Wireless Pneumatic Thermostat (WPT)

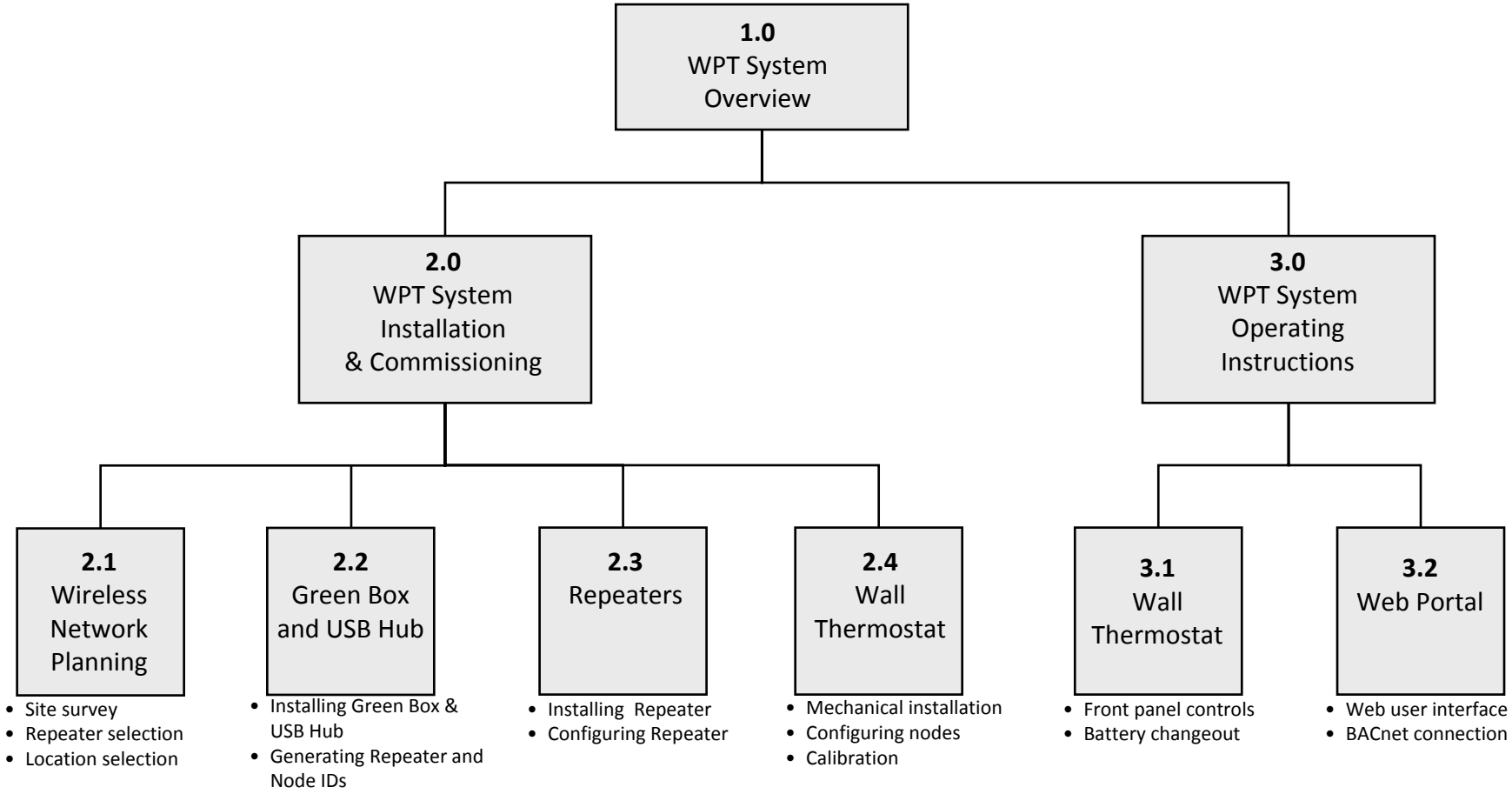
Training Program

www.CypressEnvirosystems.com

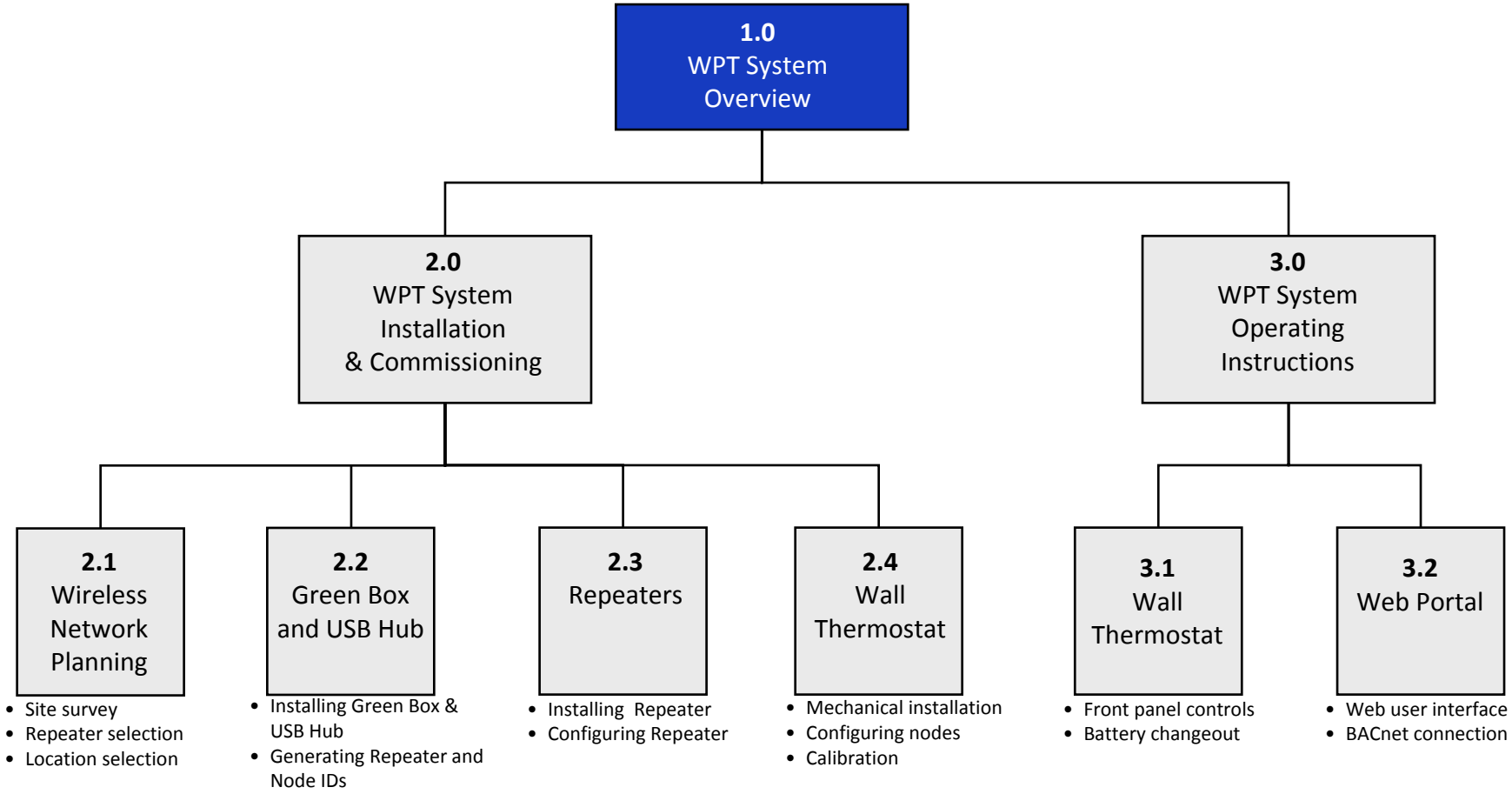
CYPRESS
ENVIROSYSTEMS

Doc No: 900-00009-01 Rev 05

WPT Training Modules



WPT Training Modules



WPT Features and Benefits

EXISTING LEGACY THERMOSTAT

DDC in 20 Minutes!

CYPRESS ENVIROSYSTEMS
WIRELESS PNEUMATIC THERMOSTAT

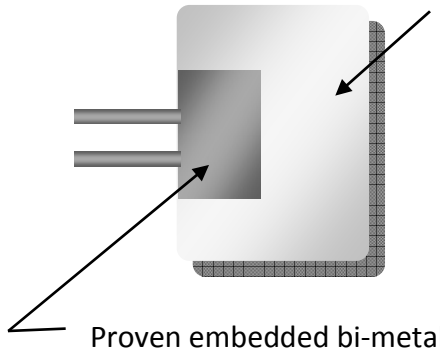
- Manual Setpoint Control
- No Remote Readings
- Manual Calibration Required
- No Diagnostics

- Remote Wireless Setpoint Control
- Remote Monitoring of Temperature & Pressure
- Automatic Self-Calibration
- Programmable Zone/Night Setback Control
- Occupancy Override
- Enables Demand Response strategies
- BACnet Interface to BMS
- Compatible With Existing Systems, i.e. Johnson, Honeywell, Siemens, Robertshaw
- More Than Two Years of Battery Life

Get the benefits of Direct Digital Control (DDC) in less than 20 minutes

Proven Wireless + Pneumatic Technology

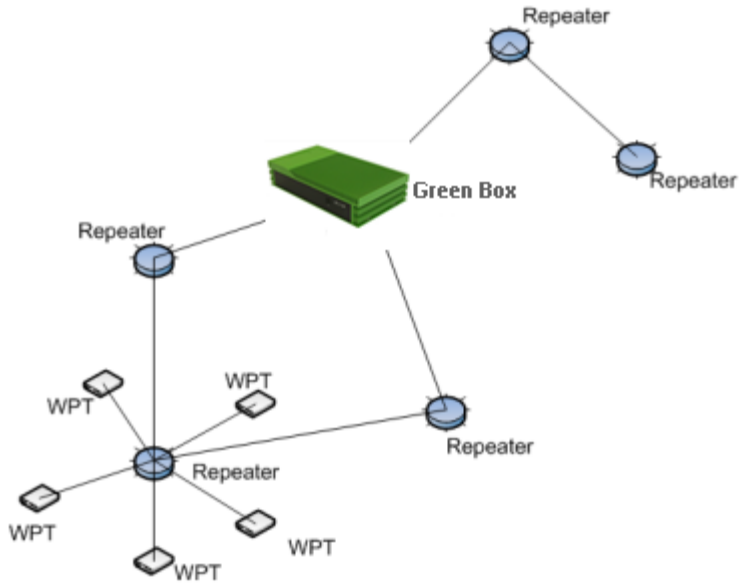
- Starts with proven pneumatic bi-metallic strip technology for room temperature control.
- Adds advanced electronics to remotely control setpoint, and monitor temperature, branch pressure, and battery status.
- If battery fails and electronics stop working, unit will function just like a traditional pneumatic thermostat.



WPT = Conventional Pneumatic Thermostat + Virtual Thumb

Cypress Wireless Communications

- Uses Cypress Semiconductor wireless technology – first deployed over six years ago, with over 25 million nodes in use today.
- Hybrid mesh wireless architecture provides coverage for most buildings and industrial sites – already in use by many Fortune 500 customers.
- Up to 225 WPTs with 14 Repeaters are supported per USB Hub.



2.4 GHz DSSS radios, +20dBm (100mW) peak output

NOTE: Do not use where cell phones or WiFi are prohibited (i.e. hospital operating rooms), or in environments requiring temperature validation.

Proven wireless technology applied for legacy retrofit applications

Selected Customer Sites Using Cypress Wireless

Stanford, Novellus, Micrel sites available for site visits upon request

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Typical Installations - Buildings

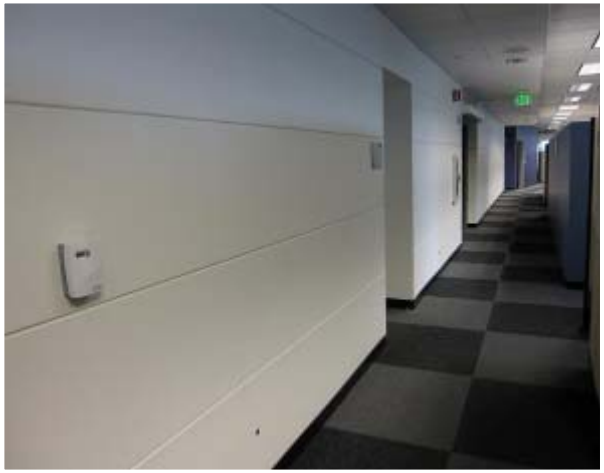
Installed August 2008

125,000 sq-ft, 30 zones installed

Installed February 2009

500,000 sq-ft, 2 buildings, 350 zones installed
Connection to Utility Auto Demand Response Program

Typical Installations – Buildings (cont'd)



Cypress Envirosystems Products Installed in Industrial Environments





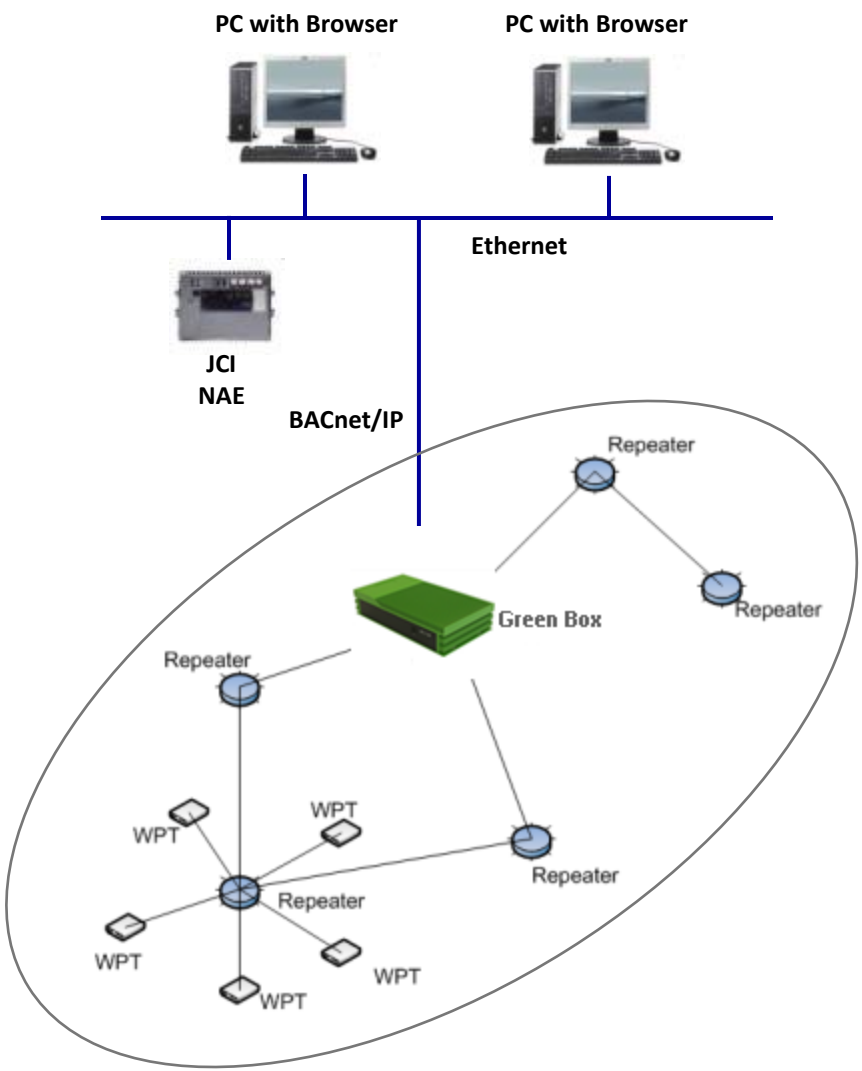
Directly Replaces Existing Thermostats

- Directly replaces most existing pneumatic thermostats from Honeywell, Johnson Controls, Siemens, Robertshaw, etc.

- Supplied with a universal wall mounting bracket, and connects to existing main and branch pipes in minutes.

User Interface and Connectivity via BACnet

- The WPT Green Box has a built-in web-based user interface for configuration and basic operations.
- The WPT Green Box may also be connected to existing automation systems via BACnet/IP using a simple Ethernet cable.
- BACnet compatible controllers (e.g. JCI Network Integration Engine) can gather data points and control setpoints, and provide a user interface.
- Users do not need a separate operator station or to learn a new interface.



BACnet Compatibility Testing

VENDOR	BAS	TEST PARTNER	LOCATION
ALERTON	BACtalk	Syserco	Fremont, CA
AUTOMATEDLOGIC CORPORATION	ALC	ACCO Engineered Systems	San Leandro, CA
Honeywell	Excel, Tridium	Honeywell Corp.	Golden Valley, MN Wixom, MI
Johnson Controls	Metasys	RSD-Total Control JCI Sensor Products	San Jose, CA Milwaukee, WI
SIEMENS	Apogee	Siemens Building Technologies	Hayward, CA
t.a.c by Schneider Electric	Andover Continuum	EMCOR Integrated Solutions	Pleasanton, CA
TRANE	Trane Tracer Summit BCU	Trane	Calgary, Alberta - Canada
Delta CONTROLS	ORCA	Cypress Semiconductor	San Jose, CA

Key Components of WPT System

Green Box
(WPT-800-SBAC)

Contains configuration tools, remote monitoring & control application, BACnet interface, DR Interface, and web services.

USB Hub
(WPT-800-HUSB)

Connects the WPT wireless network to the Green Box.

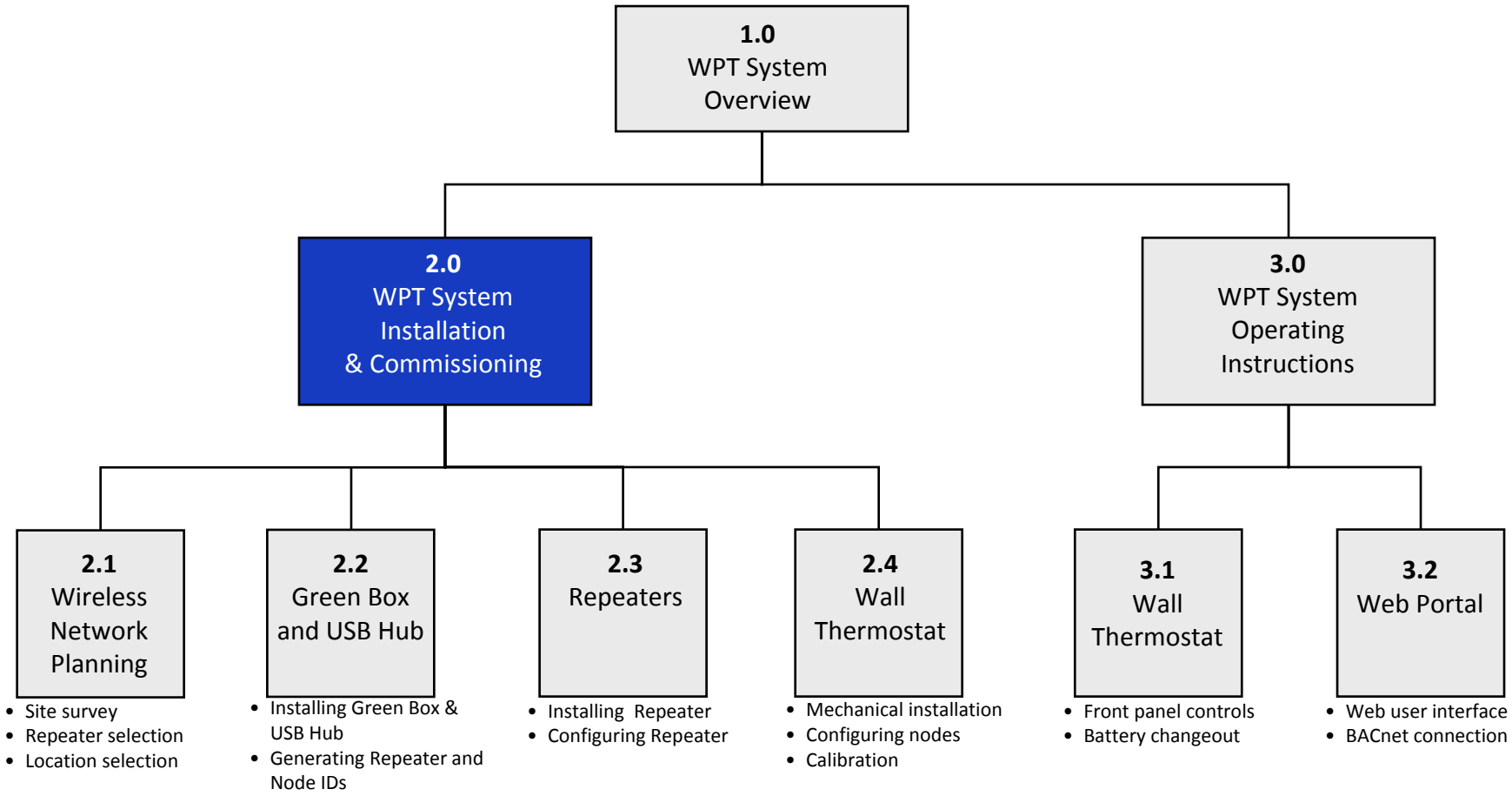
Wall powered Repeater
(WPT-800-RWAL)
(WPT-800-RWAL 24V)

Extends the WPT wireless range.

WPT Node
(WPT-800-TXXX)
(WPT-800-TXXX-DB)

Replaces the existing pneumatic thermostat. Available in single/dual pipe with direct/reverse action.

WPT Training Modules



Recommended Installation Workflow

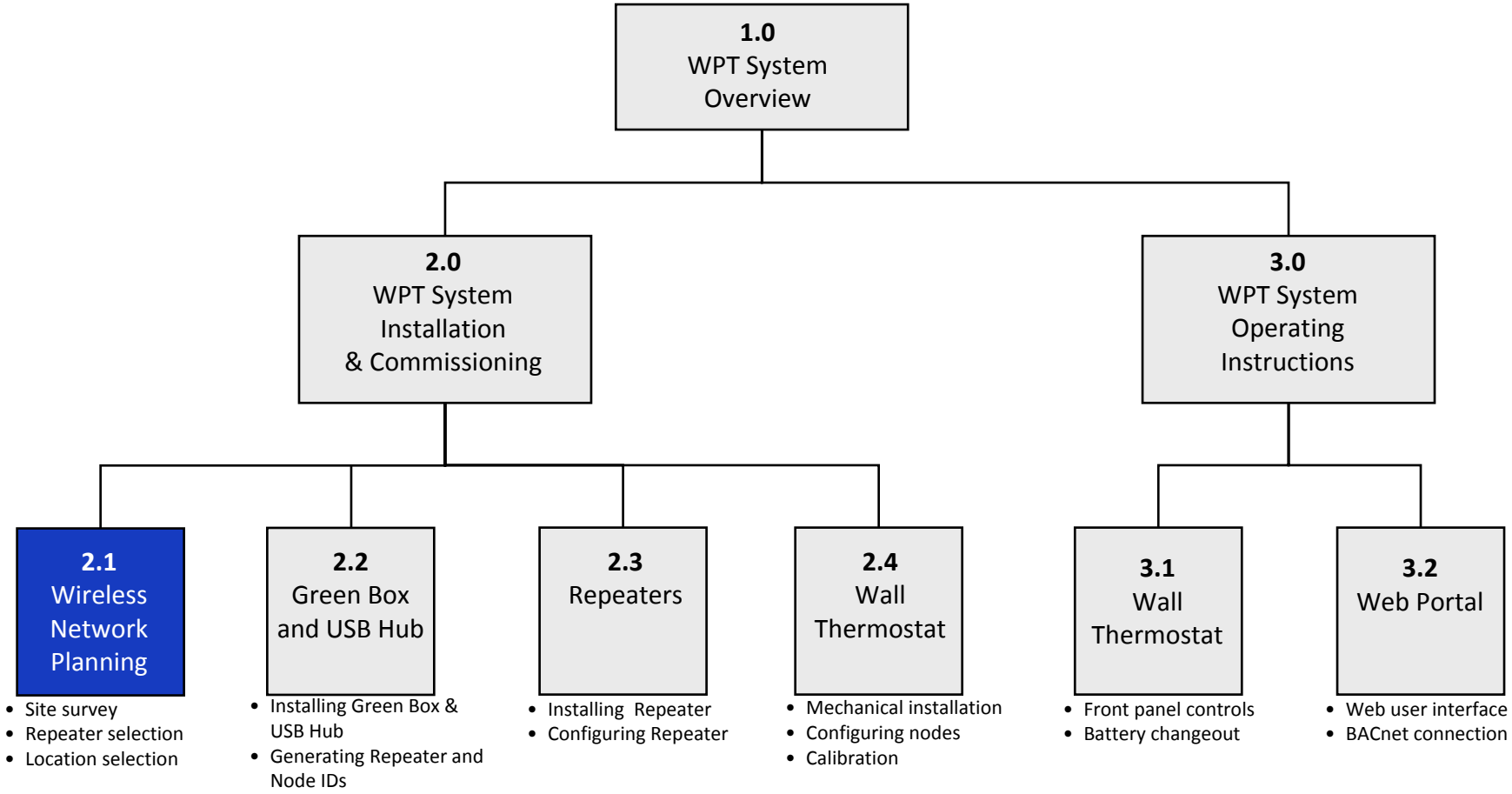
1) Start with WPT wireless network planning
   - Note the types of stats to be retrofitted
   - Perform site survey to determine where to place Repeaters, USB Hub and Green Box
   - Determine the number of Repeaters required

2) Install and configure Green Box and USB Hub
   - The USB Hub and Green Box should be installed first as the core of the network
   - Configuration tool will generate unique IDs to assign to each WPT and Repeater

3) Install and configure Repeaters
   - Install the Repeaters
   - Configure Repeaters to setup WPT wireless network

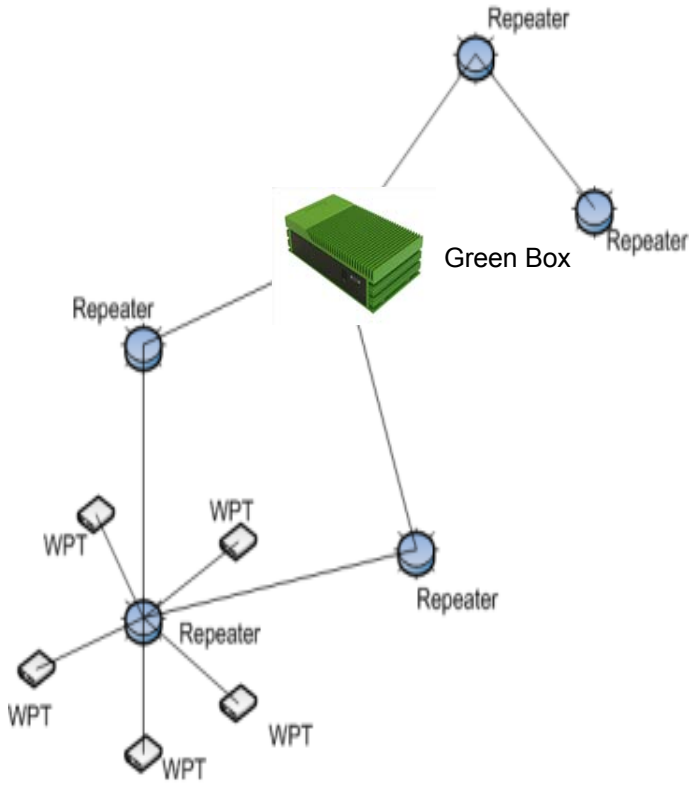
4) Install WPTs
   - Physically remove old thermostats and connect/mount WPTs in their place
   - Configure WPTs to communicate with the wireless network

WPT Training Modules



WPT Wireless Network Planning Overview

- Wireless network planning involves selecting good locations for the Repeaters and USB Hub
- Depending on the building, the wireless range and the number of Repeaters required may differ
- More than one Green Box may be used at larger sites. Each USB Hub and its associated Repeaters are considered a separate network.
- This training module addresses:
  - How to maximize wireless range
  - How to estimate number of Repeaters required
  - How to use the wireless survey tool



Guidelines for Maximizing Wireless Range

Wireless Performance in Buildings

- Cypress wireless has been installed in many different types of sites
  - low-rise office buildings
  - high-rise commercial buildings
  - industrial plants

- Typical wireless ranges for a single “hop” are:

Line of Sight	300 ft open halls 150 ft in open office floor 100 ft in corridors
Drywall / Paneling	100 ft, through five walls
Brick Walls	60 ft, through three walls
Ceilings	25 ft, through single ceiling

- Repeaters allow for multiple “hops” which extend the communications range of the system

Factors Reducing Wireless Range

- Wireless range is affected when metal obstacles are in the line of transmission.

- A solid sheet of metal and some rebar reinforced concrete present the greatest obstacles.

- Try to note the following objects and avoid them in the line of transmission:
  - Hollow lightweight walls filled with insulating metal foil
  - Office equipment and furniture such as book shelves, file cabinets, metal partitions, computer racks
  - Metal reinforced concrete walls, pillars and columns
  - Glass walls with metal coating
  - Plumbing and electrical risers
  - Elevator shafts and stairwells
  - Mechanical and electrical equipment rooms

The bigger the metal obstacles in the transmission path, the shorter the wireless range.

Where to place Repeaters and USB Hub

DOs

- Place the USB Hub in a central location on the site with power and preferably nearby LAN connection
- Mount Repeaters and USB Hubs at eye-level or higher to avoid furniture obstructions
- Place the Repeaters above each other when transmitting to adjacent floors

DON'Ts

- Avoid solid metal obstacles in the line of transmission
- Don't install Repeaters along the same side of the wall as that of the WPT (wireless coverage is better in front vs. side of WPT)
- Don't mount USB Hubs or Repeaters within 3 ft of computers or A/V equipment (which may produce interfering radio waves)

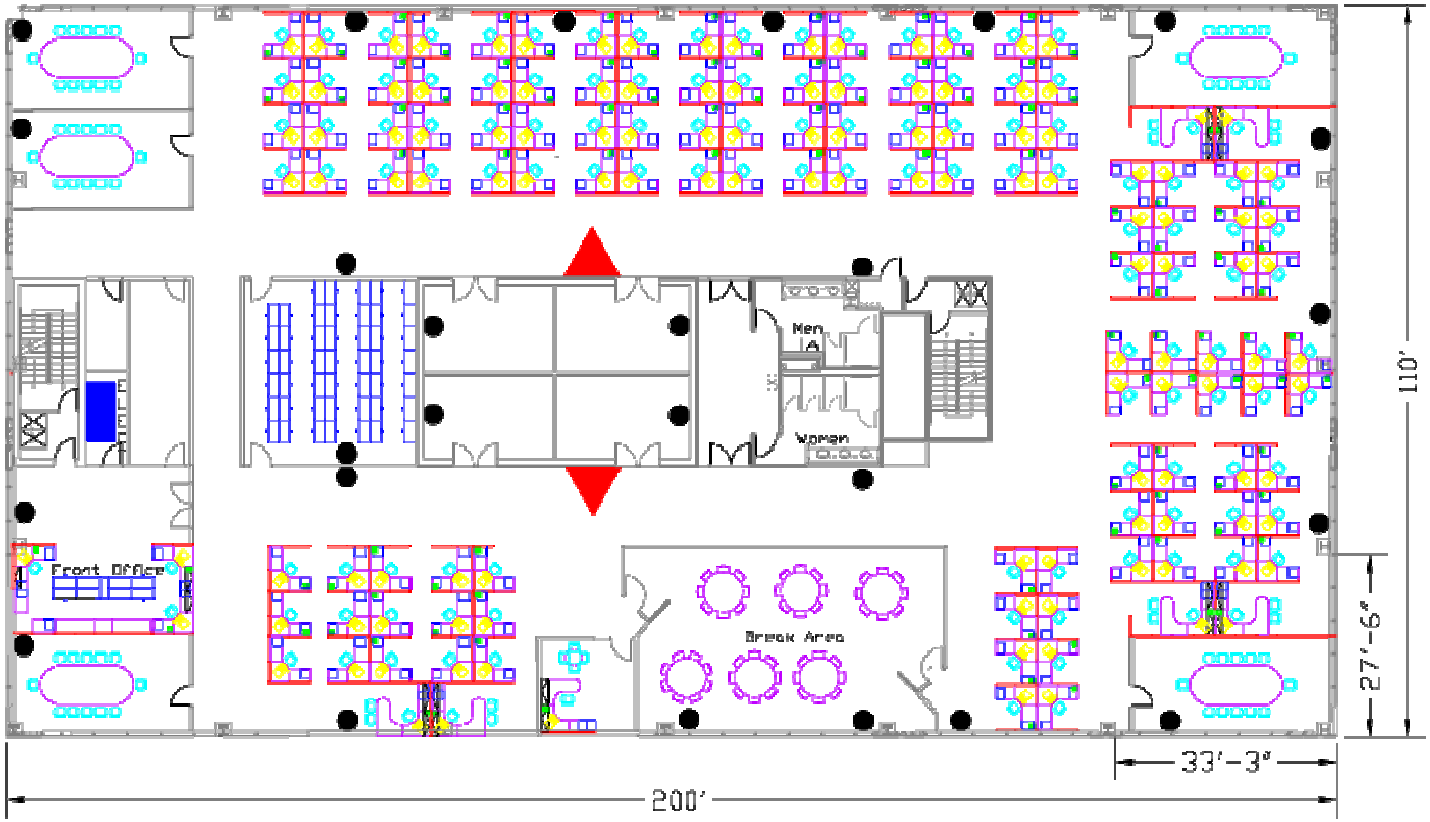
Guidelines for Estimating the Number of Repeaters Needed

Estimating Number of Repeaters Needed

GUIDELINES:

- Maximum number of Repeaters allowed in network = 14
- WPTs can talk directly to Repeaters or the USB Hub
- Allocate one Repeater for every 15 WPTs on a floor (depending on the wireless range)
- Use a Repeater for extending the WPT wireless network across different floors

Typical Layout of WPT Network in a Building



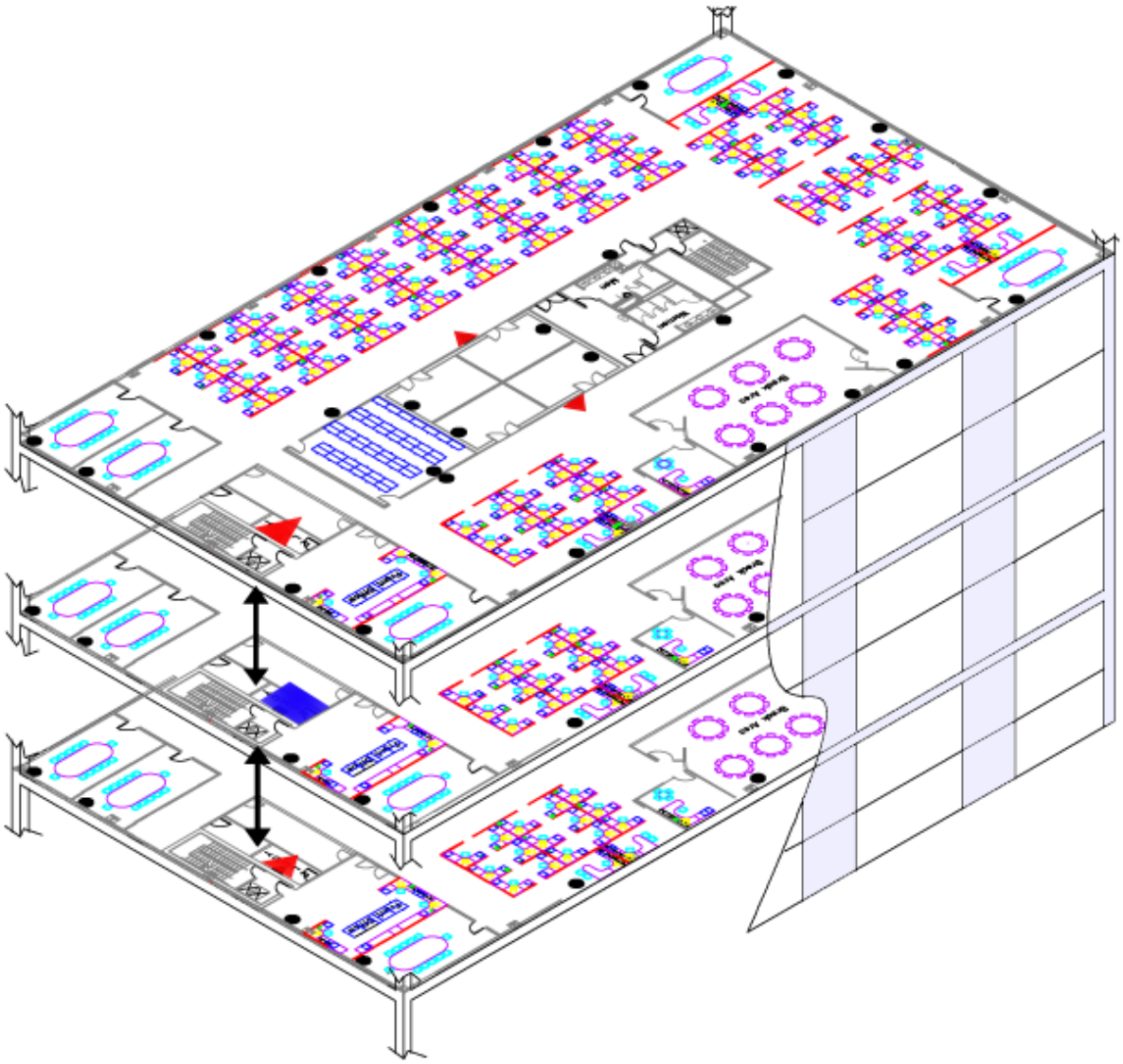
Thermostats (28)

USB Hub (1)

Repeaters (2)

WPT Wireless Network in a Typical Office Building

Typical layout of WPT Network in a Building



Thermostats

USB Hub

Repeaters

WPT Wireless Network in a typical multi-floor office building

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Using the Wireless Range Tester Kit

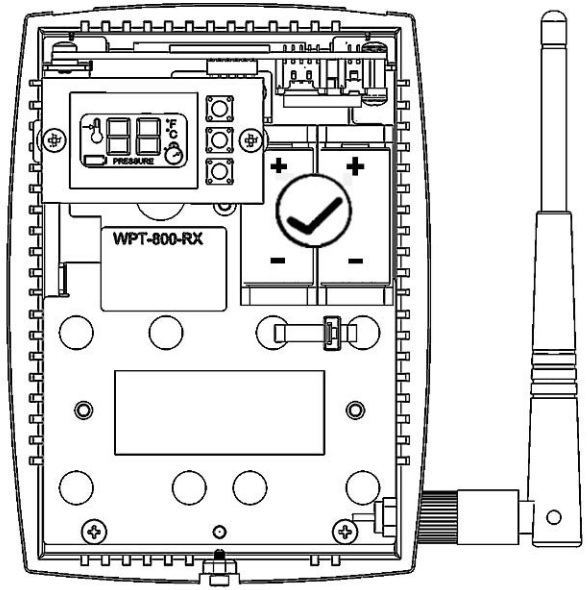
Wireless Range Tester

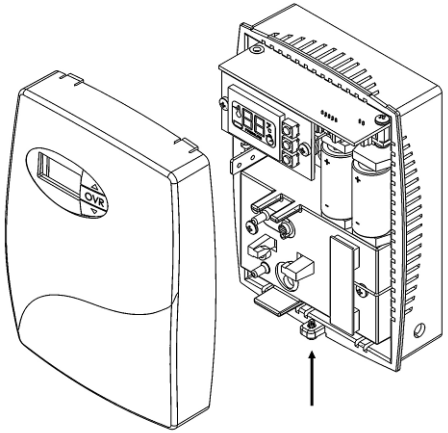
- The wireless range tester is used to determine the Repeater locations.
- The wireless range tester consists of a battery powered Receiver and Transmitter.
- The Receiver and Transmitter can be turned ON by simply inserting the batteries and pressing any button.
- The wireless range tester does a wireless discovery process (handshake) per the WPT Wireless protocol to determine the wireless coverage reliably.

Receiver

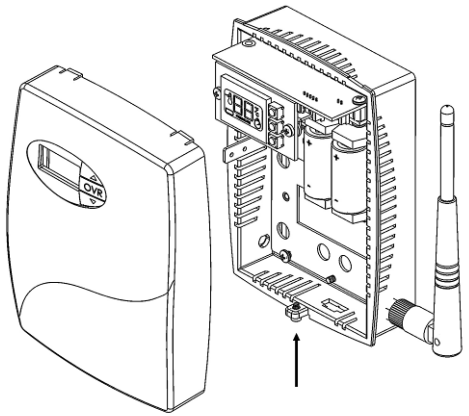
Transmitter

Installing Batteries





Range Test Transmitter

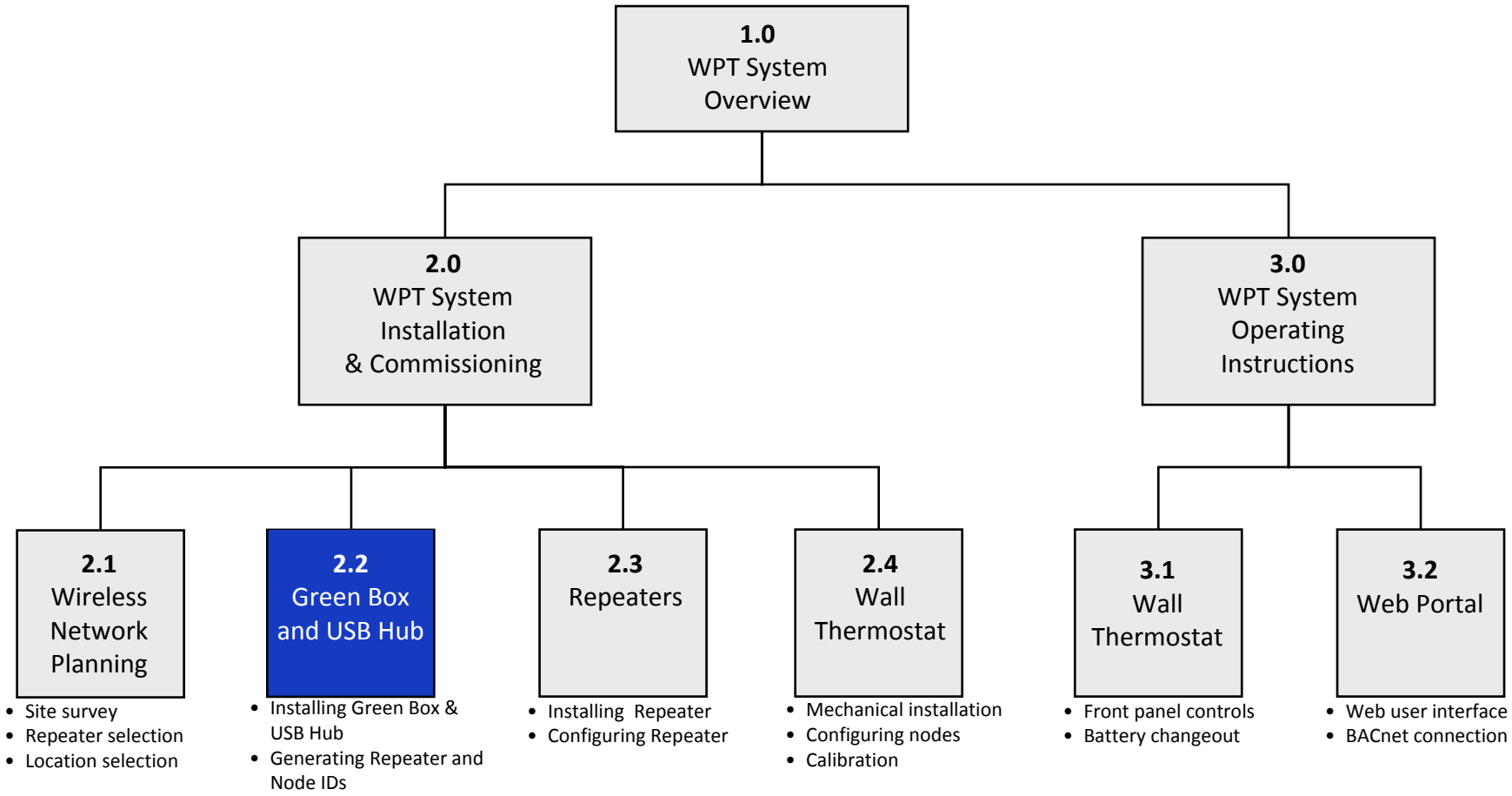


Range Test Receiver

Using the Wireless Range Tester

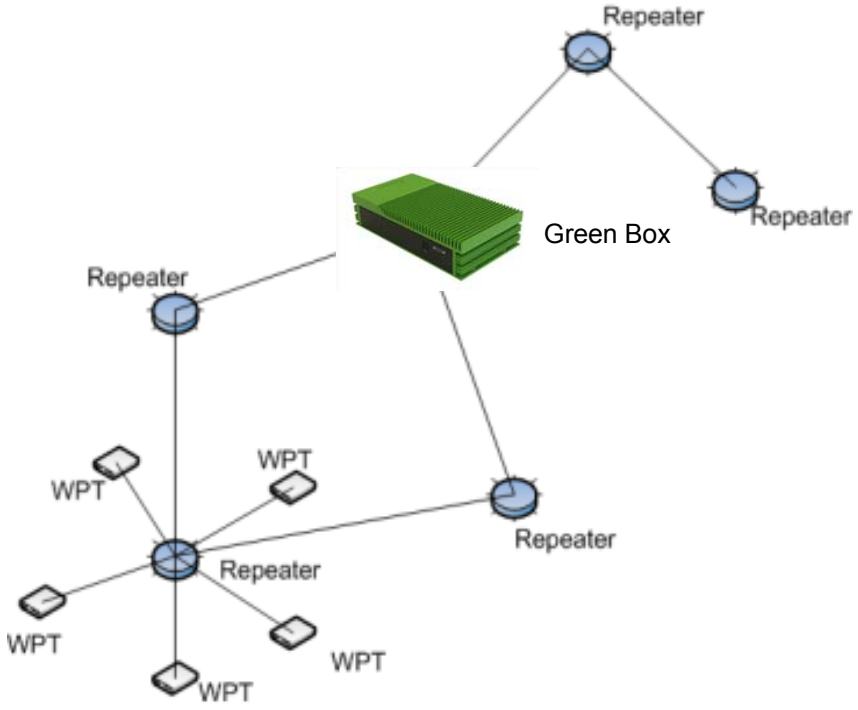
- Identify a potential location for the Repeaters and USB Hub as per the location selection guide and the floor plan.
- Configure both the Receiver and Transmitter with the same RKIT ID. Make sure there are no RKITs with same RKIT ID operating nearby.
- Place the Receiver at the target location for the HUSB and press the ▲ button. Make sure the RKIT ID is displayed and override indicator is not flashing.
- Take the transmitter to a thermostat location and start transmitting by pressing the ▲ button. The override indicator will flash once to indicate a data packet is sent. RSSI scale will be displayed (in a scale of 1 to 5) and updated every second.
  - The Transmitter displays the signal strength on a scale of 1-5
  - Scale of 5-3 indicates acceptable wireless coverage
  - Scale of 2-1 indicates weak wireless coverage
  - "--" indicates no wireless coverage

WPT Training Modules



WPT USB Hub and Green Box Setup Overview

- One USB Hub and Green Box are required per WPT Wireless Network.
- The USB Hub is the receiver/transmitter for the WPT wireless signals. The Green Box provides data storage and the User Interface.
- There may be more than one USB Hub & WPT Green Box per site (if necessary due to size of site).
- Each USB Hub may support up to 225 WPTs with 14 Repeaters.
- The Green Box uses industry standard Windows XP/Pro operating system and includes optional BACnet/IP interface.
- This training module addresses:
  - How to install and configure WPT Green Box
  - How to install and configure a USB Hub
  - How to verify a USB Hub is working correctly



WPT Green Box Setup

WPT Green Box
(Front view)

Connect the USB Hub
(into any USB port)

Connect a network cable

Connect the power cable

WPT Green Box
(Back view)

Accessing WPT Green Box

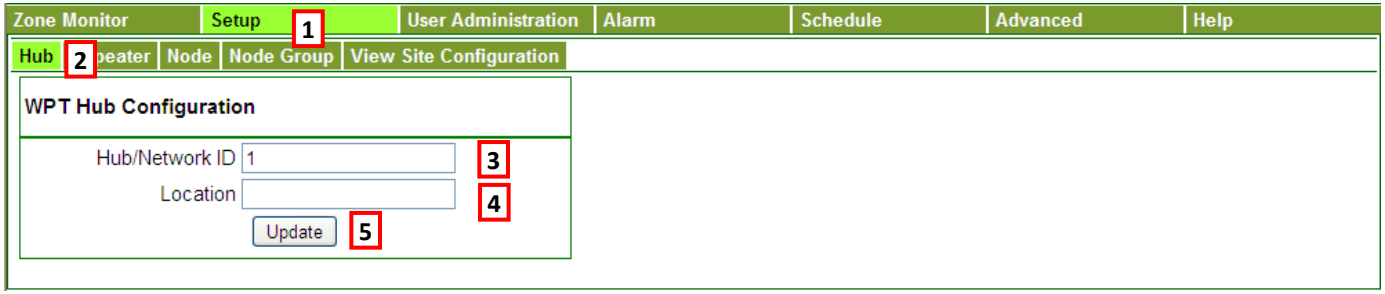
- The WPT Green Box is configured with DHCP.
- WPT Green Box IP Address can be changed by connecting from any machine in the network using Microsoft Remote Desktop connection
  (Start → All Programs → Accessories → Remote Desktop Connection)
  - Machine Name: WPTServer
  - Username: (please see training coordinator)
  - Password: (please see training coordinator)
- If the WPT Green Box is not connected to the LAN, use a network cable to directly connect from a laptop.
- The WPT Green Box can also be directly accessed by connecting a monitor, keyboard and mouse.
- WPT Web Portal has the setup tool for generating the IDs required for configuring the USB Hub, Repeaters and WPTs.
- The WPT Web Portal can be accessed using *Microsoft Internet Explorer* from a PC connected to the WPT Green Box or on the same network.

Accessing the WPT Web Portal

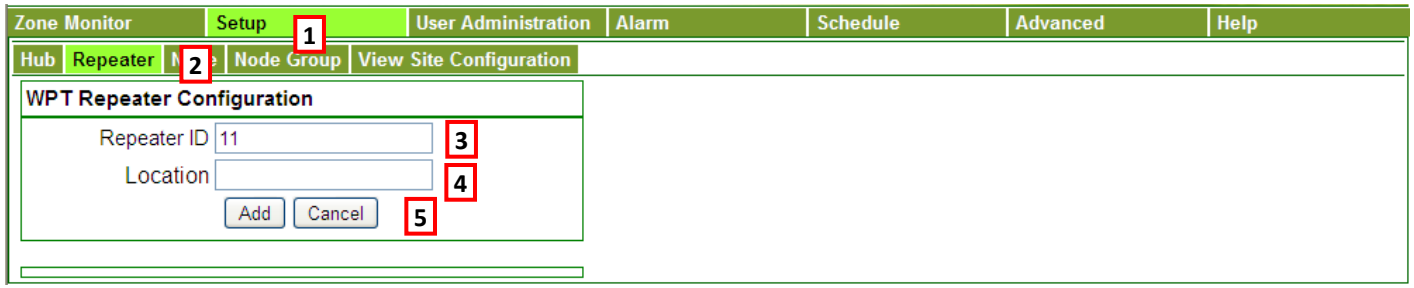
1. Enter the default username: (please see training coordinator)
2. Enter the default admin password: (please see training coordinator)
3. Click Log In.

Creating Network and Repeater IDs

Create Network ID

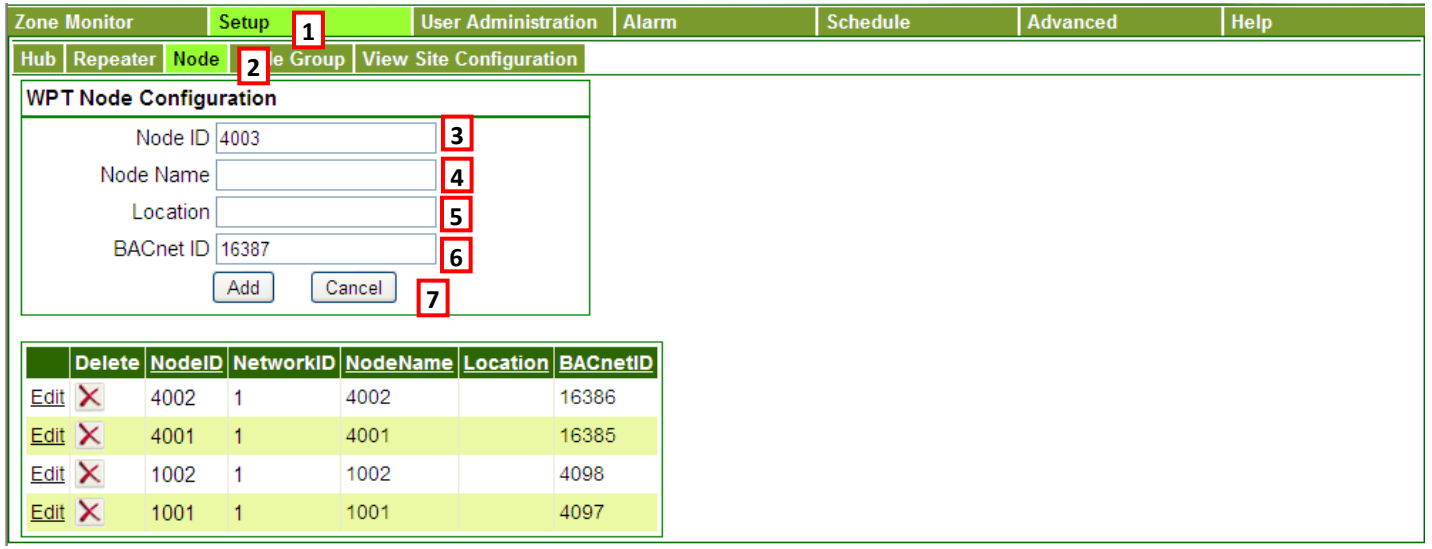


Create Repeater ID

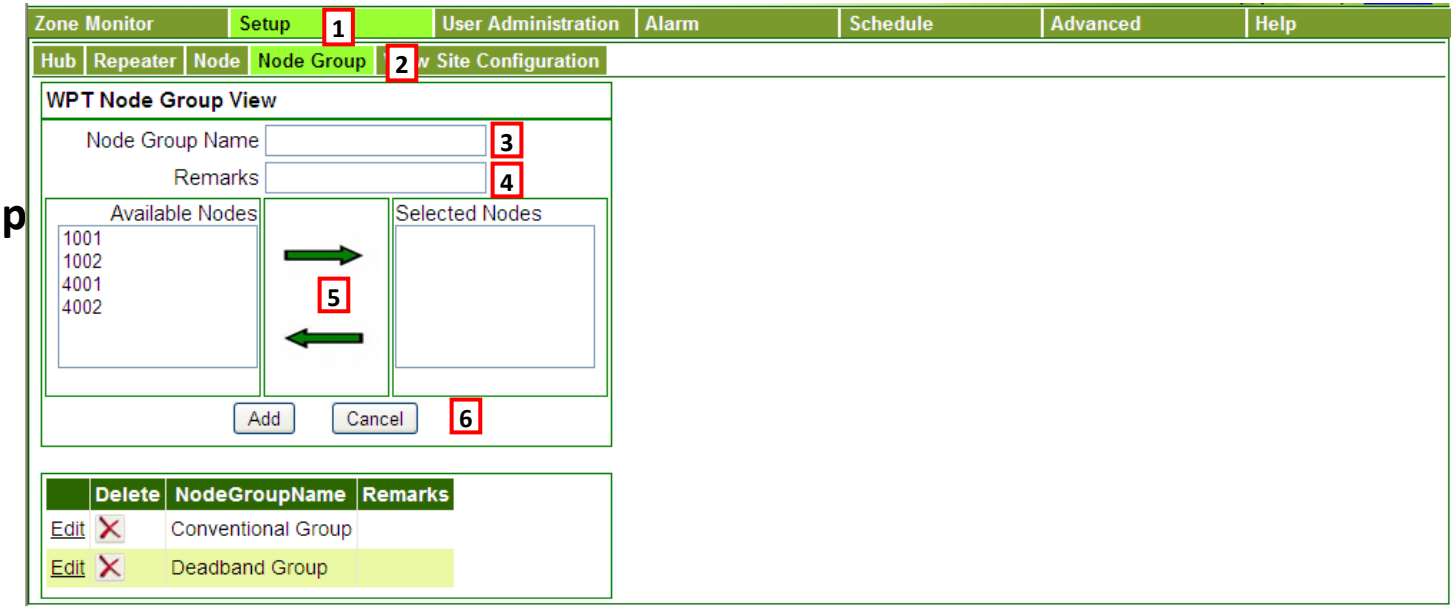


Create Node IDs and Node Groups

Create Node ID



Create Node Group



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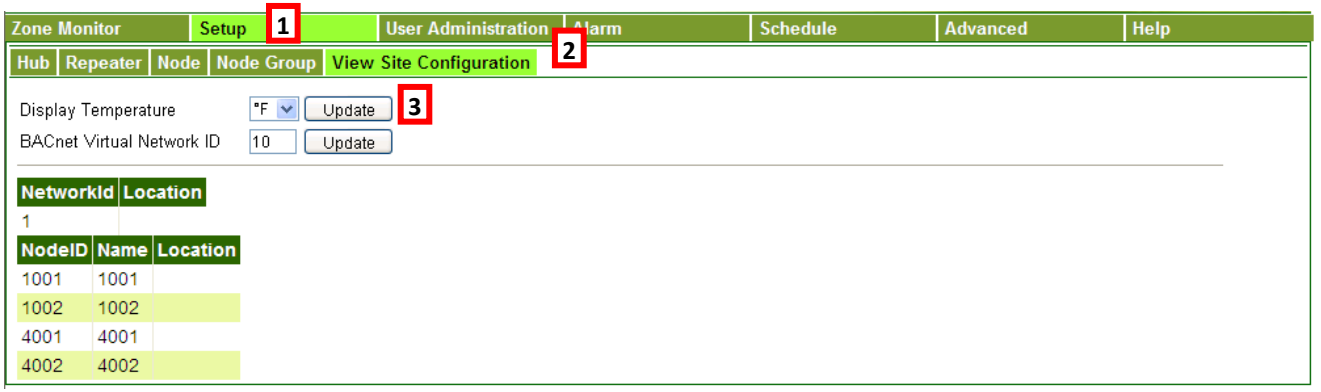
WPT Wireless Network Settings Reports

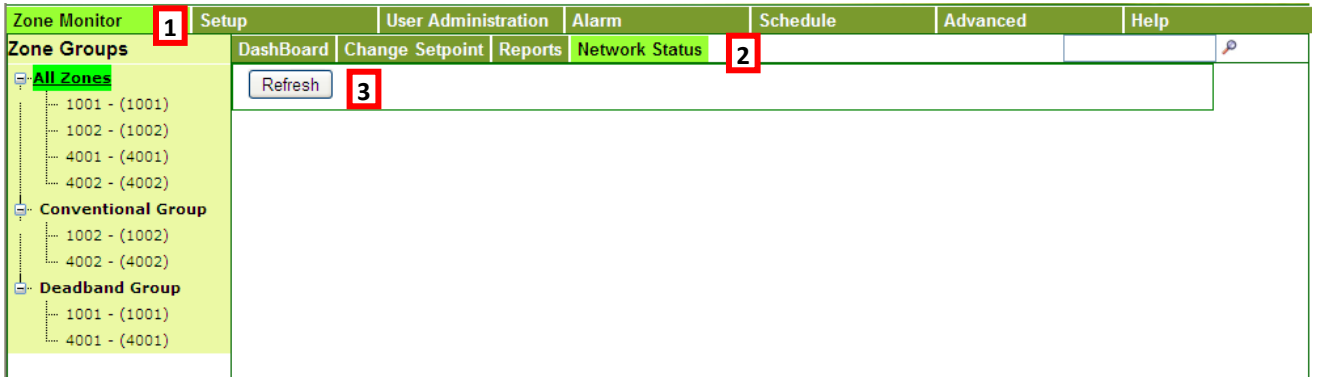
View Site Configuration

- Use this page to change the display temperature and verify Node IDs, Repeater IDs and the Network ID.



Network Status

- Use this report to view the current status of repeaters.



Multiple Green Box Servers on BACnet

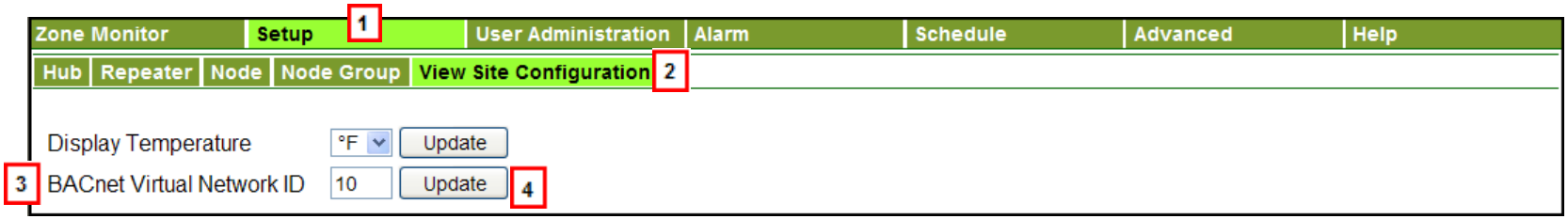
- Some installs require multiple Green Box Servers running BACnet.

- For these installs, make sure:
  - All WPTs have unique BACnet IDs
  - Each Green Box Server has a unique “Virtual Network Number”

- **WPT BACnet IDs** and the **BACnet Virtual Network ID** can be changed using the WPT web application.

Changing the Virtual Network Number

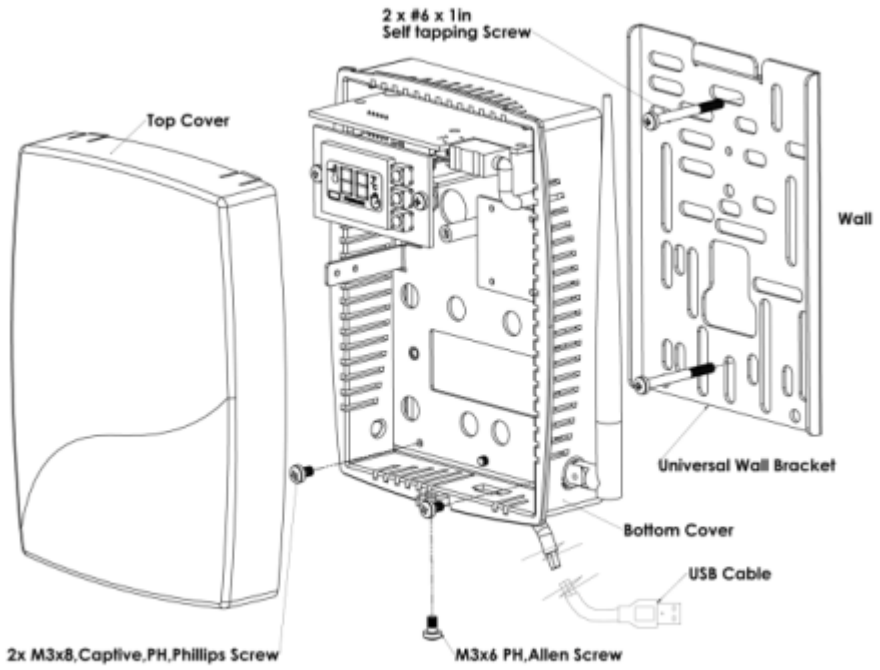
- Change to an unique BACnet Virtual Network ID
- Press Update
- BACnet Service will automatically reflect the change



Installing the USB Hub

USB Hub (HUSB) Installation

1. Mount the USB Hub on the wall at eye level or higher.



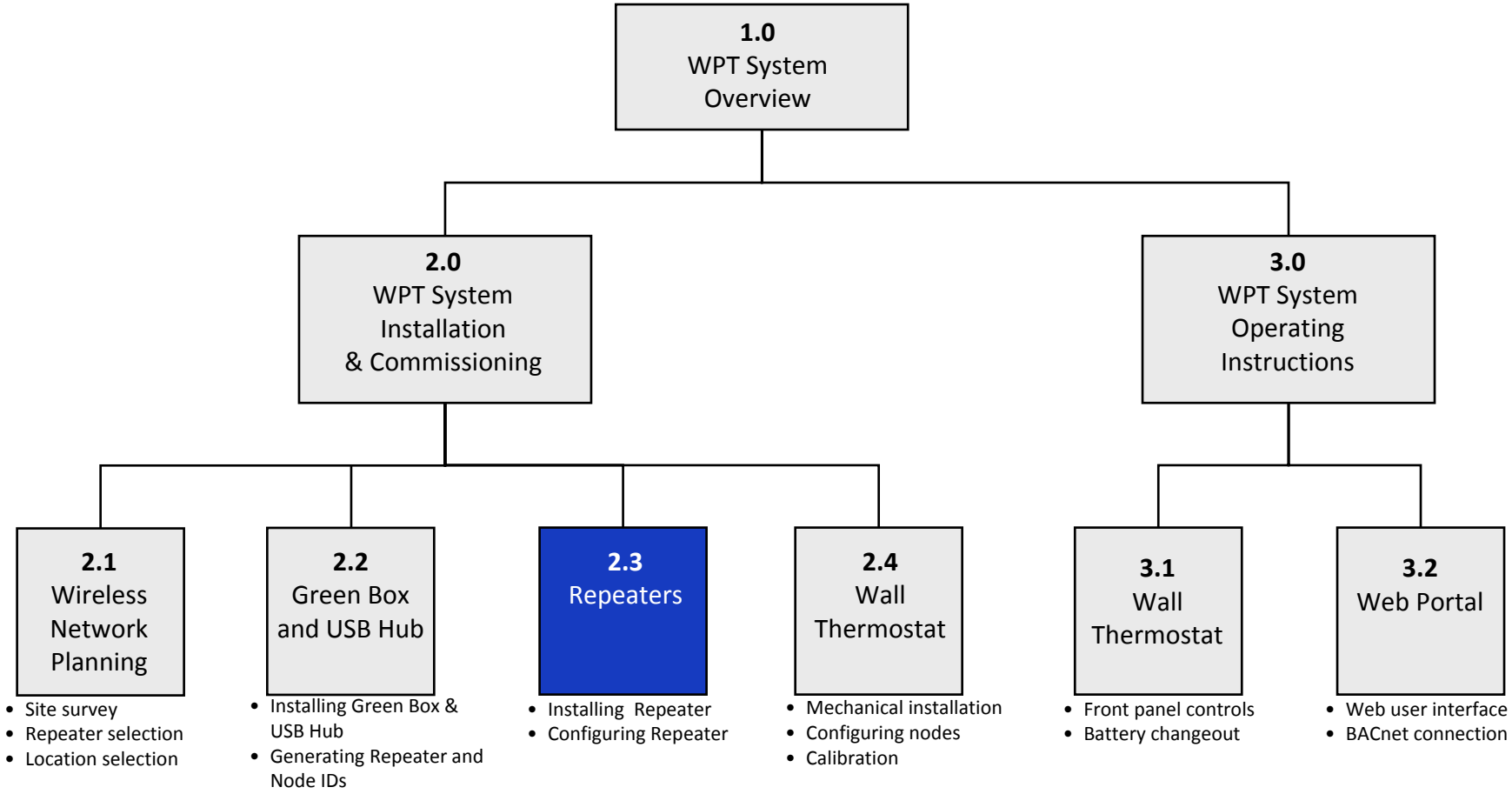
2. Turn ON the Green Box.

3. Connect the USB Hub to the Green Box's USB port.

Troubleshooting the USB Hub

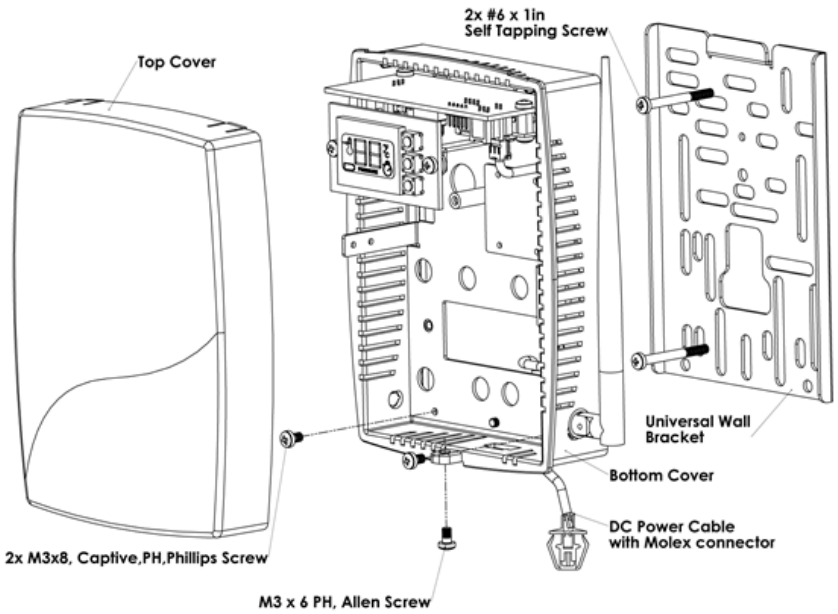
Error Code	Possible Cause	Solution
E2	Radio Error – Not able to send/receive data	Restart the unit with removing and inserting the USB cable to the WPT Green Box. If the error continues the device requires replacement. Contact the distributor.
E3	Ping Error – Not able to locate a free RF channel to use due to high RF interference	Change the position of the Hub.
E4	Connect Error – Not able to connect to the nearest Repeater	The HUSB auto recovers after a few refresh cycles, if this error occurs after successful installation. Consider adding/ changing the repeater location in the zone, if the error persists.
E5	USB Error – Not able to communicate with the WPT Green Box	Check USB cable. Change to a different USB port. Replace the HUSB if problem persists.

WPT Training Modules

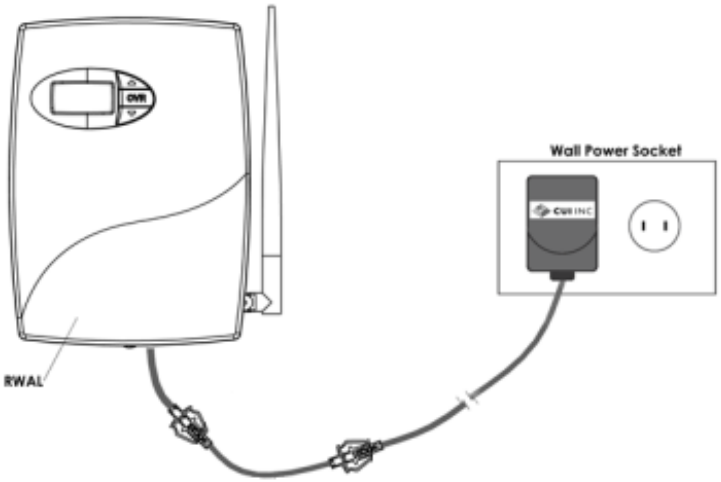


Installing Repeaters

Wall Powered Repeater (RWAL)



Mounting the Repeater



Powering the Repeater from a wall socket

NOTE: Consider using wire mold to conceal the power cable

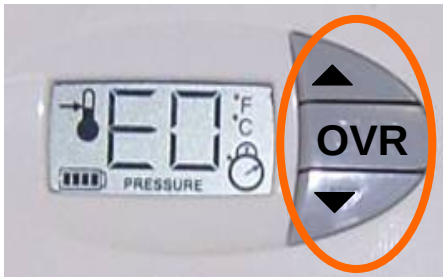
24V Powered Repeater (RWAL 24V)

Route cable service loop to provide strain relief

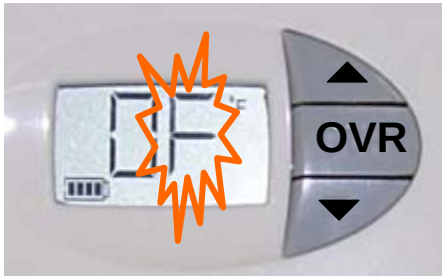
Non polarity sensitive connector

Route cable through mounting bracket

Programming Repeater Network ID



Press and release all three buttons simultaneously to enter programming mode.



Network ID Programming Mode

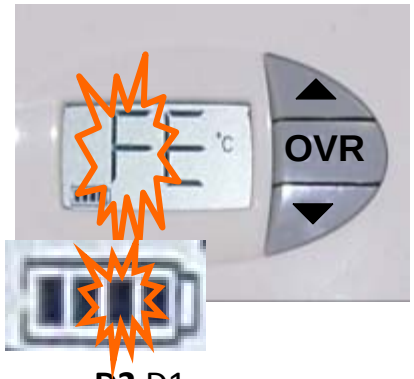
- Network ID is a single digit hexadecimal number (1-9, A-F) generated using the WPT Web Portal, as discussed in module 2.2.
  - Network ID cannot be “0”.
- °F icon is ON and Network ID flashes.
- Use ▲ and ▼ buttons to enter the ID.
- Press **OVR** button to confirm.

NOTES:

1. The Repeater is factory configured with Network ID 1. You can leave the Network ID unchanged by pressing the **OVR** button.
2. The Repeater will exit programming mode automatically if there is no action for 1 minute

Programming Repeater ID

D2 **D1**



D2 D1

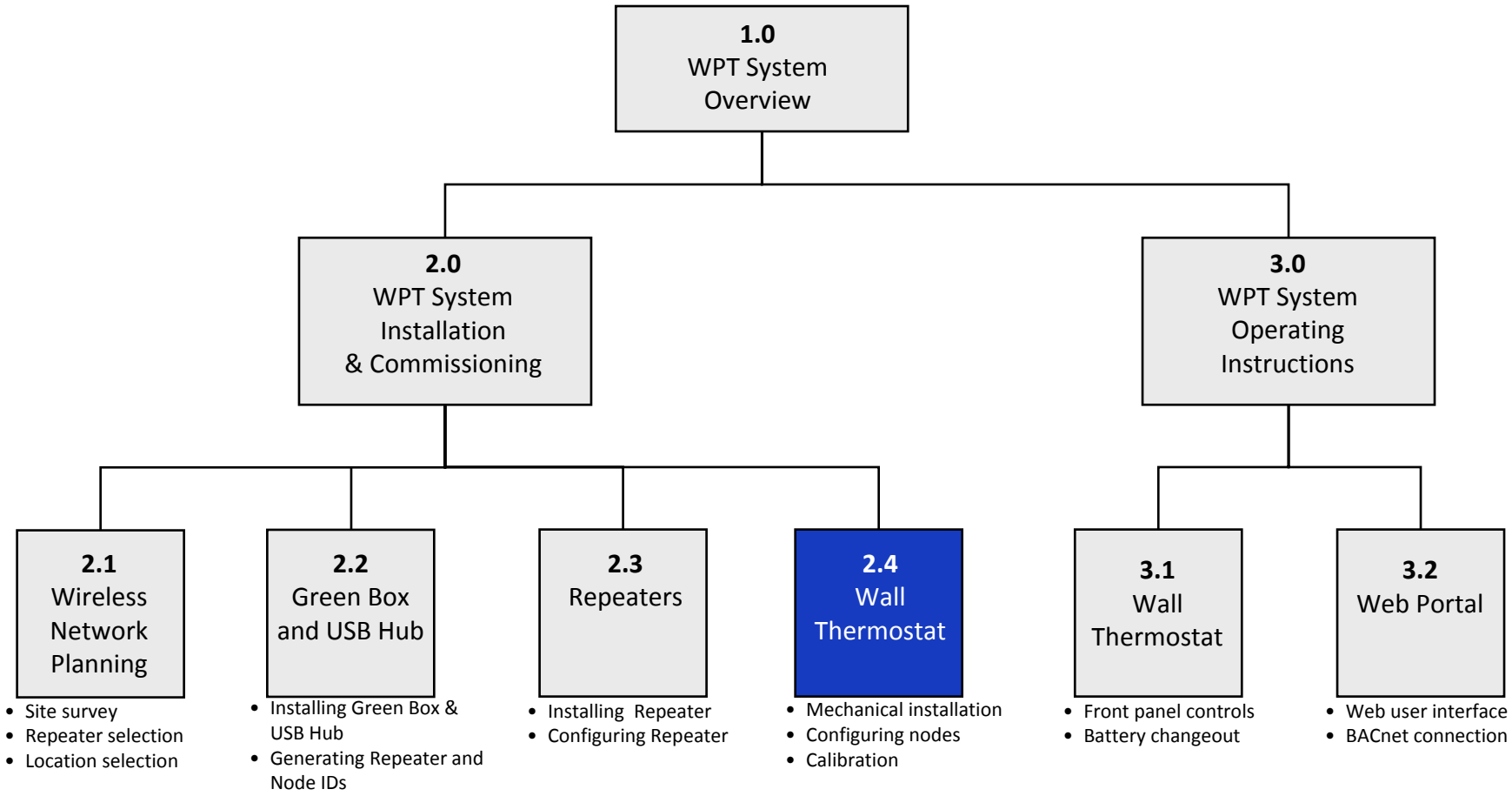
- Repeater ID is a two digit [D2 D1] hexadecimal number (0-9, A-F) generated using the WPT Web Portal, as discussed in module 2.2.
  - D1 cannot be “F”.
- °C icon is ON and the corresponding bar of the battery indicator flashes.
- Use ▲ and ▼ buttons to enter the Repeater ID.
- Press **OVR** button to confirm.

NOTE: The Repeater will exit the programming mode automatically if there is no action for 1 minute.

Troubleshooting the Repeaters

Code	Reason	Solution
dy	This code indicates that the RWAL is performing a discovery operation and it should not be disturbed.	This display goes off automatically after a few seconds.
E0	Discovery error – Not able to connect to nearest RWAL or HUSB	Force Discover to retry. Check if RWAL or HUSB is working. Reset the RWAL. Place the RWAL or HUSB in a different position, if feasible.
E1	Time synchronization error – Not able to synchronize the RWAL time with the wireless network	The RWAL recovers from this error within a few refresh cycles, if this error occurs after successful commissioning of the system.
E2	Radio error – Not able to send/receive data	Restart the unit by unplugging and plugging the adapter. If the error persists, contact the original distributor for replacement.
E3	Ping Error – Not able to locate a free RF channel to use due to high RF interference	Change the position of the RWAL.
E4	Connect error – Not able to connect to the nearest HUSB or RWAL	The RWAL recovers after a few refresh cycles, if this error occurs after successful installation. Consider adding a RWAL in the zone if the error persists.

WPT Training Modules



WPT Wall Thermostat Installation Overview

- Installing a WPT and configuring it for wireless communication should take less than 20 minutes

- This training module addresses:
  - How to physically install the WPT
  - How to install the batteries
  - How to turn on and configure the WPT using the front panel
  - How to calibrate the WPT

Mounting the WPT

Installing the WPT – Step 1

Remove the existing thermostat and wall plate

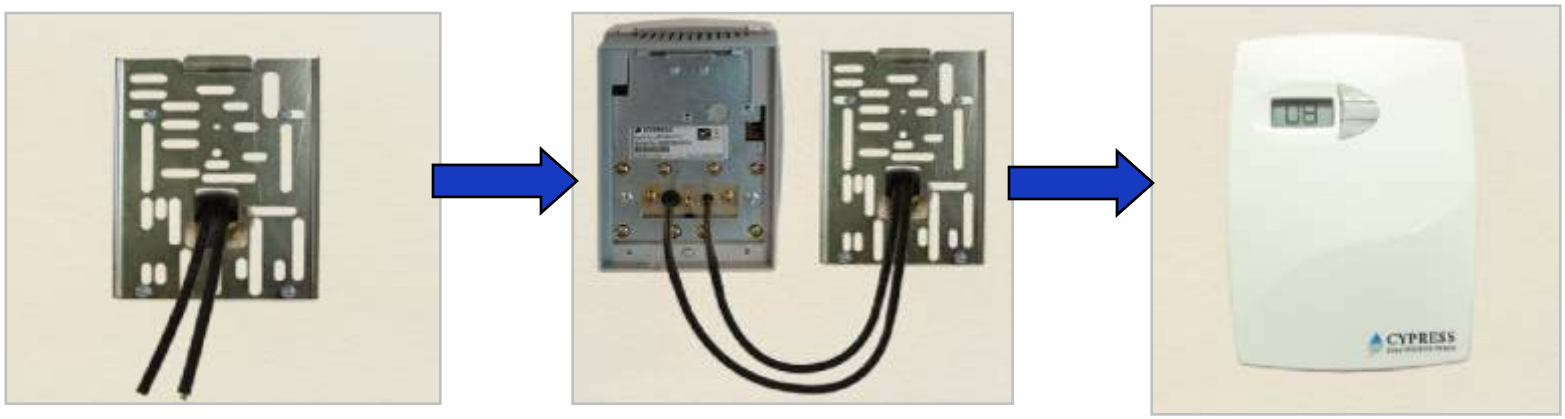
(Figure shows 2-pipe thermostat. Procedure is the same for a 1-pipe thermostat.)

NOTE: Use caution when removing the pneumatic lines from the existing thermostat. Lack of slack may cause the lines to retract into the wall.

Installing the WPT – Step 2

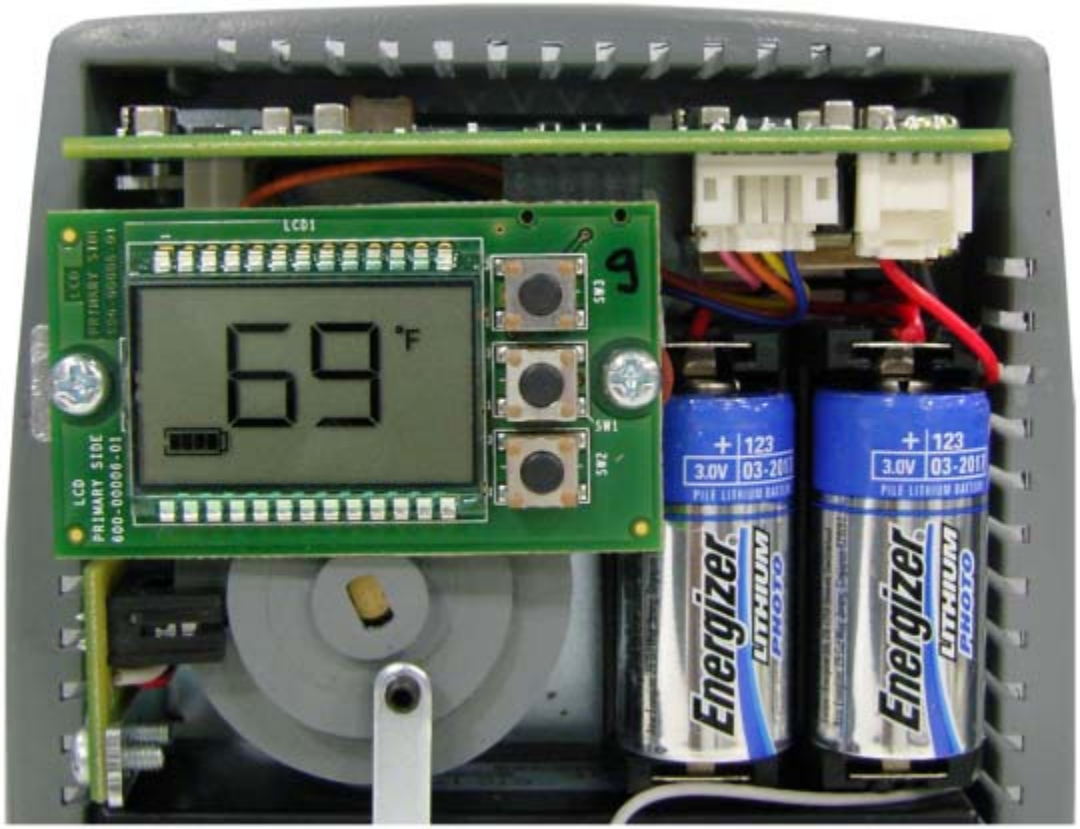
Mount universal adapter plate, connect pneumatic lines to WPT, mount WPT to wall, and install WPT cover plate

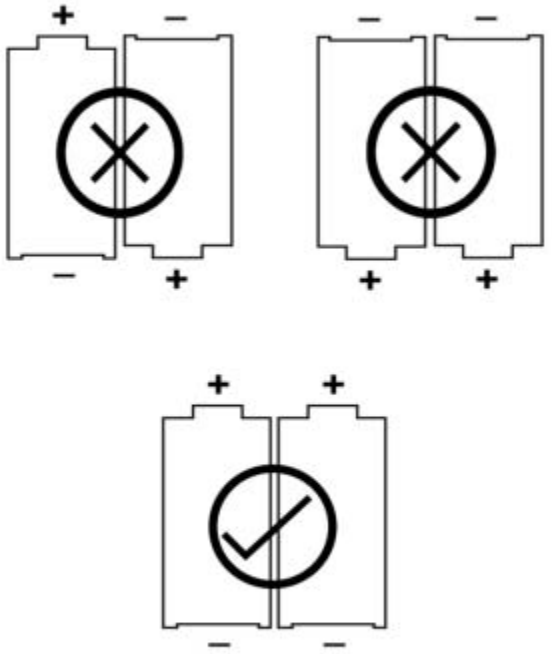
(Figure shows 2-pipe thermostat. Procedure is the same for a 1-pipe thermostat.)



Installing the Batteries

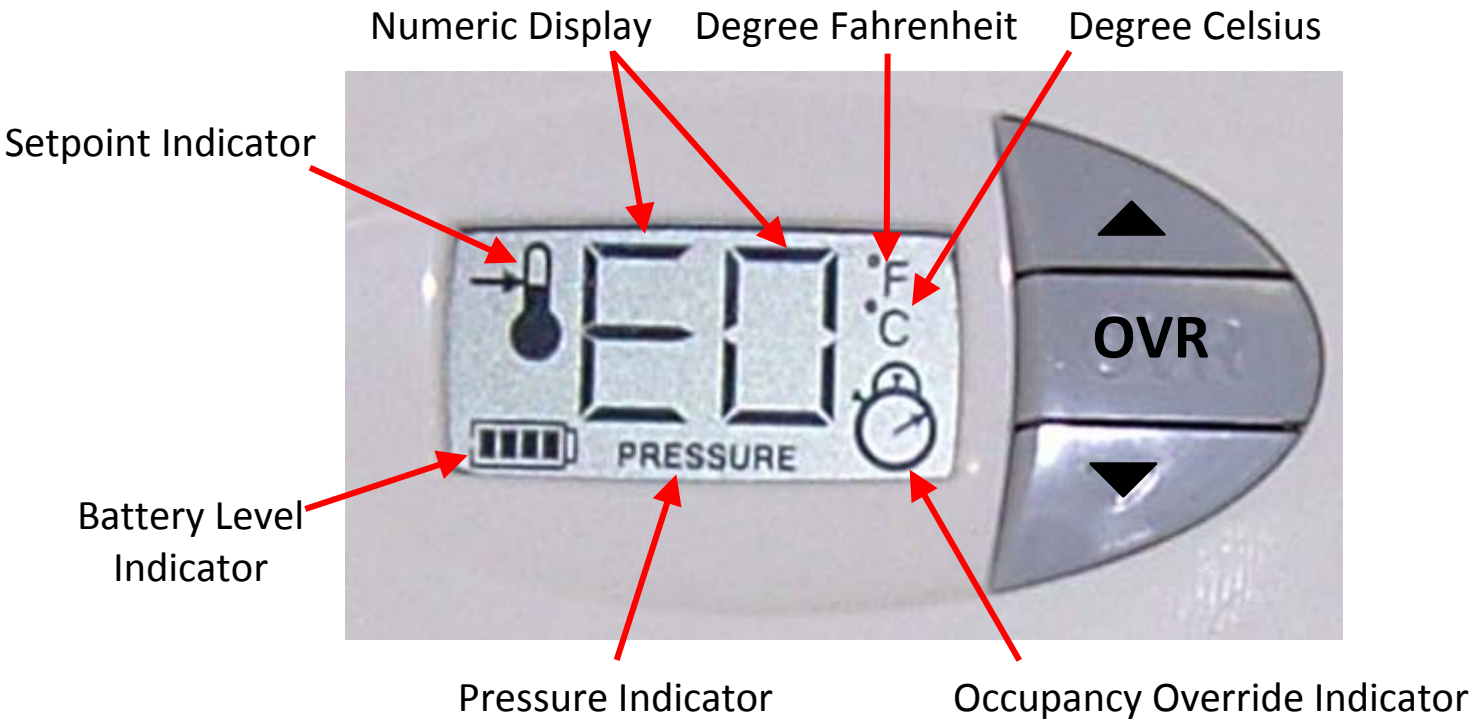
Installing the Batteries in the WPT



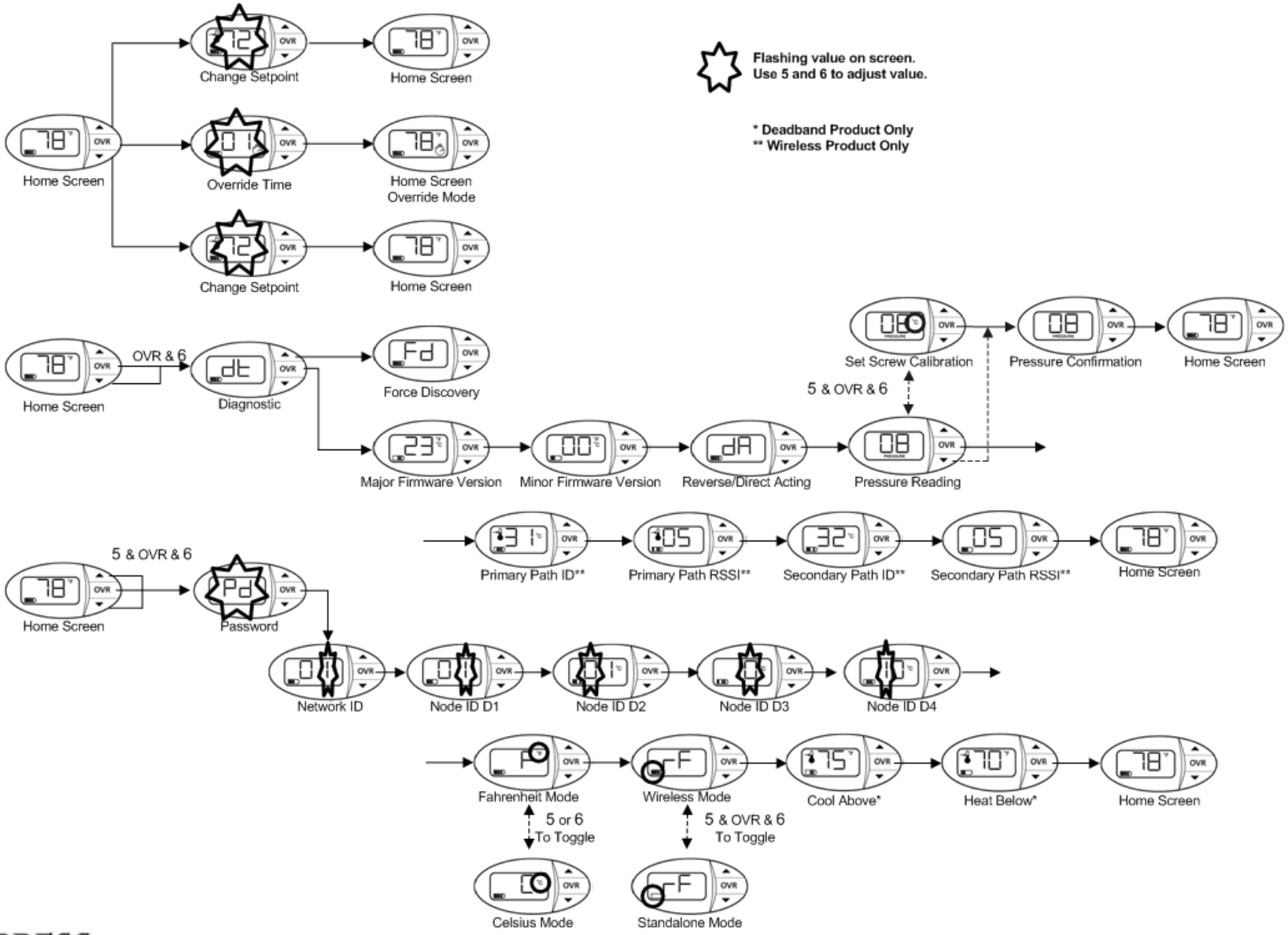


Configuring the WPT for Wireless Communications

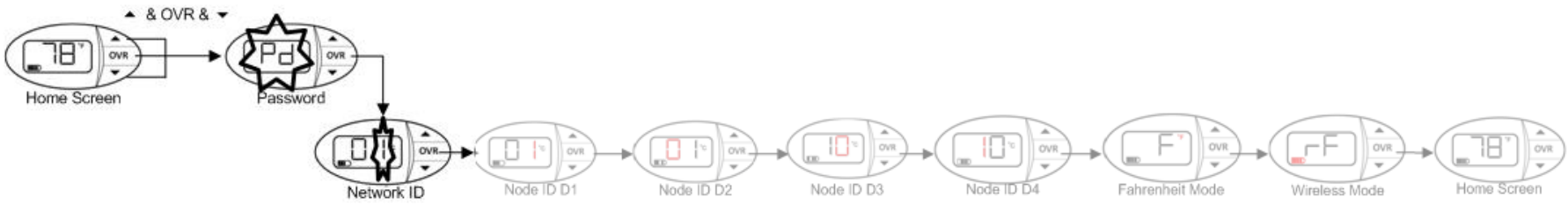
WPT LCD Display



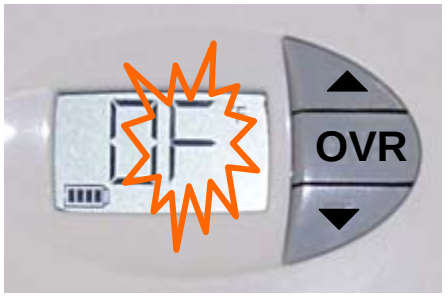
WPT Menu Structure



Programming WPT Network ID



- Network ID is a single digit hexadecimal number (1-9, A-F) generated using the WPT Web Portal, as discussed in module 2.2.
  - Network ID cannot be “0”.
- °F icon is ON and Network ID flashes.
- Use ▲ and ▼ buttons to enter the ID.
- Press **OVR** button to confirm.

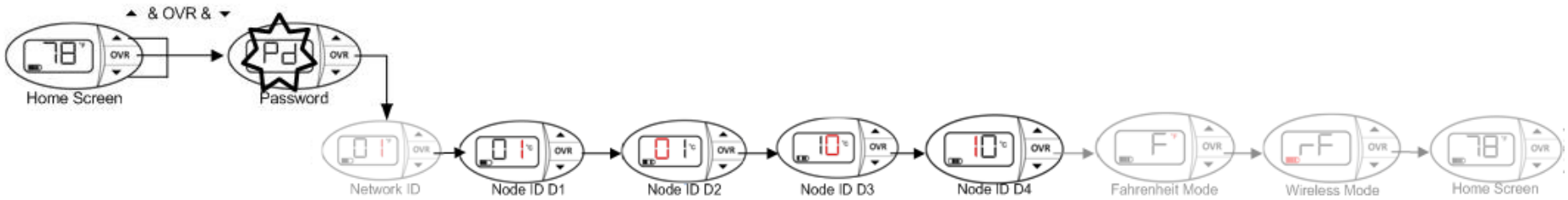


Network ID Programming Mode

NOTES:

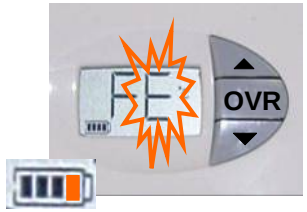
1. The WPT is factory configured with Network ID 1. You can leave the Network ID unchanged by pressing the **OVR** button.
2. The WPT will exit programming mode automatically if there is no action for 1 minute.
3. Ask training coordinator for configuration password.

Programming WPT Node ID

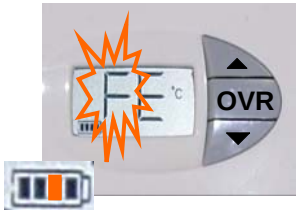


- Node ID is a four digit [D4 D3 D2 D1] hexadecimal number (0-9,A-F) generated using the WPT Web Portal, as discussed in module 2.2.
  - D1 cannot be “0”.
- Press all three buttons simultaneously to enter programming mode.
- Enter password (please see training coordinator).
- Press **OVR** to enter Node ID menu.
- °C icon is ON and corresponding bar of the battery indicator flashes.
- Press ▲ and ▼ buttons to enter Node ID D1.
- Press **OVR** button to confirm and enter Node ID D2 menu.
- Repeat until all for node digits have been entered.

NOTE: The WPT will exit programming mode automatically if there is no action for 1 minute.

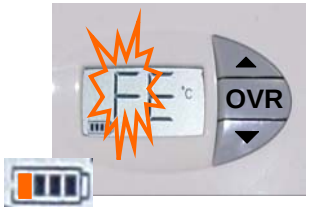


D4 D3 D2 **D1**



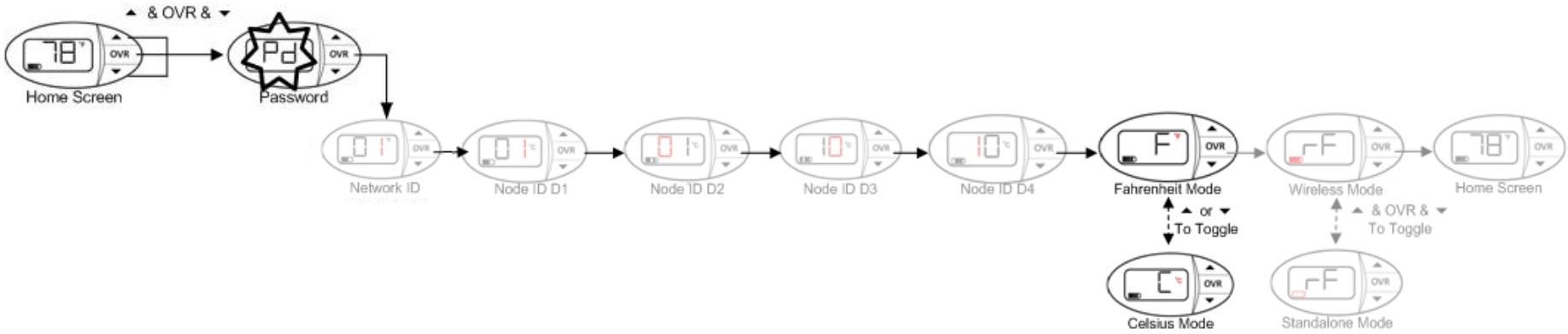
D4 D3 **D2** D1

D4 **D3** D2 D1

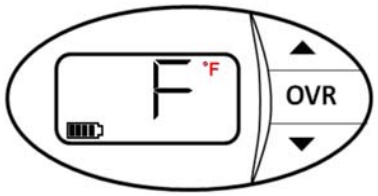


D4 D3 D2 D1

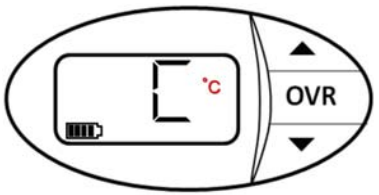
Programming the WPT Units of Measure



- Press all three buttons simultaneously to enter programming mode.
- Enter password (please see training coordinator).
- Press **OVR** button five times.
- Use the ▲ and ▼ buttons to toggle between Fahrenheit or Celsius mode.
- Press **OVR** to confirm.



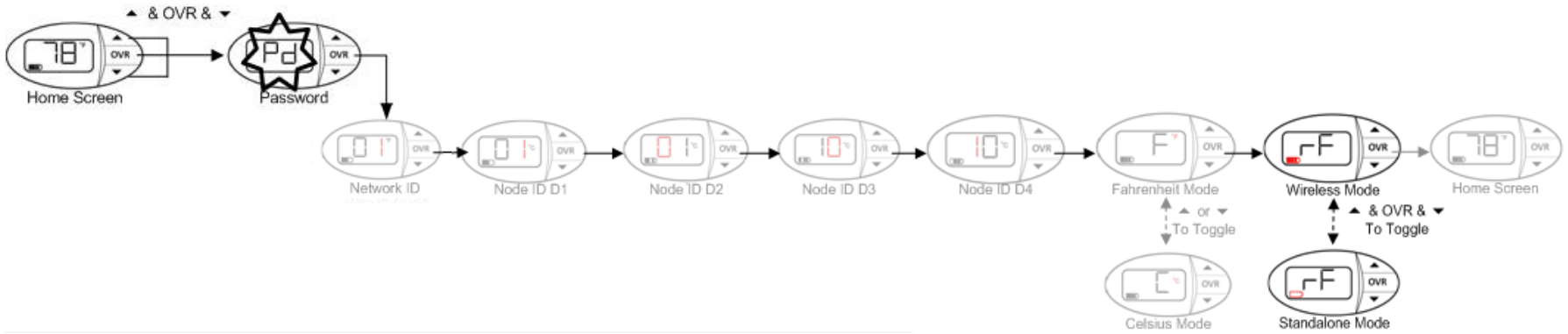
Fahrenheit mode



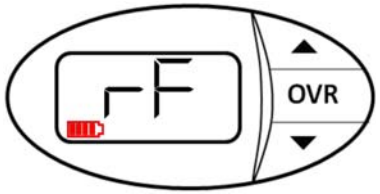
Celsius mode

NOTE: The WPT will exit programming mode automatically if there is no action for 1 minute.

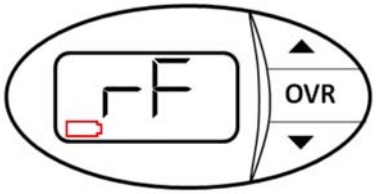
Configuring the WPT for Standalone Mode



- Press all three buttons simultaneously to enter programming mode.
- Enter password (please see training coordinator).
- Press **OVR** six times to enter wireless mode screen.
- Press all three buttons simultaneously to toggle between wireless and standalone modes.
- Press **OVR** to confirm.



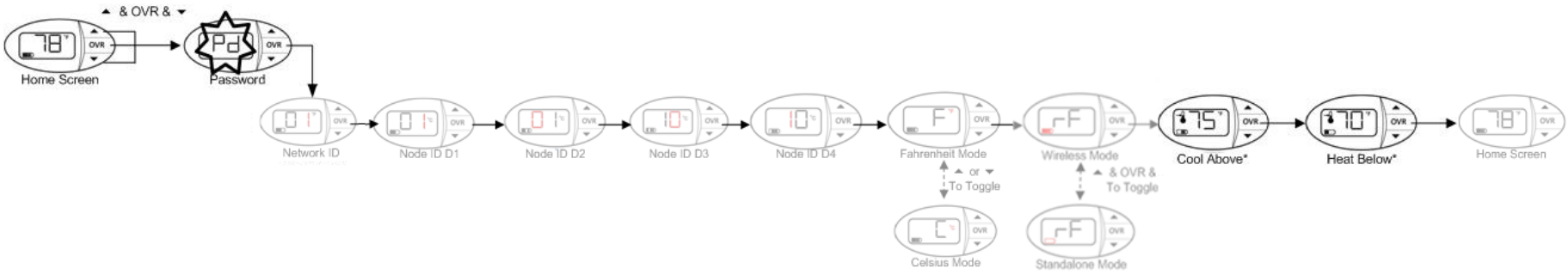
Wireless mode



Standalone mode

NOTE: The WPT will exit programming mode automatically if there is no action for 1 minute.

Configuring Deadband Range (For WPT-DB Only)



- Press all three buttons simultaneously to enter programming mode.
- Enter password (please see training coordinator).
- Press **OVR** seven times to enter Cool Above screen.
- Adjust the Cool Above temperature using the ▲ and ▼ buttons.
- Press **OVR** to confirm the Cool Above value and move to Heat Below screen.
- Adjust the Heat Below temperature using the ▲ and ▼ buttons.
- Press **OVR** to confirm.

NOTE: Cool Above must always be greater than Heat Below.

Common WPT Display Messages

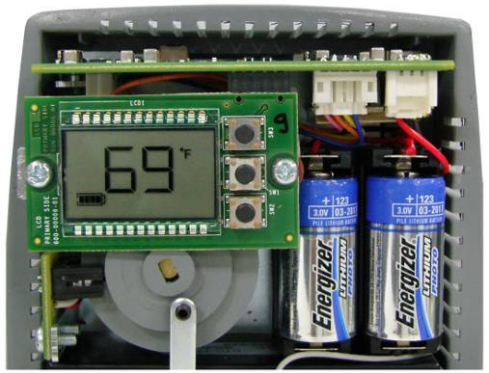
Code	Description
dy	“dy” indicates that the WPT is performing a discovery operation and it should not be disturbed.
dt	“dt” indicates that the WPT is performing a diagnostic operation.
Fd	“Fd” indicates that the WPT is performing a forced discovery operation.
UL	“UL” indicates that the keypad is unlocked by the user.
LC	“LC” indicates that the keypad is locked.
Pd	“Pd” indicates a password is required to proceed.

Troubleshooting the WPT

Error Code	Possible Cause	Solution
E0	Discovery Error – Not able to connect to nearest Repeater or USB Hub	Retry discovery by pressing any button. Check if Repeater or HUSB is working. Try resetting the repeater. Try with a different position of the repeater/ HUSB 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 couple of refresh cycles.
E2	Radio Error – Not able to send/receive data	Restart the unit by removing and inserting the battery If the error continues the device requires replacement. Contact the distributor.
E4	Optical Sensor Error – Not able to properly position motor/cam.	This error is an indication of a defective device. The unit should be replaced. Contact the distributor.

Calibrating the WPT

Calibrating the WPT – Step 1

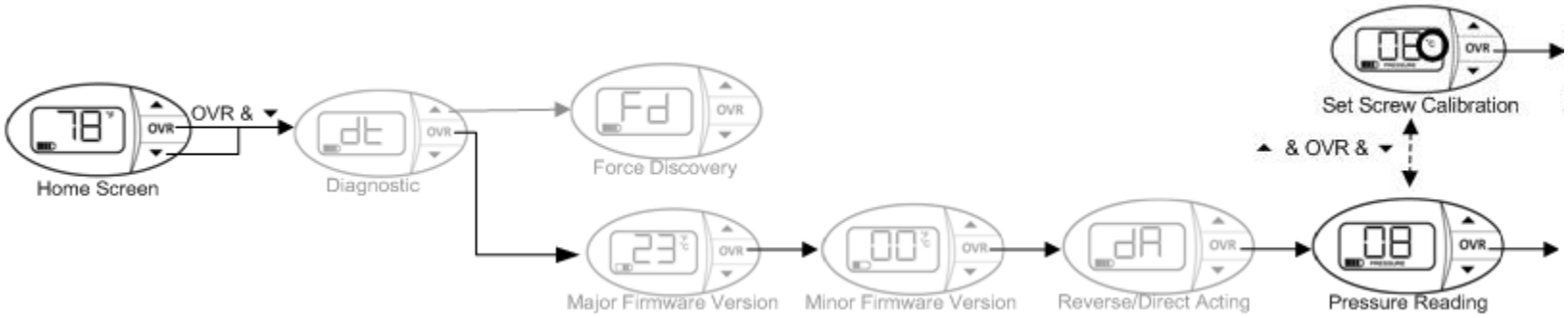


- Remove the front cover of the WPT-DB and make sure that the WPT-DB is acclimatized to the ambient temperature.

Notes

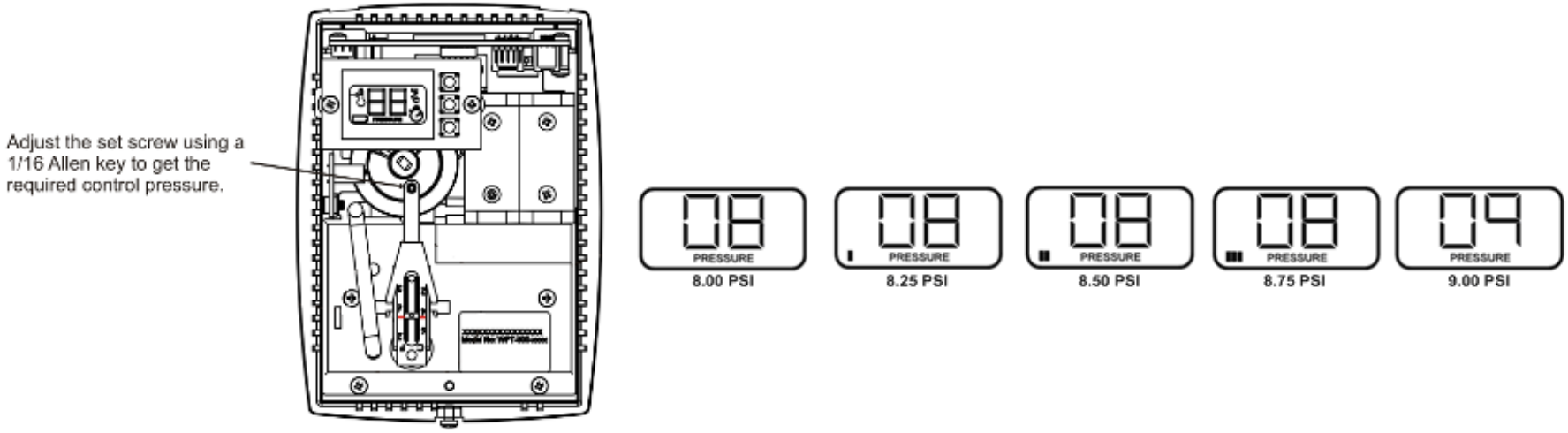
1. This can take 5 to 10 minutes after attachment to the wall. The bi-metallic spring is very sensitive to body heat. Keep hands and breathe away from WPT-DB to minimize calibration error.
2. The black throttling range adjuster has been factory set to the location marked on the lever as shown in Figure 14. The factory setting provides a Throttling Range (TR) of 4°F. This TR adjuster MUST NOT BE MOVED in order to ensure proper operation and accuracy of the WPT-DB.
3. Single pipe WPT-DBs might take a longer time to respond during calibration. Please allow sufficient time to calibrate the WPT-DB accurately.

Calibrating the WPT – Step 2



- To enter Calibration Mode, perform the following:
  - Press the ▼ button and OVR button together for two seconds, then release. The display will show ‘dt’.
  - Press OVR four times. The LCD displays the branch pressure in PSI along with PRESSURE indicator. The display shows “--" if the motor is in motion when trying to access branch pressure.
  - Press all three buttons simultaneously to enter Calibration Mode. The “C” icon will flash rapidly while in this mode.

Calibrating the WPT – Step 3



- Use a 1/16” hex Allen wrench and very carefully turn the calibration set screw on the thermostat lever, shown in the figure above, until the branch pressure is equal to the desired control point. Use extreme caution not to allow the lever to rotate sideways while adjusting the setscrew. Damage to the bi-metallic spring can result if the end of the lever is allowed to move left or right by more than 1/16”.

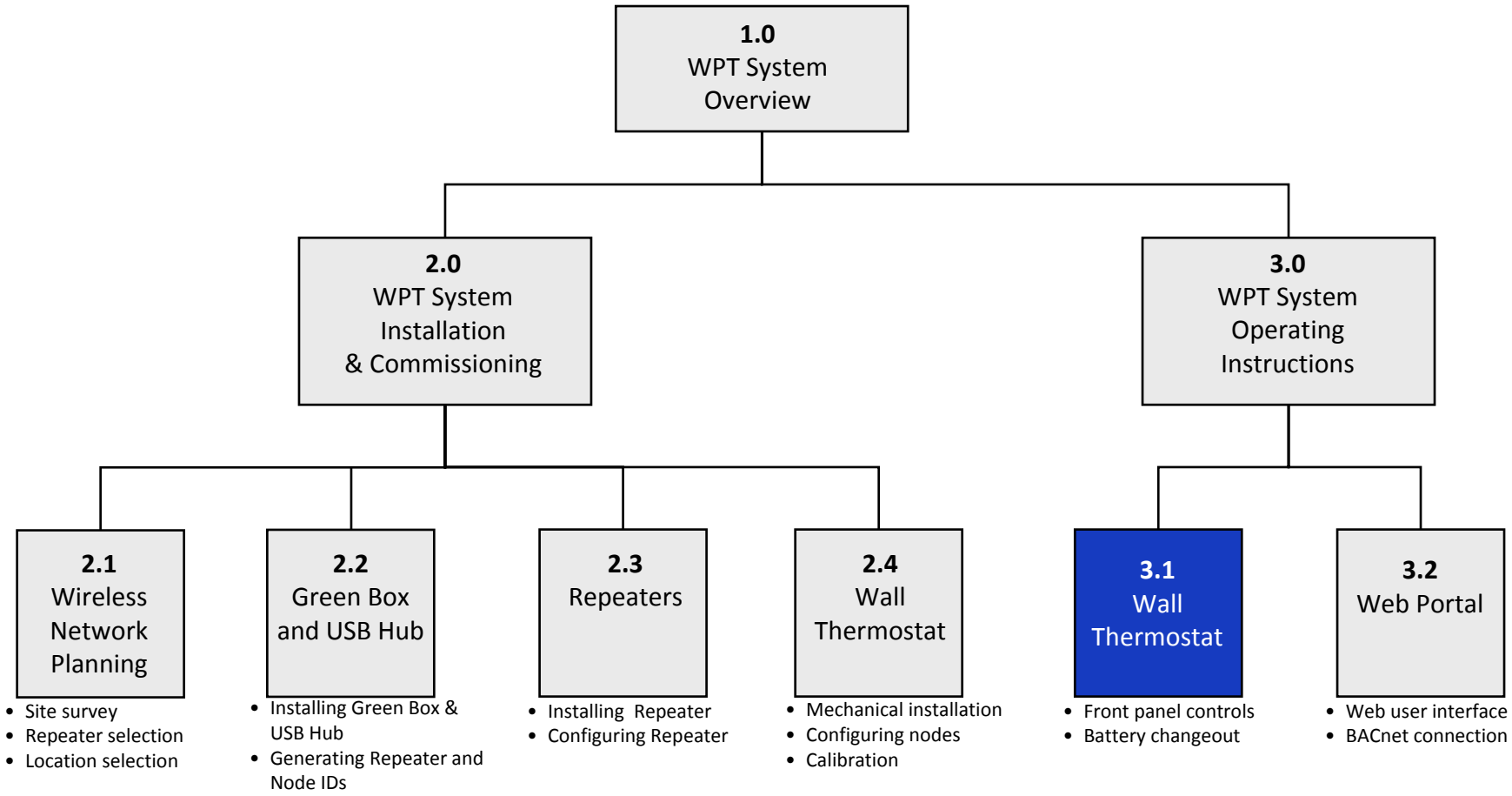
- Each battery segment on the LCD represents 0.25 PSI resolution, as shown in Figure 13. Pay special attention to this extra resolution while turning the set screw. It is critical this value precisely matches the control point for seamless operation.

- When the desired control pressure is achieved, press the OVR button to exit and save the value.
  - A confirmation screen will appear and flash the stored control pressure for 3 seconds. Repeat the calibration procedure if this value does not match the desired control pressure.

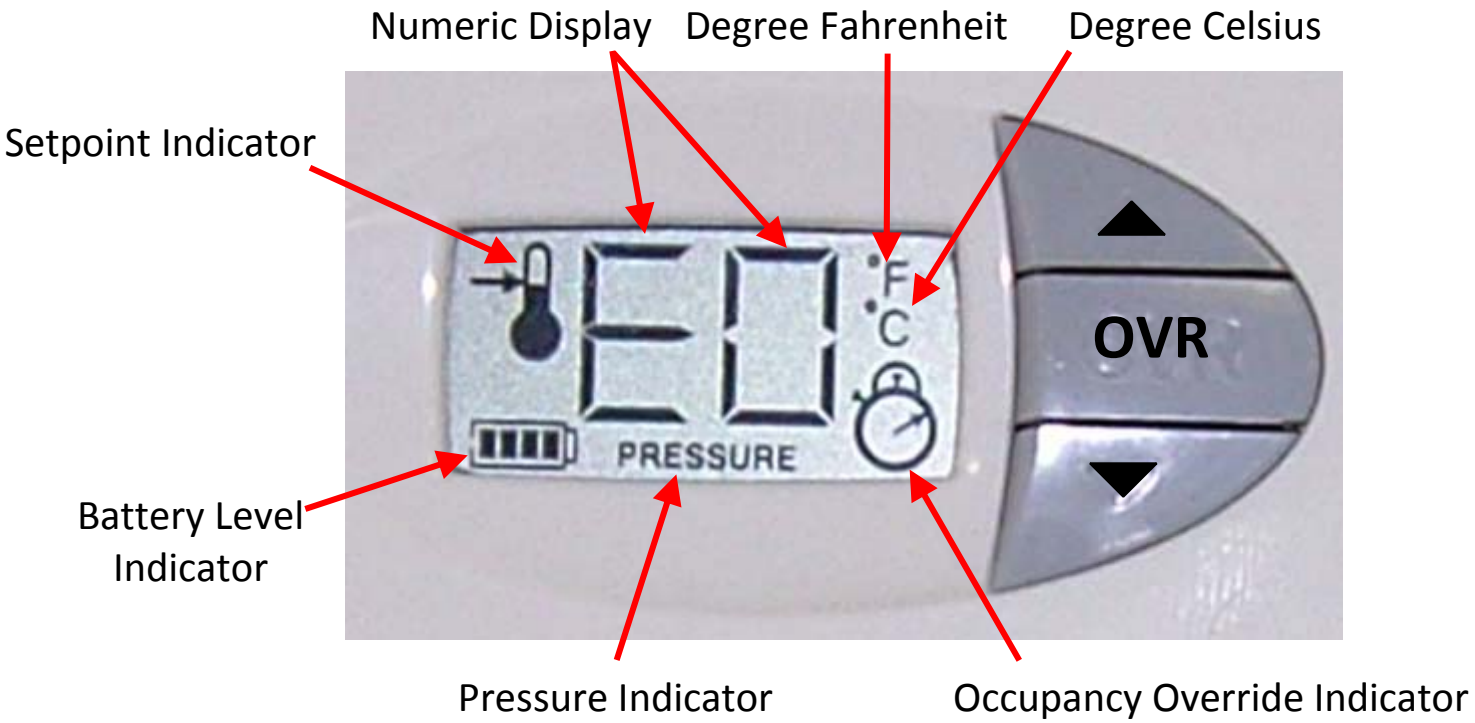
- Replace the WPT-DB front cover.

NOTE: The WPT-DB will automatically exit Calibration Mode if OVR is not pressed after 3 minutes. The control pressure will NOT be saved and the WPT-DB will return to the home screen.

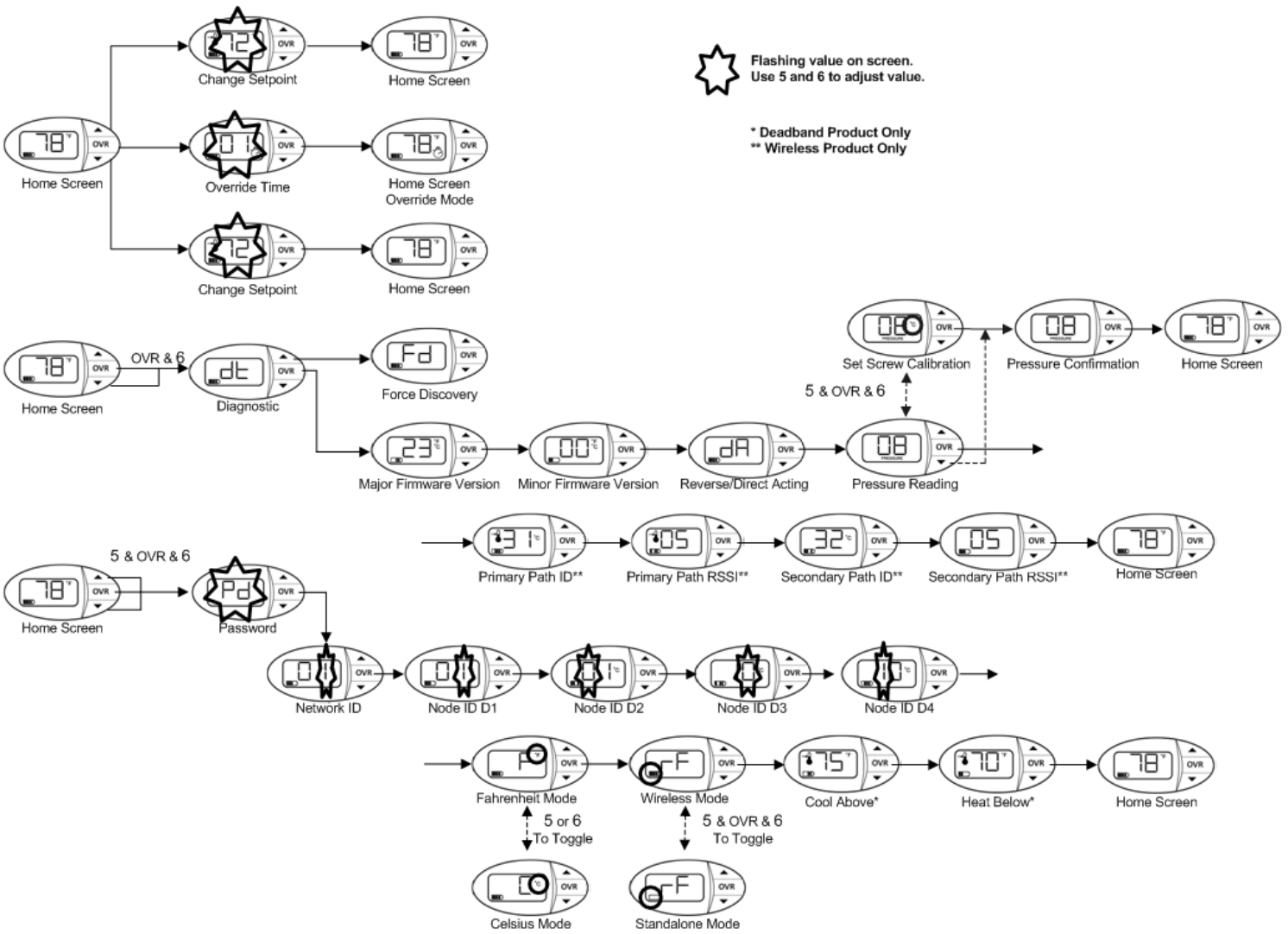
WPT Training Modules



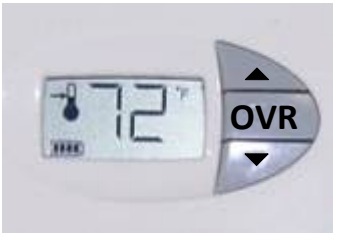
WPT LCD Display



WPT Menu Structure



WPT Operation



- Change Setpoint (for standard WPTs)
  - Press the ▲ or ▼ button once to view the current setpoint.
  - Press the ▲ or ▼ button to change the setpoint value.
  - Press the **OVR** button to accept the setpoint value and to show the current temperature.

    NOTE: The WPT accepts the new set point value and the LCD display reverts to the current temperature if there is no action after 1 minute.

- Change Deadband (for Deadband WPTs)
  - Press the ▲ or ▼ button once to view the current cool above and heat below temperature (they will each flash once).
  - Press the ▲ or ▼ button to move the range up or down. Note that the span cannot be changed from here.
  - Once the desired value is reached, press the OVR button to accept the change. Leaving the display on the desired value for 5 seconds will also result in a deadband change.

Turn On/Off Occupancy Override

- To change the occupancy state from “Unoccupied” to “Override”
  - Press the OVR button to activate the occupancy override. The LCD display flashes the override duration in hours.
  - Press the ▲ or ▼ button to change the override duration to desired value.
  - Once the desired value is reached, press the OVR button to set the duration and enter Occupancy Override. Leaving the display on the desired duration value for 5 seconds will also begin the override.
  - During Occupancy Override, the setpoint will revert to the last “Occupied” value as commanded by the server.

NOTE: This feature only works if the WPT is in “Unoccupied” mode as commanded by the scheduler.

Lock/Unlock WPT LCD Keypad

- Locking the LCD Keypad prevents user from changing the setpoint and other configuration information of WPT

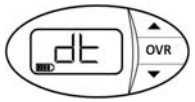
- Locking the LCD Keypad
  - Press and hold the ▲ and ▼ buttons together for 2 seconds and release.
  - The keypad is locked and the LCD displays “LC” for 2 seconds.
  - When the keypad is locked, the user won’t be able to use the buttons on the stat to change the setpoint or enter Occupancy Override.
  - When the buttons are locked and if the user tries pressing any buttons, “LC” appears to indicate that buttons are locked.

- Unlocking the LCD Keypad
  - Press and hold the ▲ and ▼ buttons together for 2 seconds and release.
  - The keypad is unlocked and the LCD displays “UL” for 2 seconds.

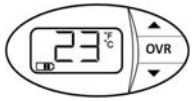
NOTE: The LCD buttons can also be locked/unlocked from the WPT Green Box.

Diagnostic Info

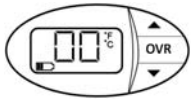
- To view diagnostic info press and hold ▼ and **OVR** buttons simultaneously for 2 seconds before releasing.



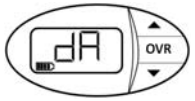
- The LCD displays '**dt**' to indicate the diagnostic mode.



- Press **OVR** once to view the major firmware version.



- Press **OVR** a second time to view the minor firmware version.



- Press **OVR** for a third time to view the control polarity (direct/reverse).

This table shows the value displayed in the control polarity window depending on the type of WPT used.

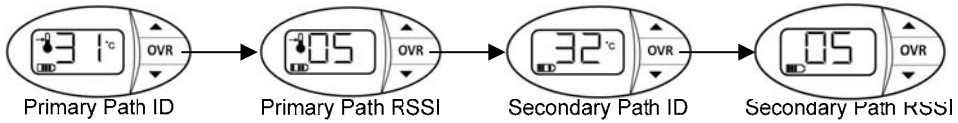
		RA	DA
Demo Node (Demonstration Only)		dr	dd
Normal	Conventional	rA	dA
	Deadband	r1	d1

- Press **OVR** for a fourth time to view the current branch pressure in PSI
  - Press the ▼ button. The LCD will flash the stored control pressure for 3 seconds and return to the home screen. The battery segments on the LCD represent 0.25 PSI resolution.

NOTES

1. The WPT will exit diagnostic mode automatically if there is no action for 1 minute.
2. The display shows "--" if the motor is in motion when trying to access branch pressure.

Checking Signal Strength



- Each WPT-DB attempts to find a primary and secondary wireless path back to the HUB. The paths and associated signal strengths (1-5) from the WPT-DB are displayed in the “dt” menu.
- Press and hold the ▼ button and OVR button together for two seconds before releasing. The display will show ‘dt’.
- Press the OVR button 5 times to see the primary path. °C icon is displayed, indicating that the ID is being displayed (either a repeater ID or the HUB ID).
- Press the OVR button again to see the wireless signal strength from the WPT-DB to the primary path.
  - Scale of 5-3 indicates acceptable wireless coverage.
  - Scale of 2-1 indicates weak wireless coverage.
- Press the OVR button again to see the secondary path. °C icon is displayed, indicating that the ID is being displayed (either a repeater ID or the HUB ID).
- Press the OVR button again to see the wireless signal strength from the WPT-DB to the secondary path.

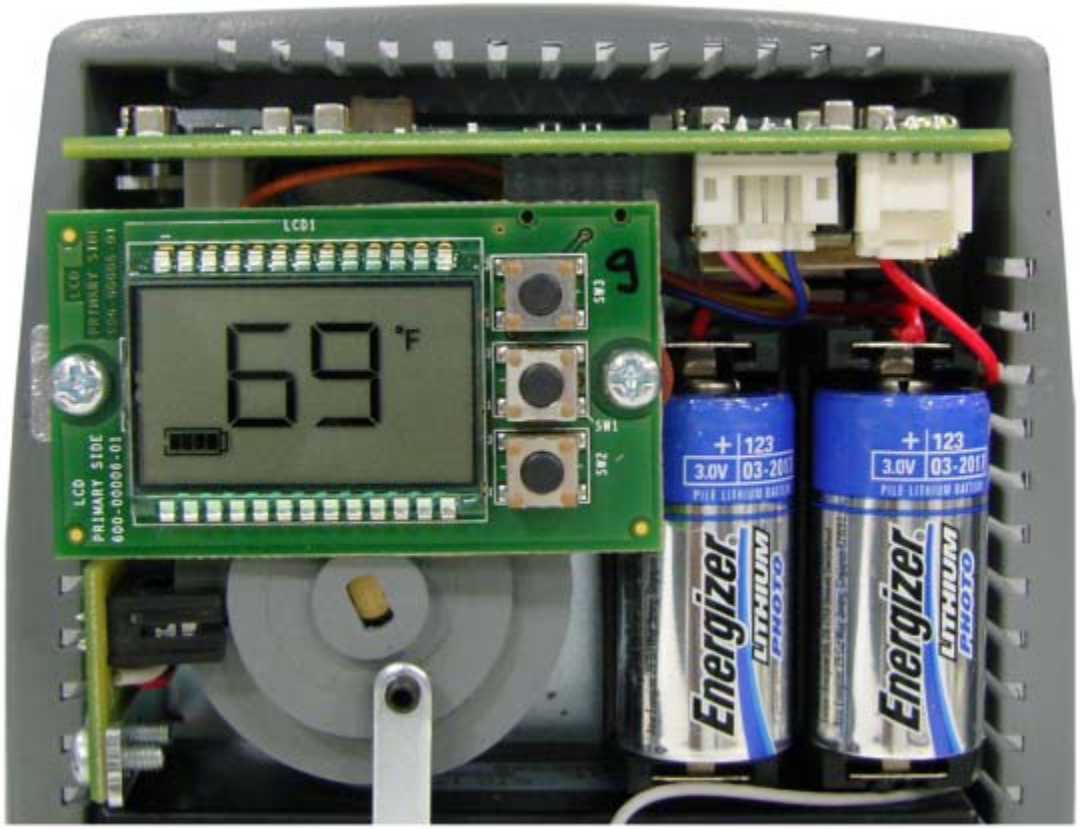
NOTE: This menu is not available in Standalone mode.

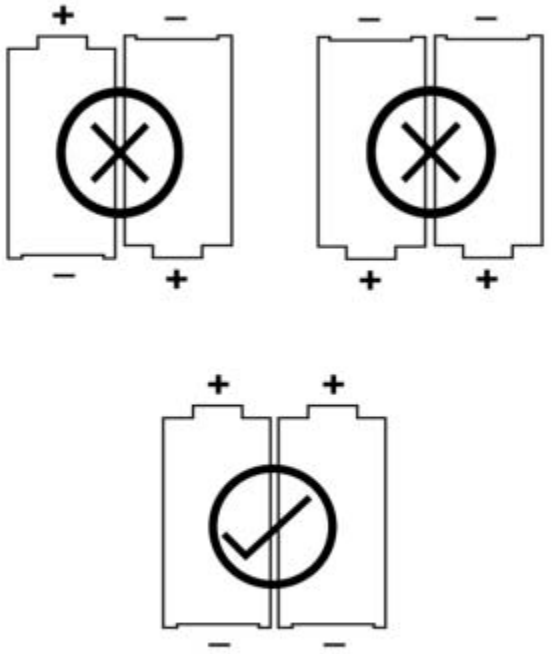
Force Discovery

- Force discovery helps in establishing the Wireless connectivity during installation/troubleshooting.
- To initiate Force Discovery, user must enter into the diagnostic mode by pressing and holding ▼ and **OVR** buttons simultaneously for 2 seconds before releasing.
- The LCD displays '**dt**' to indicate the diagnostic mode.
- Press ▲ once to enter the Force discovery mode; The LCD displays '**Fd**'.
- During the discovery process the LCD displays **"dy"** for few seconds until it returns to normal operating mode.

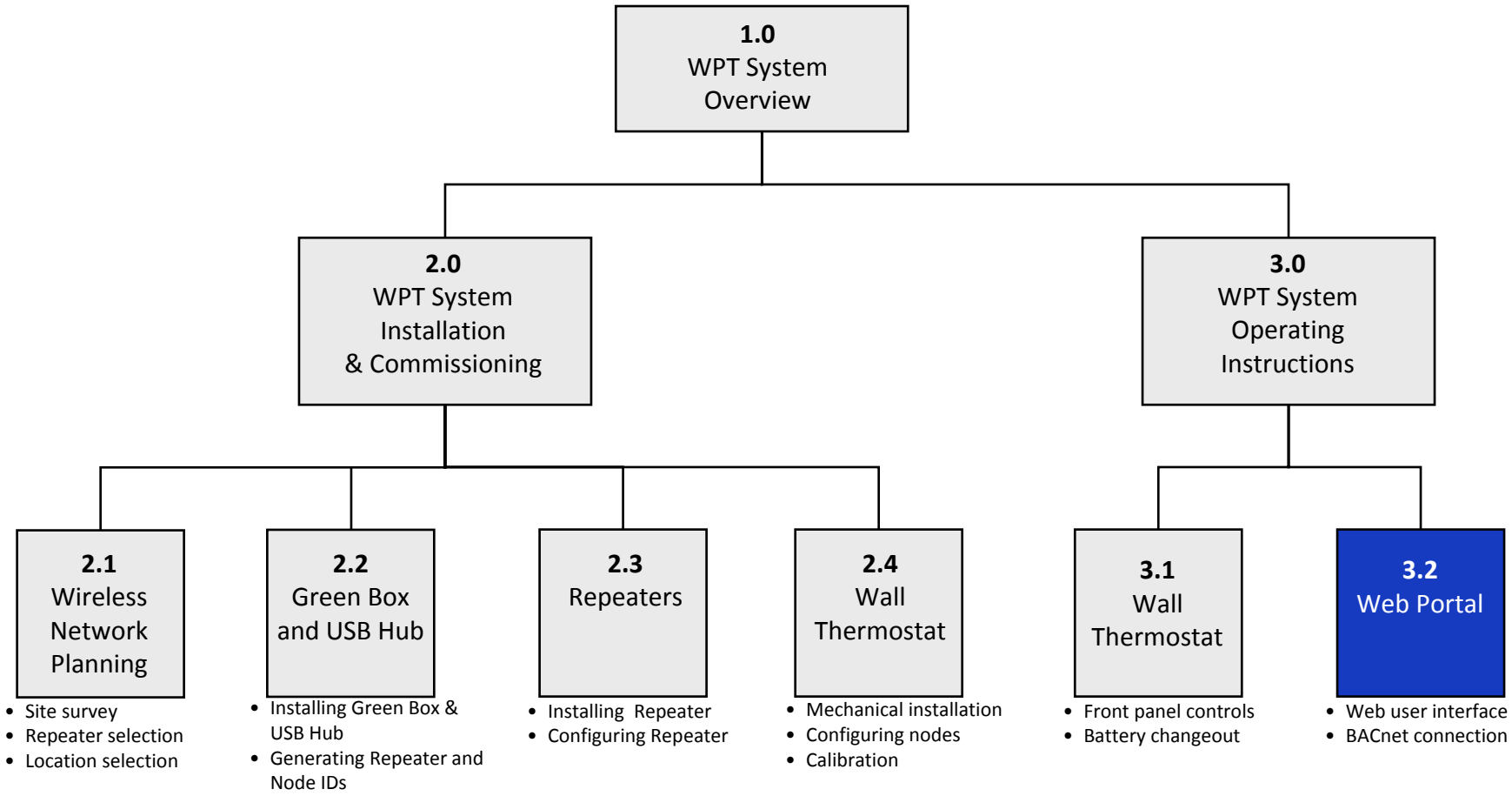
- If the WPT is not able to establish wireless connection with a Repeater/USB Hub, LCD will display '**E0**' to indicate discovery failure.
- When Force Discovery fails, use a WPT Wireless Range Tester to check the signal strength and install an additional Repeater, if required.

Changing Batteries in the WPT

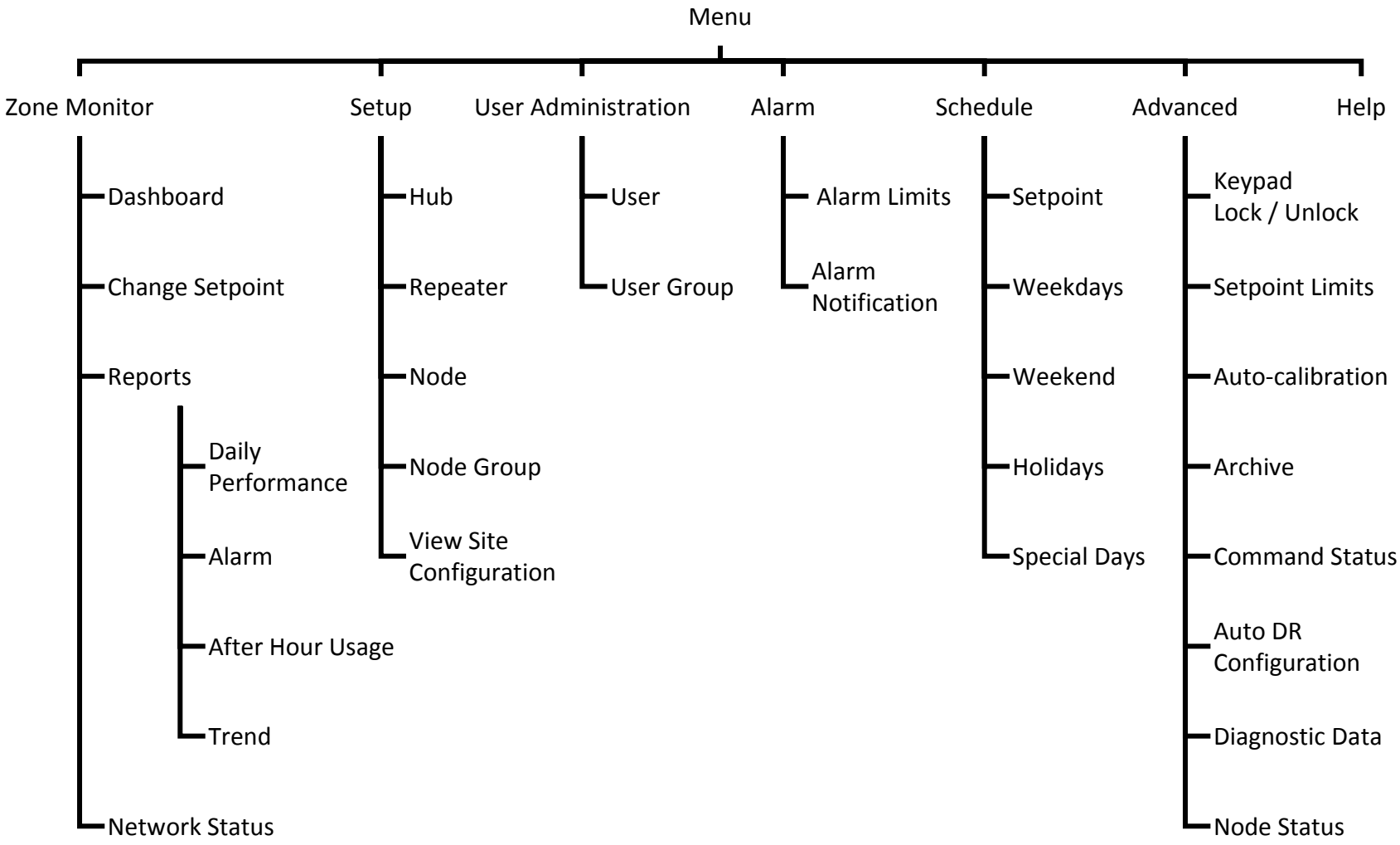




WPT Training Modules

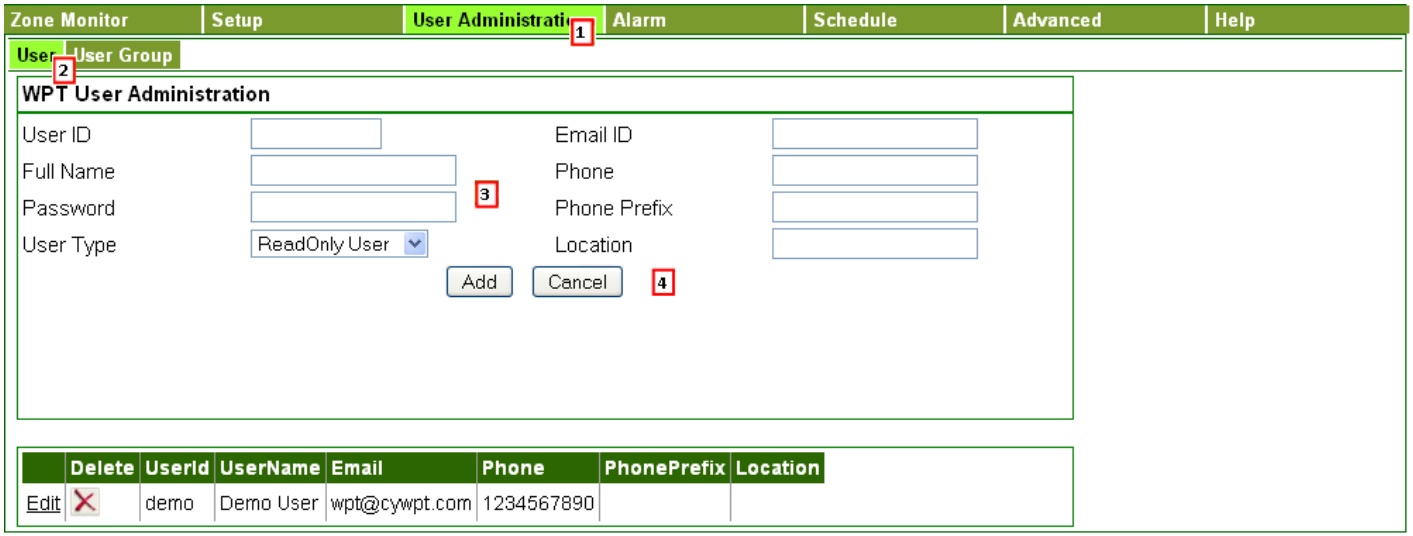


WPT Web Portal Menu Structure

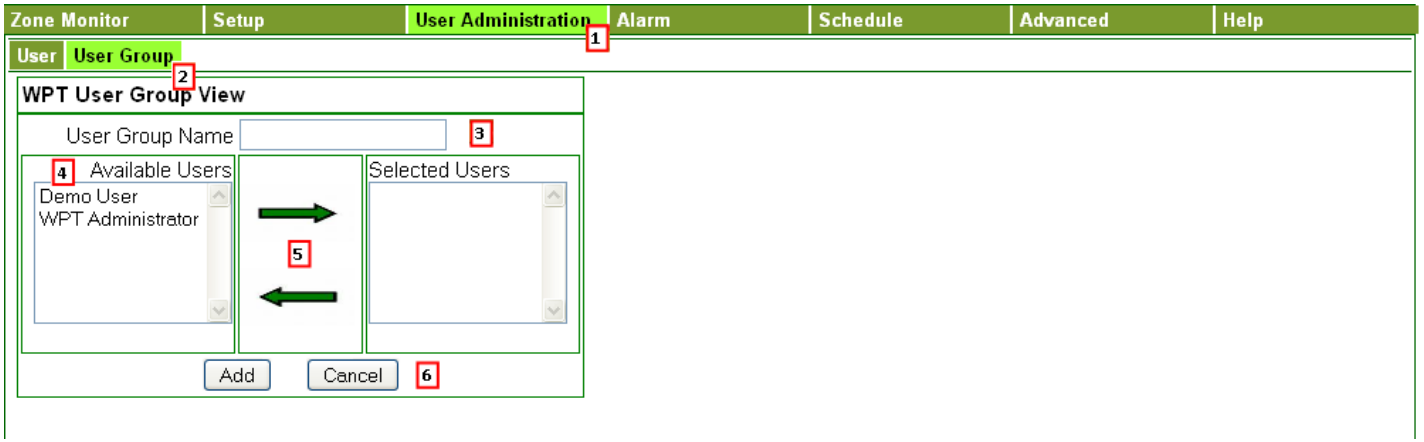


User Administration

Adding Users



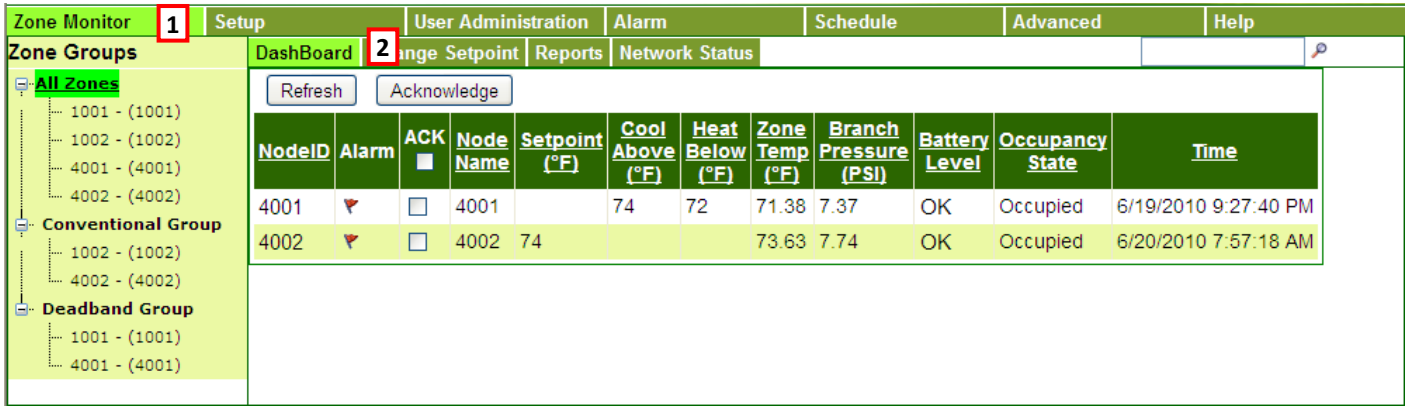
Creating User Groups



robb2

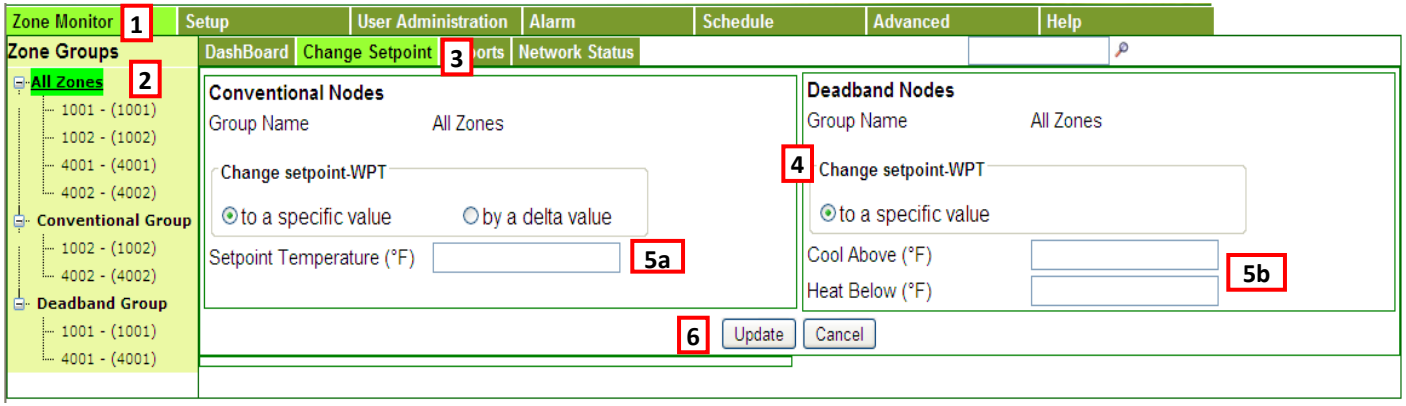
Zone Monitoring

WPT Dashboard



Changing the setpoint or deadband

- The setpoint or deadband can be changed for selected zone or for all zones in a group.
- Setpoint can be changed either by a delta value or to a specific value.

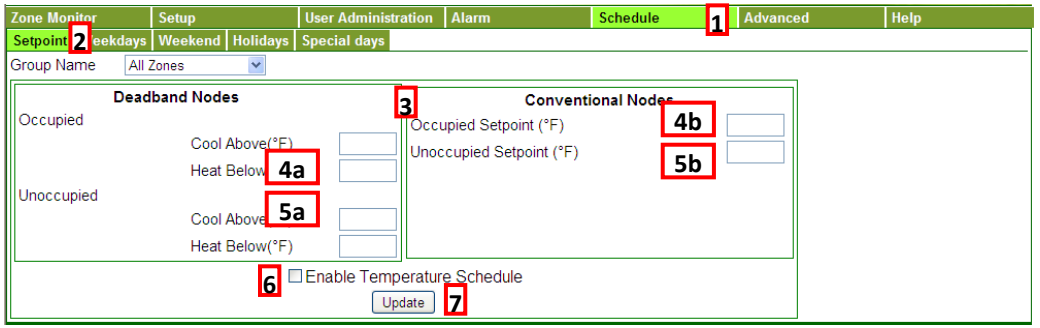


Slide 85

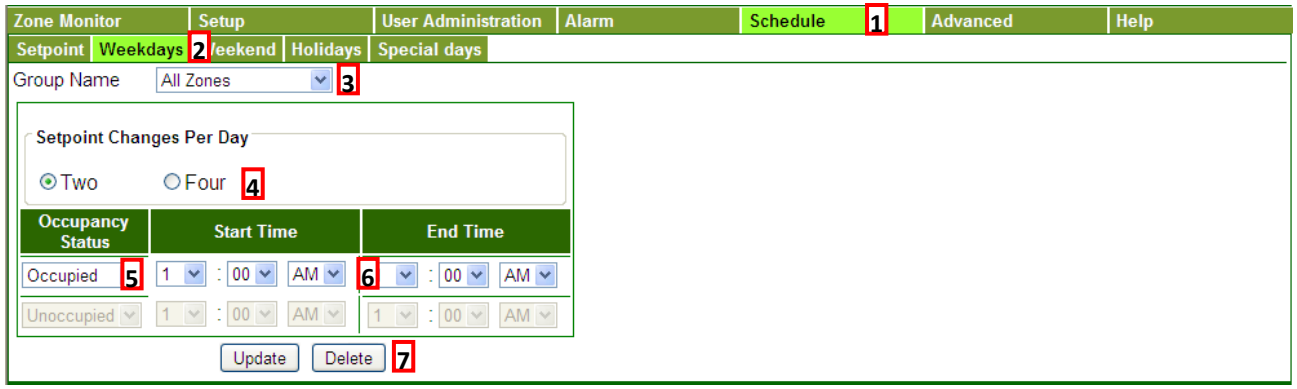
robb2 Need new screen shots with the default Data Joon is planning on adding to the demo server. Joon will have to put a server online to
Robert Brill, 6/9/2010

Configure schedule

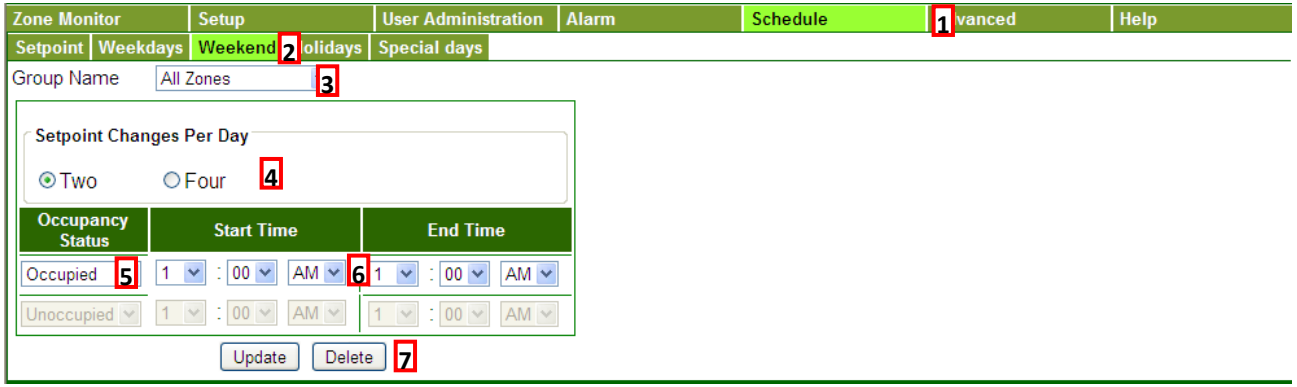
Configure Occupied / Unoccupied Setpoints and/or Deadbands



Configure Weekday Schedule

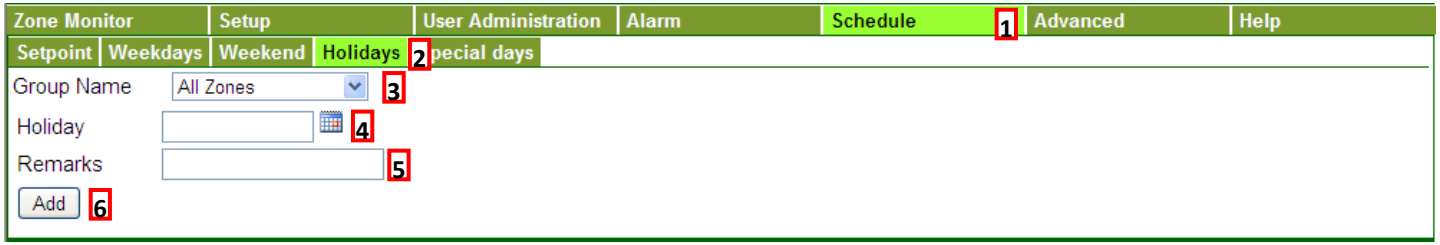


Configure Weekend Schedule

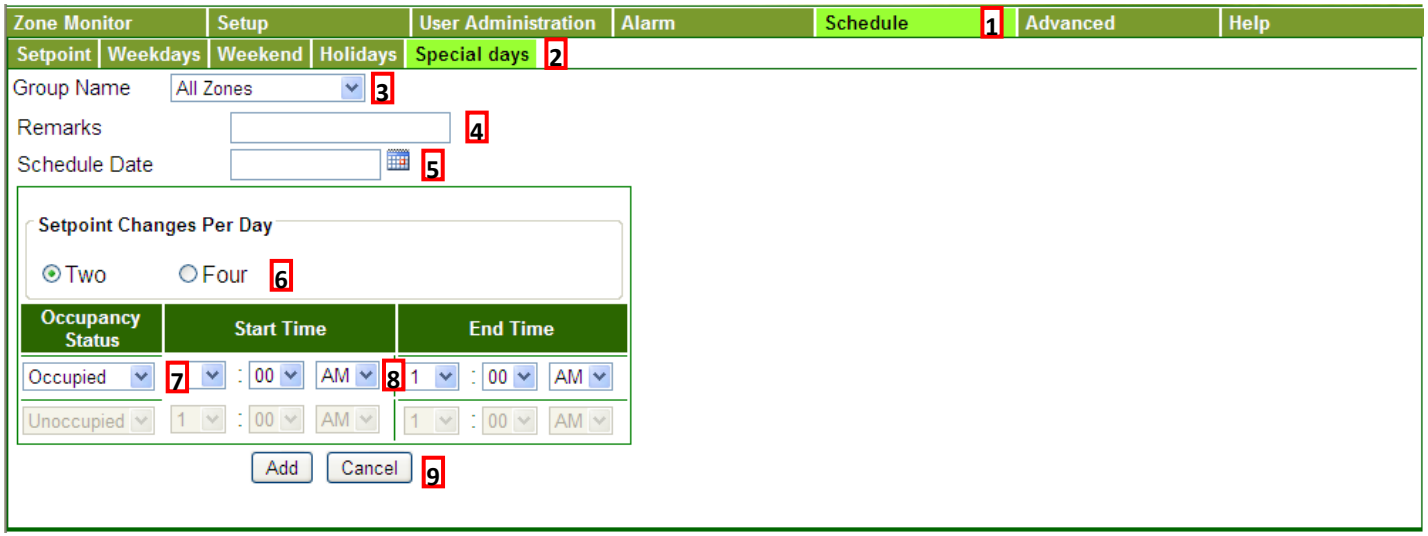


Configure Schedule

Configure Holiday Schedule

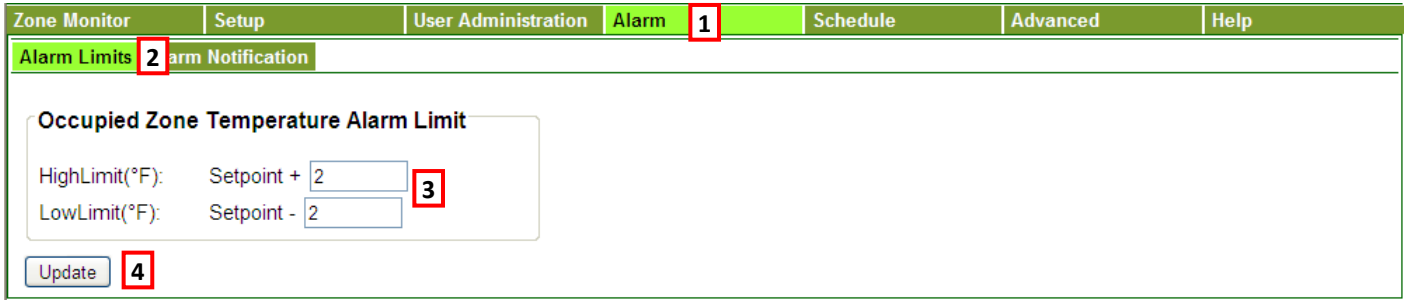


Configure Special Day Schedule

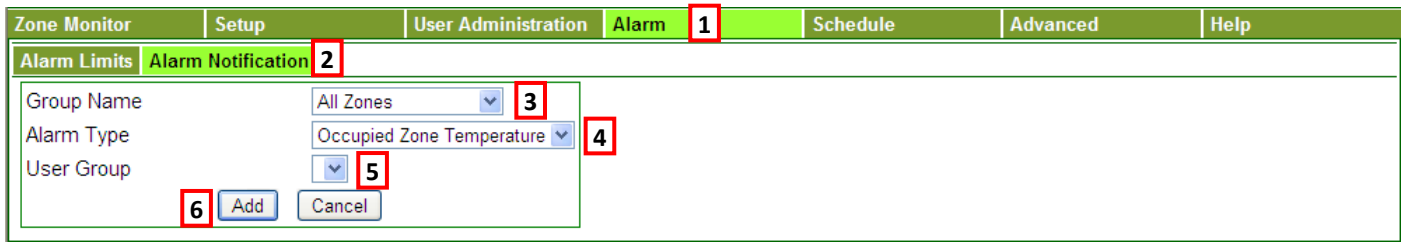


Configure Alarms

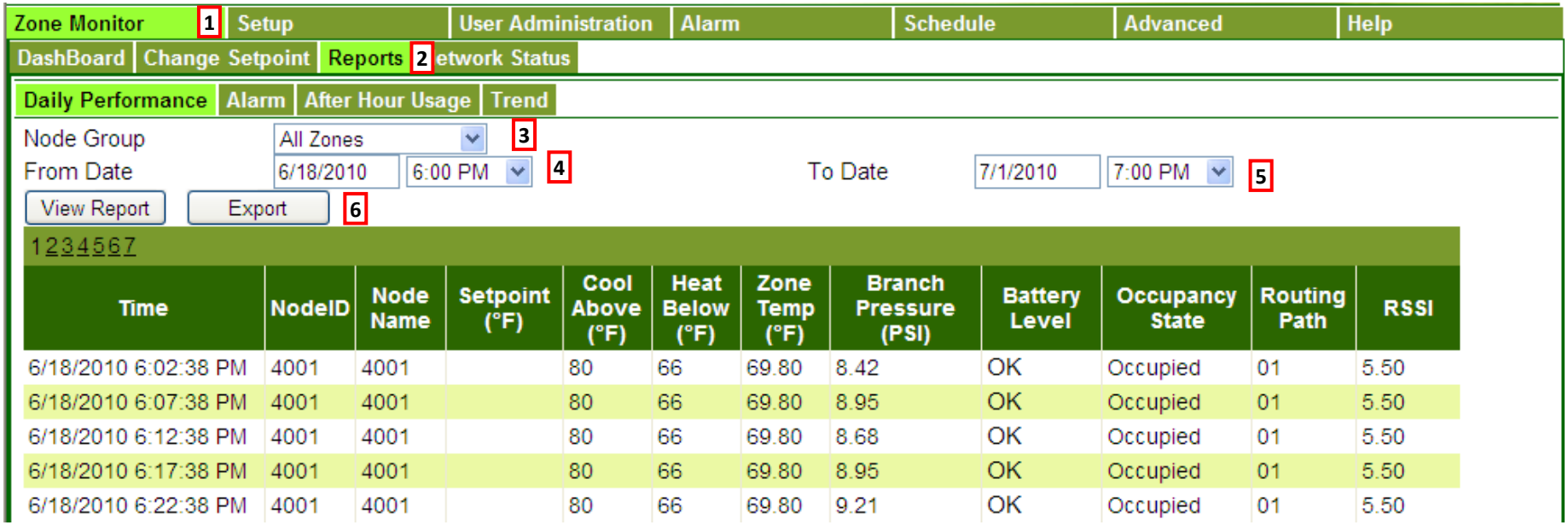
Alarm Limits



Alarm Notifications

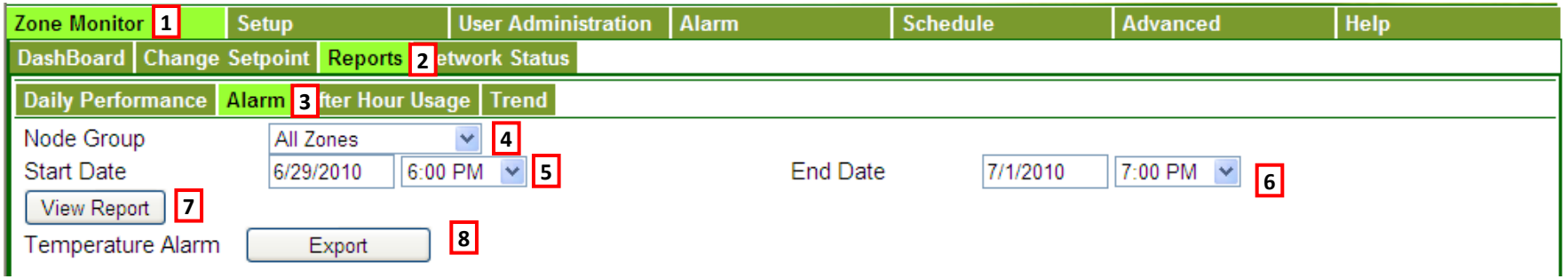


View Daily Performance Report



Time	NodeID	Node Name	Setpoint (°F)	Cool Above (°F)	Heat Below (°F)	Zone Temp (°F)	Branch Pressure (PSI)	Battery Level	Occupancy State	Routing Path	RSSI
6/18/2010 6:02:38 PM	4001	4001		80	66	69.80	8.42	OK	Occupied	01	5.50
6/18/2010 6:07:38 PM	4001	4001		80	66	69.80	8.95	OK	Occupied	01	5.50
6/18/2010 6:12:38 PM	4001	4001		80	66	69.80	8.68	OK	Occupied	01	5.50
6/18/2010 6:17:38 PM	4001	4001		80	66	69.80	8.95	OK	Occupied	01	5.50
6/18/2010 6:22:38 PM	4001	4001		80	66	69.80	9.21	OK	Occupied	01	5.50

View Alarm Report

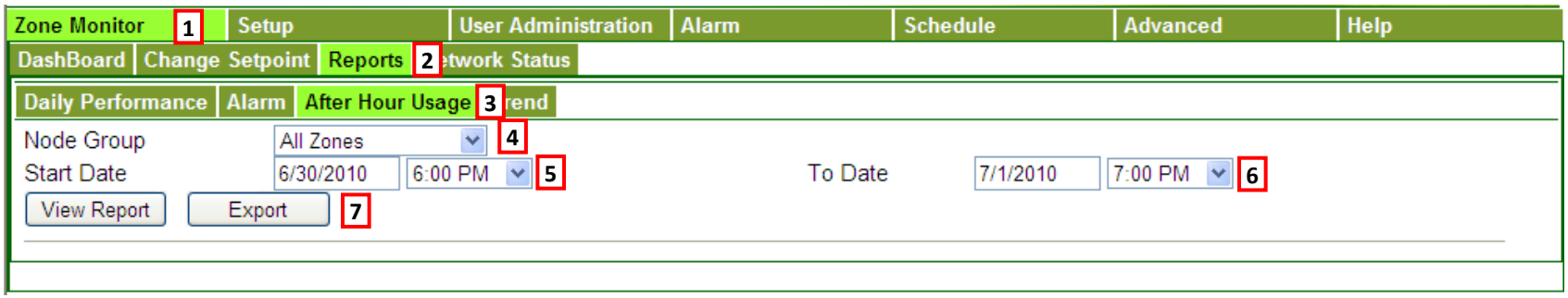


Offline Node Alarm Export 9

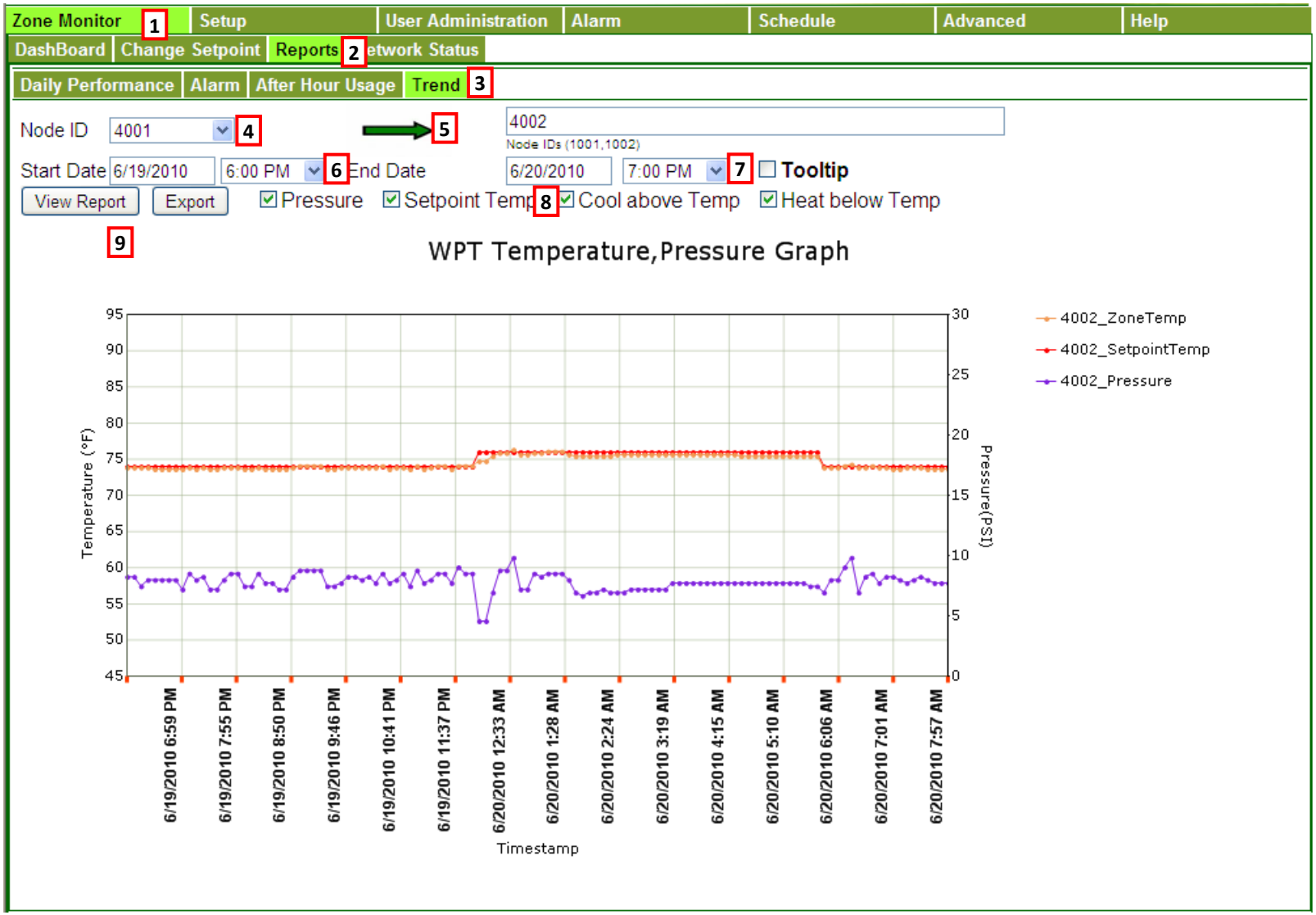
NodeID	NodeName	AlarmValue	AlarmStartTime	ACKTime	AlarmEndTime
1001	1001	ON	6/20/2010 2:31:14 PM		
1002	1002	ON	6/20/2010 2:31:14 PM		
4001	4001	ON	6/20/2010 2:31:14 PM		
4002	4002	ON	6/20/2010 2:31:14 PM		

Battery Alarm Export 10

After Hour Usage Report



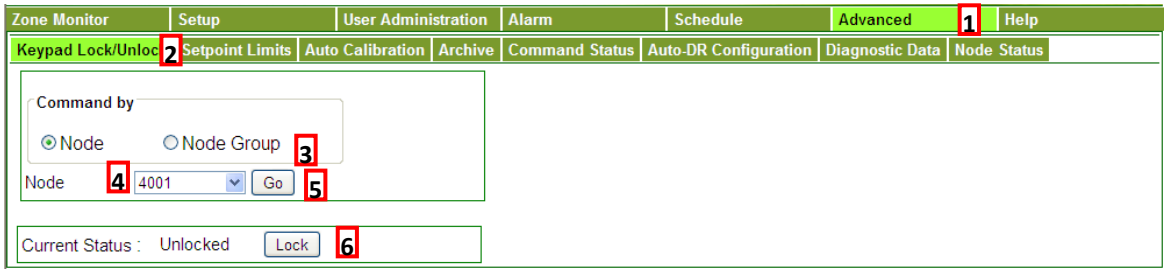
View Trend


Zone Monitor
1
Setup
User Administration
Alarm
Schedule
Advanced
Help
DashBoard
Change Setpoint
Reports
2
etwork Status
Daily Performance
Alarm
After Hour Usage
Trend
3
Node ID
4001
4
5
4002
Node IDs (1001,1002)
Start Date
6/19/2010
6:00 PM
6
End Date
6/20/2010
7:00 PM
7
Tooltip
View Report
Export
Pressure
Setpoint Temp
8
Cool above Temp
Heat below Temp
9
WPT Temperature,Pressure Graph
Temperature (°F)
Pressure(PaSI)
Timestamp
4002_ZoneTemp
4002_SetpointTemp
4002_Pressure
6/19/2010 6:59 PM
6/19/2010 7:55 PM
6/19/2010 8:50 PM
6/19/2010 9:46 PM
6/19/2010 10:41 PM
6/19/2010 11:37 PM
6/20/2010 12:33 AM
6/20/2010 1:28 AM
6/20/2010 2:24 AM
6/20/2010 3:19 AM
6/20/2010 4:15 AM
6/20/2010 5:10 AM
6/20/2010 6:06 AM
6/20/2010 7:01 AM
6/20/2010 7:57 AM

Advanced Features

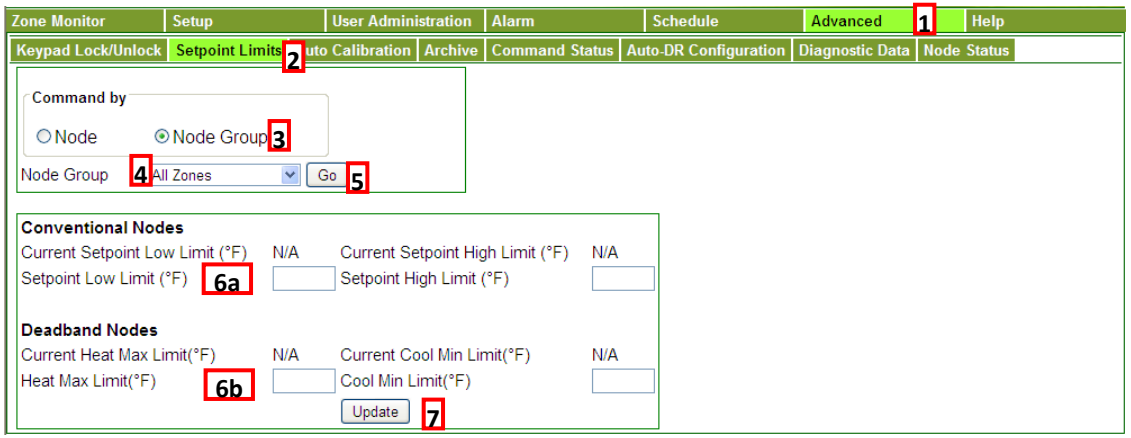
WPT LCD Keypad Lock/Unlock

- To lock/unlock the buttons on the stat so that users don't accidently change the settings



Configure Setpoint Limits

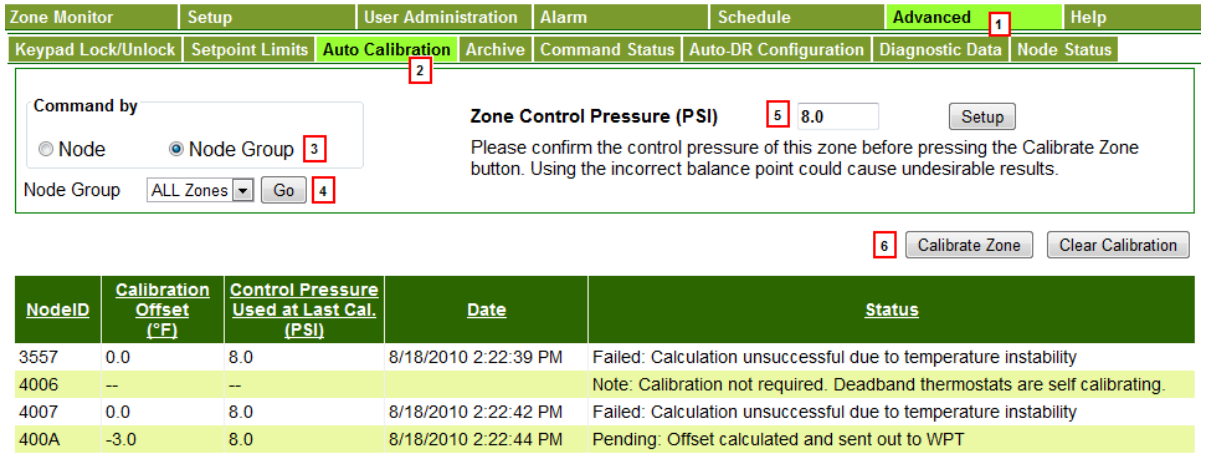
- To set the limits within which the users can change the setpoint values



Advanced Features (cont'd)

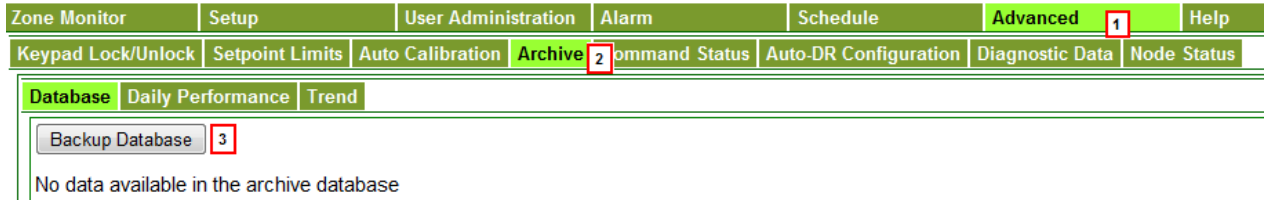
Auto Calibration

- To initiate auto calibration based on the historical data and the desired control pressure



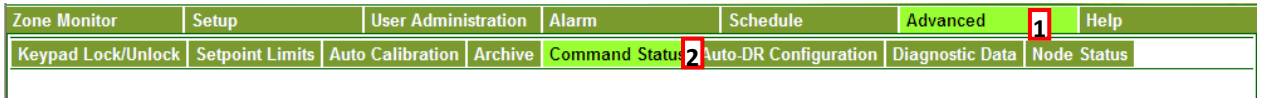
Backup Database

- To protect against data loss



Command Status

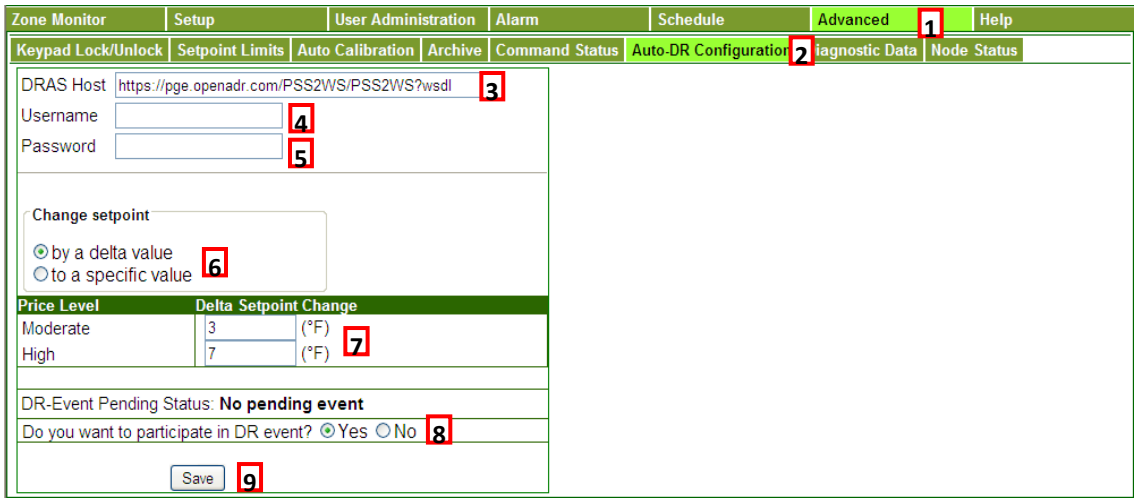
- To view advanced configuration commands for given to nodes



Advanced Features (cont'd)

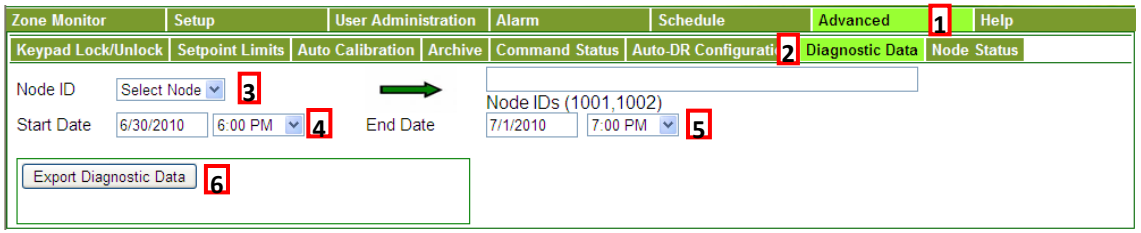
Auto-DR Configuration

- To configure the DRAS Host address, username and password
- Options to change the setpoint either by delta or to a fixed value



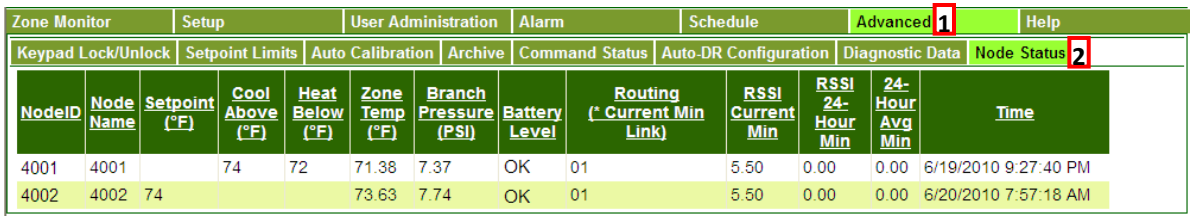
Diagnostic Data File

- Export diagnostic data to Excel



Node Status

- View WPT wireless diagnostic data



Accessing WPT using BACnet/IP

- Each WPT is represented as a BACnet Device.

- Conventional WPT devices support the following I/O Objects
  - 3 x Analog Inputs (Ambient Temp, Branch Pressure and Battery Level)
  - 2 x Analog Outputs (Setpoint, Unoccupied Setpoint)
  - 1 x Binary Input (Occupancy Override)
  - 1 x Binary Output (Occupancy State)

- Deadband WPT devices support the following I/O Objects
  - 3 x Analog Input Object (Ambient Temp, Branch Pressure and Battery Level)
  - 4 x Analog Outputs (Setpoint HeatBelow/CoolAbove, Unoccupied Setpoint HeatBelow/CoolAbove)
  - 1 x Binary Input (Occupancy Override)
  - 1 x Binary Output (Occupancy State)

- WPT BACnet Gateway is BBMD enabled.

Reference Documents

Topics	Reference Document	Document Number
Features and benefits of the WPT	Wireless Pneumatic Thermostat Product Brief	PBWPT
Installing and configuring Wall Powered Repeaters (RWAL)	RWAL Installation Manual	910-00002-01
Installing and configuring the USB Hub (HUSB)	HUSB Installation Manual	910-00003-01
Installing and configuring the WPT	WPT installation Manual	910-00005-01
Estimating the number of Repeaters and selecting the optimum locations for Repeaters and USB Hub	WPT Wireless Network Planning Guide	910-00006-01
Installing and configuring the WPT Green Box	WPT Green Box Installation Manual	910-00007-01
BACnet Objects and Properties supported by the WPT Green Box	WPT BACnet PICS	910-00008-01
Using the wireless range testers	WPT Wireless Range Tester User Manual	910-00009-01
BACnet configuration	WPT BACnet Gateway Users Guide	910-00012-01

Thank you

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