SmartStruxure Lite Solution

SE7000/SE8000 Room Controllers

ZigBee Pro Wireless Integration Guide

Get Control. Get Efficient. Get Value

Schneider Electric

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Who Should Read this Guide

This guide is for integrators of SmartStruxure™ Lite solutions. It provides important information for getting you started with the set-up and configuration of your building efficiency management system.

Ensure you follow the instructions to ensure a successful and trouble-free installation at the client's site.

Plan and Prepare

The information contained here helps you work effectively and minimizes the likelihood of any critical issues occurring during installation. Successful integration of your SmartStruxure Lite system requires proper preparation and planning. Planning in advance saves resources, prevents wasted effort, and saves time and money for you and your customer.

About this Guide

This guide provides instructions for the physical integration of a SER7000/SE8000 Series model the with the following Multi-purpose Manager (MPM):

- MPM-UN
- MPM-VA VAV
- MPM-GW

For more information visit our website at www.documentation.smartstruxurelite.com

Overview

This guide focuses on full integration of Multi-purpose Managers (MPM) and Room Controller with a built in Wireless Controller Driver Card in a ZigBee Pro adapter environment.

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Multi-purpose Manager

Multi-purpose Manager (MPM) Devices are flexible lines of site and zone Managers. They allow you to install and manage integrated solutions for HVAC, lighting, and metering. They are also a quick and efficient link between multiple devices based on many standard protocols.

The Building Expert web building energy management system is embedded in MPM Devices.

Multi-purpose Managers are fully programmable and are designed with wireless lighting and HVAC applications in mind. They can also be used to control a wide range of ZigBee Pro compatible devices such as light sensors, light switches, relays, thermostats, card readers, and magnetic door contacts.

MPM-UN

The MPM-UN is an electronic device designed to monitor and control various devices for building automation applications. The Manager consists of a printed circuit board housed in a plastic shell casing.

External connectors are available for the following:

- 6 universal inputs
- 4 analog outputs
- 2 binary outputs (dry contact)
- LAN (Ethernet cable)
- RS-485 device (Modbus)
- CANbus
- Power supply

The device has wireless modules to enable bidirectional communication with ZigBee Pro devices. Managers can communicate with each other wirelessly using their ZigBee Pro modules.

MPM-GW

The MPM-GW wireless Manager is an electronic device designed to integrate wireless solutions to wired building automation systems.

Small buildings system gateways can integrate wireless devices based on ZigBee Pro protocols and standards into building automation systems.

The MPM-GW is a printed circuit board housed in a plastic shell casing. Unlike the MPN-UN and MPM-VA, there are no physical (wired) I/Os on this Manager.

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The following connectors are concealed in a casing:

- LAN
- CANbus
- Power supply

The MPM-GWs have embedded ZigBee Pro wireless modules to enable bidirectional communication with ZigBee Pro devices. The Managers can also communicate with each other wirelessly using their ZigBee Pro modules.

MPM-VAV

The MPM-VAV Manager is designed to monitor and control various devices for building automation purposes, including VAV boxes. It can also control various devices for building automation applications.

External connectors are available for the following:

- 6 universal inputs
- 4 analog outputs
- 2 binary outputs (dry contact)
- 1 damper actuator
- 1 pressure sensor
- LAN (Ethernet cable)
- RS-485 device (Modbus)
- CANbus
- Power supply

The device has a pressure sensor and is equipped with an optional damper actuator. The device also has optional embedded EnOcean and ZigBee Pro wireless modules to enable bidirectional communication with their respective protocol. The Managers can communicate with each other wirelessly using their ZigBee Pro modules.

Room Comfort Controllers

The Room Comfort Controller allows for simple management of multiple equipment controllers from one convenient location. The device is compatible with terminal equipment controllers including fan-coil units, rooftop units, and heat-pump models. You can also adjustment set points, central system modes, global overrides, broadcasting of outdoor temperature, and central alarm reporting.

The wireless communication card can be separately installed in the Room Controller for use with Schneider Electric MPM Controllers. The communication card and associated wireless communicating controllers encourages the use of existing wiring utilized by existing electronic Controller type controls.

SE7000 Series

SE8000 Series

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ZigBee Pro Overview

ZigBee Pro is a specification for a suite of high level communication protocols used to create personal area networks built from small, low-power devices. Though low-powered, ZigBee Pro devices often transmit data over longer distances by passing data through intermediate devices to reach more distant ones. This is accomplished by creating a mesh network, such as a network with no centralized control or high-power transmitter/receiver able to reach all of the networked devices.

ZigBee Pro is a standard which is suitable for wireless sensor and controller networks. In ZigBee Pro, a device, node, or Controller is determined to have joined a network if it can obtain a ZigBee Pro network address from a parent device, provided it passes the necessary security protocols. This ZigBee Pro address is a value which is not initially exposed or available for the integrator to see.

Devices, nodes, and Controllers can calculate and assign addresses for their surrounding devices by a distributed address assignment scheme. This assignment is flexible, but it does somewhat restrict the number of attached devices and the possible depth of the said network for any given device on the network.

ZigBee Pro is a mesh type network. The ZigBee Pro coordinator, or MPM with wireless communication card, is responsible for initializing, maintaining, and controlling the network. For mesh networks, devices communicate with each other in a multi-hop fashion. The network is formed by one ZigBee Pro coordinator and extended by multiple ZigBee Pro routers. A device can join a network as an end device by associating with the coordinator or a router.

A ZigBee Pro network typically has the following three types of devices:

- **ZigBee Pro Coordinator:** heart of the network. There must be one and only one coordinator per network. Its role is to act as a trust center and to allow and approve all routers and end devices attempting to join its network.
- **ZigBee Pro Router:** the link in the network. It routes packets between other nodes, providing extended network range. A router device is always on to provide routes for other devices acting as a parent for end devices.
- **ZigBee Pro End Device:** only has the functionality to achieve a specific task and communicate with a parent node (either coordinator or router). It cannot relay data from other devices.

Addresses

Once a device, node, or Controller is assigned a ZigBee Pro address and has joined the active ZigBee Pro network, it saves its assigned ZigBee Pro address to flash memory. The address gets reused afterwards, even in the event of a power failure or a network re-start. The only time a device, node, or Controller requires a new ZigBee Pro address is if the network gets re-started with either a new PAN ID or a new Channel value. This causes the currently assigned and saved ZigBee Pro address (stored in flash) to get erased, and forces the MPM to try to re-join a new network.

ZigBee Pro is used in applications that require low data rate, long battery life, and secure networking.

ZigBee Pro Protocols

ZigBee created many protocols based on IEEE 802.15.4, which ultimately led to the evolution of ZigBee Pro. ZigBee Pro is a vertical stack from the application layer down to 802.15.4 and the network layer uses the same addressing as 802.15.4. The network layer supports a mesh network of routers that are continually powered. Also supported are end devices that do not route messages on the mesh, but can receive and send through a parent routing node. An end device node is referred to as a ZigBee End Device or ZED.

Routes in ZigBee Pro are always created through broadcast discovery and are always self-healed dynamically from the point of failure. As well, ZigBee Pro supports a single Network Key where all messages are encrypted and decrypted at every hop. Nodes may also have local keys, called Application Link Keys, which are used to communicate end-to-end to other nodes.

ZigBee Pro supports a Trust Center from which security keys are distributed.

ZigBee Topology

ZigBee Pro runs over 802.15.4 spread spectrum and is designed to coexist with WiFi. ZigBee is a mesh, where messages hop from router node to router node. However, sleeping devices do not route but may send messages and receive messages buffered in a parent device. A parent may change during a sleeping devices lifetime. Routes are fixed, until there is a route failure, upon which a new route is reestablished. Temporary interference is handled by spread spectrum and retries.

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ZigBee Security

Security is enforced by the Trust Center service, which currently resides on a single node.

There are two kinds of keys:

1. Network Key protects the network from outside access.
2. Application Link Key protects transactions between a pair of nodes, or from other nodes in the same network.

Schneider Electric products have only an Application Link Key from a device to the Trust Center.

Network Key

All messages are encrypted by a Network Key, and every node in the network must know the Network Key. The Network Key is a shared secret, but may change over the life of the network. At every hop along its route to its destination, the Network Key is used to decrypt the message for processing, and then re-encrypt the message before forwarding

Trust Center

A Trust Center decides if a device can join the network. The Trust Center sends the Network Key to a device that is joining the network. The Network Key is encrypted with the device's Trust Center Link Key. The Trust Center may have an address list to prevent or allow nodes to join the network. The Trust Center then sends the joining node a unique Trust Center Link Key that the Trust Center keeps in a database.

Trust Center Link Keys

The Trust Center Link Key is an intrinsic Application Link Key that is stored in every node and always used when a node talks to the Trust Center. Each device may have a unique Trust Center Link Key, however, all Trust Center Link Keys may be the same shared secret value. The Trust Center Link Key defines the trust relationship between the node and the Trust Center.

Distribution of the Network Key

The Network Key is transported to the device using the Trust Center Link Key (TCLK). By default every device has a well known default TCLK, and the initial transport of the Network Key is vulnerable at installation time. When installation is complete, the Trust Center sends a new random TCLK to the device.

Wireless Mesh Networks

The wireless card and related network ready wireless controllers series operate using the ZigBee Pro/IEEE 802.15.4 physical layer for communication.

The following shows general characteristics of the wireless physical communication layer:

- Uses a wireless physical layer of 2.4GHz with a data rates of 250 kbps
- Yields high throughput and low latency
- Mesh Topologies
- Fully handshake protocol for transfer reliability

The following shows IEEE 802.15.4 and ZigBee Pro networks and application support layer:

- Low cost installation deployment
- Ease of implementation
- Reliable data transfer
- Short range operation
- Very low power consumption
- Appropriate levels of security

The MPM with wireless communication card acts as network coordinator device for the IEEE 802.15.4/ZigBee Pro network used with the Schneider Electric wireless controllers. These features of the network physical layer include receiver energy detection, link quality indication, and clear channel assessment. Both contention-based and contention-free channel access methods are supported with a maximum packet size of 128 bytes, which includes a variable payload up to 104 bytes. Also employed are 64-bit IEEE and 16-bit short addressing, supporting over 65,000 nodes per network. These properties of the physical layer are used and employed in Schneider Electric devices, but are hidden to the installed/user for ease of configuration and commissioning of the network database.

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Design and Deployment

IMPORTANT: It is highly recommended you do a proper field survey with the Schneider Electric necessary survey tools to establish connectivity limitations and architecture layout on ALL job sites considered for deployment with wireless controller products.

Deployment Tool

The Schneider Electric wireless survey tools are intended to verify and validate the deployment and use of Schneider Electric wireless controllers on a potential job site. The survey tool shows a numerical percentage value on the LCD screen, which represents the wireless network ZigBee Pro RSSI dBi value (Receiving Signal Strength Indicator).

The following should be used as a RSSI dBi indicator:

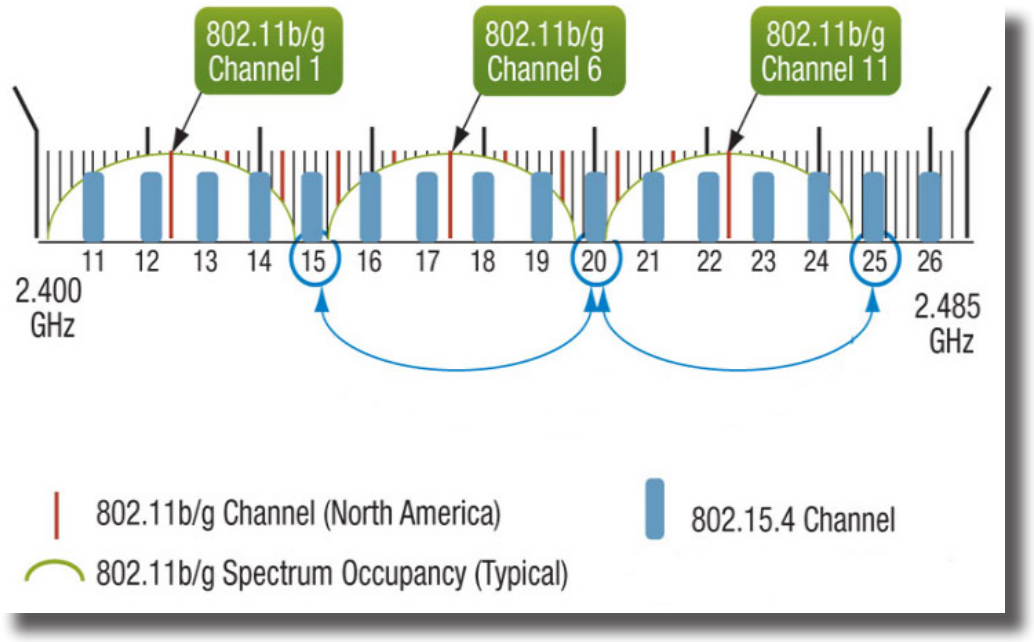
- Any value from 10 to 100% indicates good ZigBee Pro connectivity.
- Any value below 10% could indicate an extra Router (VRP 5000W/1000W) may need to be installed.

Design Considerations

When setting-up a ZigBee Pro wireless environment, a per floor horizontal architecture is recommended over a vertical one. Transmitting from one floor to the other may be possible in certain applications (such as going through stair ways), however horizontal configuration is preferred. It is recommended to be use at least one coordinator per floor.

Radio transmissions can not travel through steel. If floors are constructed with steel joists or other steel materials, it is highly unlikely the wireless controller transmissions can penetrate between floors.

To properly avoid network interference with standard 802.11 WiFi devices in the 2.4GHz spectrum range, it is recommended to use 802.15.4 channels 15, 20, and 25 only. The 802.11 WiFi transmissions overlap and may interfere with other channel selections allowed by 802.15, channels 11 to 24. There should be a clear line of sight distance between 2 nodes, and the maximum distance between each node (Controller) should be under 100 feet (30m) as shown below.



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Working with ZigBee Pro

ZigBee Pro has a number of optimizations designed specifically for larger networks comprised of thousands of devices. The following shows you how to work effectively with ZigBee Pro

Network Layer

A ZigBee Pro network is a set of wireless 802.15.4 nodes cooperating to form a mesh network over which messages hop, from node to node, to reach a destination. The ZigBee Pro network layer uses the same addressing as 802.15.4 (8-byte EUI46 MAC and 2-byte short address). Network and routing layers (above 802.15.4) support higher level addressing, discovery, and routing.

Extended PAN ID (EPID)

A ZigBee Pro network is identified by its Extended PAN ID (EPID), which is an 8-byte value. An EPID should be unique for all networks within range of each other, across all radio channels. The ZC lets you choose a random PAN ID from its EPID, and the 2-byte PAN ID (not EPID) is used for normal traffic. Nodes ignore messages with the wrong PAN ID.

The PAN ID links specific Room Controllers to specific ZigBee Pro Coordinators. For every Controller reporting to a Coordinator, you must set the same channel value both on the Coordinator and the Room Controller(s).

Channels

The Channel links specific Room Controllers to specific ZigBee Pro Coordinators. For every Room Controller reporting to a Coordinator, you must set the same channel value both on the Coordinator and the Room Controller(s).

It is recommended to use Channels 15, 20, and 25. The default value of 10 is not a valid channel, and the valid range of available channel is from 11 to 25.

Router, End Device, Coordinator, Trust Center

When a ZigBee Pro node attempts to join a network, it scans all channels for existing ZigBee Pro networks. Any ZigBee Coordinator can form a network by choosing a Channel, PAN ID, and EPID, which often is its own MAC address (EUI64). A ZigBee Coordinator is automatically assigned the short address 0x0000 referred to as the ZigBee Coordinator or ZC.

ZigBee Pro Coordinators and Routers are the nodes that participate in routing messages on the mesh. ZigBee Pro Routers and are always powered on.

A ZigBee Pro End Device (ZED) does not route messages for other devices. A ZED is usually asleep but can send a message to the ZigBee Pro network where it then gets routed. A ZED only receives messages by polling its parent as long as the parent is within one hop (radio range) of the ZED.

A ZigBee Pro Trust Center (TC) stores and distributes security keys in the network. The Trust Center is a powered device in the network with sufficient resources to provide Trust Center services. Security material can be transmitted out of band (on the wire) to the Trust Center.

Broadcasting

ZigBee Pro supports broadcasting, but network broadcasts are discouraged for normal operation because a broadcast message must be propagated to all nodes in the network, which generates a lot of traffic. In addition, all nodes must repeat the message, and each node must wait until there is a clear channel to transmit. A broadcast is limited by a radius value that decrements for each hop.

Security and Trust Center

Security is enforced by the Trust Center service, which currently resides on a single node, and has the following two key types:

- Network Key: protects the network from outside access.
- Application Link Key: protects transactions between a pair of nodes and from other nodes in the same network.

Network Key

All messages are encrypted by a Network Key and every node in the network must know the Network Key. The Network Key is a shared secret, but may change over the life of the network.

At every hop along its route to its destination, the Network Key is used to decrypt the message for processing, and then re-encrypt the message before forwarding. A Trust Center decides if a device can join the network and sends the Network Key to the device attempting to join the network. The Trust Center may have a list of MAC addresses to prevent or allow nodes to join the network. The Trust Center may also require devices attempting to join the node have a unique Trust Center Link Key the Trust Center has in a database.

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Application Link Keys

An Application Link Key is used to encrypt only the application payload of the message. The payload is only decrypted at the destination, and is therefore secure from any other nodes that come across the message along the route. Application Link Keys are distributed to a pair of nodes by the Trust Center, and each node keeps a table of Application Link Key/node entries.

Trust Center Link Keys

The Trust Center Link Key is an intrinsic Application Link Key stored in every node and always used when a node talks to the Trust Center. Each device may have a unique Trust Center Link Key, or all Trust Center Link Keys may be the same shared secret value.

The Trust Center Link Key defines the trust relationship between the node and the Trust Center. If all Trust Center Link Keys are the same in every node, then every node on the network can decrypt Trust Center messages from each node. Conversely, if all Trust Center Link Keys are unique, then each node must communicate individually to the Trust Center securely.

The Trust Center Link Key has a default value which provides no security. To secure the network, the Trust Center Link Key must be changed during a node's commissioning time. The Trust Center must also be informed so it can communicate with the node over its lifetime.

A Trust Center Link Key may become vulnerable under the following conditions:

1. A new secret Trust Center Link Key is transported to a new node at commissioning and gets encrypted with the default Trust Center Link Key.
2. A new node joins the network, is sent to the Network Key, and encrypted with the node's Trust Center Link Key.
3. The Trust Center decides to roll (change) the Network Key it transports to each node using each node's Trust Center Link Key.

Joining a Network

To join a network, the network needs to be 'open' (permit join parameter selected). Any router node may open itself, however the node that wants to join must be in range of an open node. Once a node successfully joins a network, an announcement is sent to all nodes. The Trust Center authorizes the new node on the network and transports the Network Key to the newly joined node. If the Trust Center does not authorize the node, the node is not permitted to join the Network. The Network Key is encrypted with the Trust Center Link Key that the Trust Center stores for all nodes.

Application Layer

All standard messages are sent and received using the cluster identifier.

Endpoint

A ZigBee Pro endpoint is a port or instance of a device type. A node or device is defined by a single ZigBee Pro radio and stack, and a ZigBee Pro device type is defined as having particular clusters that it supports.

To address an application message, one of the following options are present in the message:

- [short address] [endpoint] [cluster]
- [broadcast address] [endpoint] [cluster] (used for generic clusters)
- [broadcast address] [broadcast endpoint] [cluster]

Endpoints have a device type and a list of clusters that support the function of the device.

ZigBee devices have up to 240 endpoints. Applications may use endpoints numbered 1-240 and there is no correlation between application and endpoint number. Endpoint 0 is reserved for use by the ZigBee Device Object (ZDO) for network discovery and binding services. Endpoint 0xFF is the broadcast endpoint. Each endpoint provides one simple descriptor that describes the device type, application profile identifier, and a list of input and output clusters. A ZigBee Pro application profile is an inter-operable domain, such as the ZigBee Pro Building Automation.

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Cluster

An endpoint supports a limited number of clusters. Duplicate clusters on an endpoint are not allowed. Clusters have mandatory and optional attributes. An attribute is a data value stored on a device and has a particular data type.

Clusters can only communicate to another cluster with the same cluster identifier to form a communication transaction. One counterpart of the communication is the output cluster (client cluster), and the other counterpart is the input cluster (server cluster). Usually, the client sends a request and the server responds, however the server can also send unsolicited alarms, reports, etc. Clusters communicate with commands that are either specific to the cluster or work globally across all clusters. Commands to read, write, and report cluster attributes (data) are global commands. The support of cluster attributes and commands may be mandatory or optional.

Supported Cluster

Part Number	Basic	Identify	Groups	Scenes	Thermostat	Temperature Measurement	Thermostat UI Configuration	Occupancy Sensing	Fan Control	Relative Humidity Measurement
SE7657B	X	X	X	X	X	X	X	X	X	X
SE7656B	X	X	X	X	X	X	X	X	X	
SE7652A	X	X	X	X	X	X	X	X	X	
SE7652H	X	X	X	X	X	X	X	X	X	
SE7652B	X	X	X	X	X	X	X	X	X	
SE7605B	X	X	X	X	X	X	X	X	X	
SE7600B	X	X	X	X	X	X	X	X	X	
SE7600A	X	X	X	X	X	X	X	X	X	
SE7600H	X	X	X	X	X	X	X	X	X	
SE7607B	X	X	X	X	X	X	X	X	X	X
SE7350C	X	X	X	X	X	X	X	X	X	X
SE7300C	X	X	X	X	X	X	X	X	X	
SE7355C	X	X	X	X	X	X	X	X	X	X
SE7305C	X	X	X	X	X	X	X	X	X	
SE7350F	X	X	X	X	X	X	X	X	X	X
SE7300F	X	X	X	X	X	X	X	X	X	
SE7355F	X	X	X	X	X	X	X	X	X	X
SE7305F	X	X	X	X	X	X	X	X	X	
SE7200C	X	X	X	X	X	X	X	X		
SE7200F	X	X	X	X	X	X	X	X		
SE7300A	X	X	X	X	X	X	X	X	X	
SE7305A	X	X	X	X	X	X	X	X	X	
SE7350A	X	X	X	X	X	X	X	X	X	X
SE7355A	X	X	X	X	X	X	X	X	X	X
SE7600F	X	X	X	X	X	X	X	X	X	
SE7652F	X	X	X	X	X	X	X	X	X	
SE7606E	X	X	X	X	X	X	X	X	X	
SE7656E	X	X	X	X	X	X	X	X	X	
SE7600W	X	X	X	X	X	X	X	X	X	X
SE7652W	X	X	X	X	X	X	X	X	X	X

Note: The end point number for all devices is 10

Attributes Supported in Specified Clusters for Thermostat Clusters

THERMOSTAT CLUSTER					
Attribute ID	**Attribute Name**	**Range**	**Access**	**Default**	**Function**
0x0000	LocalTemperature	Temperature, min=40°F(-40°C), max=122°F(50°C)	Read Only	-	Displays the Room temperature in degrees Celsius and is measured locally or over the network.
0x0001	OutdoorTemperature	Temperature, min=40°F(-40°C), max=122°F(50°C)	Read Only	-	Displays the OA temperature in degrees Celsius and is measured locally or over the network.
0x0002	Occupancy	True = Occupied, False=Unoccupied	Read Only	Unoccupied	Displays the occupancy state of the space and is measure locally or over the network.
0X0003	AbsMinHeatSetpointLimit	Temperature, min=40°F(4.5°C), max=90°F(32°C)	Read Only	40°F(4.5°C)	States the minimum heating setpoint permitted.

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THERMOSTAT CLUSTER					
Attribute ID	**Attribute Name**	**Range**	**Access**	**Default**	**Function**
0x0004	AbsMaxHeatSetpointLimit	Temperature, min=40°F(4.5°C), max=90°F(32°C)	Read Only	86°F(30.0°C)	States the maximum heating setpoint permitted.
0x0005	AbsMinCoolSetpointLimit	Temperature, min=54°F, max=100°F	Read Only	61°F(16.0°C)	States the minimum cooling setpoint permitted.
0X006	AbsMaxCoolSetpointLimit	Temperature, min=54°F(12°C), max=100°F(37.5°C)	Read Only	100°F(37.5°C)	States the maximum cooling setpoint.
0x0007	PICoolingDemand	Percentage, min=0%, max=100%	Read Only	-	Specifies the level of cooling demanded by the PI control loop in %.
0x0008	PIHeatingDemand	Percentage, min=0%, max=100%	Read Only	-	Specifies the level of heating demanded by the PI control loop in %.
0x0012	OccupiedHeatingSetpoint	Temperature, min=40°F(4.5°C), max=90°F(32°C)	Read Only	72°F(22°C)	Specifies the heating mode setpoint when the room is occupied.
0x0011	OccupiedCoolingSetpoint	Temperature, min=54F(12C), max=100F(37.5C)	Read/Write	74°F(23°C)	Specifies the cooling mode setpoint when the room is occupied.
0x0013	UnoccupiedCoolingSetpoint	Temperature, min=54°F(12°C), max=100°F(37.5°C)	Read/Write	80°F(27°C)	Specifies the cooling mode setpoint when the room is unoccupied.
0x0014	UnoccupiedHeatingSetpoint	Temperature, min=40°F(4.5°C), max=90°F(32°C)	Read/Write	62°F(17°C)	Specifies the heating mode setpoint when the room is unoccupied.
0x0016	MaxHeatSetpointLimit	Temperature, min=40°F(4.5°C), max=90°F(32°C)	Read/Write	90°F(32°C)	Specifies the maximum heating setpoint permissible.
0x0017	MinCoolSetpointLimit	Temperature, min=54°F(12°C), max=100°F(37.5°C)	Read/Write	54°F(12°C)	Specifies the minimum cooling setpoint permissible.
0x0019	MinSetpointDeadBand	Temperature, min=2°F(1°C), max=5°F(2.5°C)	Read/Write	2°F(1°C)	Specifies the minimum difference between heat and cool setpoints.

THERMOSTAT CLUSTER						
Attribute ID	Attribute Name	Range	Text Description	Access	Default	Function
0x001b	ControlSequenceOfOperation	0x00	Cooling Only	Read/Write	Cooling and Heating 4 pipe	Specifies the overall operating environment.
		0x01	Cooling with Reheat			
		0x02	Heating Only			
		0x03	Heating with Reheat			
		0x04	Cooling and Heating 4 pipe			
		0x05	Cooling and Heating 4 pipe with Reheat			
0x001c	SystemMode	0x00	Off	Read/Write	Cool	Specifies the current operating mode.
		0x01	Auto			
		0x02	Cool			
		0x03	Heat			
		0x04	Emergency heating – NOT USED			
		0x05	Precooling- NOT USED			
		0x06	Fan Only – NOT USED			
0x0650	Occupancy Command	0x00	Local Occupancy	Read/Write	Local Occupancy	Specifies the occupancy mode.
		0x01	Occupied			
		0x02	Unoccupied			

THERMOSTAT UI CONFIGURATION CLUSTER						
Attribute ID	Attribute Name	Range	Text Description	Access	Default	Function
0x0000	TemperatureDisplayMode	0x00	Temperature in Celsius	Read/Write	Celsius	Specifies the units of the temperature displayed
		0x01	Temperature in Fahrenheit			

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THERMOSTAT UI CONFIGURATION CLUSTER						
Attribute ID	Attribute Name	Range	Text Description	Access	Default	Function
0x0001	KeypadLockout	0x00	No lockout	Read/Write	No lockout	Specifies level of functionality that is available to the user via the keypad.
		0x01	Level 1 lockout			
		0x02	Level 2 lockout			
		0x03	Level 3 lockout			
		0x04	Level 4 lockout			
		0x05	Level 5 lockout			

TEMPERATURE MEASUREMENT CLUSTER				
Attribute ID	Attribute Name	Range	Access	Function
0x0000	Measured Value	Temperature, min=40°F(-40°C), max=122°F(50°C)	Read Only	Represents the temperature in Celsius.
0x0001	MinMeasuredValue	Temperature, min=40°F(-40°C)	Read Only	Indicates the minimum value capable of being measured.
0x0002	MaxMeasuredValue	Temperature, max=122°F(50°C)	Read Only	Indicates the maximum value capable of being measured.

RELATIVE HUMIDITY MEASUREMENT CLUSTER				
Attribute ID	Attribute Name	Range	Access	Function
0x0000	Measured Value	Humidity, min=0%, max=100%	Read Only	Represents the relative humidity in %.
0x0001	MinMeasuredValue	Temperature, min=0%	Read Only	Indicates the minimum value capable of being measured.
0x0002	MaxMeasuredValue	Temperature, max=100%	Read Only	Indicates the maximum value capable of being measured.

OCCUPANCY SENSING CLUSTER					
Attribute ID	Attribute Name	Range / Index	Text Description	Access	Function
0x0000	Occupancy	Occupied or Unoccupied	-	Read Only	Specifies in the occupancy sensed.
0x0001	OccupancySensor Type	0x00	PIR	Read Only	Specifies the type of occupancy sensor.
		0x01	Ultrasonic NOT USED		
		0x02	PIR and ultrasonic NOT USED		

BASIC CLUSTER					
Attribute ID	Attribute Name	Range	Access	Default	Function
0x0000	ZCL Version	-	Read Only	1	Specifies the version number of the ZigBee Cluster Library.
0x0001	Application Version	-	Read Only	1	Specifies the version number of the application software.
0x0002	Stack Version	-	Read Only	0x30	Specifies the version number of the ZigBee Stack.
0x0003	HWVersion	-	Read Only	0	Specifies the version number of the hardware.
0x0004	ManufacturerName	-	Read Only	Viconics	Specifies the manufacturer name.
0x0005	ModelIdentifier	-	Read Only	-	Specifies the model number.
0x0007	PowerSource	-	Read Only	-	Specifies the sources of power available to the device.
0x0010	LocationDescription	-	Read/Write	-	Describes the physical location of the device.
0x0012	DeviceEnabled	0x00=Disabled,0x01=Enabled	Read/Write	Enabled	Specifies if the device is enabled or disabled.

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FAN CONTROL CLUSTER						
Attribute ID	Attribute Name	Range / Index	Text Description	Access	Default	Function
0x0000	FanMode	0x00	Off	Read/Write	Auto	Specifies the current speed of the fan.
		0x01	Low			
		0x02	Medium			
		0x03	High			
		0x04	On			
		0x05	Auto			
		0x06	Smart			
0x0001	FanModeSequence	0x00	Low/Med/High	Read/Write	Low/Med/High/Auto	Specifies the possible fan speeds available.
		0x01	Low/High			
		0x02	Low/Med/High/Auto			
		0x03	Low/ High/Auto			
		0x04	On/Auto			

IDENTIFY CLUSTER				
Attribute ID	Attribute Name	Access	Default	Function
0x0000	Identify Time	Read/Write	0x0000	Specifies the time in seconds that the device will continue to indentify itself.

GROUPS CLUSTER				
Attribute ID	Attribute Name	Range	Access	Function
0x0000	NameSupport	0=Not Supported 1=Supported	Read Only	Indicates if group names are supported.

SCENES CLUSTER			
Attribute ID	Attribute Name	Access	Function
0x0000	SceneCount	Read Only	Specifies the number of scenes currently in the devices scene table.
0x0001	CurrentScene	Read Only	Holds the Scene ID of the scene last invoked.
0x0002	CurrentGroup	Read Only	Holds the Group ID of the scene last invoked.
0x0003	SceneValid	Read Only	Indicates whether the state of the device corresponds to that associated with CurrentScene and CurrentGroup attributes. True indicates they are valid, false indicates not valid.
0x0004	NameSupport	Read Only	Indicates if scene names are supported. Value of 1 indicates they are supported, 0 indicates not supported.

Attributes

Attributes are data values referenced by a 2-byte identifier. Cluster commands can access attributes. The Read Attribute and Write Attribute commands use a list of attribute identifiers that must exist under the same cluster. Because each wireless message targets a single endpoint and single cluster, it is not possible to address multiple attributes of different clusters on the same or different endpoints.

Reporting

Reporting is a publish/subscribe service that can be supported by any cluster with any attribute. Reporting pushes attributes to a data sink, without having the sink device(s) poll for the data. Polling can add latencies in any network, especially a wireless network. The report service uses global cluster commands that allows a configuring device to create a subscription to data on the reporting device that sends the data to a sink device.

Reporting parameters can be thresholds and intervals. Any device can read the report parameters from the reporting device, including the destination(s) of the reports. Reporting can send many attributes, but from only one cluster in a single message.

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Applications in ZigBee Pro

Architecture relies on the correct management of symmetric keys and the correct implementation of methods and security policies. The architecture of an application may be decided before or after the project is started.

Sensors and Aggregator

Architecture must be considered in cases where several sensors push data to a single or a few aggregators. To operate, there must be a powered ZigBee Pro infrastructure of ZigBee Pro Routers so sensors, which are sleeping end devices, have a network to join. This infrastructure can consist of repeaters only, but could also be partially or completely comprised of common powered actuators such as lights, pumps, valves, and thermostats.

The aggregators are usually part of an overall management system that may or may not do actual control. Control may be local and the system only sets parameters the local controllers use.

Sensor and Actuator

Robust control is local when the actuator and sensor are close together. In this architecture, the sensor pushes data to the actuator. The actuator may mirror the data for the system aggregators and send it on behalf of the sensors.

Aggregators may gather data from other networks in the system, process the data, and push it out to the actuators for local control parameters.

Client and Server

This architecture defines the roles of a conversation between two devices. Both devices may always play the same role or different roles depending on the service or transaction.

Gateway and Proxy

Gateway architecture is used when ZigBee Pro networks are added to existing wired systems that are orders of magnitude faster than a wireless mesh. A gateway proxies ZigBee Pro data. If it had to read the data from the ZigBee network each time the system requested it, this would delay the higher speed system. Therefore, data is stored in a proxy format that is easy to translate to the wired system. The wired system sees the data as being hosted by the gateway, and the gateway handles the asynchronous updates from the ZigBee Pro network.

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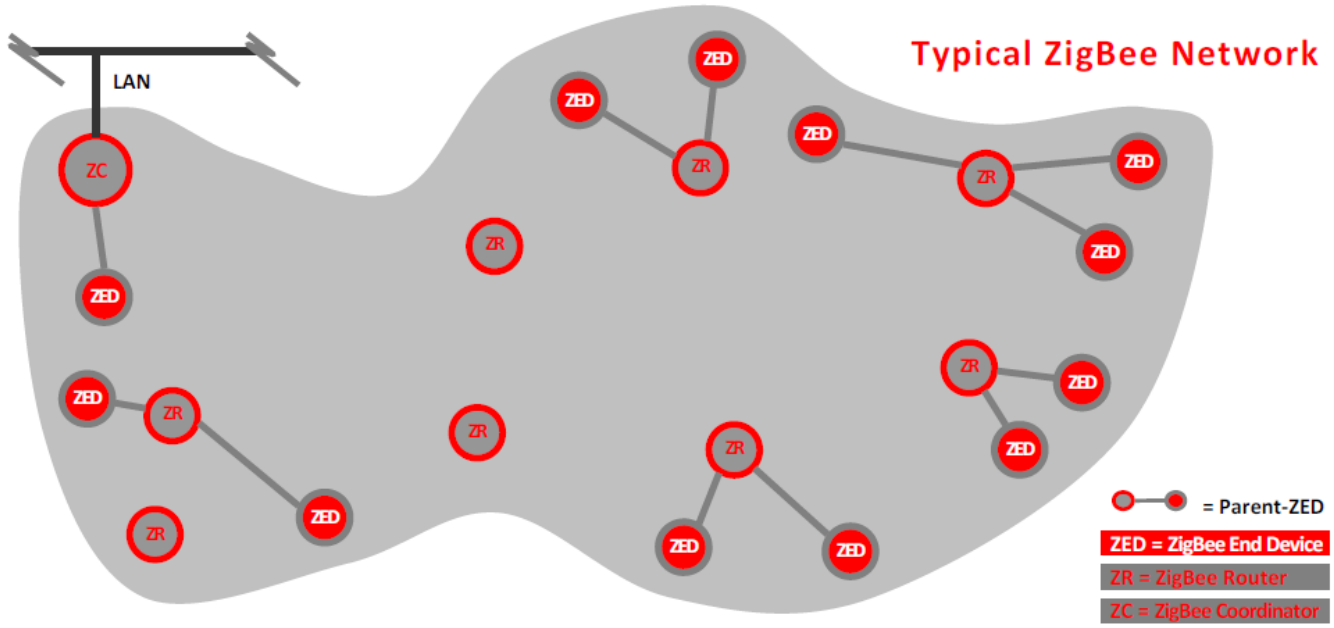
ZigBee Network Diagrams

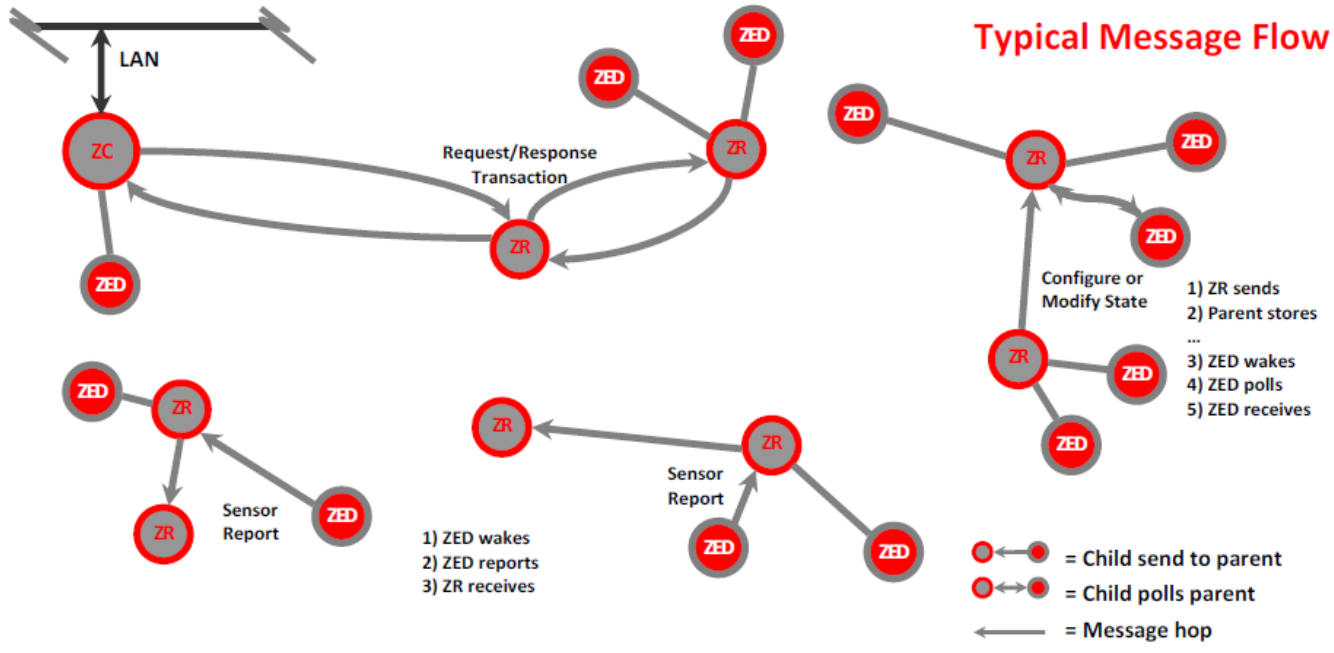
The ZigBee Pro network is a collection of ZigBee Pro routers (ZR) that create a mesh. The mesh allows messages to hop from router to router to a destination. The ZigBee Pro coordinator (ZC) is also a router and provides the security Trust Center which allows, or disallows, nodes to join the network. ZigBee Pro end devices (ZED) are powered sleeping sensors that wake up periodically to sense and send data. A ZED only receives messages from a routing parent when it wakes up, but does not route messages.

ZigBee Pro Network



ZigBee Pro Message Flow

A request/response transaction may take many hops through the network, but is transparent to the application layer. Sleeping devices can add long latencies depending on sleep parameters, however there is no guarantee of an immediate response from a sleeping device.



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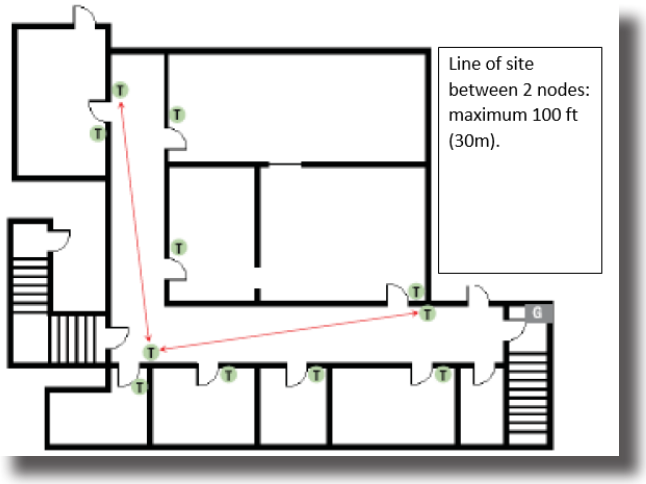
Deployment

Facilitating proper development and deployment of ZigBee Pro ensures active device support. It also allows for interaction with other devices sharing the same ZigBee pro network, as well as to actively poll devices to gain information not unavailable through passive sniffing, and send/receive ZigBee Pro standard and proprietary messages. The following shows various scenarios to assist you in deploying your ZigBee Pro installation.

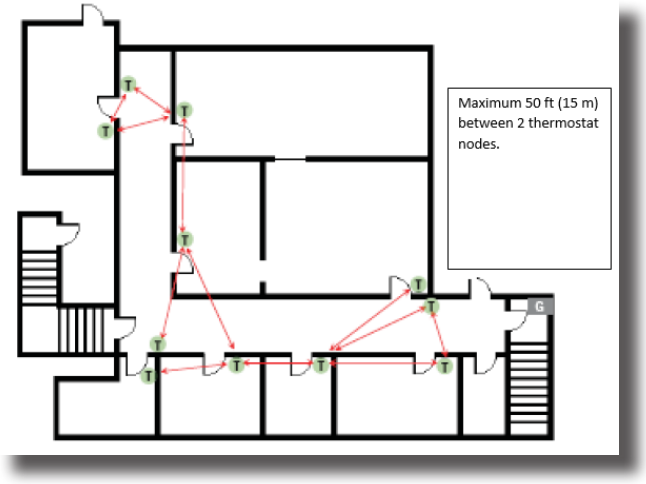
Ensure the minimum distance between any node and any WiFi devices (routers, adapters, laps-tops) is at least 3ft (1m). The preferable distance is 10ft (3m) or more.

The following should be observed when setting-up your device in a ZigBee Pro wireless environment:

- Ensure at least one controller is within 30 ft of the MPM Coordinator for every cluster of 10 Wireless Room Controllers installed.
- Always try to position, if possible, the MPM near the center of all associated wireless controllers.
- Always try to position the MPM near to and in line of sight to as many wireless controllers as possible.
- Try to avoid metal, brick walls, or concrete obstructions between wireless devices.
- Ensure the antenna on the MPM is always perpendicular to the floor.
- Avoid placing controllers near metal or enclosed in metal boxes. If the MPM needs to be installed inside a metal cabinet, use the remote antenna accessory.



Non line of sight distance for typical gypsum wall partitions made with metal stud frame should be under 30ft (10m).



Deployment Scenarios

Schneider Electric has identified 10 scenarios for setting up a ZigBee Pro wireless environment.

Scenario 1 - 10

NOTE: At the time of writing, this information is not available

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Integrate ZigBee Pro with Room Controller and Manager

Integrating a Room Controller with a Manager involves several steps, all of which must be followed to ensure correct integration between the two devices. Manual setting of the Room Controller is required before you can integrate it with a Manager. Once the Room Controller is correctly configured, Building Expert allows you to integrate it with a MPM.

Online/Offline Configuration

Device data points for the integrated Device can be set either Online or Offline. Online or Offline configuration is determined by the Integrator but can involve User preference, installation environment, availability of equipment, or security issues.

Online Room Controller Database Creation with Live Integration Binding Onsite

Online Configuration lets the Integrator install, integrate, and configure every Room Controller with a Manager in real time. Building Expert lets you set all device data points and save the data to your Manager for immediate use. Online configuration requires you bind the Room Controller to a Manager at the time of integration. The Bind process instructs the Manager to locate all Devices and record their COM address and IEEE Mac Address immediately during the binding process. Once this is done, the integration is complete and any data point or COV polled to the Manager gets saved and takes immediate affect between the Room Controller and the Manager.

Offline Room Controller Database Creation with Onsite Room Controller Integration Binding

Offline configuration follows the exact same principles as Online configuration. The major difference is there is no binding between the Room Controller and the Manager database as the integration is not done at the customer site. Assigning Object values and COV status in Offline Configuration is the same as for Online Configuration. Once the Analog or Binary values are assigned to the data points, all data can be saved directly to the Managers database. However, since the Room Controller and Manager are not yet integrated, no wireless communication exists between the two Devices. Although the data is stored in the Managers database, no action is taken as the Manager does not poll the Room Controller nor receive any broadcasts from the Room Controller until binding between the Room Controller and the Manager is complete. Once you bind the Room Controller and the Manager, wireless operation exists between the two Devices.

Offline Configuration is typically used in large scale deployment jobs where creating databases, GUIs, alarms, trend logs, etc, involves a large investment of time.

Room Controller or Manager Replacement in Field

A Room Controller or a Manager can be replaced in the field at any time. Field replacement involves replacing a defective device with a new device. The new device must be identical in model number and must be configured identically to the defective device for the replacement to be successful.

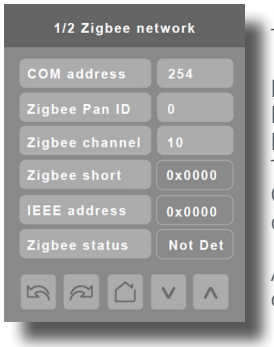
If replacing a Room Controller in the field, the new device must have the identical COM address, PAN ID, and Channel as the defective device to be recognized by the Manager. The new Room Controller can be configured Offline and switched out directly in the field with the defective device. As soon as the Manager polls the Room Controller or receives a broadcast from the Room Controller after binding, it recognizes the parameters in the replaced device and treats it with identical behavior as for the defective device.

While a Room Controller is getting replaced, the Manager continues to poll for the device at its regular 30 second intervals unless the Room Controller is set as the broadcaster.

Room Controller Configuration

You must first configure the Room Controller before you can set-up the ZigBee Pro wireless environment and integrate the device with a MPM. The Room Controllers require 24 VAC and the MPM can be powered by either 24VAC or 24VDC. The power supply must be VAC if you want to share power source between the Manager and Room Controller.

The COM address parameter for a Room Controller is required for communication purposes in a SmartStruxure™ Lite network. The COM address of each Room Controller must be set to a unique number. This ensures the easiest and fastest way to identify a specific room controller deployed at the site.



The COM address can be any value between 0 - 254, with the default value set as 254.

Room Controllers join ZigBee Pro networks as routers. You must set two communication parameters, PAN ID and Channel, to enable communication between the Room Controller and the Manager. The PAN ID and Channel settings must be the same values for all Room Controllers in the same network. These settings must also be identical to the PAN ID and Channel settings in Building Expert. Any Room Controller with a PAN ID or Channel setting different than the settings in Building Expert will not get discovered on the network when you attempt to discover and bind the Device.

A valid PAN ID can be any value between 1 - 1000, with the default value being 0. The Channel setting can be any Channel between 10 - 25

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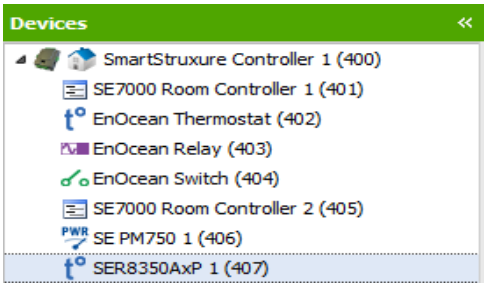
Integration

Once you have configured your Room Controller, you must login to Building Expert to integrate the Room Controller with the Manager. To integrate any Room Controller with a Manager, the Manager must know the Device exists. Building Expert allows you to add any SE7000 or SE8000 series Room Controller to your solution. Once the device is added, you can use Building Expert to integrate it with the Manager. It is essential you add the correct Room Controller model when adding a Device to your solution. Building Expert does not allow you to integrate an incorrect model with your Manager.

You can add more than one Device to your solution, including different model types, before integrating them with your Manager. However, it is recommended to not add more than 20 Room Controllers per Manager each with 20 data points. This is due to the available number of data points which should not exceed more than 400. For example, 20 Room Controllers each with 20 data points, or 10 Room Controllers each with 40 data points, falls in the accepted range per Manager. As well, on a ZigBee Pro network, a maximum of 25 nodes (1 monitor and 24 routers) is the recommended maximum.

The Manager and Room Controllers are not end devices. The Manager can be configured as either a coordinator or router on a ZigBee Pro network. The Room Controllers are usually configured as routers except when they are used in a network without any Manager. In this condition, the Room Controller must be configured as the coordinator.

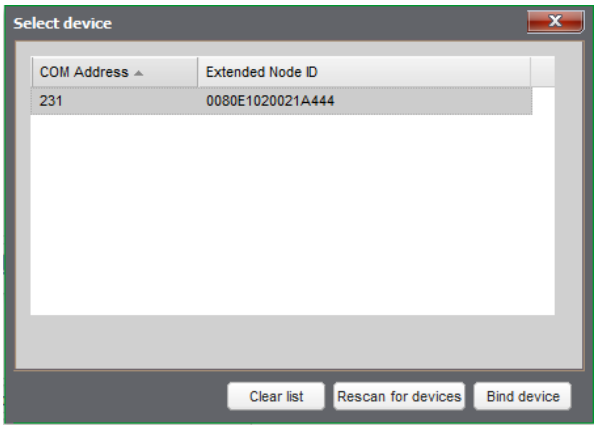


Integration with Manager using Building Expert

When all Devices are added to project, Building Expert lets you integrate them with the Manager. You can only integrate one Room Controller at a time with your Manager. You must individually select the Room Controller you want to integrate from the list of available Devices.

Binding

After selecting the Device, you must use Building Expert to Bind the Device with the Manager. Binding involves the Manager using a wireless protocol to search for the COM address and Extended Node ID to integrate itself with the Device. Once the Manager locates the two parameters, the Binding process completes the integration of the Room Controller and the Manger.



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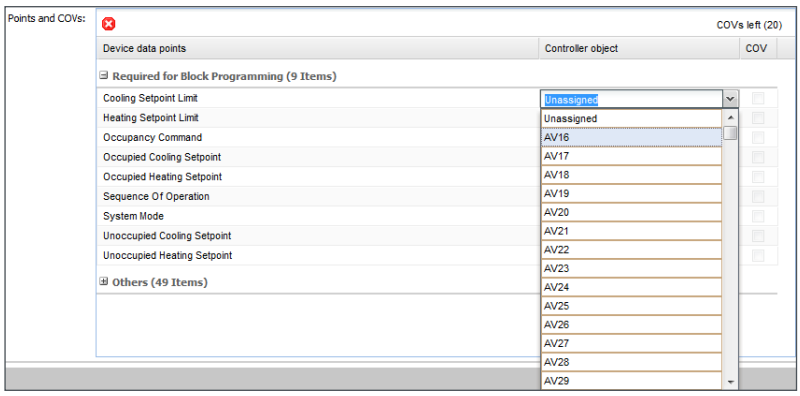
Setting Device Data Points

After integrating the Room Controller with the Manager, you must set the Device data points in Building Expert. There are two types of Device data points you can set; Required for Block Programming and Others. You must set the Required for Block Programming with the Device data points.

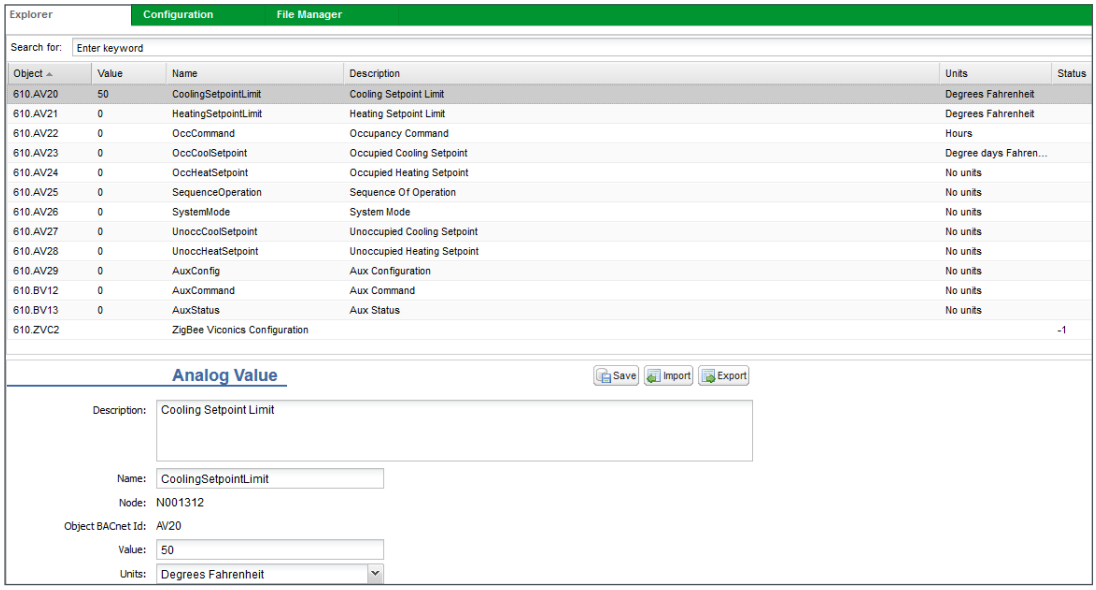


Setting Device data points involves assigning an Analog Value or Binary to from the drop-down menu. Once all the required Device data points for all Room Controllers are set, you can set as many of the Other Device data points as you want, provided the combined total of all Device data points for all Room Controllers does not exceed 400 data points per Manager.

You can not assign the same Analog Value to more than one Object, and Analog Values should be set sequentially in your project.

You must unassign a Device data point from the Object before you can remove the Object in Building Expert.

All Objects with an assigned Device data point show in Building Expert. You can modify the value for any data points by clicking on it and making the desired modification directly in Building Expert.



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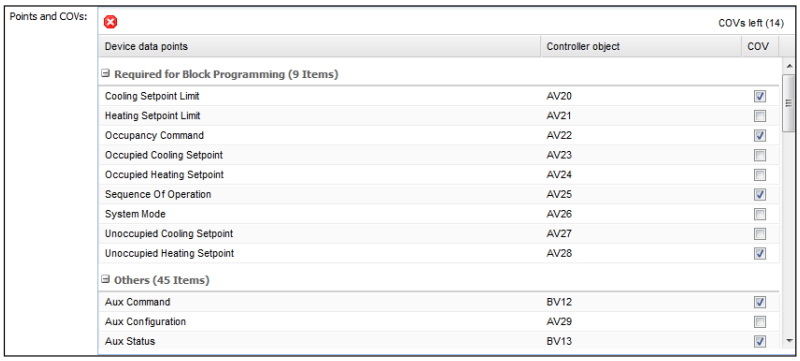
Change of Values

By default, the Manager polls each Room Controller every 30 seconds to check its data point and reads if there was any Change of Value (COV) for any data point. If any value changed, the Manager receives the COV(s) and reads the result based on preset conditions to determine the Present Value of the Room Controller. If any action is necessary based on the COV, the Manager sends instructions to the necessary device.

Selecting the COV toggle box allows the Manager to subscribe to a specific data point and receive any change in data instantaneously, rather then waiting for the next 30 second poll interval. When COV is toggled, the Room Controller becomes the broadcaster and sends any change of data point indicating a change in the Present Value immediately to the Manager. For example, if the Occupancy of a room changes, the Room Controller automatically broadcasts the data point to the Manager letting it know immediately the state of the room occupancy. By enabling a COV for a data point, the regular 30 second polling of that data point/object is no longer in effect, and therefore, the Manager relies on the Room Controller to inform the it of any COV and report its Present Value.



The Room Controller continues to send any COV to the Manager at the time the COV occurs as long as the COV stays toggled. If the data point is toggled off, any immediate COV is not broadcasted to the Manager. In this condition, the Manager will only learn of any present value changes at the next 30 second poll interval.

Note: A single Manager can only subscribe to a maximum COV of 20 Objects per Room Controller.

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Procedures - Integrate Room Controller and Manager

The following procedures show how to integrate a SE7000/SE8000 series Room Controller with a Multi-purpose Manager in a ZigBee Wireless Pro environment.

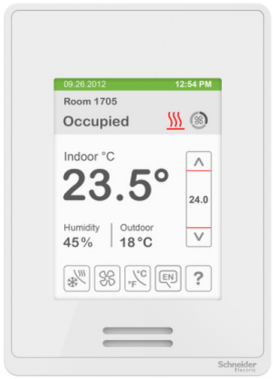
Procedure - Configure SE7200, SE7300, SE7600 and SER7300 Series

1. Press and hold **MENU/OVERRIDE** for 8 seconds until PswrdSet shows.

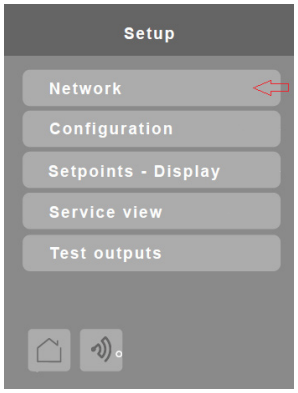
2. Using up or down arrow, set Password to any value between 0 - 1000.
3. Push **YES/OVERRIDE** when you set Password.
4. Press **NO/OVERRIDE** until **PAN ID** shows.

5. Using up or down arrow, set **PAN ID** to any value between 0 - 500.
6. Push **YES/OVERRIDE** when you set PAN ID. Record value for later use.
7. Push **YES/OVERRIDE** until Channel shows.
8. Using up or down arrow, set Channel to any value between 11 - 25.
9. Push **YES/OVERRIDE** when you set Channel. Record value for later use.

Procedure - Configure SE8000 Series



1. On right side of date, touch and hold this point for 3 seconds to enter setup mode.



2. Push **Network** button.

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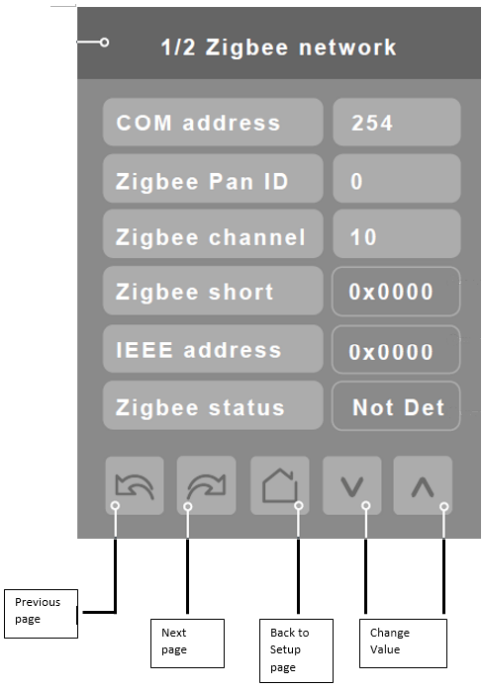


3. Set unique **COM address**.
4. Using up/down arrows, enter COM address value.
5. Set **ZigBee Pan. ID.**
6. Using up/down arrows, enter ZigBee pan. ID value.
7. Set **ZigBee channel.**
8. Using up/down arrows, enter Channel number.
9. Push **Back to Setup page**.

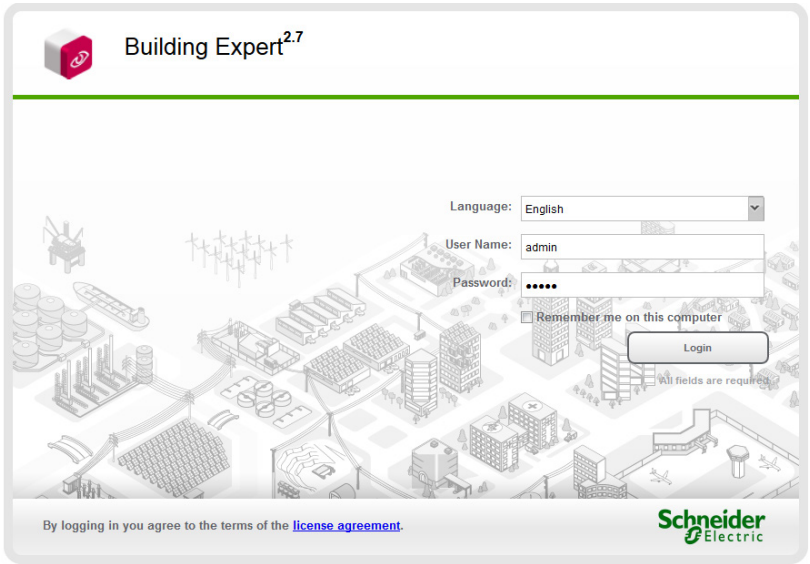
Procedure - Login to Manager

IMPORTANT

IconSmart StruxureWare™ Building Expert requires Firefox version ESR. You can download it at http://www.mozilla.org/en-US/firefox/organizations/all.html.

1. Type default address in address bar.
   - **10.50.80.3** for MPM-GW and MPM-UN,
   - **10.50.80.4** for MPM-VA.

   Building Expert login page shows.



2. Select Language (default English).
3. Enter User name (default 'admin').
4. Enter Password (default 'admin').
5. Push Login button. Building Expert loads to default page.

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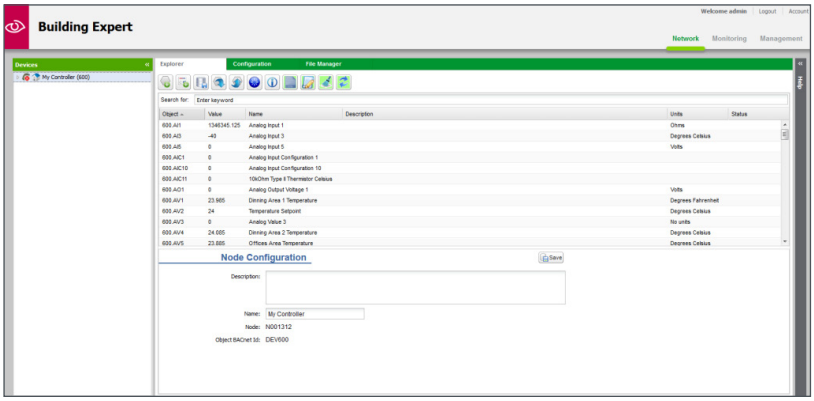
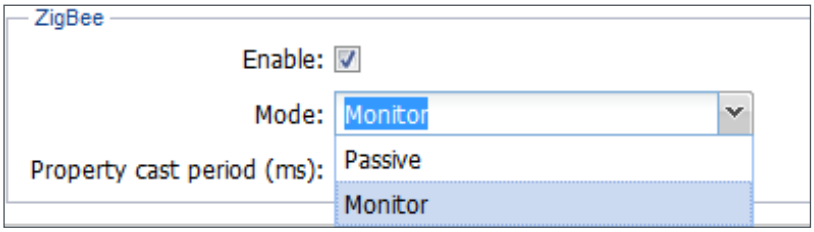


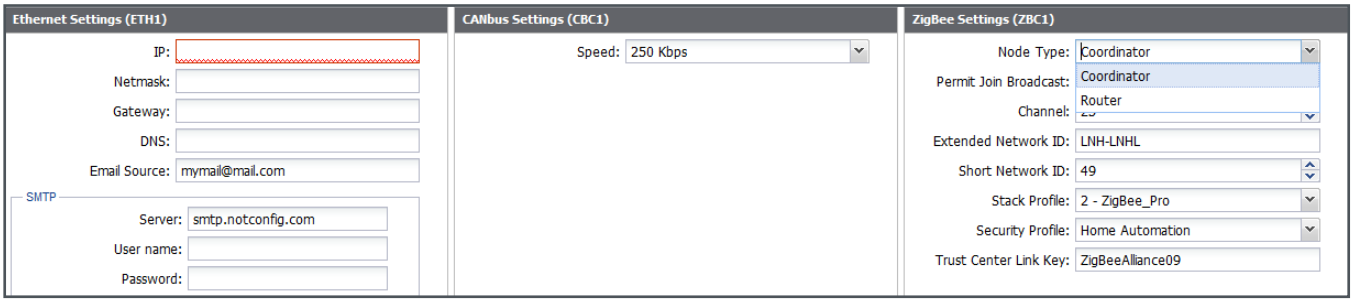
Procedure - Configure Manager

1. In Building Expert, click Configuration tab.
2. In Controller Settings (CFG1), set Adjust Time, Save Period, Time Zone Offset, and Enable DST (if applicable).

3. In ZigBee field of Network Settings (C2G1), set Manager to be Passive or Monitor.



4. Toggle Enable.
5. In Ethernet Settings (ETH1) field, set IP, Netmask, Gateway, DNS, and Email Source.



6. In ZigBee Settings (ZBC1) field, set Node Type as Coordinator or Router.
7. Set Channel to value between 11 - 25.
8. Set Stack Profile to 2 - ZigBee_Pro.
9. Click Save button.

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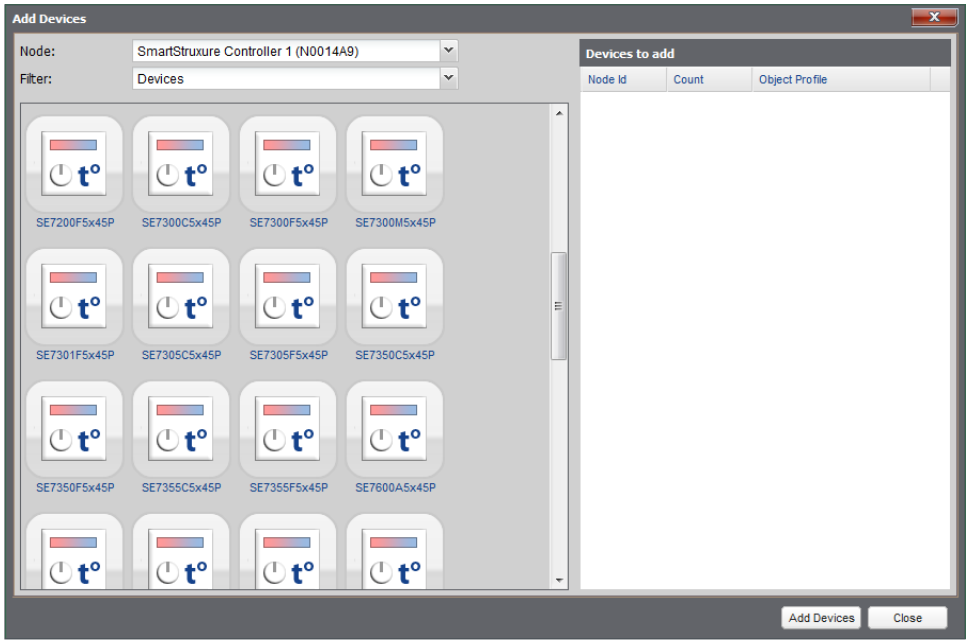
Procedure - Add Device

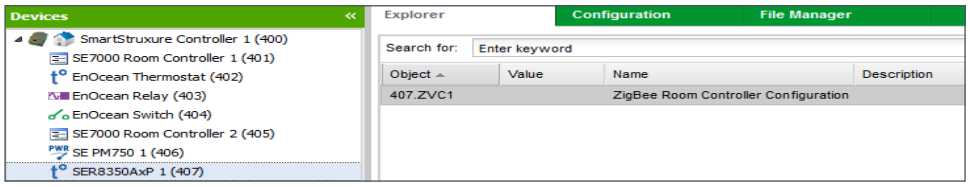
1. In Explorer tab, click Add Device button. A new window opens.



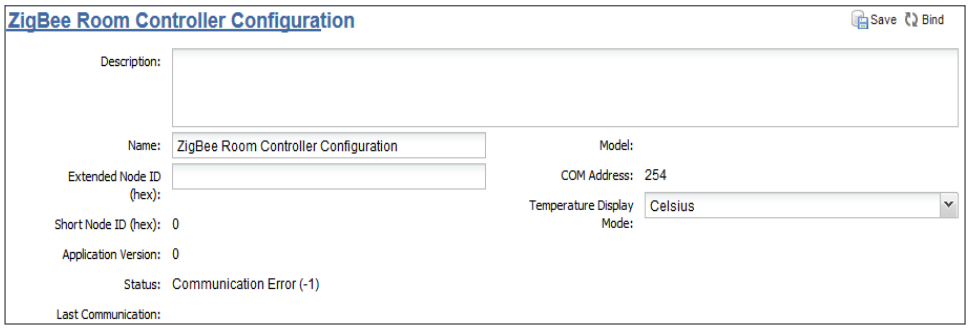
2. Select Device you want to add.
3. Click **Add Devices** button. Building Expert automatically adds Device to your project.

Procedure - Bind and Configure ZigBee Pro Online for 7000 Series

1. In Devices pane, select newly added Device.



2. Navigate down page to ZigBee Room Controller Configuration of Explorer tab.



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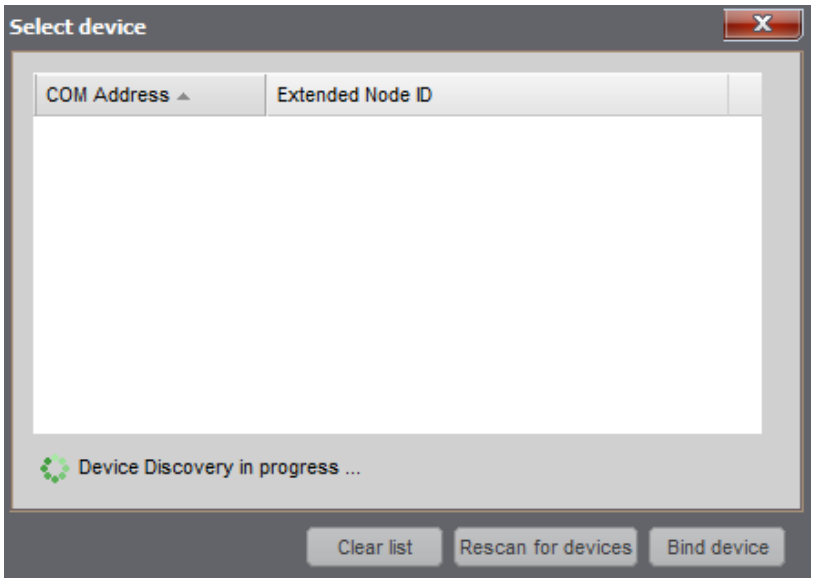
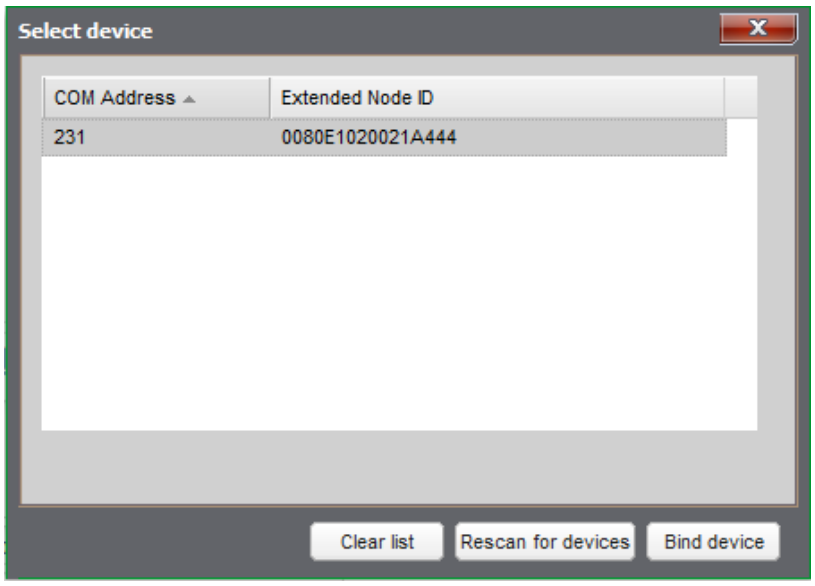
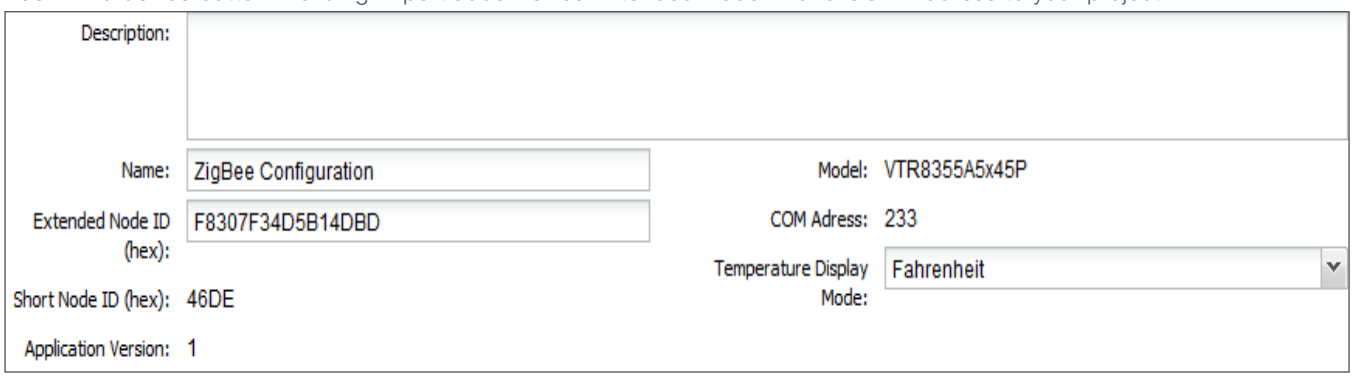
3. Select Bind tab A new window opens and Building Expert searches for the Com Address and Extended Node ID for your device.



From Select device window, select Device you want to bind with Controller.



Push Bind device button. Building Expert adds Device Extended Node ID and COM Address to your project.



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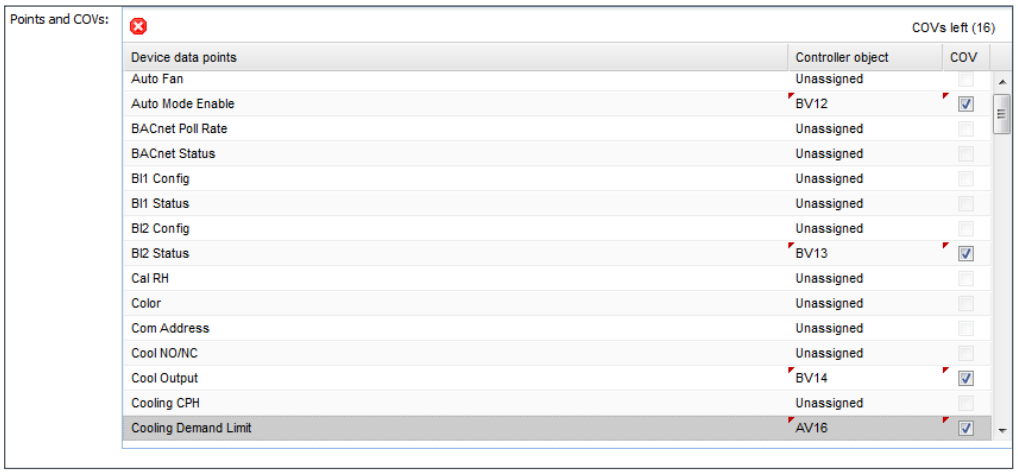
Procedure - Assign Device Data Points

1. In Controller object, click Unassigned for device data point to open drop-down menu.
2. Assign an Analog or Binary value to data point.
3. In COV field, toggle any data point you want to have poll Manager whenever device has change in present value.
4. Repeat steps 1 - 3 for remaining data points to a maximum of 20 COVs.



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Procedure - Configure ZigBee Pro Offline for SE7000 Series

1. Assign Device Data Points to Manager. Refer to Procedure - Assign Device Data Points.
2. Bind Room Controller and Manager. Refer to Procedure - Bind and Configure ZigBee Pro Online for 7000 Series.

Configure ZigBee Pro Online for SE8000 Series

1. Assign Device Data Points to Manager. Refer to Procedure - Assign Device Data Points.
2. Bind Room Controller and Manager. Refer to Procedure - Bind and Configure ZigBee Pro Online for 7000 Series.

Procedure - Configure Points and Change of Values for 8300 Series

Refer to Procedure - Assign Device Data Points for SE7000 Series.

Procedure - Configure ZigBee Pro Offline for 8300 Series

Refer to Procedure - Configure Manager for the SE7000 Series

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Object Tables

Objects Supported By Models SE7200 and SE7300 Series

Objects Supported By Models SE7200 and SE7300 Series													
Object Name	SE7200C5x45P	SE7350F5x45P	VT7300A5x00W	VT7305A5x00W	SE7355F5x45P	SE7305C5x45P	SE7350C5x45P	SE7355C5x45P	SE7300F5x45P	SE7306F5x45P	SE7350F5x45P	SE7355F5x45P
Room Temperature	√	√	√	√	√	√	√	√	√	√	√	√
Outdoor Temperature	√	√	√	√	√	√	√	√	√	√	√	√
Room Humidity									√	√		
Supply Temperature	√	√	√	√	√	√	√	√	√	√	√	√
Occupied Cooling Setpoint	√	√	√	√	√	√	√	√	√	√	√	√
Occupied Heating Setpoint	√	√	√	√	√	√	√	√	√	√	√	√
Stand-By Cooling Setpoint	√	√	√	√	√	√	√	√	√	√	√	√
Stand-By Heating Setpoint	√	√	√	√	√	√	√	√	√	√	√	√
Unoccupied Cooling Setpoint	√	√	√	√	√	√	√	√	√	√	√	√
Unoccupied Heating Setpoint	√	√	√	√	√	√	√	√	√	√	√	√
Dehumidification RH Setpoint									√	√		
Occupancy Command	√	√	√	√	√	√	√	√	√	√	√	√
Sequence of Operation	√	√	√	√	√	√	√	√	√	√	√	√
System Mode	√	√	√	√	√	√	√	√	√	√	√	√
Fan Mode			√	√	√	√	√	√	√	√	√	√
Keypad Lockout	√	√	√	√	√	√	√	√	√	√	√	√
Dehumidification Lockout			√	√					√	√		
Aux Command	√	√	√	√	√	√	√	√	√	√	√	√
Password	√	√	√	√	√	√	√	√	√	√	√	√
PI Heating Demand	√	√	√	√	√	√	√	√	√	√	√	√
PI Cooling Demand	√	√	√	√	√	√	√	√	√	√	√	√
Effective Occupancy	√	√	√	√	√	√	√	√	√	√	√	√
Dehumidification Status									√	√		
Fan Status			√	√	√	√	√	√	√	√	√	√
Aux Status	√	√	√	√	√	√	√	√	√	√	√	√
BI1 Status	√	√	√	√	√	√	√	√	√	√	√	√
BI2 Status	√	√	√	√	√	√	√	√	√	√	√	√
UI3 Status	√	√	√	√	√	√	√	√	√	√	√	√
PIR Motion Status	√	√	√	√	√	√	√	√	√	√	√	√
Service Alarm	√	√	√	√	√	√	√	√	√	√	√	√
Filter Alarm	√	√	√	√	√	√	√	√	√	√	√	√
Window Alarm	√	√	√	√	√	√	√	√	√	√	√	√
Temporary Occupancy Time	√	√	√	√	√	√	√	√	√	√	√	√
Get From	√	√	√	√	√	√	√	√	√	√	√	√
Deadband	√	√	√	√	√	√	√	√	√	√	√	√
Heating Setpoint Limit	√	√	√	√	√	√	√	√	√	√	√	√
Cooling Setpoint Limit	√	√	√	√	√	√	√	√	√	√	√	√
Display Scale	√	√	√	√	√	√	√	√	√	√	√	√
Menu Scroll	√	√	√	√	√	√	√	√	√	√	√	√
Room Temperature Override	√	√	√	√	√	√	√	√	√	√	√	√
Configuration Setpoint Type	√	√	√	√	√	√	√	√	√	√	√	√
Outdoor Temperature Override	√	√	√	√	√	√	√	√	√	√	√	√
BI1 Configuration	√	√	√	√	√	√	√	√	√	√	√	√
BI2 Configuration	√	√	√	√	√	√	√	√	√	√	√	√
UI3 Configuration	√	√	√	√	√	√	√	√	√	√	√	√
Auto Mode Enable			√	√	√	√	√	√	√	√	√	√
Pipe Number			√	√	√	√	√	√	√	√	√	√
Output #1 Configuration	√	√	√	√								
Aux Configuration	√	√	√	√	√	√	√	√	√	√	√	√
Fan Mode Sequence			√	√	√	√	√	√	√	√	√	√

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Objects Supported By Models SE7200 and SE7300 Series												
Object Name	SE7200C5x45P	SE7350F5x45P	VT7300A5x00W	VT7305A5x00W	SE7355F5x45P	SE7305C5x45P	SE7350C5x45P	SE7355C5x45P	SE7300F5x45P	SE7305F5x45P	SE7350F5x45P	SE7355F5x45P
Setpoint Function			√	√	√	√	√	√	√	√	√	√
Reheat Time Base	√	√	√	√	√	√	√	√	√	√	√	√
Proportional Band	√	√	√	√	√	√	√	√	√	√	√	√
Auto Fan			√	√	√	√	√	√	√	√	√	√
Stand-By Time	√	√	√	√	√	√	√	√	√	√	√	√
Unoccupied Time	√	√	√	√	√	√	√	√	√	√	√	√
RH Display									√	√		
Dehumidification Hysteresis									√	√		
Dehumidification Max Cooling									√	√		
Control Type	√						√	√	√	√		
Floating Motor Timing	√						√	√	√	√		
On Off Control CPH	√						√	√	√	√		
Direct Reverse Acting		√									√	√

Objects Supported By Models SE7600 Series

Objects Supported By Models SE7600 Series																
Object Name	SE7600A5x45P	SE7652A5x45P	SE7600B5x45P	SE7652B5x45P	SE7600F6x45P	SE7652F5x45P	SE7606E5x45P	SE7656E5x45P	SE7605B545P	SE7656B5x45P	SE7607B5x45P	SE7657B5x45P	SE7600H5x45P	SE7652H5x45P	SE7600W5x45P	SE7652W5x45P
Room Temperature	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Room Temperature Override	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Outdoor Temperature	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Outdoor Temperature Override	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Supply Temperature	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Supply RH											√	√				
Room Humidity											√	√			√	√
Room Humidity Override											√	√	√	√	√	√
Occupancy Command	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Effective Occupancy	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Occupied Cooling Setpoint	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Occupied Heating Setpoint	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Unoccupied Cooling Setpoint	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Unoccupied Heating Setpoint	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
PI Cooling Demand	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
PI Heating Demand	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
System Mode RTU	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
System Mode HPU													√	√		
Fan Mode	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Y1 Status	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Y2 Status			√	√	√	√	√	√	√	√	√	√	√	√	√	√
W1 Status	√	√	√	√			√	√	√	√	√	√	√	√		
W2 Status			√	√			√	√	√	√	√	√				
Frost Alarm	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Set Clock Alarm		√		√		√		√		√		√		√		√
Service Alarm	√	√	√	√	√	√			√	√	√	√	√	√	√	√
Filter Alarm	√	√	√	√	√	√			√	√	√	√	√	√	√	√
Fan Lock Alarm	√	√	√	√	√	√			√	√	√	√				
Fan Lock Alarm													√	√	√	√
DI Status											√	√				
DI1 Status	√	√	√	√	√	√			√	√			√	√	√	√

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Objects Supported By Models SE7600 Series																	
Object Name	SE7600A5x45P	SE7652A5x45P	SE7600B5x45P	SE7652B5x45P	SE7600F5x45P	SE7652F5x45P	SE7606E5x45P	SE7656E5x45P	SE7605B545P	SE7656B5x45P	SE7607B5x45P	SE7657B5x45P	SE7600H5x45P	SE7652H5x45P	SE7600W5x45P	SE7652W5x45P
DI2 Status	√	√	√	√	√	√			√	√			√	√	√	√
DI1 Config	√	√	√	√	√	√			√	√			√	√	√	√
DI2 Config	√	√	√	√	√	√			√	√			√	√	√	√
DI Config											√	√				
Humidifier Output											√	√				
Dehumidification Status											√	√				
Dehumidification Hysteresis											√	√				
Dehumidification Low OA Lockout											√	√				
Dehumidification Lockout Functions											√	√				
Heating Setpoint Limit	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Cooling Setpoint Limit	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Economizer Output									√	√						
G Fan Status	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Reversing Valve Status													√	√	√	√
Aux Status	√	√	√	√	√	√			√	√	√	√	√	√	√	√
PIR Motion Status										√	√					
PIR Motion Status	√	√	√	√	√	√	√	√	√				√	√	√	√
Dehumidification RH Setpoint											√	√				
Humidification RH Setpoint											√	√				
Effective Humidification RH Setpoint											√	√				
Humidification High Limit Setpoint											√	√				
Low RH Setpoint											√	√				
Low Temperature Reset RH Setpoint											√	√				
High Temperature Reset RH Setpoint											√	√				
Temporary Occupancy Time	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Unoccupied Time	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Thermostat Model Number	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Module Firmware Version Number	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√
Thermostat Firmware Version Number	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Keypad Lockout	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Password											√	√				
Password	√	√	√	√	√	√	√	√	√	√						
Password													√	√	√	√
Heating Stages			√	√					√	√	√	√				
Cooling Stages			√	√	√	√	√	√	√	√	√	√				
Heating CPH	√	√	√	√			√	√	√	√	√	√	√	√		
Cooling CPH	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Display Scale	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Menu Scroll	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
RH Display											√	√				
Cooling Lockout Temperature	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Powerup Delay	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Progressive Recovery		√		√		√		√		√		√		√		√
Aux Contact	√	√	√	√	√	√			√	√	√	√	√	√	√	√
Fan Purge Delay	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Anticycle	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Event Display		√		√		√		√		√		√		√		√
Get From											√	√				

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Objects Supported By Models SE7600 Series																
Object Name	SE7600A5x45P	SE7652A5x45P	SE7600B5x45P	SE7652B5x45P	SE7600F5x45P	SE7652F5x45P	SE7606E5x45P	SE7656E5x45P	SE7605B545P	SE7656B5x45P	SE7607B5x45P	SE7657B5x45P	SE7600H5x45P	SE7652H5x45P	SE7600W5x45P	SE7652W5x45P
Get From	√	√	√	√	√	√	√	√	√	√			√	√	√	√
Deadband	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Proportional Band	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Frost Protection	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fan Control	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Heatpump Stages													√	√	√	√
Economizer Changeover Setpoint							√	√	√	√						
√	√						√	√	√	√						
Mechanical Cooling Enable							√	√	√	√						
Mixed Air Setpoint							√	√	√	√						
High Balance Point													√	√		
Low Balance Point													√	√		
Comfort Mode													√	√		
Reversing Valve Config													√	√	√	√
Compressor Auxiliary Lockout													√	√		
Fresh Air Alarm							√	√								
High CO2 Alarm							√	√								
Economizer Minimum Position							√	√								
TRSS	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
RH Display															√	√
Dehumidification RH Setpoint															√	√
Dehumidification Hysteresis															√	√
Dehumidification Low OA Lockout															√	√
Dehumidification Lockout Functions															√	√
Dehumidification Output Status															√	√
Water Temperature															√	√
Economizer Output							√	√								
AI1 Value							√	√								
Analog Heat Output Status							√	√								
Fresh Air Level							√	√								
Supply Heat Lockout Status							√	√								
CO2 Level							√	√								
Discharge Air Alarm							√	√								
Heating Stages							√	√								
Fresh Air Max Range							√	√								
Discharge High Limit Setpoint							√	√								
Discharge Low Limit Setpoint							√	√								
AI1 Configuration							√	√								
Minimum Supply Heat Setpoint							√	√								
Supply Heat Lockout Temperature							√	√								
Supply PI Heat Demand							√	√								
Minimum Fresh Air							√	√								
Maximum Fresh Air							√	√								
Minimum CO2 Level							√	√								
Maximum CO2 Level							√	√								
Analog Heat Output Status					√	√										
Supply Heat Lockout Status					√	√										

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Objects Supported By Models SE7600 Series																
Object Name	SE7600A5x45P	SE7652A5x45P	SE7600B5x45P	SE7652B5x45P	SE7600F5x45P	SE7652F5x45P	SE7606E5x45P	SE7656E5x45P	SE7605B545P	SE7656B5x45P	SE7607B5x45P	SE7657B5x45P	SE7600H5x45P	SE7652H5x45P	SE7600W5x45P	SE7652W5x45P
Discharge Air Alarm					√	√										
Discharge High Limit Setpoint					√	√										
Discharge Low Limit Setpoint					√	√										
Minimum Supply Heat Setpoint					√	√										
Supply Heat Lockout Temperature					√	√										
Supply PI Heat Demand					√	√										

Objects Supported By Models SE7300 Controllers

Objects Supported By Models SE7300 Controllers				
Object Name	SER7300A545P	SER7305A5x45P	SER7350A5x45P	SER7355A5x45P
Auto Mode Enable	√	√	√	√
Pipe Number	√	√	√	√
Fan Mode Sequence	√	√	√	√
Setpoint Function	√	√	√	√
Proportional Band	√	√	√	√
Auto Fan	√	√	√	√
Stand-By Time	√	√	√	√
Unoccupied Time	√	√	√	√
RH Display			√	√
Dehumidification Hysteresis			√	√
Dehumidification Max Cooling			√	√
RUI1 Configuration	√	√	√	√
RBI2 Configuration	√	√	√	√
RUI1 Status	√	√	√	√
RBI2 Status	√	√	√	√
Sequence of Operation	√	√	√	√
Heating CPH	√	√	√	√
Cooling CPH	√	√	√	√
Heat No/Nc	√	√	√	√
Cool No/Nc	√	√	√	√
Pulsed Heat	√	√	√	√
Low Battery Alarm	√	√	√	√
Wireless Window Switch Used	√	√	√	√
Wireless Window Switch Status	√	√	√	√
Wireless Door Switch Used	√	√	√	√
Wireless Door Switch Status	√	√	√	√
Heating Demand Limit	√	√	√	√
Cooling Demand Limit	√	√	√	√

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List of Property Numeric Values Range Restrictions

List of Property Numeric Values Range Restrictions		
Object Name	Object Type	Thermostat Range / Indexes
AI1 Value	Numeric Point	volt,min=0,max=10
Analog Heat Output Status	Numeric Point	percent,min=0,max=100
AO2 Outside Air Lockout Setpoint	Numeric Writable	temperature,min=-40,max=122
AO2 Status	Numeric Point	percent,min=0,max=100
BO5 Outside Air Lockout Setpoint	Numeric Writable	temperature,min=-40,max=122
ByPass Damper Position	Numeric Point	percent,min=0,max=100
ByPass Damper Position Or VFD	Numeric Point	percent,min=0,max=100
CO2 Level	Numeric Point	parts per million,min=0,max=2000
Cooling Demand Limit	Numeric Writable	percent,min=0,max=100
Cooling Lockout Temperature	Numeric Writable	temperature,min=-40,max=95
Cooling Setpoint Limit	Numeric Writable	temperature,min=54,max=100
Damper Max Heat Position	Numeric Writable	percent,min=0,max=100
Damper Maximum Position	Numeric Writable	percent,min=0,max=100
Damper Minimum Position	Numeric Writable	percent,min=0,max=100
Damper Position	Numeric Point	percent,min=0,max=100
Deadband	Numeric Writable	temperature,min=2.0,max=4.0
Deadband	Numeric Writable	temperature,min=2.0,max=5.0
Dehumidification Hysteresis	Numeric Writable	percent,min=2,max=20
Dehumidification Low OA Lockout	Numeric Writable	temperature,min=-40,max=122
Dehumidification Max Cooling	Numeric Writable	percent,min=20,max=100
Dehumidification RH Setpoint	Numeric Writable	percent,min=15,max=95
Dehumidification RH Setpoint	Numeric Writable	percent,min=30,max=95
Discharge High Limit Setpoint	Numeric Writable	temperature,min=70,max=150
Discharge Low Limit Setpoint	Numeric Writable	temperature,min=35,max=65
Economizer Changeover Setpoint	Numeric Writable	temperature,min=14,max=70
Economizer Maximum Position	Numeric Writable	percent,min=0,max=100
Economizer Minimum Position	Numeric Writable	percent,min=0,max=100
Economizer Output	Numeric Point	percent,min=0,max=100
Effective Humidification RH Setpoint	Numeric Point	percent,min=0,max=100
Fresh Air Level	Numeric Point	cubic feet per minute,min=0,max=20000
Fresh Air Max Range	Numeric Writable	cubic feet per minute,min=0,max=20000
Get From	Numeric Writable	none,min=0,max=254
Heating Demand Limit	Numeric Writable	percent,min=0,max=100
Heating Lockout Temperature	Numeric Writable	temperature,min=-15,max=120
Heating Setpoint Limit	Numeric Writable	temperature,min=40,max=90
High Balance Point	Numeric Writable	temperature,min=34,max=90
High Temperature Reset RH Setpoint	Numeric Writable	temperature,min=20,max=55
Humidification High Limit Setpoint	Numeric Writable	percent,min=50,max=90
Humidification RH Setpoint	Numeric Writable	percent,min=10,max=90
Humidifier Output	Numeric Point	percent,min=0,max=100
Low Balance Point	Numeric Writable	temperature,min=-40,max=30
Low RH Setpoint	Numeric Writable	percent,min=10,max=90
Low Temperature Reset RH Setpoint	Numeric Writable	temperature,min=-40,max=15
Maximum CO2 Level	Numeric Writable	parts per million,min=0,max=2000
Maximum Fresh Air	Numeric Writable	cubic feet per minute,min=0,max=20000

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List of Property Numeric Values Range Restrictions		
Object Name	Object Type	Thermostat Range / Indexes
Minimum CO2 Level	Numeric Writable	parts per million,min=0,max=2000
Minimum Fresh Air	Numeric Writable	cubic feet per minute,min=0,max=20000
Minimum Supply Heat Setpoint	Numeric Writable	temperature,min=50,max=72
Mixed Air Setpoint	Numeric Writable	temperature,min=50,max=90
Occupied Cooling Setpoint	Numeric Writable	temperature,min=54,max=100
Occupied Heating Setpoint	Numeric Writable	temperature,min=40,max=90
Outdoor Temperature	Numeric Writable	temperature,min=-40,max=122
Outdoor Temperature	Numeric Writable	temperature,min=-40,max=150
Password	Numeric Writable	none,min=0,max=1000
PI Cooling Demand	Numeric Point	percent,min-0,max=100
PI Heating Demand	Numeric Point	percent,min-0,max=100
Powerup Delay	Numeric Writable	seconds,min=10,max=120
Return Air Temperature	Numeric Point	temperature,min=-40,max=122
Room Humidity	Numeric Writable	percent,min=0,max=100
Room Humidity	Numeric Writable	percent,min=5,max=90
Room Temperature	Numeric Writable	temperature,min=-40,max=122
RTC Comm Address	Numeric Writable	none,min=1,max=127
Standby Cooling Setpoint	Numeric Writable	temperature,min=54,max=100
Standby Heating Setpoint	Numeric Writable	temperature,min=40,max=90
Standby Time	Numeric Writable	hours,min=5.0,max=240.0
Static Pressure	Numeric Point	pascal,min=0,max=5000
Static Pressure Setpoint	Numeric Writable	pascal,min=0,max=5000
Supply Heat Lockout Temperature	Numeric Writable	temperature,min=-15,max=120
Supply PI Heat Demand	Numeric Point	percent,min=0,max=100
Supply RH	Numeric Point	percent,min=0,max=100
Supply Temperature	Numeric Point	temperature,min=-40,max=122
Supply Temperature	Numeric Point	temperature,min=-40,max=150
Unoccupied Cooling Setpoint	Numeric Writable	temperature,min=54,max=100
Unoccupied Heating Setpoint	Numeric Writable	temperature,min=40,max=90
Unoccupied Time	Numeric Writable	hours,min=0.0,max=240.0
Unoccupied Time	Numeric Writable	hours,min=5.0,max=240.0
Water Temperature	Numeric Point	temperature,min=-40,max=122
Weighted PI Cooling Demand	Numeric Point	percent,min-0,max=100
Weighted PI Heating Demand	Numeric Point	percent,min-0,max=100

List of Property Enumeration Sets for BV Objects

List of Property Enumeration Sets for BV Objects		
Object Name	Object Type	Thermostat Range / Indexes
AI1 Configuration	Boolean Writable	falseText=None,trueText=CO2
AO2 Lock Status	Boolean Point	falseText=Inactive,trueText=Active
AO2 RA/DA	Boolean Writable	falseText=Direct Acting,trueText=Reverse Acting
Auto Fan	Boolean Writable	falseText=Auto Speed,trueText=Auto Speed / Auto Demand
Auto Mode Enable	Boolean Writable	falseText=Disabled,trueText=Enabled
Aux Command	Boolean Writable	falseText=Off,trueText=On
Aux Contact	Boolean Writable	falseText=Normally Opened,trueText=Normally Closed
Aux Status	Boolean Point	falseText=Off,trueText=On
BI1 Status	Boolean Point	falseText=Deactivated,trueText=Activated
BI2 Status	Boolean Point	falseText=Deactivated,trueText=Activated
BO5 Contact Function	Boolean Writable	falseText=Normally Opened,trueText=Normally Closed
BO5 Lock Status	Boolean Point	falseText=Inactive,trueText=Active
BO5 Status	Boolean Point	falseText=Off,trueText=On
BO5 Time Base	Boolean Writable	falseText=15 Minutes,trueText=10 Seconds

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List of Property Enumeration Sets for BV Objects

Object Name	Object Type	Thermostat Range / Indexes
Comfort Mode	Boolean Writable	falseText=Comfort,trueText=Economy
Compressor Auxiliary Lockout	Boolean Writable	falseText=Off,trueText=On
Config Motion Detection	Boolean Writable	falseText=No PIR,trueText=PIR Cover Present
Control Type	Boolean Writable	falseText=On/Off,trueText=Floating
Cool NO/NC	Boolean Writable	falseText=Normally Closed,trueText=Normally Openend
Cool Stages Lockout Status	Boolean Point	falseText=Off,trueText=On
Cooling Lockout Status	Boolean Point	falseText=Off,trueText=On
Cooling Valve Status	Boolean Point	falseText=Off,trueText=On
Dehumidification Lockout	Boolean Writable	falseText=Disabled,trueText=Enabled
Dehumidification Lockout Functions	Boolean Writable	falseText=Disabled,trueText=Enabled
Dehumidification Output Status	Boolean Point	falseText=Off,trueText=On
Dehumidification Status	Boolean Point	falseText=Off,trueText=On
DI Status	Boolean Point	falseText=Deactivated,trueText=Activated
DI1 Status	Boolean Point	falseText=Deactivated,trueText=Activated
DI2 Status	Boolean Point	falseText=Deactivated,trueText=Activated
Direct Reverse Acting	Boolean Writable	falseText=Direct Acting,trueText=Reverse Acting
Discharge Air Alarm	Boolean Point	falseText=Off,trueText=On
Discharge Temperature Alarm	Boolean Point	falseText=Off,trueText=On
Display Scale	Boolean Writable	falseText=C,trueText=F
Fan Control	Boolean Writable	falseText=Off,trueText=On
Fan Lock Alarm	Boolean Point	falseText=Off,trueText=On
Fan Options	Boolean Writable	falseText=On Heat,trueText=Auto Heat
Fan Purge Delay	Boolean Writable	falseText=Off,trueText=On
Filter Alarm	Boolean Point	falseText=Off,trueText=On
Frost Alarm	Boolean Point	falseText=Off,trueText=On
Frost Protection	Boolean Writable	falseText=Off,trueText=On
G Fan Status	Boolean Point	falseText=Off,trueText=On
Heat NO/NC	Boolean Writable	falseText=Normally Closed,trueText=Normally Openend
Heat Stages Lockout Status	Boolean Point	falseText=Off,trueText=On
Heating Lockout Status	Boolean Point	falseText=Off,trueText=On
Heating Valve Status	Boolean Point	falseText=Off,trueText=On
Low Battery Alarm	Boolean Point	falseText=Off,trueText=On
Mechanical Cooling Enable	Boolean Writable	falseText=Off,trueText=On
Menu Scroll	Boolean Writable	falseText=No Scroll,trueText=Scroll Active
Outdoor Temperature Override	Boolean Writable	falseText=Normal,trueText=Override
PIR Motion Status	Boolean Point	falseText=No Motion,trueText=Motion
Progressive Recovery	Boolean Writable	falseText=Off,trueText=Active
RBI2 Status	Boolean Point	falseText=Off,trueText=On
Reheat Time Base	Boolean Writable	falseText=15 Minutes,trueText=10 Seconds
Reversing Valve Config	Boolean Writable	falseText=Normally Cool,trueText=Normally Heat
Reversing Valve Status	Boolean Point	falseText=Off,trueText=On
RH Display	Boolean Writable	falseText=Disabled,trueText=Enabled
Room Humidity Override	Boolean Writable	falseText=Normal,trueText=Override
Room Temperature Override	Boolean Writable	falseText=Normal,trueText=Override
RTC Smart Recovery Active	Boolean Point	falseText=Off,trueText=On
RUI1 Status	Boolean Point	temperature,min=-40,max=122
Service Alarm	Boolean Point	falseText=Off,trueText=On
Set Clock Alarm	Boolean Point	falseText=Off,trueText=On
Setpoint Function	Boolean Writable	falseText=Dual Setpoints,trueText=Attached Setpoints
Setpoint Type	Boolean Writable	falseText=Permanent,trueText=Temporary
Supply Heat Lockout Status	Boolean Point	falseText=Inactive,trueText=Active
UI3 Status	Boolean Point	falseText=Deactivated,trueText=Activated
Units	Boolean Writable	falseText=Imperial,trueText=SI
W1 Status	Boolean Point	falseText=Off,trueText=On
W2 Status	Boolean Point	falseText=Off,trueText=On

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List of Property Enumeration Sets for BV Objects		
Object Name	Object Type	Thermostat Range / Indexes
Window Alarm	Boolean Point	falseText=Off,trueText=On
Wireless Door Switch Status	Boolean Point	falseText=Off,trueText=On
Wireless Door Switch Used	Boolean Point	falseText=Not Used,trueText=Used
Wireless Window Switch Status	Boolean Point	falseText=Off,trueText=On
Wireless Window Switch Used	Boolean Point	falseText=Not Used,trueText=Used
Y1 Status	Boolean Point	falseText=Off,trueText=On
Y2 Status	Boolean Point	falseText=Off,trueText=On

List of Property Enumeration Sets for MV Objects

List of Property Enumeration Sets for MV Objects		
Object	Index	Range Restrictions
Alarm (VT72xx & VT73xx)	0	No alarm
	1	Window alarm
	2	Filter alarm
	3	Service alarm
	4	Window & filter alarms
	5	Window & service alarms
	6	Filter & service alarms
Alarm-VT76xx	0	No alarm
	1	Frost alarm
	2	Clock alarm
	3	Clock & frost alarms
	4	Filter alarm
	5	Filter & frost alarms
	6	Filter & clock alarms
	7	Filter & frost & clock alarms
	8	Service alarms
	9	Service & frost alarms
	10	Service & clock alarms
	11	Service & frost & clock alarms
	12	Filter & service alarms
	13	Service & filter & frost alarms
	14	Service & filter & clock alarms
	15	Clock & filter & frost & service alarms
Aux Configuration	0	Not Used
	1	Normally Opened With Occupancy
	2	Normally Closed With Occupancy
	3	Normally Opened With Occupancy & Fan
	4	Normally Opened With Occupancy & Fan
	5	Network Controlled
Cooling CPH	0	3 CPH
	1	4 CPH
Control Type	0	Highest
	1	Average of 3 highest
	2	Average of 5 highest
BI1 Config (SE72 / VT73xx)	0	None
	1	Rem NSB
	2	Motion NO
	3	Motion NC
	4	Window
BI2 Config (SE72 / VT73xx)	0	None
	1	Door Dry
	2	Rem OVR
	3	Filter
	4	Service

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List of Property Enumeration Sets for MV Objects		
Object	Index	Range Restrictions
DI1 Config (SE76xx)	0	None
	1	Rem NSB
	2	Rem OVR
	3	Filter
	4	Service
	5	Fan Lock Alarm
DI2 Config (SE76xx)	0	None
	1	Rem NSB
	2	Rem OVR
	3	Filter
	4	Service
	5	Fan Lock Alarm
BI1 Config (SE7200X)	0	None
	1	Motion NO
	2	Motion NC
Effective Occupancy	0	Occupied
	1	Unoccupied
	2	Temporary Occupied
	3	Stand-by
Door Time	0	1 minute
	1	2 minutes
	2	3 minutes
	3	4 minutes
	4	5 minutes
	5	6 minutes
	6	7 minutes
	7	8 minutes
	8	9 minutes
	9	10 minutes
Fan Mode (SE73xx) Note 4:	0	Low
	1	Med
	2	High
	3	Auto
Fan Mode (SE76xx) Note 4:	0	On
	1	Auto
	2	Smart
Fan Mode Sequence (SE73xx) Note 4:	0	Low - Med - High
	1	Low - High
	2	Low - Med - High - Auto
	3	Low - High - Auto
	4	On - Auto
Fan Status (SE73xx)	0	Off
	1	Low
	2	Medium
	3	High
Fan Control	0	On
	1	On – Auto
	2	Off-All

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List of Property Enumeration Sets for MV Objects		
Object	Index	Range Restrictions
Floating Motor Timing	0	0.5 Minutes
	1	1 Minute
	2	1.5 Minutes
	3	2 Minutes
	4	2.5 Minutes
	5	3 Minutes
	6	3.5 Minutes
	7	4 Minutes
	8	4.5 Minutes
	9	5 Minutes
	10	5.5 Minutes
	11	6 Minutes
	12	6.5 Minutes
	13	7 Minutes
	14	7.5 Minutes
	15	8 Minutes
	16	8.5 Minutes
	17	9 Minutes
Heat Pump Stage	0	One Stage
	1	Two Stages
Heating CPH	0	3 CPH
	1	4 CPH
	2	5 CPH
	3	6 CPH
	4	7 CPH
	5	8 CPH
Cooling Valve Status	0	Closed
Heating Valve Status	1	Open
Keypad Lockout (SE73xx)	0	
	1	Level 1
	2	Level 2
	3	Level 3
	4	Level 4
	5	Level 5
Keypad Lockout (SE72xx)	0	Level 0
	1	Level 1
	2	Level 2
	3	Level 3
Keypad Lockout (SE76xx)	0	Level 0
	1	Level 1
	2	Level 2
Minimum On/Off Time (Anticycle)	0	0 Minutes
	1	1 Minute
	2	2 Minutes
	3	3 Minutes
	4	4 Minutes
	5	5 Minutes
Event Display	0	2 Events
	1	4 Events
Heating Stages	0	1 Stage
Cooling Stages	1	2 Stages
Network Handle	0	Default Zone Handle
	1	Default Minus Occupancy
	2	Full Release

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List of Property Enumeration Sets for MV Objects		
Object	Index	Range Restrictions
Occupancy Command	0	Local Occupancy
	1	Occupied
	2	Unoccupied
On Off Control CPH	0	3 CPH
	1	4 CPH
	2	5 CPH
	3	6 CPH
	4	7 CPH
	5	8 CPH
Output #1 Configuration (SE72xx)	0	One Output
	1	Separate Outputs
PI Cooling Weight PI Heating Weight	0	0%
	1	25%
	2	50%
	3	75%
	4	100%
Pipe Number	0	
	1	
Proportional Band (SE76xx)	0	3 °F / 1.7 °C
	1	4 °F / 2.2 °C
	2	5 °F / 2.8 °C
	3	6 °F / 3.3 °C
	4	7 °F / 3.9 °C
	5	8 °F / 4.4 °C
	6	9 °F / 5.0 °C
	7	10 °F / 5.6 °C
Proportional Band-(SE72xx & SE73xx)	0	2 °F / 1.1 °C
	1	3 °F / 1.7 °C
	2	4 °F / 2.2 °C
	3	5 °F / 2.8 °C
	4	6 °F / 3.3 °C
	5	7 °F / 3.9 °C
	6	8 °F / 4.4 °C
Pulsed Heat	0	On
	1	Off
	2	Occupancy Output
RUI1 Config	0	None
	1	Filter
	2	Service
	3	(COC/NH) Change over dry contact. Normally Heat
	4	(COC/NC) Change over dry contact. Normally Cool
	5	(COS) Change over analog sensor
RBI2 Config	0	None
	1	Filter
	2	Service
Reheat Config	0	None
	1	Analogue Duct Heater Only
	2	On/Off Duct Heater Only
	3	On/Off Peripheral Heating Only
	4	Analogue Duct and On/Off Peripheral Heating

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List of Property Enumeration Sets for MV Objects		
Object	Index	Range Restrictions
Reheat CPH	0	2 CPH
	1	3 CPH
	2	4 CPH
	3	5 CPH
	4	6 CPH
	5	7 CPH
	6	8 CPH
Zone Sequence	0	Cool
	1	Heat
Sequence Of Operation (SE73xx & SE72xx) Note 2	0	Cooling only
	1	Heating only
	2	Cooling & reheat
	3	Heating & reheat
	4	Cooling & heating 4 pipes
	5	Cooling heating 4 pipes & reheat
Sequence Of Operation (SE73xx) Note 3	0	Cooling only
	1	Heating only
	2	Cooling / Heating or Cooling With Electric Reheat
	3	Heating With Electric Reheat
	4	Electric Reheat Only
Static Pressure Range	0	0 to 1.5 in WC
	1	0 to 2 in WC
	2	0 to 3 in WC
	3	0 to 4 in WC
	4	0 to 5 in WC
System Mode-SE76Hxx	0	Off
	1	Auto
	2	Cool
	3	Heat
	4	Emergency
System Mode – VT76xx	0	Off
	1	Auto
	2	Cool
	3	Heat
System Mode – SE72xx, VSE72xx & SE73xx - Note 1, Note 2 & Note 3	0	Off
	1	Auto
Temporary Occupancy Time (SE76xx)	0	0 Hours
	1	1 Hour
	2	2 Hours
	3	3 Hours
	4	4 Hours
	5	5 Hours
	6	6 Hours
	7	7 Hours
	8	8 Hours
	9	9 Hours
	10	10 Hours
	11	11 Hours
	12	12 Hours

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List of Property Enumeration Sets for MV Objects		
Object	Index	Range Restrictions
Temporary Occupancy Time-(VT73xx & VT72xx)	0	0 Hours
	1	1 Hour
	2	2 Hours
	3	3 Hours
	4	4 Hours
	5	5 Hours
	6	6 Hours
	7	7 Hours
	8	8 Hours
	9	9 Hours
	10	10 Hours
	11	11 Hours
	12	12 Hours
	13	13 Hours
	14	14 Hours
	15	15 Hours
	16	16 Hours
	17	17 Hours
	18	18 Hours
	19	19 Hours
	20	20 Hours
	21	21 Hours
	22	22 Hours
	23	23 Hours
	24	24 Hours
UI3 Config	0	None
	1	(COC/NH) Change over dry contact. Normally Heat
	2	(COC/NC) Change over dry contact. Normally Cool
	3	(COS) Change over analog sensor
	4	(SS) Supply air sensor monitoring

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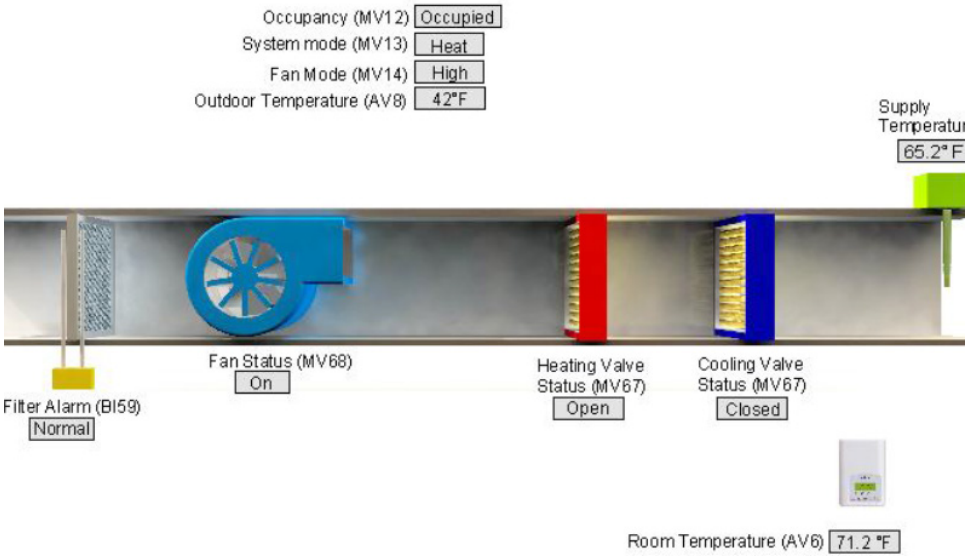
SE720xx Integration – GUI Objects

The following objects should be typically used in a GUI:

- Room Temperature
- Occupied and Unoccupied Heat Setpoints
- Occupied and Unoccupied Cool Setpoints
- Outdoor Temperature
- Supply Temperature
- Occupancy Command
- System Mode
- Heating Valve Status
- Cooling Valve Status
- PI Heating Demand
- PI Cooling Demand
- Window Alarm
- Filter Alarm
- Service Alarm



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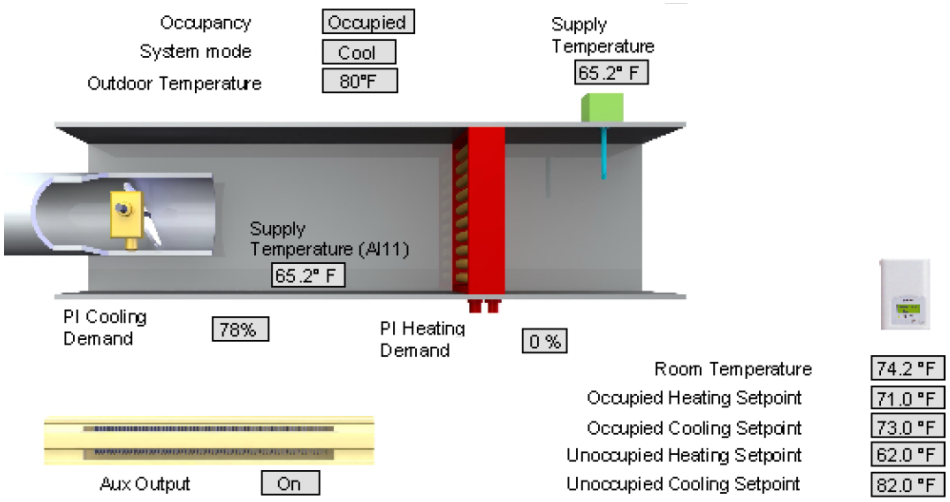
SE73xxX Integration – GUI Objects

The following objects should be typically used in a GUI:

- Room Temperature
- Occupied and Unoccupied Heat Setpoints
- Occupied and Unoccupied Cool Setpoints
- Room Humidity
- Room Humidity Setpoint
- Outdoor Temperature
- Supply Temperature
- Occupancy Command
- System Mode
- Fan Mode
- Fan Status
- Heating Valve Status
- Cooling Valve Status
- PI Heating Demand
- PI Cooling Demand
- Window Alarm
- Filter Alarm
- Service Alarm



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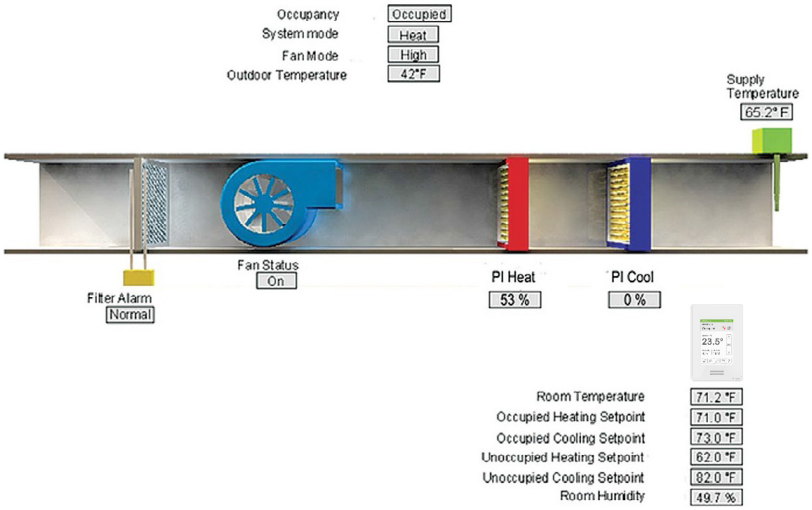
SE8000X Integration – GUI

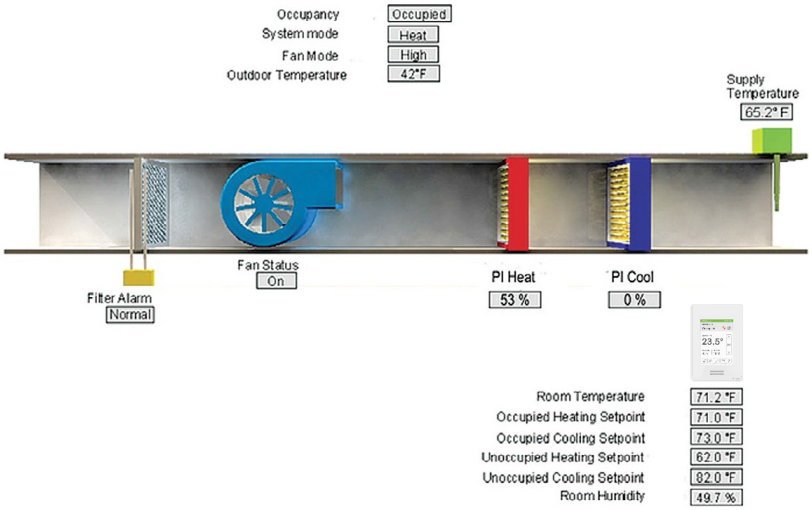
Objects that should typically be used in a GUI:

- Room Temperature
- Occupied and Unoccupied Heat Setpoints
- Occupied and Unoccupied Cool Setpoints
- Outdoor Temperature
- Supply Temperature
- Occupancy Command
- System Mode
- Heating Output
- Cooling Output
- PI Heating Demand
- PI Cooling Demand
- Window Alarm
- Filter Alarm
- Service Alarm



SE8000X Integration – GUI

- Room Temperature
- Occupied and Unoccupied Heat Setpoints
- Occupied and Unoccupied Cool Setpoints
- Room Humidity
- Room Humidity Setpoint
- Outdoor Temperature
- Supply Temperature
- Occupancy Command
- System Mode
- Fan Mode
- Heating Output
- Cooling Output
- PI Heating Demand
- PI Cooling Demand
- Window Alarm
- Filter Alarm
- Service Alarm



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