1. Overview

This technical note describes the Wireless Pneumatic Thermostat (WPT) behavior after the controller has lost position of the motor and provides detailed steps to recover from this problem.

1.1. Tools Required for Installation

- 1/16" hex Allen wrench
- 2mm hex Allen wrench (Hardware revision 25 or older)

2. Detecting Loss of Motor Position

The WPT will not be able to properly regulate temperature if the WPT looses the motor position. When the WPT looses track of the motor position there are a few symptoms that can help diagnose this problem.

- The WPT cannot regulate to the setpoint temperature and may appear as being out of calibration.
- A direct acting thermostat may appear to be reverse acting or a reverse acting thermostat may appear to be direct acting. In some cases the thermostat may appear to switch between direct and reverse acting.
- After the cam wheel stops moving, the control lever arm is resting on the backside of the cam wheel. The cam wheel contains a front side and a backside. The front side is the larger section of the cam wheel with a more gradual slope. The backside is the shorter section with the steeper slope. See Figure 1 for details. The WPT may have to have its setpoint changed to one of the extremes (55F / 85F) to exhibit this behavior.

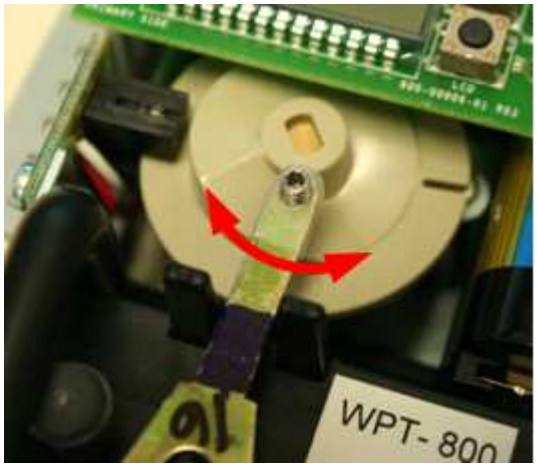

Figure 1: A WPT control lever arm resting on the backside of the cam wheel. The backside of the cam wheel is located inside the red arc. The motor position of this WPT has been lost and requires corrective action.

3. Recovering from Loss of Motor Position

In the case that a WPT has lost the motor position there are three recovery options.

1. If the firmware version is v25.00 or higher, calibrate the WPT using the advanced calibration menu. See Section 4 on calibrating the WPT using the advanced calibration menu.

NOTE: The firmware version and hardware version numbers may be different. To check the firmware version number, press the ▼ button and OVR button together for two seconds. The display will show 'dt'. Then press OVR one time. The number displayed will be the firmware version number.

2. If calibrating the WPT does not fix the problem or the firmware version is lower than v25.00, then the WPT needs to be reset. See Section 5 on resetting the WPT.
3. If both resetting and calibrating the WPT does not fix the problem, then the WPT needs to be replaced.

4. Calibrating the WPT

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

NOTE: Keep hands and breathe away from WPT to minimize calibration error.

NOTE: The black throttling range adjuster has been factory set to the location marked on the lever as shown in Figure 4. The factory setting provides a Throttling Range (TR) of 4℉. This TR adjuster MUST NOT BE MOVED in order to ensure proper operation and accuracy of the WPT.

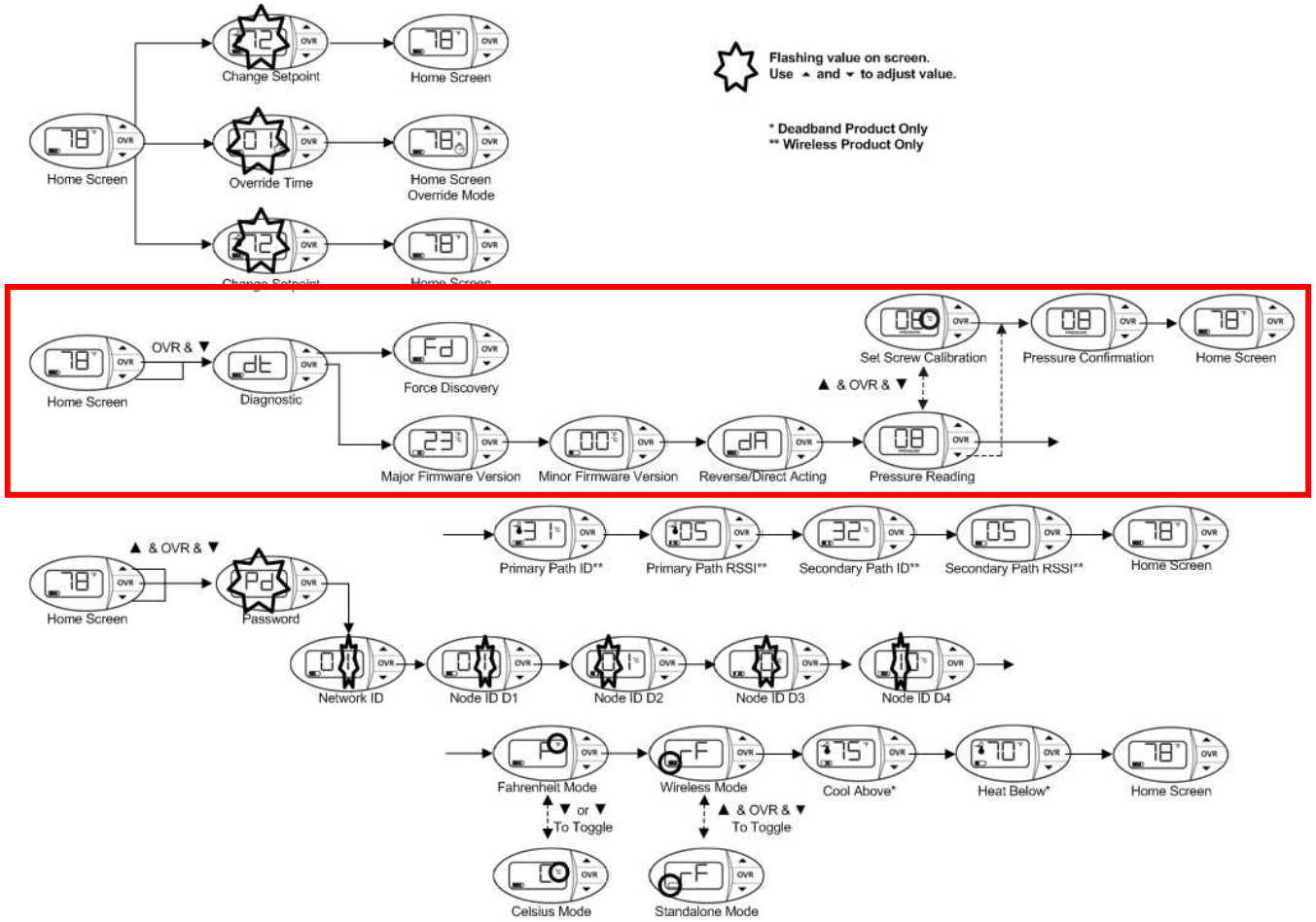

Figure 2: WPT Menu Structure (FW v25.00 and higher)

4.1. WPT firmware v25.00 or higher

To enter Calibration Mode, perform the following:

1. Press the ▼ button and OVR button together for two seconds. The display will show 'dt'.
2. 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.
3. Press all buttons simultaneously to enter Calibration Mode. The "C" icon will flash rapidly while in this mode.
4. Use a 1/16" hex Allen wrench and very carefully turn the calibration set screw on the thermostat lever, shown in Figure 4, 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 moves left or right by more than 1/16".

NOTE: Ensure that there is at least one thread of calibration screw adjustment above the top surface of the Friction Clip, or not less than one thread below the bottom surface of the Control Lever as depicted in Figure 5.

NOTE: Each battery segment on the LCD represents 0.25 PSI resolution, as shown in Figure 3. 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.

Figure 3. Pressure Display Resolution

NOTE: Single pipe WPTs might take a longer time to respond during calibration. Please allow sufficient time to calibrate the WPT accurately.

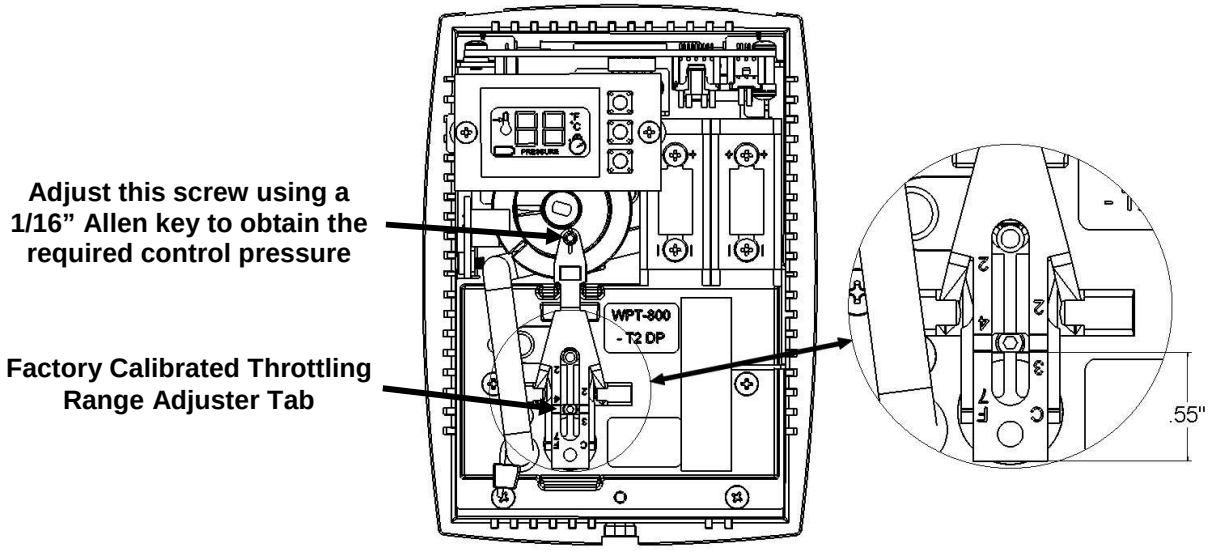

Figure 4. WPT Calibration

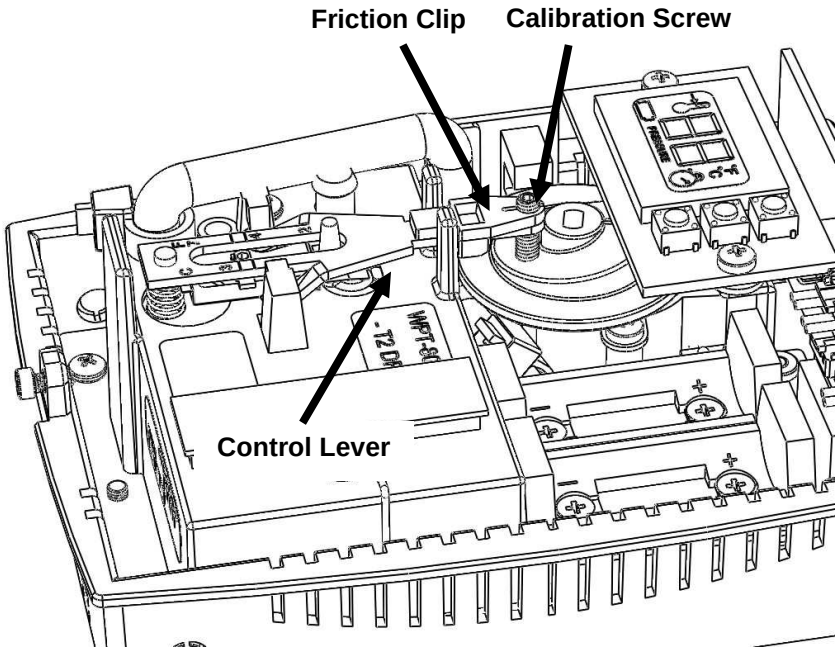

Figure 5: Friction Clip and Control Lever

5. When the desired control pressure is achieved, press the OVR button to exit and save the value.
6. 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.

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

7. Replace the WPT front cover.

4.2. WPT firmware v22.00 & v23.00

To enter Calibration Mode, perform the following:

1. Adjust the setpoint manually using the ▲ or ▼ key to match the ambient temperature value displayed on the LCD.
2. Press the ▼ button and OVR button together for two seconds. The display will show 'dt'.
3. Press OVR four times. The LCD displays the branch pressure in PSI along with PRESSURE indicator. Refer to Figure 6.
4. Use a hex Allen wrench and very carefully turn the calibration set screw on the thermostat lever, shown in Figure 4, 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 moves left or right by more than 1/16".
5. When finished, press the OVR button once again, or just wait for the mode to time-out.

NOTE: Single pipe WPTs might take a longer time to respond during calibration. Please allow sufficient time to calibrate the WPT accurately.

6. Replace the WPT front cover.

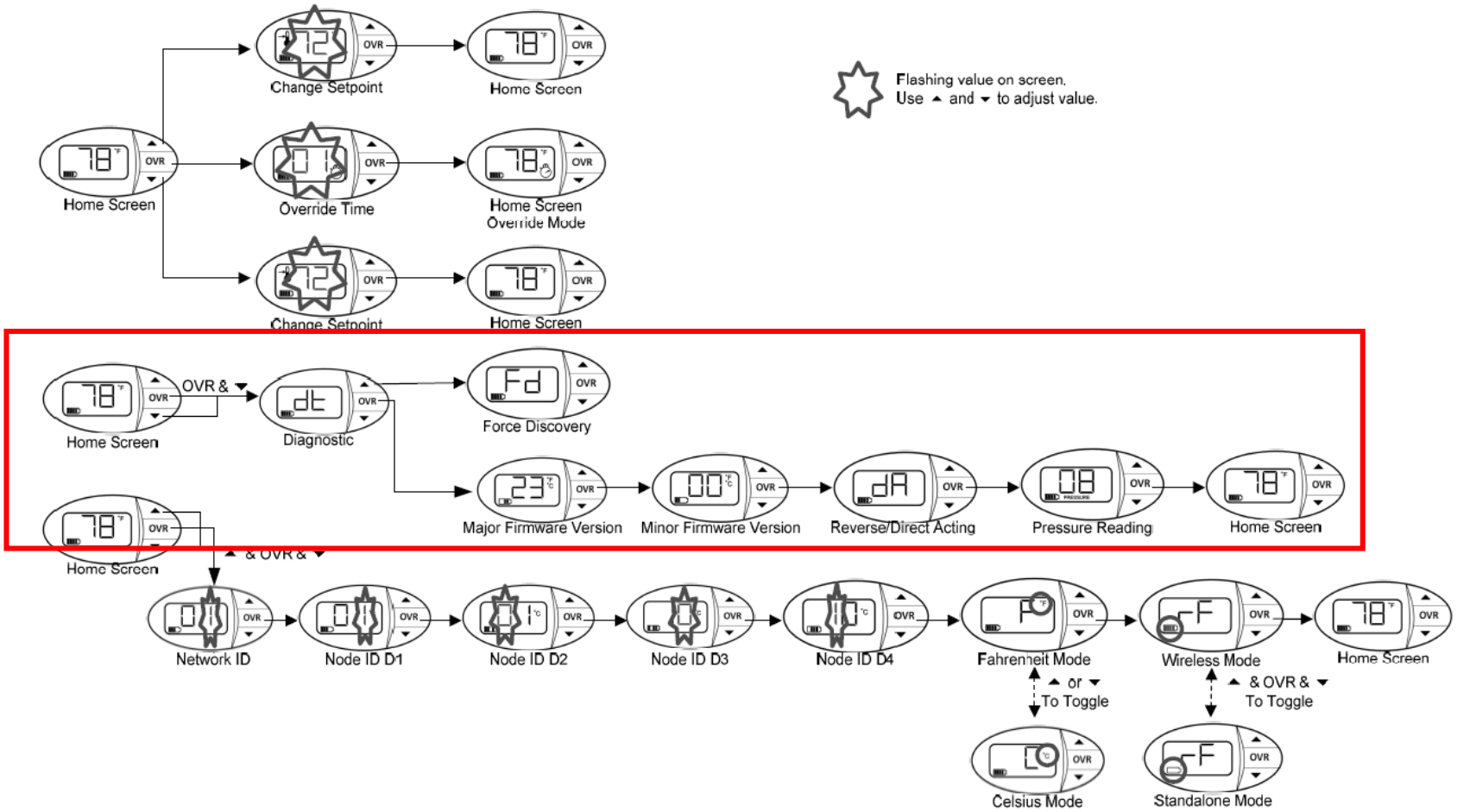

Figure 6: WPT Menu Structure (FW v22.00 & V23.00)

5. Resetting the WPT

If the WPT fails to operate correctly after calibration or if the firmware version is lower than v25.00, perform the following steps.

1. Remove both batteries from the WPT thermostat.
2. Press all 3 buttons on the WPT for 5 seconds.
3. Let the thermostat sit for 30 minutes to fully discharge all components. This will default many of the operating parameters of the thermostat to factory defaults.
4. Re-install the batteries

After re-installing the batteries, the following tasks must be performed:

1. Press any button to power on the WPT.
2. Perform a Force Discovery. Refer to Figure 2 for the menu structure.
3. Perform a manual calibration. Refer to section 4.1 or 4.2.
4. (Optional) Resend temperature setpoints, setpoint limits and auto calibration values from the WPT Green Box Controller. Refer to the appropriate WPT Green Box manual for instructions.

5.1. Battery Handling Precautions

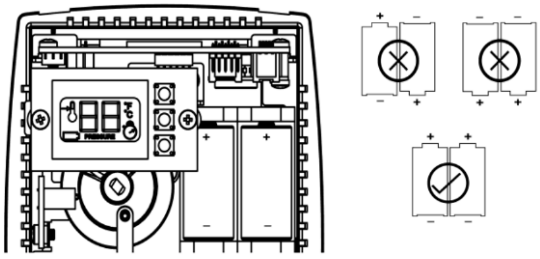

Figure 7: WPT Batteries

Warning!

Only replace battery with Type CR123A, that meet UL-1642, as evidenced by UL component recognition mark (from Panasonic, Energizer or Duracell). Use of any other battery may present a risk of fire or explosion. See Figure 7 for correct polarity.

- Underwriters Laboratories Recognition Mark:
- Caution: The battery used in this device may present a fire or chemical burn hazard if mistreated. Keep away from children and/or other untrained personnel. Do not recharge, disassemble, heat above 100 ºC (212 ºF), or dispose of in fire.
- Dispose of used battery promptly in accordance with local regulations (place in plastic bag and recycle if possible).
- 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 or leave the batteries in direct sunlight or in high-temperature areas.

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