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# ELECTRA-FLOW™

## EF7200 SERIES

### CONTROLLER THERMOSTAT

### INSTALLATION AND PROGRAMMING

**24 VAC LOW VOLTAGE ZONING THERMOSTATS  
FOR USE WITH EFS & EFL SERIES VAV DIFFUSERS  
PIR READY EF7200 SERIES**

#### Product overview

The EF7200 PI thermostat is specifically designed for Electra-Flow VAV diffuser zoning applications. Typical applications include pressure dependent EF series VAV diffusers with or without local reheat. The product features a backlit LCD display with dedicated function menu keys for simple operation. Accurate temperature control is achieved due to the product's PI proportional control algorithm, which virtually eliminates temperature offset associated with traditional, differential-based thermostats. In addition remote room sensing is available.

They all contain a SPST auxiliary switch that can be used to control lighting or auxiliary reheat. 3 additional inputs are also provided for monitoring and / or various advanced functions.



Fig.1 - EF7200 Series

All devices are available with Echelon, BACnet MS-TP or Zigbee wireless network adapter. Standard models are communication ready and network adapter boards can be added at any time.

The thermostats are also compatible with the new Thermal Products Corp. PIR cover accessories. Thermostats equipped with a PIR cover provide advanced active occupancy logic, which will automatically switch occupancy levels from Occupied to Stand-By and Unoccupied as required by local activity being present or not. This advanced occupancy functionality provides advantageous energy savings during occupied hours without sacrificing occupant comfort. All thermostats can be ordered with or without a factory installed PIR cover.

#### Models available

<b>Thermal Products Corporation Part Numbers</b>	<b>EF7200F5x31</b> <b>EF7200F5x31B (BACnet)</b> <b>EF7200F5x31E (Echelon)</b> <b>EF7200F5x31W (Wireless)</b>
Control Outputs	2 x Analog 0 to 10 Vdc 1 x Auxiliary or reheat contact

#### Ordering Information Notes:

- Thermostats can be ordered with a factory installed PIR cover. Please use (5531) extension instead of the (5031) only extension.: Ex. EF7200C5531E.
- Thermostats ordered without a PIR cover can be retrofitted with a separate PIR accessory cover afterwards when required

#### Features and benefits

Features	Benefits
• Advanced occupancy functions	⇒ Through the network or smart local occupancy sensing
• Ready for PIR accessory cover	⇒ Fully integrated advanced occupancy functionality with a PIR accessory cover
• 3 configurable inputs	⇒ Adds functionality
• Pre-configured sequences of operation	⇒ One model meet more applications ⇒ Reduces project delivery cost
• Unique configuration setup utility	⇒ Minimizes parameter tampering
• Lockable keypad	⇒ Tamper proof, no need for thermostat guards
• Auxiliary output	⇒ Can be used for lighting or reheat
• Available with various open industry standards communication adapters	⇒ Adds network integration functionality for additional savings

## Installation —

- Remove security screw on the bottom of thermostat cover.
- Open up by pulling on the bottom side of thermostat.
- Remove Assembly and remove wiring terminals from sticker. **(Fig. 3)**
- Please note the FCC ID and IC label installed in the cover upon removal of cover for the wireless products.

### A) Location (using internal room sensor):

- 1- Should not be installed on an outside wall.
- 2- Must be installed away from any heat source.
- 3- Should not be installed near an air discharge grill.
- 4- Should not be affected by direct sun radiation.
- 5- Nothing must restrain vertical air circulation to the thermostat.

### B) Installation:

- 1- Swing open the thermostat PCB to the left by pressing the PCB locking tabs. **(Fig. 4)**
- 2- Pull out cables 6" out of the wall.
- 3- Wall surface must be flat and clean.
- 4- Insert cable in the central hole of the base.
- 5- Align the base and mark the location of the two mounting holes on the wall. Install proper side of base up.
- 6- Install anchors in the wall.
- 7- Insert screws in mounting holes on each side of the base. **(Fig. 4)**
- 8- Gently swing back the circuit board on the base and push on it until the tabs lock it.
- 10- Strip each wire 1/4 inch.
- 11- Insert each wire according to wiring diagram.
- 13- Gently push back into hole excess wiring **(Fig. 5)**
- 14- Re-Install wiring terminals in correct location. **(Fig. 5)**
- 15- Reinstall the cover (top side first) and gently push back extra wire length into the hole in the wall.
- 16- Install security screw.



- If replacing an old thermostat, label the wires before removal of the old thermostat.
- Electronic controls are static sensitive devices. Discharge yourself properly before manipulation and installing the thermostat.
- Short circuit or wrong wiring may permanently damage the thermostat or the equipment.
- Anti-short cycling can be set to 0 minutes for equipment that possesses their own anti cycling timer. Do not use that value unless the equipment is equipped with such internal timer. Failure to do so can damage the equipment.
- All EF7000 series thermostats are to be used only as operating controls. Whenever a control failure could lead to personal injury and/or loss of property, it becomes the responsibility of the user to add safety devices and/or alarm system to protect against such catastrophic failures.

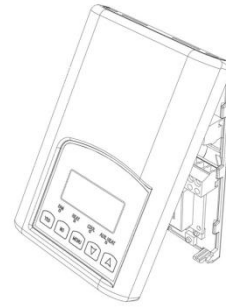


Fig.3

### Location of PCB retaining tabs

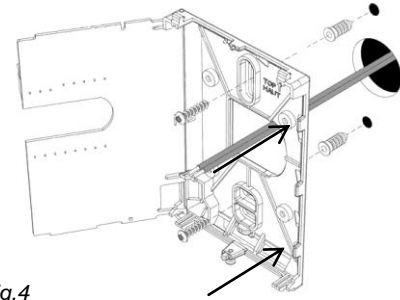


Fig.4

### Re-install terminal blocks

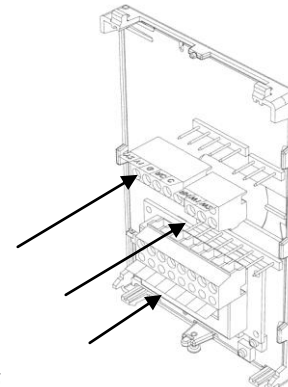


Fig.5

### Thermostat assembly (EF7300F5x31B shown)



Fig.6

## Programmable BI/UI inputs overview

### Binary input #1 can be configured for the following functions:

1. **(None):** No function will be associated with the input
2. **(Rem NSB):** remote NSB timer clock input. The scheduling will now be set as per the binary input. It provides low cost setback operation via a dry contact
  - Contact opened = Occupied
  - Contact closed = Unoccupied
3. **(Motion NO) and (Motion NC)(PIR models only):** Advanced PIR occupancy functions using a Normally Open (NO) or Normally Closed (NC) remote PIR motion sensor. Occupancy mode is now set as per applied PIR function and configuration. Application information and examples, are available on document: *APP-PIR-Guide-Exx*. This document will provide the installers and system designers with detailed examples on applications, parameter configuration information, sequence of operation, troubleshooting and diagnostic help required for the proper usage of the PIR accessory covers
4. **(Window) EMS:** Forces the system to disable any current heating or cooling action by the thermostat. The mode stays the same and the current setpoints are the same Occupied setpoints. **Only the outputs are disabled.** There is a Door/Window/Fan alarm displayed on the thermostat to indicate to the local tenant that the door/window needs to be closed or fan turned on for cooling or heating to resume. **Use NC contact.**
  - Contact opened = System disabled with local Window alarm
  - Contact closed = System enabled

### Binary input #2 can be configured for the following functions:

1. **(None):** No function will be associated with the input
2. **(Door Dry) Door contact & Motion detector:** This configuration is only functional if binary input #1 is set to **Motion NO** or **Motion NC** or a **PIR accessory cover** is used.

With this sequence enabled, the occupancy is now dictated through those 2 inputs. Any motion detected will set the zone to occupied status. The zone will remain permanently in occupied mode until the door contact switch opens momentarily. The thermostat will then go in stand-by mode. If more movements are detected, the occupied mode will resume. While the door is opened, any movements detected by the remote PIR sensor or the PIR accessory cover will be ignored. Use a Normally Closed contact switching device.

  - Contact opened = Door opened
  - Contact closed = Door closed

3. **(RemOVR):** temporary occupancy remote override contact. This function disables the central button override function on the thermostat. The override function is now controlled by a manual remote momentarily closed contact. When configured in this mode, the input operates in a toggle mode.

It is now possible to toggle between unoccupied & occupied setpoints for the amount of time set by parameter (TOccTime) temporary occupancy time.
4. **(Filter):** a backlit flashing **Filter** alarm will be displayed on the thermostat LCD screen when the input is energized. It can be tied to a differential pressure switch that monitor filters
  - Contact opened = No alarm
  - Contact closed = Alarm displayed
5. **(Service):** a backlit flashing **Service** alarm will be displayed on the thermostat LCD screen when the input is energized. It can be tied in to the AC unit control card, which provides an alarm in case of malfunction.
  - Contact opened = No alarm
  - Contact closed = Alarm displayed

### Universal input #3 can be configured for the following functions:

1. **(None):** No function will be associated with the input
2. **(COC/NH) Change over dry contact. Normally Heat:** Used for hot / cold air.
  - Contact closed = Cold air
  - Contact opened = Hot air

Only used and valid if system is setup as 2.0. Parameter ( Out1Conf ) set as 2.0.
3. **(COC/NC) Change over dry contact. Normally Cool:** Used for hot / cold air.
  - Contact closed = Hot air
  - Contact opened = Cold air

Only used and valid if system is setup as 2.0. Parameter ( Out1Conf ) set as 2.0.
4. **(COS) Change over analog sensor:** Used for hot / cold air.

Only used and valid if system is setup as 2.0. Parameter ( Out1Conf ) set as 2.0.

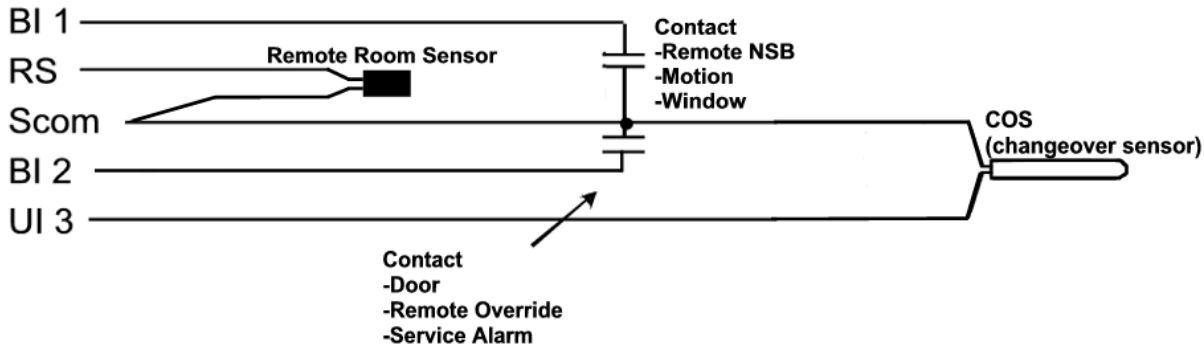
  - If temperature is > 77 °F = Hot air
  - If temperature is < 75 °F = Cold air
5. **(SS) Supply air sensor monitoring:** Used for supply air temperature monitoring.

Only used for network reporting of the supply air temperature. Has no internal function in the thermostat.

Terminal Identification		
Thermal Products Corporation		EF7200F5x31(x)
Terminal	Description / App.	1 or 2 Analog outputs
4	24 Vac - Hot	24 V – Hot
5	24 Vas – Com	24V – Com
6	Aux BO 5	BO 5 - Aux
7	Aux BO 5	BO 5 - Aux
9	AO 2 Heat	AO 2
10	AO 1 Cool	AO 1
	Not Used Blank	Blank
12	BI 1	BI 1
13	RS	RS
14	Scom	Scom
15	BI 2	BI 2
16	UT 3-COS/COC/SS	UI 3

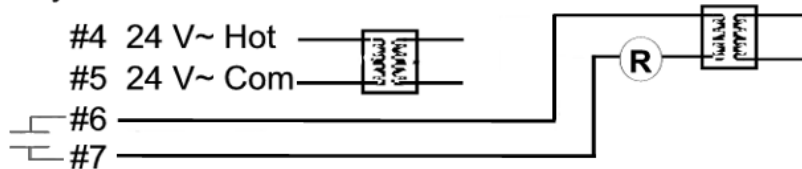
Generic wiring

**Remote inputs ( All models )**

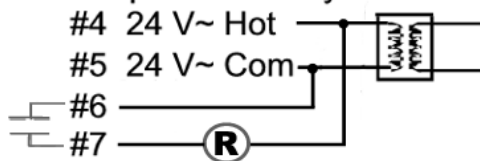


**Auxiliary output ( All models )**

- Dry contact to end device 24 V~ Max



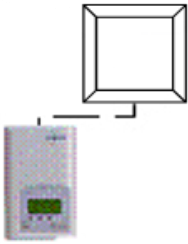
- 24 Vac power to relay



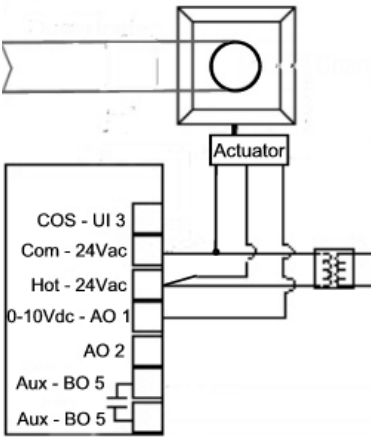
## Typical applications

**Pressure dependent VAV cooling only: EF7200F5x31(x) Analog actuator**

**ELECTRA-FLOW SERIES  
VAV Diffuser Actuator**



Room Temperature Control  
Min. & Max. Damper Position  
Adjusted at the EFS diffuser

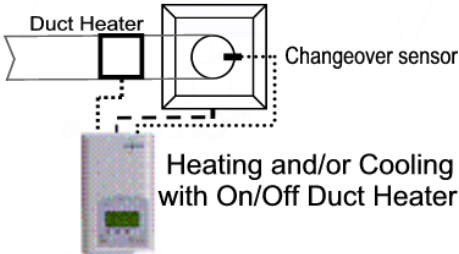


**Mandatory**

- Out1Conf = 2.0
- RA/DA = *as per actuator*
- SeqOpera = 0 Cooling only

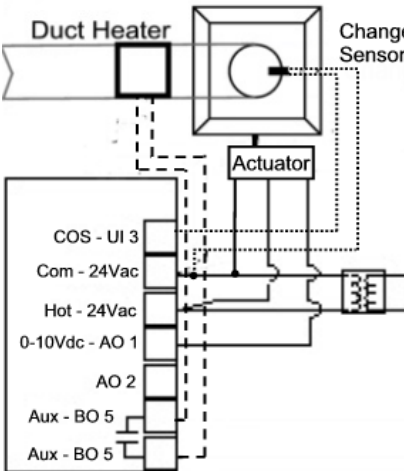
**Pressure dependent VAV cooling / heating with changeover and reheat: EF7200F5x31(x) Analog actuator**

**ELECTRA-FLOW SERIES  
VAV Diffuser Actuator**



Heating and/or Cooling  
with On/Off Duct Heater

Room Temperature Control  
Min. & Max. Damper Position  
Adjusted at the EFS diffuser



**Mandatory**

- Out1Conf = 2.0
- RA/DA = *as per actuator*

If **heat / cool auto-changeover**  
with a local discharge air  
temperature sensor set:

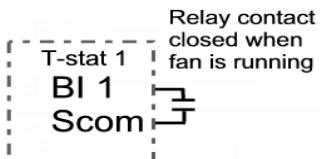
- SeqOpera = 2 Cooling with Reheat
- UI3 = COS

### EF Diffuser w/optional Internal Room Sensor

When using EF Series diffusers, with a built in internal room sensor, it is important that the diffuser actuator is turned off when there is no airflow through the diffuser. The room sensor is located at the inlet of the induction guide of the EF diffuser. The thermal actuator is also located in the induction guide behind the room sensor. When air is flowing through the induction guide aspirates room air into and through the induction guide at all times. When there is no aspiration and no airflow through the induction guide. When the EF diffuser actuator is on, with no airflow, heat from the thermal actuator will warm the induction guide and the room sensor. This will cause false (high) room temperature readings at the thermostat and on the display. To maintain accurate temperature control and temperature readings, when using EF diffusers (with internal room sensors) airflow must be maintained when the diffuser is on. The wiring diagram below demonstrates a simple way to turn off the diffuser actuator(s) when there is no airflow. If multiple EF7200F thermostats are used, powered by a **single** 24Vac transformer, connect all of the **BI 1** terminals together and connect all of the **Scom** terminals together. A single relay contact, connecting **BI 1** and **Scom** together (when the fan is running), will activate the diffuser actuators. **Phasing and polarity of the 24Vac-COM and Scom terminals must be maintained.** When multiple 24Vac transformers are used, separate isolation relays (as illustrated), should be used to prevent component damage. Consult the factory for other wiring options specific to the application.

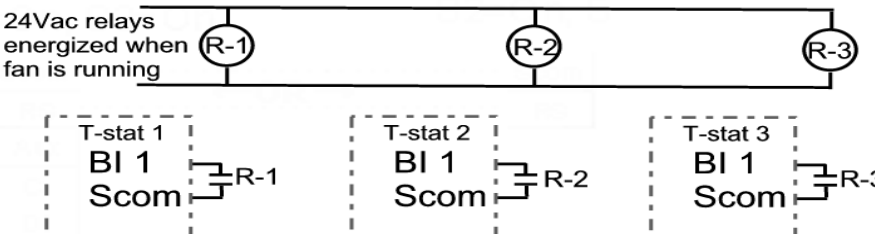
**Wiring example of EF7200 power off with no airflow**      **Mandatory: Binary input #1 = (Window) EMS**

**EF7200F Series  
Single Thermostat**



Relay contact closed when fan is running

**EF7200F Series Multiple Thermostats**



24Vac relays energized when fan is running

## Remote sensor accessories

Model no.	Description
S3010W1000	Wall mounted temperature sensor
S3020W1000	Wall mounted temperature sensor with override key and occupancy status LED
S2060A1000	Averaging temperature sensor
S2000D1000	Duct mounted temperature sensor



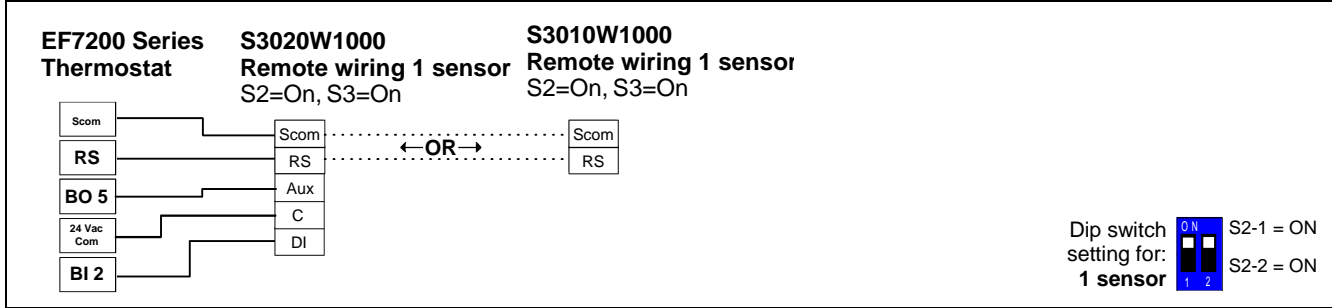
Remote mount temperature sensors use 10K NTC thermistor.

- This sensor can be used for:
- Each sensor can be configured for various averaging combinations
- Optional occupancy led
- Optional override key

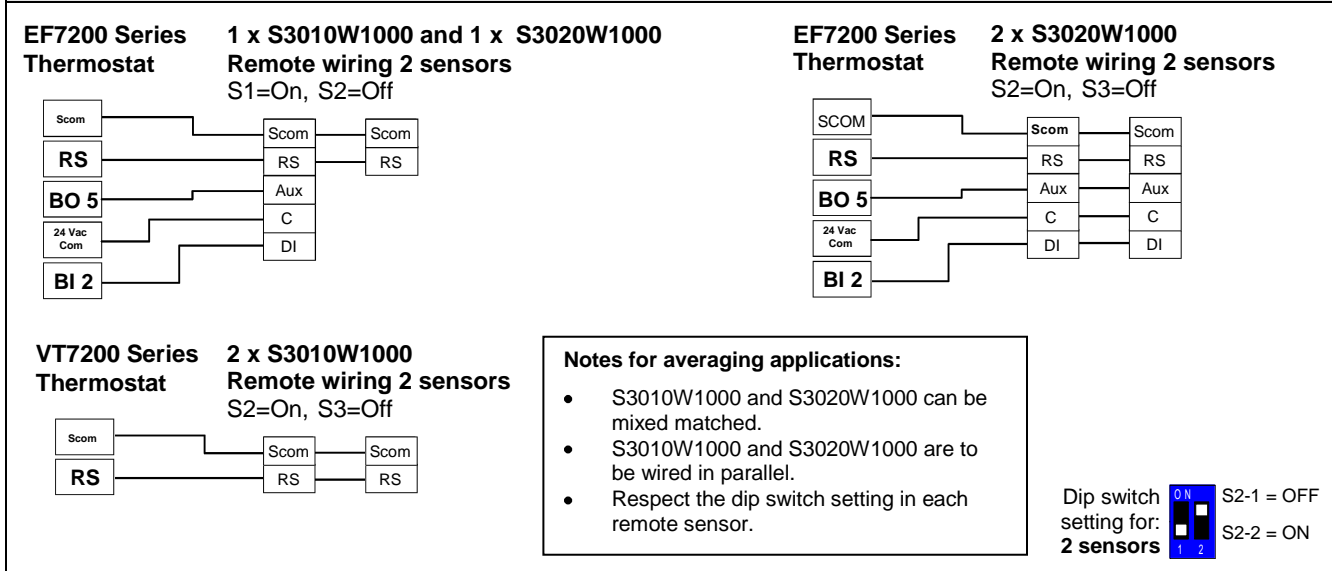
Fig.8 – S3020W1000

## Wall mounted sensor

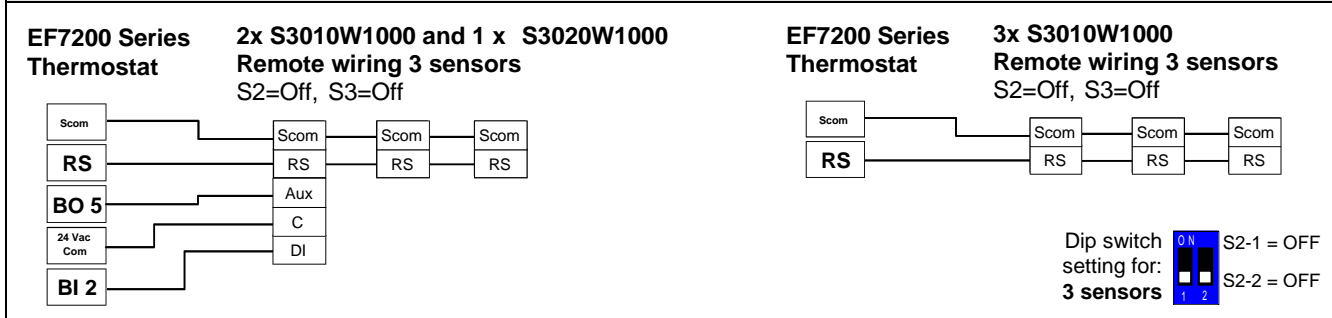
### Wiring example of single remote room sensor:



### Wiring examples of 2 remote room sensors for averaging applications:



### Wiring examples of 3 remote room sensors for averaging applications:



## Temperature vs. resistance chart for 10 Kohm NTC thermistor ( $R_{25^{\circ}\text{C}} = 10\text{K}\Omega \pm 3\%$ , $B_{25/85^{\circ}\text{C}} = 3975\text{K} \pm 1.5\%$ )

°C	°F	Kohm	°C	°F	Kohm	°C	°F	Kohm	°C	°F	Kohm	°C	°F	Kohm
-40	-40	324.3197	-20	-4	94.5149	0	32	32.1910	20	68	12.4601	40	104	5.3467
-35	-31	234.4009	-15	5	71.2430	5	41	25.1119	25	77	10.0000	45	113	4.3881
-30	-22	171.3474	-10	14	54.1988	10	50	19.7390	30	86	8.0694	50	122	3.6202
-25	-13	126.6109	-5	23	41.5956	15	59	15.6286	35	95	6.5499	55	131	3.0016

**Status display**

The thermostat features a two-line, eight-character display. There is a low level backlight level that is always active and can only be seen at night.

When left unattended, the thermostat has an auto scrolling display that shows the actual status of the system. There is an option in the configuration menu to lockout the scrolling display and to only present the room temperature and conditional outdoor temperature to the user. With this option enabled, no local status is given of mode, occupancy and relative humidity.

Each item is scrolled one by one with the back lighting in low level mode. Pressing any key will cause the back light to come on to high level. When left unattended for 10 seconds after changes are made, the display will resume automatic status display scrolling.

To turn on the back light to high level, press any key on the front panel. The back lit display will return to low level when the thermostat is left unattended for 45 seconds

**Sequence of auto-scroll status display:**

Room & Humidity	System Mode	Occupancy Status	Outdoor Temperature	Alarms
RoomTemp x.x °C or °F	Sys mode Auto	Occupied	Outdoor x.x °C or °F	Service
	Sys mode Cool	Stand-By	Network value only	Filter
	Sys mode heat	Unoccup		Window
	Sys mode off	Override		

**Outdoor air temperature**

- Display is only enabled when outdoor air temperature network variable is received.

**Occupancy Status**

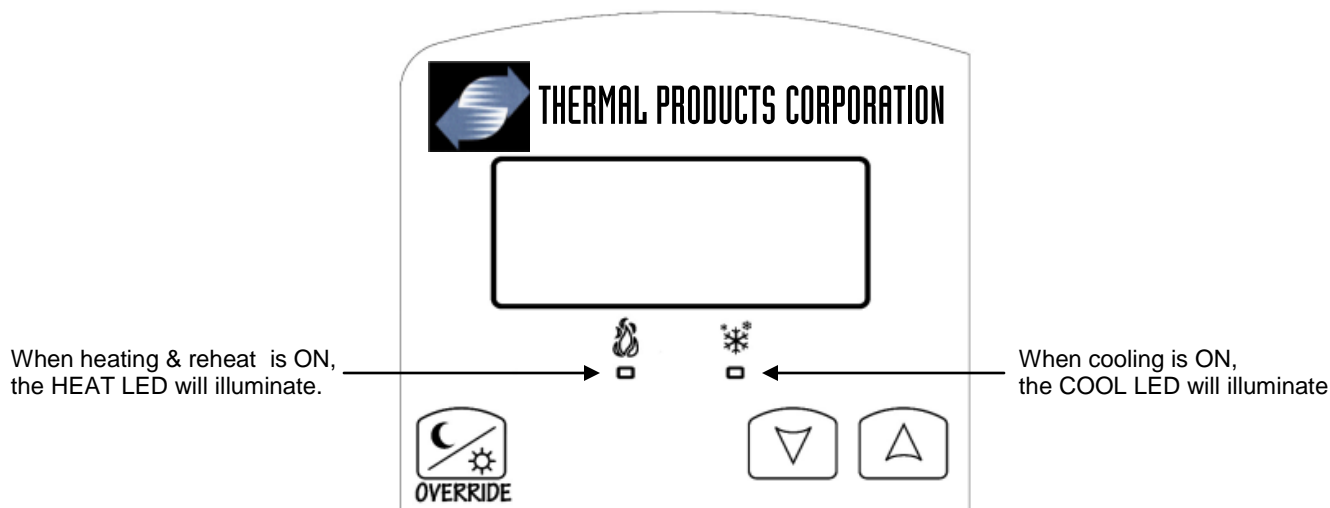
- Occupied, Stand-By, Unoccupied and Override status are displayed on the scrolling display.

**Alarms**

- If alarms are detected, they will automatically be displayed at the end of the status display scroll.
- During an alarm message display, the back lit screen will light up at the same time as the message and shut off during the rest of the status display.
- Two alarms maximum can appear at any given time. The priority for the alarms is as follows:

<b>Service</b>	Indicates that there is a service alarm as per one of the programmable binary input ( B12 )
<b>Filter</b>	Indicates that the filters are dirty as per one of the programmable binary input ( B12 )
<b>Window</b>	Indicates that the outside window or door is opened and that the thermostat has cancelled any cooling or heating action ( B11 )

Two status LED's on the thermostat cover are used to indicate a call for heat or a call for cooling.



## User interface

### • Unoccupied mode Override

An Override can be made during an unoccupied period. If the Override option is enabled in the lockout configuration pressing the Override button will resume occupied setpoints for a time specified by parameter ToccTime

### • Keypad interface

<b>Override</b>	An Override can be made during an Unoccupied period. If the Override option is enabled in the lockout configuration pressing the override key will resume occupied setpoints for a time specified by parameter ToccTime
<b>Down</b>	Adjust the setpoints down ❖ In cooling mode only the cooling setpoint displayed, ❖ In heating mode only the heating setpoint displayed ❖ In auto mode, (See below)
<b>Up</b>	Adjust the setpoints up ❖ In cooling mode only the cooling setpoint displayed, ❖ In heating mode only the heating setpoint displayed ❖ In auto mode, (See below)

1. Any setpoint change can be permanent or temporary based on configuration parameter (Setpoint Type)
2. Any setpoint written through the network, will be permanent and cancel any active temporary setpoints
3. Lockouts of access to certain functions is made with configuration parameter (lockout)

### • Occupied setpoint adjustments

Cooling mode	Heating mode	Off mode	Auto Mode
Cool XX.X °F or °C	Heat XX.X °F or °C	No access to setpoint	<ul style="list-style-type: none"> <li>• Setpoint presented to user is the setpoint from the last action taken by the thermostat or the one currently in use.</li> <li>• Both heating and cooling setpoint are changed simultaneously while respecting the minimum configured deadband</li> </ul>
			<b>Cool XX.X °F or °C and Heat XX.X °F or °C Both heating &amp; cooling setpoints are change simultaneously</b>

### • Unoccupied setpoints adjustments

Setting the unoccupied setpoints is done through the network or through configuration setup only.

### • System mode function.

- PLEASE NOTE THAT: Default system mode of operation is dependent on sequence of operation selected
- **Default mode** is in **bold** when sequence of operation parameter is changed
- The available mode can only be changed through the network since there is no local mode access

Sequence selected	Mode Menu
0 = Cooling only	Off - <b>Cool</b>
1 = Heating only	Off - <b>Heat</b>
2 = Cooling with reheat	Off – <b>Auto</b> – Heat – Cool
3 = Heating with reheat	Off - <b>Heat</b>
4 = N/C	N/A
5 = N/A	N/A

### Installer configuration parameter menu

Configuration can be done through the network or locally at the thermostat.

- To enter configuration, press and hold the Override button for 8 seconds
- If a password lockout is active, “Password” is prompted. Enter password value using the “up” and “down” arrows and press the Override button again to gain access to all configuration properties of the thermostat. A wrong password entered will prevent local access to the configuration menu.
- Press again the Override button repetitively to scroll between all the available parameters
- Use the up and down key to change the parameter to the desired value.
- To acknowledge and save the new value, press the Override button again.
- The next listed parameter is now displayed

### Configuration interface

<b>Override</b>	Enters the configuration mode. Press and hold for 8 seconds Pressing repetitively will scroll all available parameters one by one
<b>Down</b>	Adjust / rotate parameter value down
<b>Up</b>	Adjust / rotate parameter value up



Configuration parameters Default value	Significance and adjustments
<b>PswrdSet</b> Configuration parameters menu access password Default value = <b>0</b> Range is: <b>0 to 1000</b>	This parameter sets a protective access password to prevent unauthorized access to the configuration menu parameters. A default value of "0" will not prompt a password or lock the access to the configuration menu.  Range is: 0 to 1000
<b>ONLY FOR MODELS: EF7200X5x31B EF7200X5x31W</b> <b>Com Addr</b> Thermostat networking address  Default value = <b>254</b> Range is: <b>0 to 254</b>	<b>Conditional parameter to BACnet MS-TP models (EF7200X5x31B)</b> <b>Conditional parameter to Wireless models (EF7200X5x31W)</b> <b><u>This parameter will only appear when a BACnet or wireless network adapter is present.</u></b> <b>If the thermostat is installed as a stand-alone unit or with an Echelon adapter, this parameter will not be used or displayed</b>  - <b>For BACnet MS-TP models valid range to use is from 1 to 127.</b> - <b>Default value of 254 disables BACnet communication for the thermostat.</b> For wireless models valid range is 0 to 254 with a maximum of 30 thermostat per VWG
<b>BI 1</b> Binary input no.1 configuration  Default value = <b>(NONE)</b>	<b>(None):</b> No function will be associated with the input <b>(Rem NSB):</b> remote NSB timer clock input. The scheduling will now be set as per the binary input. It provides low cost setback operation via a dry contact Contact opened = Occupied Contact closed = Unoccupied <b>(Motion NO) or (Motion NC):</b> Advanced PIR occupancy functions using a Normally Open (NO) or Normally Closed (NC) remote PIR motion sensor. Occupancy mode is now set as per applied PIR function and configuration. Application information and examples are available on document: <i>APP-PIR-Guide-Exx</i> . This document will provide the installers and system designers with detailed examples on applications, parameter configuration information, sequence of operation, troubleshooting and diagnostic help required for the proper usage of the PIR accessory covers <b>(Window) EMS:</b> Forces the system to disable any current heating or cooling action by the thermostat. The mode stays the same and the current setpoints are the same Occupied setpoints. Only the outputs are disabled. There is a Door/Window alarm displayed on the thermostat to indicate to the local tenant that the door/window needs to be closed for cooling or heating to resume. Note: (Window) EMS should be selected when using internal diffuser room sensors. A dry contact is closed when the fan is running. (See section- EF Diffuser w/optional Internal Room Sensor ) * These settings will disable the local override function on the thermostat.
<b>BI 2</b> Binary input no.2 configuration  Default value = <b>(NONE)</b>	<b>(None):</b> No function will be associated with the input <b>(Door Dry) Door contact &amp; Motion detector:</b> This configuration is only functional if binary input #1 is set to <b>Motion NO</b> or <b>Motion NC</b> or a <b>PIR accessory cover</b> is used. With this sequence enabled, the occupancy is now dictated through those 2 inputs. Any motion detected will set the zone to occupied status. The zone will remain permanently in occupied mode until the door contact switch opens momentarily. The thermostat will then go in stand-by mode. If more movements are detected, the occupied mode will resume. While the door is opened, any movements detected by the remote PIR sensor or the PIR accessory cover will be ignored. Use a Normally Closed contact switching device. Contact opened = Door opened Contact closed = Door closed <b>(RemOVR):</b> temporary occupancy remote override contact. This function disables the central button override function on the thermostat. The override function is now controlled by a manual remote momentarily closed contact. When configured in this mode, the input operates in a toggle mode. It is now possible to toggle between unoccupied & occupied setpoints for the amount of time set by parameter (TOccTime) temporary occupancy time. <b>(Filter):</b> a backlit flashing <b>Filter</b> alarm will be displayed on the thermostat LCD screen when the input is energized. It can be tied to a differential pressure switch that monitor filters Contact opened = No alarm Contact closed = Alarm displayed <b>(Service):</b> a backlit flashing <b>Service</b> alarm will be displayed on the thermostat LCD screen when the input is energized. It can be tied in to the AC unit control card, which provides an alarm in case of malfunction. Contact opened = No alarm Contact closed = Alarm displayed

<b>UI 3</b> Universal input no.3 configuration  Default value = <b>(COS)</b> <b>Change over analog sensor</b>	<b>(None):</b> No function will be associated with the input <b>(COC/NH) Change over dry contact. Normally Heat:</b> Used when both heating and cooling are controlled from the same thermostat output. Contact closes when cold air/water is present. Only used and valid if system parameter (Out1Conf) is set at 2.0 <b>(COC/NC) Change over dry contact. Normally Cool:</b> Used when both heating and cooling are controlled from the same thermostat output. Contact closes when hot air/water is present. Only used and valid if system parameter (Out1Conf) is set at 2.0 <b>(COS) Change over analog sensor:</b> Used where heating and cooling are controlled from the same output. Temperature in duct/pipe determines control mode (heat/cool) Only used and valid if system parameter ( Out1Conf ) is set at 2.0 <b>(SS) Supply air sensor monitoring:</b> Used for supply air temperature monitoring. Only used for network reporting of the supply air temperature. Has no internal function in the thermostat																					
<b>MenuScro</b> Menu scroll Default value = <b>On</b> = Scroll active	Removes the scrolling display and only present the room temperature/humidity to the user. With this option enabled, no status is given of mode, schedule and outdoor temperature. <b>On = Scroll active</b> <b>Off = Scroll not active</b>																					
<b>C or F</b> Sets the display scale Default value = <b>°F</b>	°F for Fahrenheit scale °C for Celsius scale																					
<b>Lockout</b>  <table border="1" data-bbox="77 688 472 894"> <thead> <tr> <th>Level</th> <th>Occupied temperature setpoints</th> <th>Unoccupied Override</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Yes access</td> <td>Yes access</td> </tr> <tr> <td>1</td> <td>Yes access</td> <td>No access</td> </tr> <tr> <td>2</td> <td colspan="2">Level not used</td> </tr> <tr> <td>3</td> <td colspan="2">Level not used</td> </tr> <tr> <td>4</td> <td>No access</td> <td>Yes access</td> </tr> <tr> <td>5</td> <td>No access</td> <td>No access</td> </tr> </tbody> </table>	Level	Occupied temperature setpoints	Unoccupied Override	0	Yes access	Yes access	1	Yes access	No access	2	Level not used		3	Level not used		4	No access	Yes access	5	No access	No access	Keypad lockout levels. Default value = <b>0 No lock</b>
Level	Occupied temperature setpoints	Unoccupied Override																				
0	Yes access	Yes access																				
1	Yes access	No access																				
2	Level not used																					
3	Level not used																					
4	No access	Yes access																				
5	No access	No access																				
<b>Out1Conf</b> Output # 1 configuration Default is: <b>2.0</b>	Defines the type of operation needed for Output #1 (BO1 & BO2) <b>2.0,</b> will limit the number of sequences of operation available from 0 to 3 Will enable heat/cool operation from the same output ( refer to wiring diagram ) <b>4.0,</b> can access all the sequences of operation from 0 to 5 Will enable heat/cool operation from different output ( refer to wiring diagram )																					

SeqOpera Sequence of operation Default is: <b>Sequence #0</b>	Single output application (Out1Conf) = 2.0)	Dual output application (Out1Conf) = 4.0)
0 = Cooling Only	Yes access	Yes access
1 = Heating only	Yes access	Yes access
2 = Cooling with Reheat	Yes access	Yes access
3 = Heating with Reheat	Yes access	Yes access
4 = Cool and Heat, 2 outputs	No access	Yes access
5 = Cool and Heat, 2 outputs with Reheat	No access	Yes access

**For single output applications, the system access is also limited if UI 3 is configured for local changeover COS, COC/NC or COC/NH.**

<b>St-By TM</b> Stand-by Timer value Default <b>0.5 hours</b>	Time delay between the moment where the PIR cover detected the last movement in the area and the time which the thermostat stand-by mode and setpoints become active. Range is: <b>0.5 to 24.0 hours</b> in 0.5hr increments
<b>Unocc TM</b> Unoccupied Timer value Default <b>0.0 hours</b>	Time delay between the moment where the thermostat toggles to stand-by mode and the time which the thermostat unoccupied mode and setpoints become active. The factory value or <b>0.0 hours:</b> Setting this parameter to its default value of 0.0 hours disables the unoccupied timer. This prevents the thermostat to drift from stand-by mode to unoccupied mode when PIR functions are used Range is: <b>0.0 to 24.0 hours</b> in 0.5hr increments
<b>St-By HT</b> Stand-by heating setpoint Default value = <b>69 °F</b>	The value of this parameter should reside between the occupied and unoccupied heating setpoints and make sure that the difference between the stand-by and occupied value can be recovered in a timely fashion when movement is detected in the zone. Stand-by heating setpoint range is: <b>40 to 90 °F ( 4.5 to 32.0 °C )</b>
<b>St-By CL</b> Stand-by cooling setpoint limit Default value = <b>78 °F</b>	The value of this parameter should reside between the occupied and unoccupied cooling setpoints and make sure that the difference between the stand-by and occupied value can be recovered in a timely fashion when movement is detected in the zone. Stand-by cooling setpoint range is: <b>54 to 100 °F ( 12.0 to 37.5 °C )</b>
<b>Unocc HT</b> Unoccupied heating setpoint Default value = <b>62 °F</b>	Heating setpoint range is: <b>40 to 90 °F ( 4.5 to 32.0 °C )</b>

<p><b>Unocc CL</b> Unoccupied cooling setpoint limit Default value = <b>80 °F</b></p>	<p>Cooling setpoint range is: <b>54 to 100 °F ( 12.0 to 37.5 °C )</b></p>																														
<p><b>heat max</b> Maximum heating setpoint limit Default value = <b>90 °F</b></p>	<p>Maximum occupied &amp; unoccupied heating setpoint adjustment. Heating setpoint range is: <b>40 to 90 °F ( 4.5 to 32.0 °C )</b></p>																														
<p><b>cool min</b> Minimum cooling setpoint limit Default value = <b>54 °F</b></p>	<p>Minimum occupied &amp; unoccupied cooling setpoint adjustment. Cooling setpoint range is: <b>54 to 100 °F ( 12.0 to 37.5 °C )</b></p>																														
<p><b>Pband</b> Proportional band setting Default is : <b>3</b></p>	<p>Adjust the proportional band used by the thermostat PI control loop.</p> <p><b>Warning.</b> Note that the default value of 3.0 °F ( 1.2 °C ) gives satisfactory operation in most normal installation cases. The use of a superior proportional band different than the factory one is normally warranted in applications where the thermostat location is problematic and leads to unwanted cycling of the unit. A typical example is a wall mounted unit where the thermostat is installed between the return and supply air feeds and is directly influenced by the supply air stream of the unit.</p> <table border="1" data-bbox="631 793 1019 1110"> <thead> <tr> <th>Value</th> <th>F scale Pband</th> <th>C scale Pband</th> </tr> </thead> <tbody> <tr><td>2</td><td>2 F</td><td>0.6 C</td></tr> <tr><td>3</td><td>3 F</td><td>1.2 C</td></tr> <tr><td>4</td><td>4 F</td><td>1.7 C</td></tr> <tr><td>5</td><td>5 F</td><td>2.2 C</td></tr> <tr><td>6</td><td>6 F</td><td>2.8 C</td></tr> <tr><td>7</td><td>7 F</td><td>3.3 C</td></tr> <tr><td>8</td><td>8 F</td><td>3.9 C</td></tr> <tr><td>9</td><td>9 F</td><td>5.0 C</td></tr> <tr><td>10</td><td>10 F</td><td>5.6 C</td></tr> </tbody> </table>	Value	F scale Pband	C scale Pband	2	2 F	0.6 C	3	3 F	1.2 C	4	4 F	1.7 C	5	5 F	2.2 C	6	6 F	2.8 C	7	7 F	3.3 C	8	8 F	3.9 C	9	9 F	5.0 C	10	10 F	5.6 C
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10	10 F	5.6 C																													
<p><b>Set Type</b> Temporary setpoint enable Default is : <b>Permment</b> Enables temporary setpoints feature to any change of occupied or unoccupied setpoint.</p>	<p><b>Temporary:</b> (temporary) Local changes to the heating or cooling setpoints by the user are temporary. They will remain effective for the duration specified by ToccTime. Setpoints will revert back to their default value after internal timer ToccTime expires.</p> <p>To change setpoints permanently, revert to <b>No</b> this variable or write setpoints through the network. Any setpoints written through the network will be permanent ones and saved to EEPROM.</p> <p><b>Permment:</b> (permanent) Any change of occupied or unoccupied setpoints through the keypad by the user are permanent and saved to &amp; EPROM</p>																														
<p><b>ToccTime</b> Temporary occupancy time Default value = <b>2 hours</b></p>	<p>Temporary occupancy time with occupied mode setpoints when override function is enabled When the thermostat is in unoccupied mode, function is enabled with either the menu or BI1 or BI2 configured as remote override input. <b>0,1, 2, 3, 4, 5, 6, 7, 8, 9, 10, &amp; up to 24 hours</b></p>																														
<p><b>deadband</b> Minimum deadband Default value = <b>2.0 °F</b></p>	<p>Minimum dead band value between the heating and cooling setpoints. If modified, it will be applied only when any of the setpoints are modified. <b>2, 3, 4 or 5 °F, 1.0 °F increments ( 1.0 to 2.5 °C, 0.5 °C increments )</b></p>																														
<p><b>cal RS</b> Room air temperature sensor calibration Default value = <b>0.0 °F</b></p>	<p>Offset that can be added/subtracted to actual displayed room temperature <b>± 5.0 °F, 1.0 °F increments ( ± 2.5 °C, 0.5 °C increments )</b></p>																														

<p><b>Aux cont</b> Auxiliary contact function &amp; configuration</p> <p>Default value = <b>0 (Not Used)</b></p>	<p>0 Aux contact function used for reheat <i>IF SEQUENCE IS SET TO REHEAT THROUGH NETWORK OR LOCAL</i>, Ignore this parameter</p> <p>The output will directly follow the occupancy of the thermostat</p> <p>1 Auxiliary NO, Occ or St-By = Contact Closed / Unoccupied = Contact Opened 2 Auxiliary NC, Occ or St-By = Contact Opened / Unoccupied = Contact Closed Output to follow directly main occupancy and Fan on command Typically used for 2 position fresh air damper applications.</p> <p>3 Auxiliary NO, Occ or St-By &amp; Fan On = Contact Closed / Unoccupied &amp; Fan On or Off = Contact Opened 4 Auxiliary NC, Occ or St-By &amp; Fan On = Contact Opened / Unoccupied &amp; Fan On or Off = Contact Closed Output to follow secondary network occupancy command</p> <p>5 Auxiliary On/Off Control through auxiliary network command. The output can be commanded through the network for any required auxiliary functions through a separate &amp; dedicated network variable.</p>
<p><b>RA/DA</b> Reverse acting or Direct acting signal for Analog output signals <b>EF72xxF5x31(x) models only</b></p> <p>Default value: <b>DA signal</b></p>	<p>Changes the action of the analog outputs on the analog models.</p> <p><b>DA</b> = Direct acting 0 to 100 % = 0 to 10 Vdc <b>RA</b> = Reverse acting 0 to 10 % - 10 to 0 Vdc</p>
<p><b>Reheat</b> Sets the time base for the reheat output if used</p> <p>Default value: <b>0= 15 minute</b></p>	<p>Sets the reheat output time base Valid only if reheat sequences are enabled</p> <p><b>0</b> = 15 minutes <b>1</b> = 10 seconds for Solid state relays</p>
<p><b>UI 3 dis</b> Display supply or changeover temperature</p>	<p>Used as diagnostic / service help to troubleshoot and diagnose sensor operation Only when UI 3 is configured as an analog input ( SS or COS )</p>

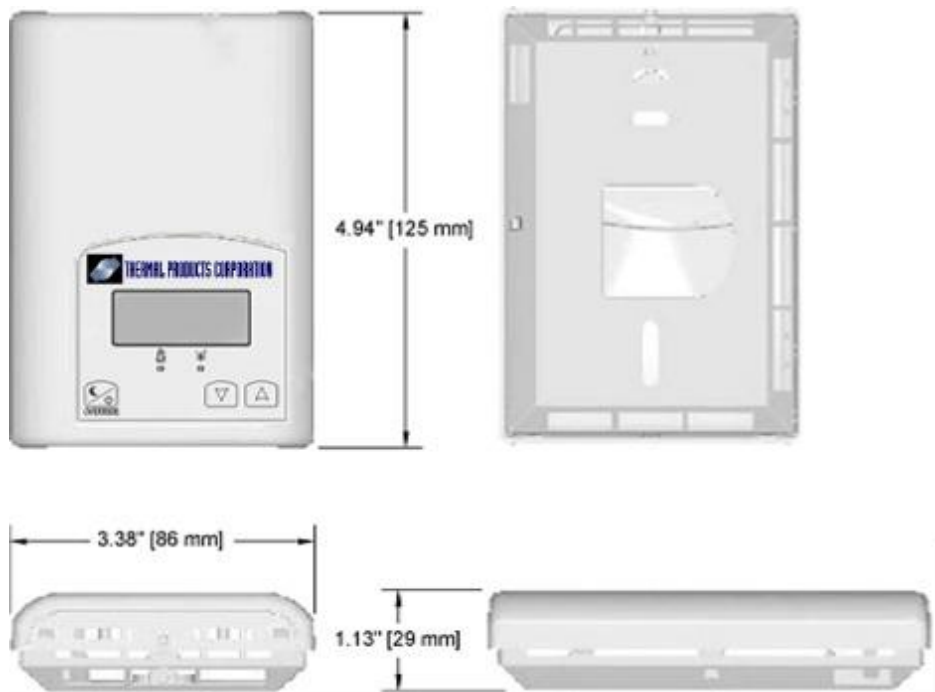
## Specifications

Thermostat power requirements:	19-30 Vac 50 or 60 Hz; 2 VA Class 2
Operating conditions:	0 °C to 50 °C ( 32 °F to 122 °F ) 0% to 95% R.H. non-condensing
Storage conditions:	-30 °C to 50 °C ( -22 °F to 122 °F ) 0% to 95% R.H. non-condensing
Temperature sensor:	Local 10 K NTC thermistor
Temperature sensor resolution:	± 0.1 °C ( ± 0.2 °F )
Temperature control accuracy:	± 0.5 °C ( ± 0.9 °F ) @ 21 °C ( 70 °F ) typical calibrated
Occ, Stand-By and Unocc cooling setpoint range:	12.0 to 37.5 °C ( 54 to 100 °F )
Occ, Stand-By and Unocc heating setpoint range:	4.5 °C to 32 °C ( 40 °F to 90 °F )
Room and outdoor air temperature display range	-40 °C to 50 °C ( -40 °F to 122 °F )
Proportional band for room temperature control:	Cooling & Heating: 1.8°C ( 3.2°F )
Binary inputs:	Dry contact across terminal BI1, BI2 & UI3 to Scdm
Contact output rating:	Triac output: 30 Vac, 1 Amp. Maximum, 3 Amp. in-rush Analog: 0 to 10 Vdc into 2KΩ resistance min.
Wire gauge	18 gauge maximum, 22 gauge recommended
Dimensions:	4.94" x 3.38" x 1.13"
Approximate shipping weight:	0.75 lb ( 0.34 kg )
Agency Approvals all models:	<b>UL:</b> UL 873 (US) and CSA C22.2 No. 24 (Canada), File E27734 with CCN XAPX (US) and XAPX7 (Canada) <b>Industry Canada:</b> ICES-003 (Canada)
Agency Approvals all models	<b>FCC:</b> Compliant to CFR 47, Part 15, Subpart B, Class A (US) <b>CE:</b> EMC Directive 89/336/EEC (Europe Union) <b>C-Tick:</b> AS/NZS CISPR 22 Compliant (Australia / New Zealand) Supplier Code Number N10696
Agency Approvals Wireless models	<b>FCC:</b> Compliant to: Part 15, Subpart C

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

## Drawing & Dimensions

## Important Notice



All EF7200 series controls are for use as operating controls only and are not safety devices. These instruments have undergone rigorous tests and verifications prior to shipment to ensure proper and reliable operation in the field. Whenever a control failure could lead to personal injury and/or loss of property, it becomes the responsibility of the user / installer / electrical system designer to incorporate safety devices ( such as relays, flow switch, thermal protections, etc...) and/or alarm system to protect the entire system against such catastrophic failures. Tampering of the devices or miss application of the device will void warranty.

Fig.13 – Thermostat dimensions