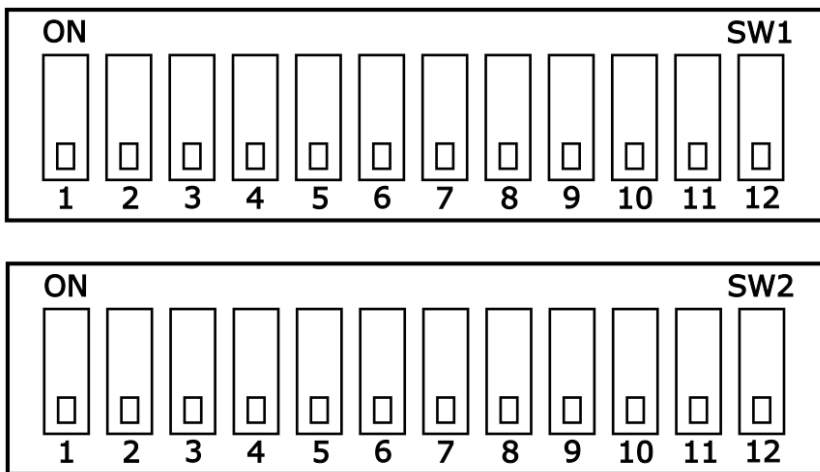


Fig. 4

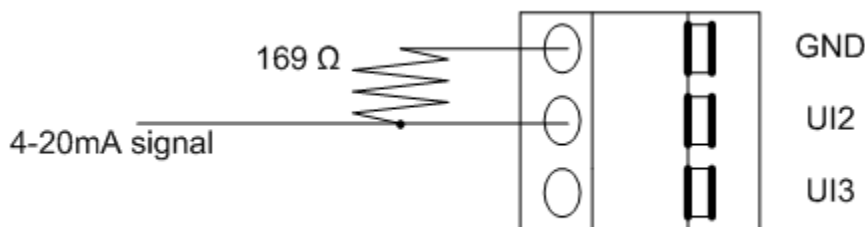
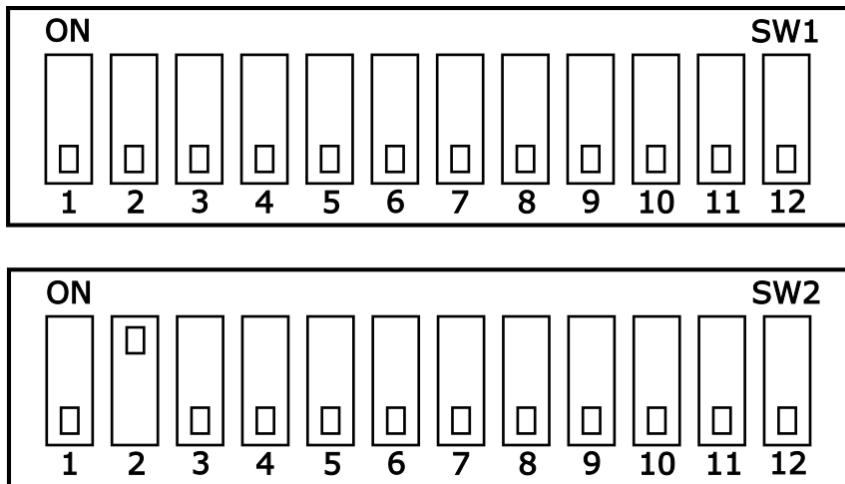


Fig. 5

## 0-5V or 0-10V Input

The DIP switch setting for a voltage input is to set switch 2/3/4/5 on SW2 for the respective input, see figure 6\*.

The input signal is scaled using the min-pres-value property (integers only), of the Analog Input Object, for the zero and max-pres-value for the range (integers only). The sensor value will be displayed on the present value property of the Analog Input. If you need to set the input for a sensor that is -.5 to +.5, set the input to -5 to +5 and adjust your setpoint accordingly.



\*Note: Figure 6 shows the DIP switch setting for UI-2, to configure UI-3/4/5 set switch 3/4/5 on SW2.

Fig. 6

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## Analog Output Setup

The analog outputs for the thermostat require no hardware setup. The maximum and minimum output signal can be adjusted using the max-pres-value (integers only) and min-pres-value (integers only) properties of the Analog Output Object. By default, depending on the model, the two outputs will modulate between 0 and 10 volts based on a 0-100% control signal.

## Binary Input Setup

The binary inputs for the thermostat require no setup. The digital status of each universal input is updated continuously, whether they are being used or not. The input is active low. A zero-volt signal will show the BI ACTIVE. Any input signal higher than zero volts will show the BI as INACTIVE.

It is recommended to set AV-30 through AV-35 to a value of 0 (counts) for any required binary input.

## Binary Output Setup

The binary outputs for the thermostat require no setup. The outputs are active high. The Common Relay input (BO HOT) is used to switch 24VAC/DC to the thermostat's relays. BO-5 is a logical point only and is used for occupancy scheduling only.