

Non-Invasive Pneumatic To DDC Retrofit



Improve Tenant Satisfaction
Increase Energy Efficiency
Reduce Maintenance Effort
Enable Demand Response
Gain LEED Points



CYPRESS
ENVIROSYSTEMS™

www.CypressEnvirosystems.com

Challenge: Existing Pneumatic Controls



- Building uses pneumatic thermostats for temperature control.
- Very common for buildings constructed up to 1999.
- Fully manual – not networked, no programmability, no remote control, no remote monitoring/diagnostics
- Cannot implement modern energy savings strategies: setbacks, duct static pressure control, optimal start/stop etc.
- Requires more maintenance labor – no fault detection/ diagnostics, no alarms. More occupant complaints.

Very Costly to Upgrade to DDC

- Pneumatic controls are deeply embedded in a building's infrastructure.
- Must open up walls and ceilings to replace – may have asbestos abatement
- Cost \$2,500 or more to replace with conventional DDC.
- >10 years payback – very difficult to justify retrofit

**Traditional DDC Retrofits are Invasive
And Labor Intensive**



Upgrading from pneumatics to DDC is labor intensive, costly, disruptive to occupants, with long payback

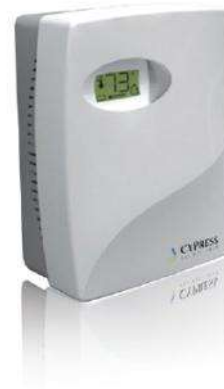
Non-Invasive Pneumatic to DDC Retrofit

EXISTING LEGACY STAT



DDC in 20 Minutes!

WIRELESS PNEUMATIC THERMOSTAT



- Manual Setpoint Control
- No Remote Readings
- No Diagnostics
- Manual Calibration Required

- Communicating
- Programmable
- BACnet/IP interface
- Self-Calibrating
- Battery life of 3 – 5 years

Air Conditioning | Heating | Refrigeration
the NEWS
THE HVACR CONTRACTOR'S WEEKLY NEWSMAGAZINE SINCE 1925
Gold Award 2010



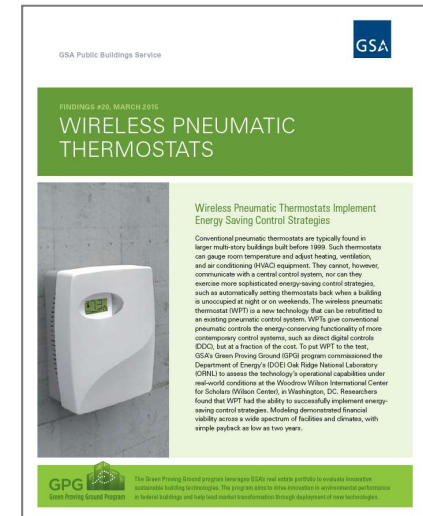
**Building
Operating
Management
2012 Top Product**

Fraction of the cost of conventional DDC retrofit, with no occupant disruption

US Department of Energy / GSA Best Practice

“WPT technology deployment is recommended for ANY FACILITY WITH PNEUMATIC CONTROLS”

***-US Department of Energy Oak Ridge National Labs
GSA Green Proving Ground Report, March 2015***

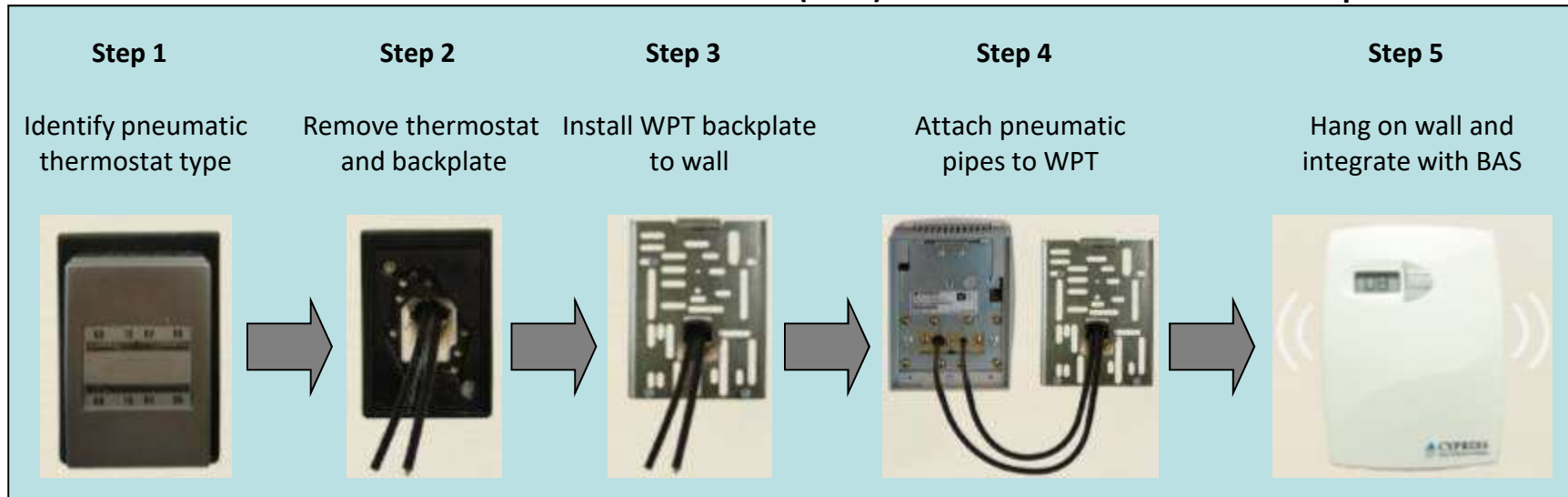


<http://www.gsa.gov/portal/content/215315>



Less than 10 Minute - Non-Invasive Installation

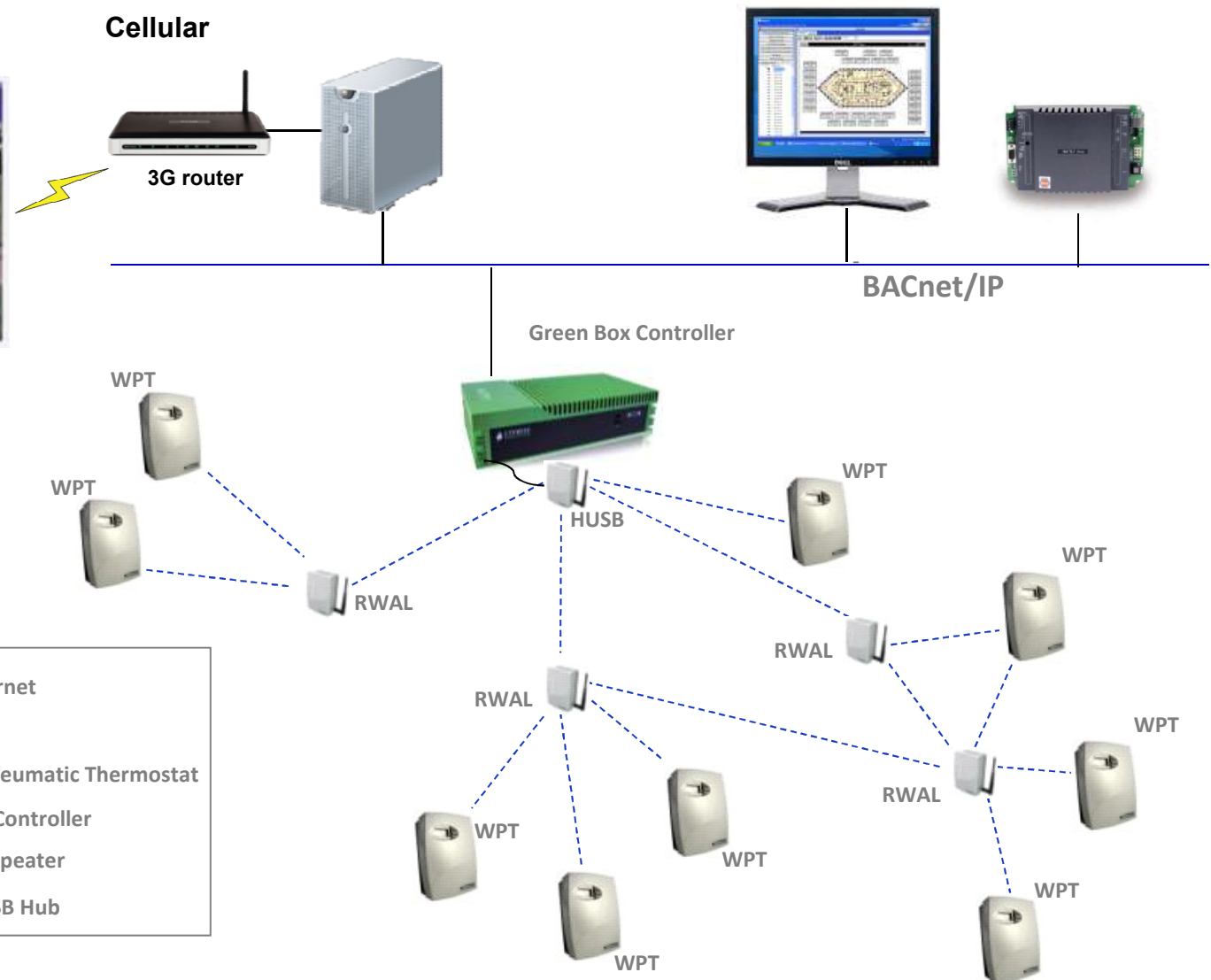
The Wireless Pneumatic Thermostat Provides (WPT) DDC Zone Control without Disruption



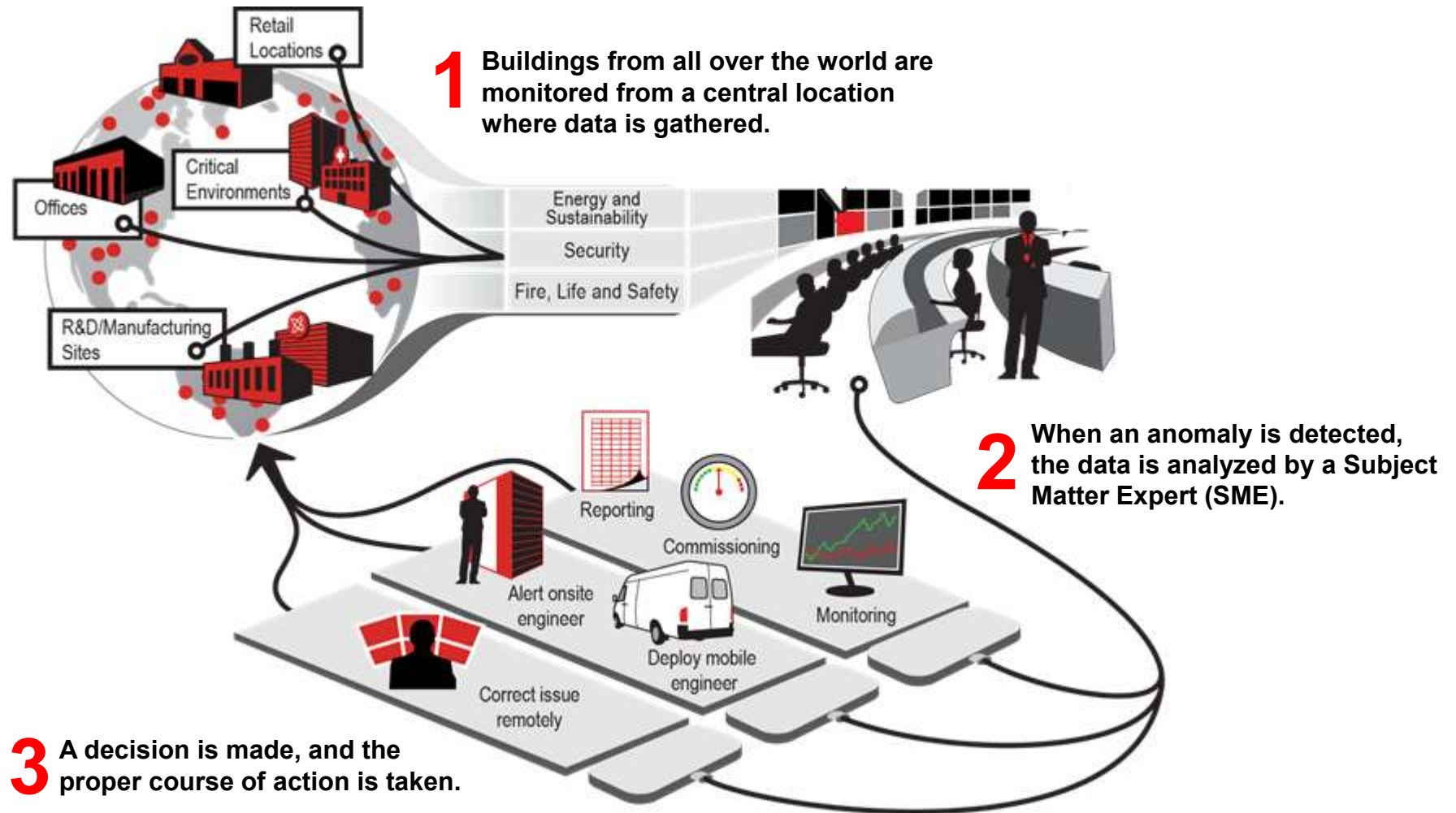
Integration of “Digital Pneumatics” to JLL Smart Building Center



Remote Command Center

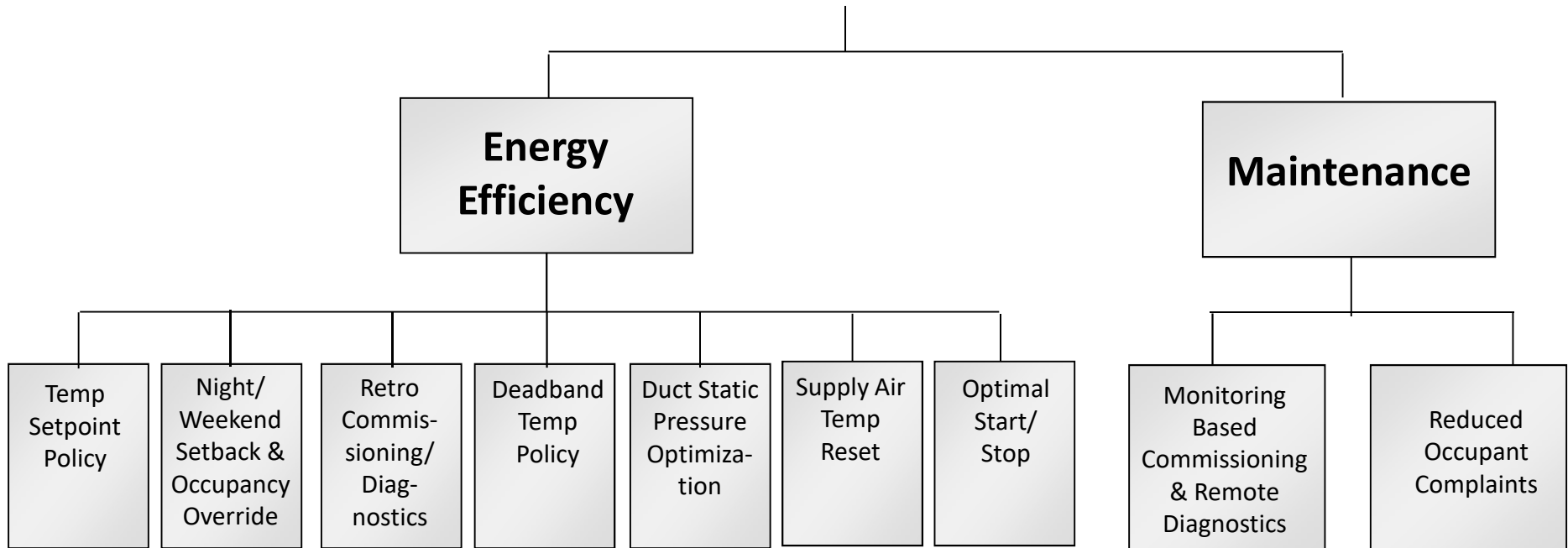


JLL IntelliCommand - Monitoring Based Commissioning



Savings Strategies Targeted

Savings



Energy Savings Strategies - Quantification

	Applicability for 311 South Wacker Dr.	Typical Savings based DDC and WPT experience	Est. Savings for 311 Wacker Dr.
Programmable Setbacks	Setback for about 60% of zones for heating only. (Cooling setback already in place at central plant level).	5-10%	9%
Duct Static Pressure Reset	Fans have variable pitch blades which can be modulated based on WPT branch pressure readings	5-10%	6%
Setpoint Enforcement, auto-calibration, continuous commissioning	Enforce setpoints to reasonable levels (i.e. between 65 and 75 degrees) to avoid simultaneous heating/cooling. Only apply to perimeter reheat zones.	5-10%	3%
Supply Air Temp Reset	Use WPT temperature sensors to optimize supply air temp at AHU's	2-4%	3%
Deadband Setpoints	Deadband setpoints may be applicable for some areas - verify tenant service level agreement	3-5%	3%
Optimal Start/Stop	AHU's on set schedule - can introduce optimal start/stop for cooling only	5-10%	2%
Potential Energy Savings via Applicable ECM's			26%



ECM Fully Applicable



ECM Partially Applicable



ECM Not Applicable

Easy deemed rebate for WPT: \$100/thermostat

HVAC INCENTIVES WORKSHEET
June 1, 2016 through May 31, 2017

Restroom Exhaust Fan Occupancy Sensor

SPECIFICATIONS:

- Existing restroom exhaust fan must be 0.6 amps to 2.0 amps.
- The occupancy sensor must automatically shut off the exhaust fan after a specified period of time when no occupancy is detected.
- The fans cannot be controlled by any existing building automation system.
- Manual timers controlling the exhaust system do not qualify.
- The existing exhaust volume flow rate must be at least 75 cfm per toilet room fixture.

EQUIPMENT TYPE and DEFINITION	(A) NUMBER OF UNITS	(B) INCENTIVE PER UNIT	(A x B) INCENTIVE
Restroom Exhaust Fan Occupancy Sensor Installation of occupancy sensors on a standalone restroom exhaust fan with existing control from a manual switch that is either tied or not tied to the lighting.		\$10 per fan	\$ 0.00
SUBTOTAL			\$ 0.00

Wireless Pneumatic Thermostat

SPECIFICATIONS:

- Wireless pneumatic thermostat system must be new and include:
 - Central time control for setback of space temperature
 - Minimum setback space temperature of at least 8 °F in both heating and air conditioning mode
 - Minimum setback period of more than 2,200 hours per year
- System must include central control interface for all thermostats to set the space temperature setpoints for both heating and air conditioning mode.
- Thermostat may allow for manual override of space temperature setpoints but must be reset to central control setpoints after all setback periods.
- Thermostat must include auto-calibration feature to eliminate drift to better maintain space temperature setpoint.

EQUIPMENT TYPE and DEFINITION	(A) NUMBER OF UNITS	(B) INCENTIVE PER UNIT	(A x B) INCENTIVE
Wireless Pneumatic Thermostat Replacement of an existing pneumatic thermostat with a new wireless pneumatic thermostat with a direct digital-to-pneumatic signal for control of such end devices as VAV boxes, fan powered boxes, reheat coils, fan coils and radiant heat.		\$100 per thermostat	\$ 0.00
SUBTOTAL			\$ 0.00

9

ComEd Energy Efficiency Program ComEd powering lives
An Exelon Company

ComEd Rebate - receive \$100 per thermostat:

- 8° setback for 2,200 hours/year
- Complete ComEd worksheet
- Issue PO after receiving rebate letter

<https://www.comed.com/WaysToSave/ForYourBusiness/Documents/HVACWorksheet.pdf>

SMARTPneumatics Analytics



1

Wireless Pneumatic Thermostat collects extensive sensor and operational data on zone temperatures, setpoints, occupancy modes, air pressure etc.

Time	NodeID	Node Name	Type	Setpoint (Zone Temp Branch Pn Battery Le Occupancy Mode)	Hop-1	Hop-2	Hop-3	Hop-4	Hop-5	Hop-6	RSSI-1	RSSI-2	RSSI-3	RSSI-4	RSSI-5	RSSI-6
11/27/2015 0:04	301	Barnes Co Conv	62	69.8 18.95 OK Occupied	15	14	13	12	11	1	5.38	5.21	3	2.5	3	4
11/27/2015 0:19	301	Barnes Co Conv	62	69.8 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	1.86	3.33	3.67
11/27/2015 0:34	301	Barnes Co Conv	62	69.8 18.42 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2.5	3	4
11/27/2015 0:49	301	Barnes Co Conv	62	69.8 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.25	3	2.5	3.33	3.67
11/27/2015 1:04	301	Barnes Co Conv	62	69.8 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3.33	3.67
11/27/2015 1:19	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2.5	3.33	3.67
11/27/2015 1:34	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2.5	3.33	4
11/27/2015 1:49	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3	3.67
11/27/2015 2:04	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	2	1.86	3	3.67
11/27/2015 2:19	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.25	2.5	2	3	4
11/27/2015 2:34	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	2	2.5	3	3.67
11/27/2015 2:49	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.38	5.21	2.5	2	3.33	4
11/27/2015 3:04	301	Barnes Co Conv	62	69.58 18.16 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2.5	3.33	3.67
11/27/2015 3:19	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2.5	3	3.67
11/27/2015 3:34	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3	3.67
11/27/2015 3:49	301	Barnes Co Conv	62	69.58 18.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3.33	2.5	3	3.67
11/27/2015 4:04	301	Barnes Co Conv	62	69.58 18.42 OK Occupied	15	14	13	12	11	1	5.42	5.21	3.67	2.5	3.33	4
11/27/2015 4:19	301	Barnes Co Conv	70	69.8 4.21 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3	3.67
11/27/2015 4:34	301	Barnes Co Conv	70	70.03 3.95 OK Occupied	15	14	13	12	11	1	5.42	5.25	3	1.86	3	3.67
11/27/2015 4:49	301	Barnes Co Conv	70	70.7 5 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3.33	3.67
11/27/2015 5:04	301	Barnes Co Conv	70	70.7 5.53 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3	4
11/27/2015 5:19	301	Barnes Co Conv	70	70.83 5.79 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	2.5	3.67
11/27/2015 5:34	301	Barnes Co Conv	70	71.15 6.32 OK Occupied	15	14	13	12	11	1	5.42	5.25	2.5	1.86	3	4
11/27/2015 5:49	301	Barnes Co Conv	70	71.15 6.58 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3	4
11/27/2015 6:04	301	Barnes Co Conv	70	71.38 6.58 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3	4
11/27/2015 6:19	301	Barnes Co Conv	70	71.38 6.84 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2.5	3	3.67
11/27/2015 6:34	301	Barnes Co Conv	70	71.6 6.84 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3	3.67
11/27/2015 6:49	301	Barnes Co Conv	70	71.6 7.11 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3.33	3.67
11/27/2015 7:04	301	Barnes Co Conv	70	71.6 7.11 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3	3.67
11/27/2015 7:19	301	Barnes Co Conv	70	71.6 7.11 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3	4
11/27/2015 7:34	301	Barnes Co Conv	70	71.83 7.37 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3.33	3.67
11/27/2015 7:49	301	Barnes Co Conv	70	71.83 7.37 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	1.71	2.5	4
11/27/2015 8:04	301	Barnes Co Conv	70	72.05 7.63 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2.5	3.33	3.67
11/27/2015 8:19	301	Barnes Co Conv	70	72.05 7.89 OK Occupied	15	14	13	12	11	1	5.42	5.21	2.5	2	3	3.67
11/27/2015 8:34	301	Barnes Co Conv	70	72.05 7.89 OK Occupied	15	14	13	12	11	1	5.38	5.21	3	3	3.33	3.67
11/27/2015 8:49	301	Barnes Co Conv	70	71.83 8.42 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3.33	3.67
11/27/2015 9:04	301	Barnes Co Conv	70	71.6 8.68 OK Occupied	15	14	13	12	11	1	5.42	5.21	3	2	3	3.67

Adjust Setpoint(s) to More "Reasonable" Temperature

NodeID	Description	Recommended Action
118	O'Brien Rm 25	Cool Above Setpoint is too low (63F). Try adjusting.
119	O'Brien Rm 27	Cool Above Setpoint is too low (63F). Try adjusting.

Check for Oil in Pneumatic Lines

NodeID	Description	Recommended Action
113	O'Brien Rm23	May need to clean system, install new filter/dryers, replace WPT.

Actuators May be Stuck

NodeID	Description	Recommended Action
118	O'Brien Rm 25	Check Heating Actuator - may be stuck open
117	O'Brien Rm 30	Check Heating Actuator - may be stuck open

Check Thermostat Calibration

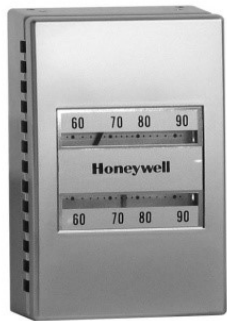
NodeID	Description	Recommended Action
116	O'Brien Rm 28	Check thermostat calibration - 4.1 deg F offset



2

Advanced patent pending analytics software perform fault detection diagnostics and produces easy to read actionable report.

Remember: Legacy Pneumatic Thermostats



Every time you see legacy pneumatic thermostats, it's an opportunity for:

- Easy retrofit
- Better comfort
- Fast payback
- Significant energy savings
- Easier maintenance