

Commercial- and Industrial-Class Wireless Mesh Networking

The Entuit Pneumatic Thermostat (Wi-Stat IIIp) Provides Reliable Zone Comfort and Enhanced Energy Economy Through Remote Monitoring and Set Point Management, Enabling Greater Energy Policy Compliance and Usage Analysis

Features at a Glance

Thermal Zone Features

- No valve calibration (Piezo electric valve actuator)
- Wireless mesh thermostat provides remote monitoring and HVAC control capabilities
- ~ 60 data points available
- +/- 1° F control accuracy for maximum comfort
- Easy to install; economical retrofit is compatible with and uses the existing thermostat and HVAC pneumatics
- Bi-directional wireless communication
- Occupancy scheduling and monitoring capabilities define and enforce energy policies
- Allows for local thermostat operation within the specified comfort zone
- Override feature allows local operation during scheduled unoccupied periods
- Detects and displays branch line air pressure
- IC- and FCC-compliant hardware modules

Wireless Sensor Network Features

- Operates on a license-free 2.4 GHz ISM radio band with 15 user-selectable channels
- Configures as part of an Entuit network that includes hundreds of wireless devices
- Wireless communication ranges available of at least 750 feet between adjacent devices
- Extensive (1000s of feet) mesh network coverage

Retrofit Pneumatic HVAC

Wi-Stat IIIp replaces mechanical Bi-Metal elements with advanced Piezo electric valve actuator for much more accurate pneumatic controls. It is the only universal thermostat replacement to provide 802.15.4 wireless communication for buildings with pneumatic interfaces for HVAC controls. The Wi-Stat IIIp supports 2 pipe pneumatic interface options to rapidly and affordably upgrade existing systems for energy management and provides an easy migration path for the future elimination of pneumatics, if desired.

Typical Applications

The Wi-Stat IIIp is an intelligent energy conservation device for pneumatic commercial, industrial, and municipal HVAC environments with retrofit, low cost, and ease of deployment as key drivers. The Wi-Stat IIIp is familiar and easy-to-use, for it operates with the local conventional thermostat. Local supervisory control features enforce constraints and communicate via the mesh network to a remote monitoring and control application. Alternatively, a Wi-Stat IIIp can be configured to include the Wi-Zone temperature input for improved temperature uniformity within a zone.

Long Range

The Wi-Stat IIIp transmits at a radio power of 60-mW, allowing for communication distances of at least 750 feet clear line of sight. Meshing capabilities allow for coverage of 1000s of feet.

Entuit Networking

The Wi-Stat IIIp uses the industrially-proven Entuit networking system which features:

- **Self-administrating network:** a self-forming and self-healing mesh network requires no administration
- **Robust:** a network that ensures multi-route, reliable data transmission over extensive distances
- **Responsive:** a network that quickly adapts to changes in topology and radio frequency (RF)
- **Power efficient:** can run for years on a single battery set
- **Scalable:** with the application, can scale to hundreds of wireless nodes with minimal overhead
- **Low latency:** very short network data delivery times

The Wi-Stat IIIp is designed to be part of the Entuit system, which can be configured to provide either single-site or multi-site monitoring/control via an internet web interface.



The Wi-Stat IIIp is one of a family of Wi-Stats that provide local supervisory control and enable remote monitoring. It overcomes the challenges experienced with point-to-point radios by communicating through a robust wireless mesh sensor network.

Remote Monitoring/Control Features

The Entuit Wi-Stat IIIp is designed to interface with any BACnet or Modbus® compatible Remote HVAC Monitoring and Control software application. Entuit's Wi-EMS Remote HVAC Monitoring and Control provides a full-featured and easy-to-use 365-day occupancy scheduling calendar that reports, trends, and analyzes energy consumption.

Wi-Stat IIIp HVAC Compatibility

- 2-Pipe, Multiple Temperature Setpoints
- Direct / Reverse Acting, Dead Band Control, Summer / Winter thermostat systems
- Heat only, cool only, and heat/cool dual mode systems
- No calibration or throttling range adjustment is needed
- Standard barb fittings for air pipe connections

Pneumatic Thermostat (Wi-Stat IIIp)

ENPTH



Parameter	Value	Unit	Notes
Pneumatic Features			
Thermostat Type	2 - Pipe, Multiple Temperature Setpoints		
Contact Action	Direct / Reverse Acting, Dead Band Control, Summer / Winter thermostat		
Element Type	Piezo electric valve actuator		
Air Connections	5/32" (4.00 mm)		
Airflow Usage	0.011 scfm (5.2 mL/s)		
Throttling Range	0 – 10 F		User configurable
Pressure Measurement			
Sensor type	Surface mount pre-amplified pressure gauge		
Measurement range	0 ~ 30	PSI	
Accuracy	1.5% full scale %		
Pneumatic Output Ports			
Main line	Port M	port	Maximum main line pressure 30 psi
Branch line	Part Br	port	Actively controlled with pressure sensor feedback for various pressure level requirements
Optional Opto-isolated Output Channel or Motion Sensor Input Channel			
Number of channels	1	channel	<ul style="list-style-type: none"> Output - Opto-isolated (dry contact) for separate on/off fan control Input - dry contact motion sensor signal for occupancy detection applications
Maximum output voltage	50	V, AC or DC	
Maximum output current	1	A	
Temperature Measurement			
Sensor type	Integrated circuit sens or		Low current drain, < 90 uA
Measurement range	-50°F ~ +300°F (-10°C ~ +149°C)		°F (°C)
Accuracy	±1.00 (±0.56)		°F (°C)
Power			
Internal batteries	3.6	VDC	Four AA size Lithium batteries
External DC supply	12 maximum VDC		Through screw terminal
Minimum supply voltage	3.1	VDC	
Estimated battery life	Up to 5	Years	With minimum pneumatic line leakage (w/ Lithium)
Display			
Display type	Liquid crystal		Displays temperature, branch line pressure, set point, occupied / set back mode, heat / cool / fan status, battery voltage & wireless connection status; supports set point adjustment, HVAC mode (auto / heat only / cool only) selection, fan mode selection (auto / on), and maintenance mode selection
Radio			
Operating frequency range	2405 ~ 2475 MHz		ISM band
Number of available channels	15		IEEE 802.15.4 channels 11 ~ 25
Channel spacing	5	MHz	
Maximum RF transmit power	18		dBm
Receiver sensitivity	-95		dBm
RF data transmission rate	250		Kbits/sec
Sampling interval	5 (default)		min
Channel agility	Yes		Remotely configurable Automatically realigns RF channel when gateway switches to a new channel.
Environmental & Mechanical			
Operating temperature range	41°F to 99°F (5°C to 37°C)		°F (°C)
Storage temperature range	-4°F to 158°F (-20°C to 70°C)		°F (°C)
Dimension	4.75x3.5x1.0 (117x95x25)		in (mm)
Weight	6		oz
Regulatory Compliance			
FCC & IC for unlicensed operation			