Wireless Pneumatic Thermostat- WPT-800 Series

1. Overview

Cypress Envirosystems's Wireless Pneumatic Thermostat (WPT) retrofits existing Pneumatic Thermostats in minutes to deliver Direct Digital Control (DDC) like zone control functionality in a fraction of a time and cost without disturbing the occupants.

The WPT enables remote monitoring of zone temperature, branch pressure, remote control of setpoints, and programmable setback or setup of the pneumatic HVAC systems. It also enables integration with utility Demand Response programs.

The WPT either works as a standalone system or integrates with the existing Building Management System via BACnet/IP. As a result, the WPT helps building owner and tenants to save energy, improve comfort, and reduce the maintenance cost of the legacy pneumatic HVAC systems.

1.1 Parts Included

The parts included in the WPT- 800 Series kit are as follows:

- WPT
- Universal wall bracket
- Mounting screws (x2)
- CR123 Batteries (x2)

1.2 Prerequisites for Installation

The WPT relies on a wireless network for communication. Before installing the WPT's, the wireless network has to be set up, as per the WPT Network Planning Guide (Document no. 910-00006-01 rev 01). It must also be ensured that the following tasks are completed before proceeding to WPT installation:

- Installation of WPT Web Server and Hub
- Installation of WPT Repeaters
- Assigning network ID
- Assigning node ID's (Each WPT requires a unique node ID to identify itself within the network).

1.3 Special Tools Needed

The special hand tools needed for WPT installation are the following:

- Philips head screw driver
- 1/16” hex Allen key
- 2mm hex Allen key

2.WPT Installation

Installation of the WPT consists of the following:

- Mounting the WPT on the wall
- Configuring the WPT
- Calibrating the WPT

2.1 Mounting the WPT

The mounting of WPT consists of the following:

- Removing existing thermostat
- Installing WPT

2.1.1 Removing Existing Thermostat

To remove the existing thermostat:

1. Remove the external cover, if any.
2. Locate and remove the mounting screws and carefully withdraw the unit from the wall along with the pneumatic tubes attached.
3. Detach the old thermostat unit from the air pipes carefully.
   In a 2-pipe system, note the positions of branch and main pipes.

Warning !

2.1.2 ESD Handling Precautions

- **The WPT contains ESD sensitive circuit cards and components.**
- **Great care must be exercised while handling WPT with the cover open.**
- **Do not touch any of the circuit boards with fingers or any part of the body.**
- **Touching the circuit boards may cause the unit to fail due to Electrostatic discharge.**
- **Hold and handle the unit as shown in figures 1, using the external bottom plastic cover as the support.**

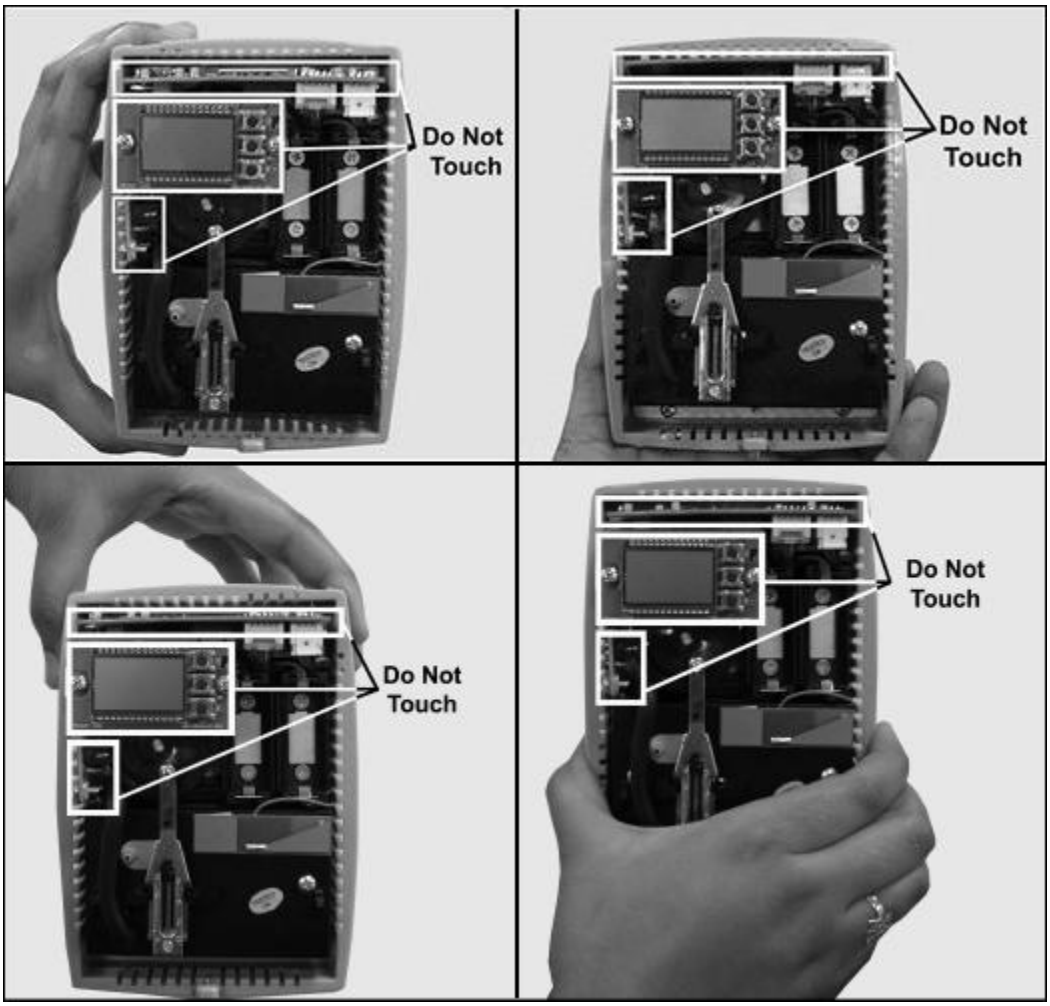

Figure 1- Handling WPT

2.1.3 Installing WPT

The WPT is installed in the existing thermostat location using a universal wall bracket provided with the WPT kit. To install the WPT:

1. Remove the universal wall mounting bracket from the WPT.
   This can be done by unscrewing the two captive screws on the bottom of the WPT, as shown in figure 2.

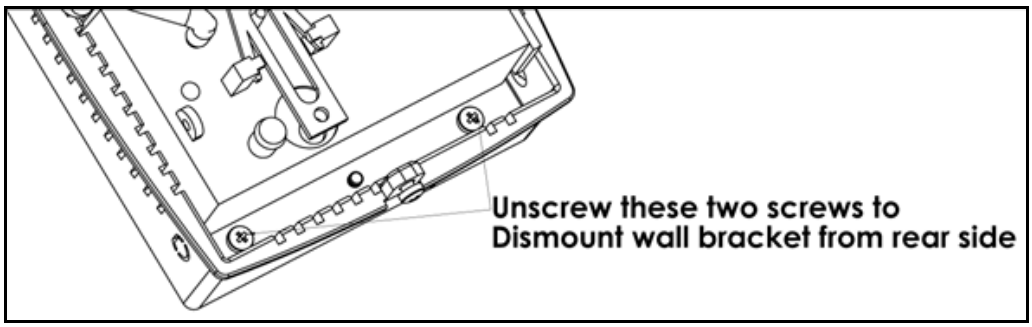

Figure 2- Removing Universal Wall Bracket

2. Adjust the wall bracket against the old thermostat position, such that any two slots on the wall bracket match the existing two holes on the wall. The universal wall bracket is as shown in figure 3.

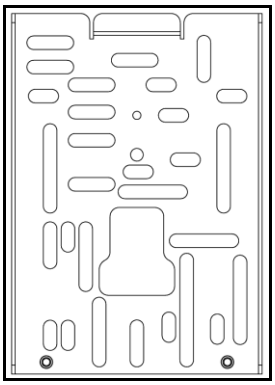

Figure 3- Universal Wall Bracket

3. Pull out the air pipes through the central opening of the wall bracket.

4. Fix the wall bracket to the wall with two screws as shown in figure 4.

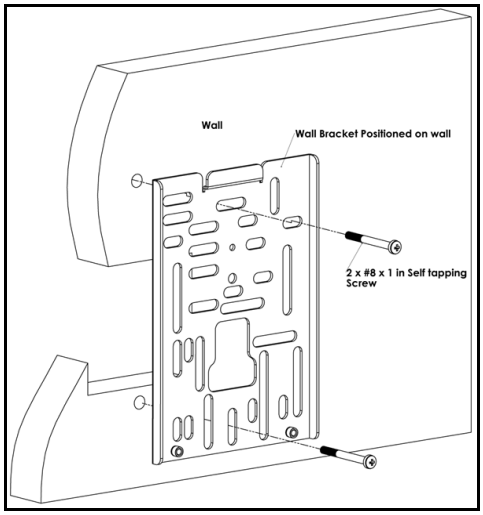

Figure 4- Mounting the Universal Wall Bracket

5. Connect the branch and main tube to the air pipes marked B and M on the rear of the WPT as shown in figure 5.
   Connect the pneumatic pipe to the M port in case of single pipe WPT

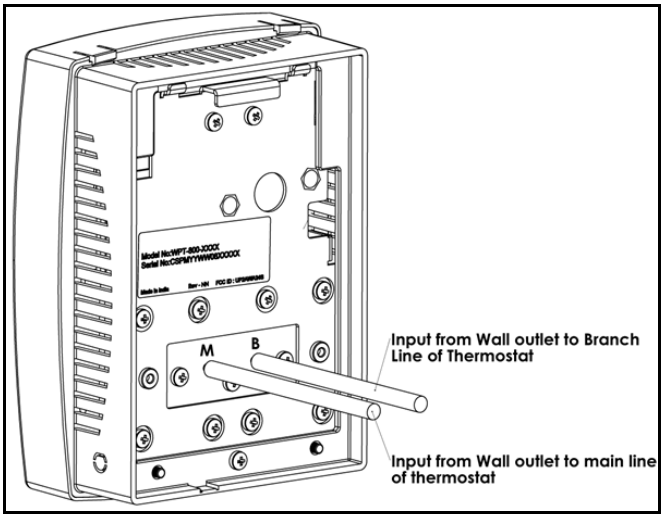

Figure 5- Connecting Main and Branch Pipe to M and B Port

6. Fit the WPT to the wall bracket using the captive screws.

2.1.4 Installing/ Replacing Batteries

Warning!

- **Do not charge.**
- **Do not heat, disassemble nor dispose of in fire.**
- **Do not insert batteries with the ⊕ and ⊙ polarities reversed.**
- **Do not short-circuit.**
- **Be sure to wrap each battery when disposing or storing to avoid short circuit.**

Caution!

- **If leaked liquid gets in the eyes, wash them with clean water and consult a physician immediately.**
- **Do not use new and used batteries together. Do not use different types of batteries together.**
- **Do not apply strong pressure to the batteries nor handle roughly.**
- **Do not use nor leave the batteries in direct sunlight nor in high-temperature areas.**

Warning!

Replace battery with CR 123 type or equivalent from Panasonic or Sanyo or Energizer or Duracell only. Use of any other battery may present a risk of fire or explosion. See diagram below for correct polarity.

Fit the batteries and close the top cover. The battery polarities are as shown in figure 6.

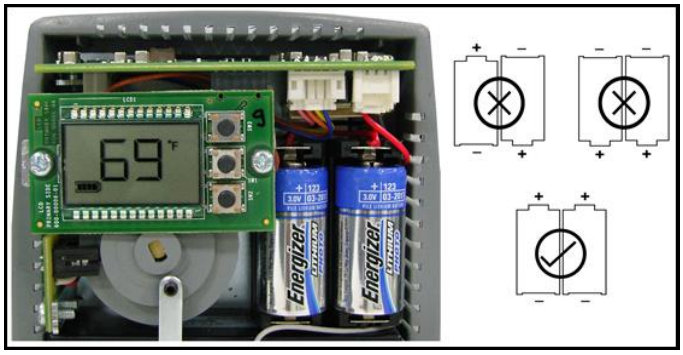

Figure 6- WPT Batteries

2.2 Configuring the WPT

The WPT has to be configured with a valid network ID and node ID for the WPT to be operational. The network ID is a single digit number while the node ID is a four digit number.

D4	D3	D2	D1

Figure 7- WPT Node ID Digits

Before configuring the WPT, insert the batteries in the holder and press any key. The system will switch on and perform initialization. After initialization, the LCD displays either E0 or current temperature. The WPT is now ready for the configuration of the network ID and the node ID.

To configure the network ID and the node IDs, perform the following:

1. Press all three keys starting from top-middle-bottom and hold them for two seconds. The WPT enters programming mode and shows the current or default network ID.
   Note: °F is displayed, indicating that the network ID is being programmed.
2. Press the ▲ or ▼ key to change the network ID to the required value.
3. Press **OVR** to confirm the network ID.
   This completes the programming of the network ID and the LCD displays the first digit, D1, of the node ID.
   Note: °C is displayed, indicating that the node ID is being programmed.
4. Press the ▲ or ▼ key to change D1 to the required value.
5. Press **OVR** to confirm D1.
6. Repeat steps 4 and 5 to configure D2, D3, and D4 of the node ID.
   Note: While the node ID is being configured, the corresponding bar of the battery indicator flashes.
7. After D4 is configured and confirmed, WPT will exit from the programming mode.
   Note: WPT will automatically exit the programming mode if there is no key press for one minute.

The network and node IDs can be changed any time by following steps one through seven.

2.3 Calibrating the Ambient Temperature Display

Follow the steps below to calibrate the ambient temperature displayed on the WPT:

1. Use an IR gun (of equal or better accuracy than FLUKE 62Mini) to measure the ambient temperature (A) at the top portion of the WPT housing, holding the IR Gun at about 1ft away from WPT.

   Note: After installing the WPT, please provide sufficient time for it to settle down to the ambient temperature before calibrating the ambient temperature display.

2. Note down the temperature displayed on the LCD (B).
3. Calculate the Ambient Temp offset value is as A-B.
4. Enter the Temp Offset value in the node configuration page of the WPT Web Application.

Note: Please allow at least 15 min from the time the offset is configured on the server for it to update the WPT.

2.4 Calibrating the WPT

Follow the steps below to calibrate the WPT:

1. Remove the front cover of WPT.
2. Complete section 2.3 and note down the ambient temperature displayed on the LCD or measure the ambient temperature using an accurate Thermometer.
3. Change the setpoint manually using the ▲ or ▼ key to the ambient temperature value.
4. Measure the branch line pressure. See section 3.3 for the procedure
5. Use a 1/16” hex Allen wrench and turn the calibration set screw on the thermostat lever as shown in figure 8, until the desired pressure is achieved.

Note: the single pipe stats might take longer time to respond during calibration. So, please allow sufficient time to calibrate the stat accurately.

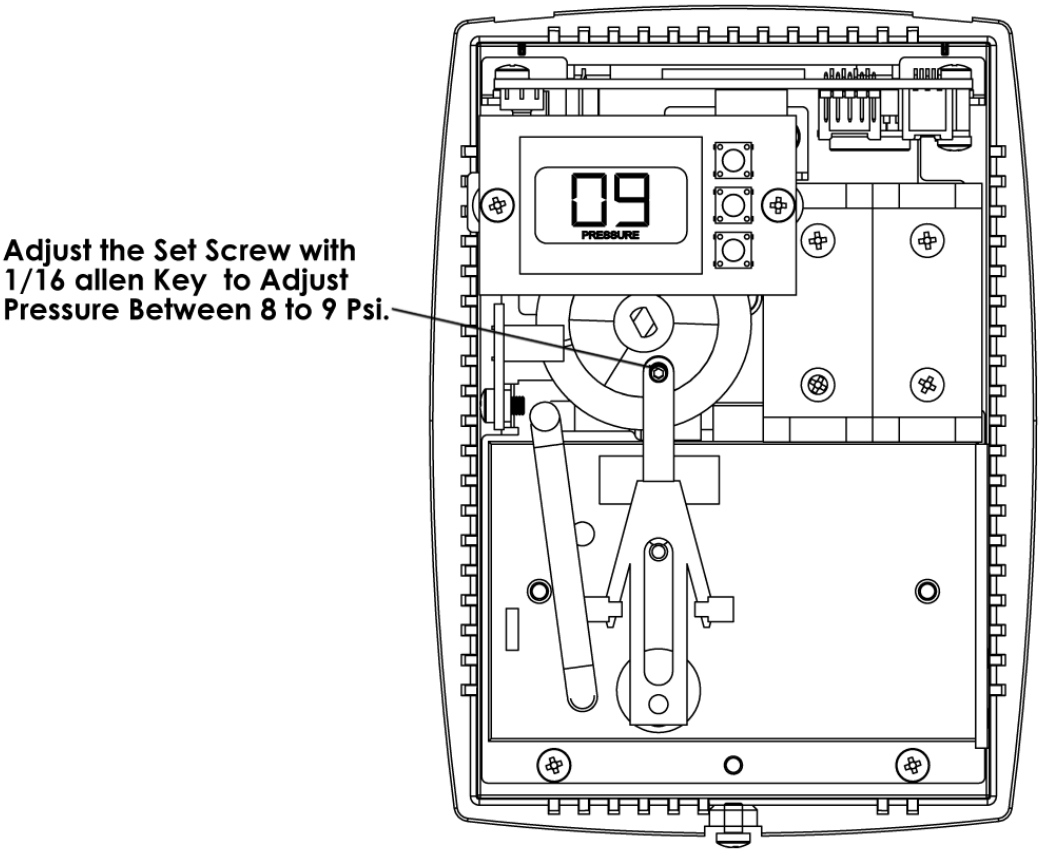

Figure 8- Calibration Set Screw

6. Press **OVR** key to exit pressure measurement mode.
7. Verify that the pressure changes as per the control action (Direct/Reverse) by increasing and decreasing the setpoint using the ▲ or ▼ key.
8. Set the setpoint to the desired value using the ▲ or ▼ key.
9. Replace the WPT front cover.

2.5 Adjusting the WPT Throttling Range

WPTs are factory set for 3º F throttling range. The approximate throttling range setting is stamped on the lever in both ºF and ºC on the WPT. If it is necessary to change the throttling range, perform the following steps:

1. Remove the front cover of the WPT.
2. Gently slide the black throttling range adjuster to the appropriate location.

3. Verify the calibration after the throttling range adjustment.
4. Replace the front cover of the WPT.

3.Operation

The various indicators and characters that are displayed on the LCD display are as shown in the figure 9.

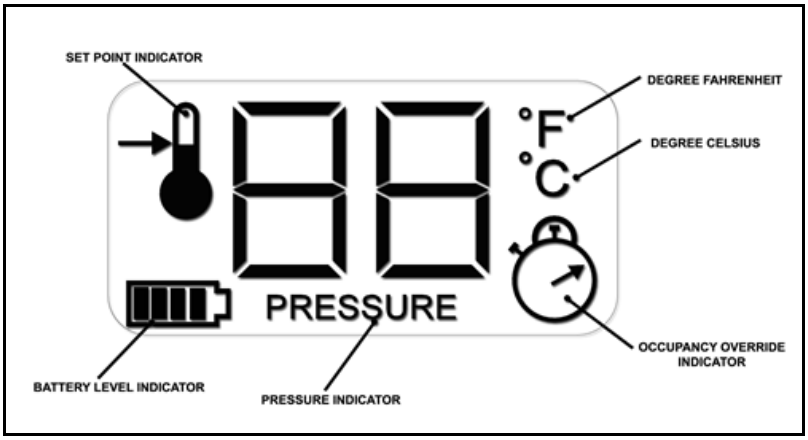

Figure 9- LCD Display

The front panel of the LCD display is used to perform the following:

- Changing the setpoint temperature
- Turning on/off the occupancy override

3.1 Changing the Setpoint Temperature

The setpoint temperature can be changed any time using the ▲ or ▼ keys. To change the setpoint temperature, perform the following:

1. Press the ▲ or ▼ key once to view the current setpoint along with the setpoint indicator.
2. Press the ▲ or ▼ key to change the setpoint value.

After the desired setpoint is set, the LCD display reverts to show the current temperature.

3.2 Turning ON/OFF the Occupancy Override

To change the occupancy override, perform the following:

1. Press the **OVR** key to activate the occupancy override.
   The LCD display flashes the override duration in hours.
2. Press the ▲ or ▼ key to change the override duration to desired value.

During the override duration, the LCD displays the OVR indicator.

3.3 Measuring the Branch Line Pressure

To measure the branch line pressure, perform the following:

1. Press the ▼ key and **OVR** key together for two seconds.
   Note: The display shows '`dt`'.
2. Press **OVR** twice. The LCD displays the branch pressure in PSI along with PRESSURE indicator.
3. Press **OVR** to exit.

4.Troubleshooting

WPT is designed with diagnostic functions to detect and diagnose faults.

Error Code	Possible Cause	Solution
E0	Discovery error – Not able to connect to nearest Repeater or Hub	Retry discovery by pressing any key Check if repeater or Hub is working. Try resetting the repeater. Try with a different position of the repeater/ Hub if feasible.
E1	Time synchronization error – Not able to synchronize the WPT time with the wireless network	If this error occurs after successful commissioning of the system, WPT will recover from this error within coupe of refresh cycles.
E2	Radio error – Not able to send/receive data	Restart the unit with removing and inserting the battery. If the error continues the device requires replacement. Contact the distributor.
E4	Connect error – Not able to connect to the nearest Hub or Repeater	If this error occurs after successful installation, the WPT will auto recover after couple of refresh cycles. If the error persists consider adding a repeater in the zone.

5.Repair

Except for the batteries, the WPT does not have any replacement or repairable parts. Contact the original distributor of the unit for repair or warranty service.

Note: Care should be taken to keep the unit dust-free during installation.

WPT is designed to work reliably with a clean, dry-compressed air supply at the required pressure.

6.Technical Specification

The technical specifications of the WPT are as follows:

Action	Direct/ Reverse Acting
Number of pipes	Single/ Dual pipe
Setpoint Temperature Range	55 ºF to 85 ºF
Air connections	3/32 in (2.5mm) ID tube
Maximum Operating Pressure	25 psi (170 kPa)
Airflow Usage	0.011 scfm (5.2 mL/s)
Operating Frequency Band	2.4 GHz ISM Band
Battery Life	More than 2 years*
Operating Condition	32 to 122 ºF (0 to 50 ºC); 95%RH Max, Noncondensing
Storage Condition	-40 to 122 ºF (-40 to 50 ºC); 95%RH Max, Noncondensing
Dimensions	Length – 141mm(5.6”) Width – 28.5 mm(1.2”) Depth – 103.5mm(4.1”)

* With two setpoint changes per day.

Cypress Envirosystems

198 Champion Court

San Jose, CA-95134, US

info@cypressenvirosystems.com

Phone: +1(408)943-2800