# PCM - PLENUM PRESSURIZATION

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Plenum Pressure Control

Office spaces are one of the more diversely loaded spaces which, in underfloor applications, can share a common pressurized plenum. Diffusers and grilles for underfloor air distribution (UFAD) are selected based on a designed floor static pressure. This demands maintaining floor pressurization for proper comfort and system operation. Pressure nodes that are concealed within the floor diffusers are used to monitor the pressure differential in the plenum and space. Underfloor pressure controllers must be capable of handling very low pressure resolution, on the order of 0.001 in. w.g. or less. Typically, plenum pressure set-points range from as low as 0.05 in. w.g. to 0.08 in. w.g.

Control Methods

Fan Column Adjustment

Plenum pressure can be controlled by the PCM via a 0-10 VDC analog output to the Variable Frequency Drive (VFD) installed on the fan column. The fan column can be controlled to maintain a constant pressure within the plenum, adjusting to compensate for opening and closing of dampers on the installed diffusers and grilles. Alternatively, the plenum pressure setpoint can be altered based on space load to achieve the desired space setpoint.

Plenum Supply Damper Adjustment

If Underfloor Deflection Grilles with Dampers (DGD) are installed, these can also be controlled by the PCM. Daisy chained together, up to twelve DGDs can be controlled via a Price plug-and-play cable to modulate the air being supplied to the underfloor plenum. Similar to modulation of the fan column, supply air can be adjusted using either a constant or variable plenum pressure control sequence.
PCM - PLENUM PRESSURIZATION

PRODUCT OVERVIEW

General Description

PCM - Underfloor Pressure Controller

The Price PCM with BACnet can control up to 12 plenum dampers, controlling the amount of airflow that enters the underfloor plenum. By reading static pressure sensor inputs, the PCM can monitor and regulate the very low static pressure required by typical underfloor plenums.

The PCM can be wired to multiple Price RPN (Relative Pressure Node) sensors or to third-party static pressure sensors. The outputs can operate DGD (Underfloor Deflection Grille) dampers or third-party dampers. The PCM features native BACnet connectivity and is, therefore, able to be networked to a BAS through easy plug-and-play connections.

* This is used for BACKET MS/TP and not an Ethernet connection
Remote Pressure Node

Plenum pressure relative to room pressure is measured using Remote Pressure Nodes (RPN). The RPN fits inside any style mounting ring and under any Price round floor diffuser. This maintains a consistent look with the installed diffusers. The RPN is equipped with an extremely sensitive pressure transducer, providing the measurement of small differential pressures with less than 1% error, which is critical to underfloor applications. This integral pressure transducer is powered via 24 VAC, and outputs a 1-10 VDC signal which is sent to the PCM to regulate plenum pressure.

Features of the PCM

- BACnet network capabilities that allow the PCM to be networked to a BAS.
- Output terminal blocks used to convey power and control signal to as many as 12 remote plenum dampers.
- Up to three input terminal blocks used to accept static pressure sensor ratings.
- ETL certified with transformer, circuit board, terminal blocks, and all necessary hardware for trouble-free installation and startup.
- 96VA Class 2 transformer.
- Available with thermostat input for temperature-dependent pressure regulation (Room Sensor, Dial, LCD, LCD with Motion Sensor, and LCD with CO2 and Humidity Monitoring).
- Constant pressure regulation or variable pressure regulation based on room temperature.
- Plenum temperature monitoring.
Installing the PCM

1. Place the PCM in the underfloor plenum in the center of the controlled zone using a 35 ft. cable.

2. Supply power and ground to terminal per wiring diagram. THIS TASK MUST BE COMPLETED BY A CERTIFIED AND LICENSED ELECTRICIAN.

3. Connect up to three RPN pressure transducers using field wired cable to the analog input terminals on the PCM.

4. If variable pressure sequence (9841) is used, run thermostat wire to thermostat, and plug into “T-Stat” port on the PCM. (For thermostat installation reference the Installation & Mounting Instructions Thermostat Installation section.

5. Connect BACnet network (if used). For more detailed information on networking with PCM reference the Display Navigation Address Menu section.

6. Flip the PCM's power switch to the ON position.
## Input/Output Description

### 24VAC Binary Outputs

<table>
<thead>
<tr>
<th>BO1 – Open</th>
<th>Aux binary output available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BO2 – Plenum Damper</td>
<td>Plenum damper open. Used for floating point actuators.</td>
</tr>
<tr>
<td>BO3 – Plenum Damper</td>
<td>Plenum damper closed. Used for floating point actuators.</td>
</tr>
<tr>
<td>BO4 – Open</td>
<td>Aux binary output available.</td>
</tr>
<tr>
<td>BO5 – Open</td>
<td>Aux binary output available.</td>
</tr>
</tbody>
</table>

### Analog Outputs

<table>
<thead>
<tr>
<th>AO1 – Open</th>
<th>Aux analog output available (0-10VDC).</th>
</tr>
</thead>
<tbody>
<tr>
<td>AO2 – Open</td>
<td>Aux analog output available (0-10VDC).</td>
</tr>
<tr>
<td>AO3 – Open</td>
<td>Aux analog output available (0-10VDC).</td>
</tr>
<tr>
<td>AO4 – Open</td>
<td>Used to control variable fan or 0-10V actuators (0-10V output).</td>
</tr>
<tr>
<td>AO5 – Open</td>
<td>Aux binary output available.</td>
</tr>
</tbody>
</table>

### Analog 0-10VDC Inputs

<table>
<thead>
<tr>
<th>Primary Pressure Sensor</th>
<th>Primary remote pressure sensor (RPN). A minimum of one sensor (primary) is required for operation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Pressure Sensor</td>
<td>Additional RPN. Controller uses average of these inputs.</td>
</tr>
<tr>
<td>Tertiary Pressure Sensor</td>
<td>Additional RPN. Controller uses average of these inputs.</td>
</tr>
</tbody>
</table>

### Additional Inputs

<table>
<thead>
<tr>
<th>AI1 – 5VDC Sensor</th>
<th>Typically used for voltage monitoring over BACnet network.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Closure</td>
<td>Configurable Binary Input can be used for night setback, damper force open/close etc.</td>
</tr>
<tr>
<td>AI3 – T1 Thermistor</td>
<td>Analog Input for temperature probe hookup with 10k Type J Thermistor. Typically used for temperature monitoring over BACnet network. Can also be configured for heat/cool changeover if required.</td>
</tr>
<tr>
<td>AI8 – T2 Thermistor</td>
<td>Typically used for temperature monitoring over BACnet network.</td>
</tr>
</tbody>
</table>
Wiring

Below is an example of a typical PCM sequence diagram – constant pressure application. Each PCM has a sequence pre-programmed at the factory, however many adjustments can be made in the field with either an LCD thermostat or the USB LINKER service tool.

Sequence of Operation – Constant Pressure

On startup, the controller will calibrate all dampers to the fully-closed position for 2 minutes.

Regardless of room condition, the pressure controller will maintain plenum pressure at the pre-selected pressure set point (default: 0.05” w.c.).

On an increase in plenum static pressure the controller will command the actuators to close the supply dampers (B03), or command the fan to reduce speed (A04), in order to decrease the amount of air delivered into the underfloor plenum. On an decrease in plenum static pressure the controller will command the actuators to open the supply dampers (B02), or command the fan to increase speed (A04), in order to increase the amount of air delivered into the underfloor plenum.

Upon detection of air handler shutdown (zero plenum pressure with supply dampers fully open or fan at full speed), the controller will command the dampers and fan to the pre-selected setback target (default: 50%).
Thermostat Installation

General Description

The PCM Thermostats are all physically the same size and mounting instructions will be typical.

Location

1. The PCM Thermostats must be mounted to a wall and wired to the controller via the supplied plenum rated CFLEX cable. This cable plugs into the thermostat and the PCM controller with the ease of RJ-45 connections. 
   **NOTE:** The cable run can be extended using a Price cable coupler and an additional CFLEX cable.

2. Mount the required thermostat in a place that is convenient for the end user, but the following should be taken into consideration:
   - Do not mount a thermostat in direct sunlight i.e. across from a window where heat can alter the temperature reading.
   - Should not be installed on an outside wall.
   - Keep away from hot equipment like computers, monitors and heaters etc.
   - Ensure nothing will restrict vertical air circulation to the thermostat. (Do Not Cover)
   - Ensure wall is NOT pressurized! Hot/Cold air from a pressurized wall will blow directly onto the thermostat's temperature sensor causing inaccurate readings.

Installation

1. The back plate on each thermostat is removable and can be mounted to a standard electrical box or directly to drywall using anchors supplied by others.

2. Run the CAT-5 cable through the center hole in the plate and connect the cable to the thermostat. Then, secure the thermostat onto the wall plate by inserting the top portion of the thermostat first, then snapping the bottom half in.

3. All thermostats will come equipped with a 0.050 in. Allen Key for the set screw at the bottom.

**TECH TIP ▼**

Careful thermostat installation will reduce field issues! Do not twist or kink the blue CAT-5 thermostat cable. Damaged cables are difficult to troubleshoot!

Thermostat cable product code: PIC-CABLE
How to use Thermostats

Room Sensor Thermostat
- The Room Sensor Thermostat is powered from the controller.
- Measures room temperature.
- Setpoint can be adjusted from a hidden dial on the back of the thermostat using a small flat-head screw driver.
- Setpoint limits can be adjusted through free setup software using the Price LINKER, or through a BACnet system.
- Eliminated problem of unauthorized tampering with the thermostat.
- Occupancy button can be used to override the system during unoccupied times. Default setting is 4 hours.

Dial Thermostat
- The Dial Thermostat is powered from the controller.
- Measures room temperature and features a dial adjustment and an occupancy button.
- Temperature Setpoint limits can be adjusted through free setup software using the Price LINKER, or through a BACnet system.
- Simply use the adjustable dial for temperature adjustment.
- Occupancy button can be used to override the system during unoccupied times. Default setting is 4 hours.
- LED light indicates what mode the thermostat is in. One blink is cooling mode, two blinks is heating mode, three blinks is neutral.

LCD Thermostat
- The LCD Thermostat is powered from the controller and has a variety of features.
- Measures room temperature and features an LCD screen with push button day Setpoint adjustment.
- Temperature Setpoint limits are set through the thermostat setup menus, free setup software using the Price LINKER, or through a BACnet system.
- Balancing and additional setup functions also available through the menus.
- [Optional] Add CO2 and humidity monitoring with PIC-TS-CO2H

LCD Thermostat with Motion Sensor
- The LCD Thermostat with Motion Sensor is powered from the controller and has a variety of features as well.
- This model measures room temperature, features an LCD screen with day Setpoint adjustment, and motion sensor with lighting control.
- Temperature Setpoint limits are set through the thermostat setup menus, free setup software using the Price LINKER, or through a BACnet system.
- Balancing and additional setup functions are also available through the menus.
- This model is equipped with a motion sensor to determine occupancy of the space. This sensor can also be used to control lighting.
DISPLAY NAVIGATION

Initial Startup:

*(LCD & Motion Thermostat only)*

When the LCD thermostat is powered from the PIC, it will display the following information:

- **PRICE ELECTRONICS**
  - Start-up screen.

- **LCD THERMOSTAT STANDARD MODEL**
  - Standard/Motion model.

- **LCD THERMOSTAT VERSION X.XX**
  - Displays firmware version of thermostat.

- **LOADING: INITIALIZING**
  - Loading parameters.

- **PCM VERSION X.XX**
  - Controller type and controller firmware version.

- **SEQUENCE XXXX**
  - Displays sequence programmed into stat.  
    **NOTE:** A sequence number of 0 means the stat has NOT been calibrated.

- **MAC ADDRESS XXX**
  - Displays current MAC Address.

- **DEVICE INST. XXXXXX**
  - Displays device instance.

- **CURRENT PRESS 0.050 IN H2O**
  - (For example)

---

**Changing the Setpoint – LCD & Motion Thermostat only**

Day Setpoint Adjustment. Increase and decrease push buttons for Day Setpoint adjustment:

- **DAY SETPOINT 75.0°F**
- **DAY SETPOINT SAVING...**
Info Menu

*(LCD & Motion Thermostat only)*

The info menu shows information about the controller status regarding room load, damper position and BACnet Address info. No values can be changed from this menu and it is not locked or protected in any way.

Press ‘Enter Menu’ button to enter the User Menu, scroll through using the **up** and **down** buttons.

- **OCCUPANCY ON VVT MODE**
  
  The Occupancy can be determined by the contact closure, motion or by a user pressing a button.

- **THERM READING**
  
  Temperature reading from T1 Sensor.

- **DAMPER POS.**
  
  This indicates the current position of the damper as a (%). Range is 0-100% (100% = full open or maximum air).

- **DAMPER TARGET**
  
  This indicates the damper position as a (%) the controller is targeting. Range is 0-100% (100% = full open or maximum air).

- **AI4 PRESSURE**
  
  Current pressure reading on AI4 in in. w.g.

- **AI5 PRESSURE**
  
  Current pressure reading on AI5 in in. w.g.

- **CURRENT PRESS**
  
  Current final pressure reading in in. w.g.

- **PRESS TARGET**
  
  Current pressure target in in. w.g.

- **AO4 OUTPUT**
  
  Current output on the AO4.

- **AIRHANDLER IS ACTIVE**
  
  Controller will sense airflow if the air handler is running. If no air is present, the display will read Not Active.

- **MAC ADDRESS 1**
  
  Shows the BACnet MAC address. Range 1-99. MAC Addresses can be set via dip switch or through software in the thermostat.

- **DEVICE INSTANCE**
  
  (Instance must be “globally” unique on your site) Displays controller’s BACnet Device Instance (if BACnet is attached). Device Instance can range from 0-4, 194, 303.

- **PRESS MENU TO EXIT**
  
  **NOTE:** Service menu will automatically time out after 20 seconds.
**PCM - PLENUM PRESSURIZATION**

**DISPLAY NAVIGATION**

**Service Menu**

*(LCD Thermostat only)*

Hold down the ‘Menu’ button for 5 seconds, display will show ‘Passcode:’

Use ‘Up’ and ‘Down’ keys to enter the password in this sequence: **Down – Up – Up – Down**.

<table>
<thead>
<tr>
<th>PRESS SETUP</th>
<th>Change the application the unit is operating as.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMP SETPOINT</td>
<td><em>(Variable Pressure application only) – page #.</em></td>
</tr>
<tr>
<td>INPUT</td>
<td>Shows sensor readings, settings, and configuration.</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>Allows setup of Damper, Heat, Cool, outputs. Allows setup of room light output (motion stat only).</td>
</tr>
<tr>
<td>BACNET</td>
<td>Allows setup of BACnet addresses. MAC address, Device Instance, Baud Rate.</td>
</tr>
<tr>
<td>STAT SETUP</td>
<td>Allows setup of LCD back lighting, sounds, motion sensor, Adjustment of HVAC and room lighting time-outs.</td>
</tr>
</tbody>
</table>

**PRESS MENU TO EXIT**

**NOTE:** Service menu will automatically time out after 20 seconds.
### Service Menu

#### PRESS APP:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONST. PRESS</td>
<td>Regardless of room condition, the pressure controller will maintain plenum pressure at the pre-selected pressure setpoint (default: 0.05 in. w.g.)</td>
</tr>
<tr>
<td>VAR. PRESS</td>
<td>Controller will decrease or increase static pressure based on room temperature</td>
</tr>
<tr>
<td>CONSTPRESSBYP</td>
<td>Throttles the bypass valve to maintain constant pressure setpoint</td>
</tr>
<tr>
<td>VAR.PRESSBYP</td>
<td>Controller will decrease or increase static pressure based on temperature</td>
</tr>
<tr>
<td>PRESS SP-COLD</td>
<td>Sets cooling pressure setpoint (Constant Pressure application only)</td>
</tr>
<tr>
<td>PRESS SP-HOT</td>
<td>Sets heating pressure setpoint (Constant Pressure application only)</td>
</tr>
<tr>
<td>NOM.PRESS.COLD</td>
<td>In. w.g. (Variable Pressure application only) Controller will target between this value and cooling values based on duct air when PI is less than zero.</td>
</tr>
<tr>
<td>MINPRESS-COLD</td>
<td>Sets the cool min pressure. Must be lower than (or same as) cool max pressure (Variable Pressure application only).</td>
</tr>
<tr>
<td>MAXPRESS-COLD</td>
<td>Sets the cool max pressure. Must be higher than (or same as) cool min pressure (Variable Pressure application only).</td>
</tr>
<tr>
<td>NOMPRESS-HOT</td>
<td>In. w.g. (Variable Pressure application only) Controller will target between this value and heating values based on duct air when PI is greater than zero.</td>
</tr>
<tr>
<td>MIN PRESS-HOT</td>
<td>Sets the hot min pressure. Must be lower than (or same as) heat max pressure. (Variable Pressure application only).</td>
</tr>
<tr>
<td>MAX PRESS-HOT</td>
<td>Sets the hot max pressure. Must be higher than (or same as) heat min pressure (Variable Pressure application only).</td>
</tr>
<tr>
<td>UNOCC PRESSSP</td>
<td>Deadband on either side of the pressure setpoint [default .03 in. w.g.]</td>
</tr>
<tr>
<td>PRESSDEADBAND</td>
<td>Maximum amount that output will be charged per step. Range 1-50 [default 5%].</td>
</tr>
<tr>
<td>MAX STEP</td>
<td>Maximum amount that output will be charged per step. Range 1-50 [default 5%].</td>
</tr>
</tbody>
</table>
## PCM - PLENUM PRESSURIZATION

### DISPLAY NAVIGATION

### Service Menu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIVIDER</strong></td>
<td>Default 250 Used to increase and decrease damper speed (damper step) (Default 250)</td>
</tr>
<tr>
<td><strong>NEARPRESS.PNT</strong></td>
<td>In. w.g. Near Pressure Setpoint - Reduces damper steps as it nears this pressure setpoint.</td>
</tr>
<tr>
<td><strong>STL TIME-NEAR</strong></td>
<td>120 sec how long it slows the damper when within the pressure setpoint.</td>
</tr>
<tr>
<td><strong>STL TIME-FAR</strong></td>
<td>20 sec how long it increases the damper movements when outside the pressure setpoint.</td>
</tr>
<tr>
<td><strong>DETECTAH.SHDN</strong></td>
<td>NO Detect Air Handler Shutdown: YES – Occupied and unoccupied modes triggered by pressure. (If enabled day pressure and night pressure trip trigger occupied/unoccupied mode). NO – occupied and unoccupied modes not triggered by pressure.</td>
</tr>
</tbody>
</table>
Temperature Setpoint Menu

(Variable Pressure application only. Setpoint Limits and Temperature Units)

Scroll through menu with Up and Down keys.

Press ‘Enter/Menu’ button to apply your changes. "---Saving---" will display as your changes are applied.

- **SET LOW LIMIT 65.0F**
  - This is the lowest setpoint allowed.
  - Range: 10.0°F – 100.0°F Default: 65.0°F

- **SET HIGH LIMIT 80.0F**
  - This is the highest setpoint allowed.
  - Range: 10.0°F – 100.0°F Default: 80.0°F

- **TEMPERATURE UNITS FAHRENHEIT**
  - Fahrenheit or Celsius.
  - Default: °F

- **NIGHT HEAT SET 62.0F**
  - PIC will maintain this heating setpoint when unoccupied.
  - Range: 10.0°F – 100.0°F Default: 65.0°F

- **NIGHT COOL SET 83.0F**
  - PIC will maintain this cooling setpoint when unoccupied.
  - Range: 10.0°F – 100.0°F Default: 83.0°F

- **PROPORTIONAL BAND 2.0F**
  - Default 2°F, 1°C
  - Proportional Band is the range of control or the throttling range of the device.

- **DAY DIFFERENTIAL 1.0F**
  - 1°F, 0.5°C
  - Day differential is the deadband on either side of the setpoint.
**PCM - PLENUM PRESSURIZATION**

**DISPLAY NAVIGATION**

**Service Menu – Input Menu**

Scroll through menu with Up and Down keys.

Press ‘Enter/Menu’ button to apply your changes. "---Saving---" will display as your changes are applied.

<table>
<thead>
<tr>
<th>#OF SENSORS 2</th>
<th>Number of sensors connected to the PCM.</th>
</tr>
</thead>
</table>
| SENSOR MODE   | • Average (Default) – Gathers all sensor readings and averages them.  
                • High Value – Uses only high sensor values. Low Value – Uses only low sensor values. |
| SENSOR RANGE  | Default: 0.250 in. w.g.                 |
| CURRENT PRESS | Current pressure reading in in. w.g.    |
| SUPPLYAIRTEMP | Current Supply air temperature.         |
| NEUTRAL MODE  | • When supply air temperature (SAT) is below room temperature is considered cooling.  
                • When supply air temperature (SAT) is above temperature is considered heating.  
                • Conventional uses Hot and Cold switch points.  
                • Force cool, Force Heat always assumes cold or hot.  
                • Not recommended. |
| SAT OFFSET 0.0F | Apply an offset to the SAT temperature. |
| CONTACTCLOCFG | Not used, Unoccupied on close, Occupied when closed, Damper full open, Damper full closed. |
| CO2 SENSOR DETECTED | Indicates that the CO2 sensor is connected. |
| CO2 TWEAK 0%  | • Percentage that the CO2 reading can be tweaked if required.  
                • Default is 0%. |
| CO2 OFFSET 0PPM | Value to offset CO2 reading if required.  
                 Default 0 PPM. |
| HUMIDITY SENSOR DETECTED | Indicates that the humidity (RH) sensor is connected. |
| HUMIDITY TWEAK | • Percentage that the RH reading can be tweaked if required.  
                • Default 0%. |
| HUMIDITY OFFSET | • Value of offset RH reading if required.  
                • Default 0% RH. |

Press Menu to exit
**Service Menu – Output Menu**

Scroll through menu with Up and Down keys.
Press ‘Enter/Menu’ button to apply your changes. "---Saving---" will display as your changes are applied.

- **DAMPER & AO4**
  - **B02&3 USED AS DAMPER**
    - Assign use of B02 and B03 to reheat or damper.
  - **DPR. RUNTIME 95SEC.**
    - Change the total runtime of damper.
  - **DPR. DIRECTION NORMAL**
    - Changes which direction open and close are set to.
  - **AO4 MIN 0.0 VDC**
    - • Default 0.0VDC.
  - **AO4 MAX 10.0 VDC**
    - • Set maximum output voltage.
    - • Default 10.0 VDC.

- **B01 & AO1**
  - **ECM COOL MIN 1.5 VDC**
    - • PI cooling min (-1 to –100%) output voltage.
    - • Default 1.5 VDC.
  - **ECM COOL MAX 8.0 VDC**
    - • PI cooling max (-100%) output voltage.
    - • Default 8.0 VDC.
  - **ECM HEAT MIN 1.5 VDC**
    - • PI heating max (+100%) output voltage.
    - • Default 1.5 VDC.
  - **ECM HEAT MAX 8.0 VDC**
    - • PI heating min (+1 to +100%) output voltage.
    - • Default 8.0 VDC.
  - **ECM DEADBAND 1.5 VDC**
    - • PI in neutral/deadbond.
    - • Default 1.5 VDC.
  - **ECM UNOCCUPIED 1.5 VDC**
    - • Controller in occupied mode.
    - • Default 1.5 VDC.

- **BINARYFANTYPE**
  - This controls the binary FAN output
    - • No Fan: Fan output disabled
    - • Heating: Fan on when PI heating (+1 to +100%) (Day & night mode)
    - • DAY & NIGHT HEAT: During the day, fan is always on. During the night, the fan is only on when PI is heating (+1 to +100%)
    - • CONTINUOUS: Fan always on
    - • DAY AND NIGHT HEAT/ COOL: During the day, fan is always on. During the night, the fan is only on when PI is heating or cooling (+1 to +100%)
    - • HEAT AND COOL: Fan is on when PI is heating or cooling (+1 to +100% or -1 to –100%)
 PCM - PLENUM PRESSURIZATION

DISPLAY NAVIGATION

Output Menu - Heat

(Setup of Heat Outputs)

Scroll through menu with Up and Down keys.

Press ‘Enter/Menu’ button to apply your changes. *---Saving---* will display as your changes are applied.

- **REHEAT TYPE: BINARY**
  - Reheat Type: Binary, Hot water, Binary/PWM, Hot Water/PWM.
  - Binary uses Stage 1, 2, 3 – Default.
  - Binary/PWM and Hot Water/PWM – Stage 3 is PWM.

- **DRIVE TIME**
  - 90 SECONDS
  - Hotwater runtime in seconds.
  - Not shown if BINARY heat is used.

- **HEAT STAGE 1 1%**
  - Heat Stage 1 Trip Point: Stage 1 engages at 1% heating.
  - Not shown if hot water heat is used.

- **HEAT STAGE 2 50%**
  - Heat Stage 2 Trip Point: Stage 1 engages at 50% heating.
  - Not shown if hot water heat is used.

- **HEAT STAGE 3 100%**
  - Heat Stage 3 Trip Point: Stage 1 engages at 100% heating.
  - Not shown if hot water heat is used.

- **REHEAT FAIL SAFE OFF**
  - Off- Outputs sends 24 VAC on call for heat.
  - On- Outputs send 24VAC when no call for heat (fail open valve in cold climates – ie: Winnipeg).

- **ANALOG HEAT MIN**
  - 0.0 VDC
  - Outputs this voltage on heat analog pin when there is a minimum call for heating.

- **ANALOG HEAT MAX**
  - 10.0 VDC
  - Outputs this voltage on heat analog pin when there is a maximum call for heating.

- **ANALOG HEAT IDLE**
  - 0.0 VDC
  - Outputs this voltage on heat analog pin when there is no call for heating.
**Output Menu - Cool**

*(Setup of Cool Outputs)*

Scroll through menu with Up and Down keys.

Press ‘Enter/Menu’ button to apply your changes. *---Saving---* will display as your changes are applied.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BINARY COOL 1%</td>
<td>Binary Cool Trip Point: engages at 1% cooling load.</td>
</tr>
<tr>
<td>ANALOG COOL MIN 0.0 VDC</td>
<td>Outputs this voltage on cool analog pin when there is a minimum call for cooling.</td>
</tr>
<tr>
<td>ANALOG COOL MAX 10.0 VDC</td>
<td>Outputs this voltage on cool analog pin when there is a maximum call for heating.</td>
</tr>
<tr>
<td>ANALOG COOL IDLE 0.0 VDC</td>
<td>Outputs this voltage on cool analog pin when there is no call for cooling.</td>
</tr>
</tbody>
</table>
Output Menu – Room Lights

(Setup of Room Lighting Output – Motion Thermostat option only)

Scroll through menu with Up and Down keys.

Press ‘Enter/Menu’ button to apply your changes. *---Saving---* will display as your changes are applied.

Analog Outputs: Can reassign outputs as needed.
- Fan: Heat,
- Cool: Aux.

Binary Outputs: Can reassign binary outputs as needed.
- Fan: Heat 1, Heat 2, Heat 3
- Cool: Aux 1, and Aux 2

Output Menu – Room Lights

- **OUTPUT ROOM LIGHTS**
  - **ROOM LIGHTS DISABLED**
    - Disabled: No outputs used – default.
  - **ROOM LIGHTS FAN**
    - Fan: Will trigger room lights.
  - **ROOM LIGHTS HEAT STAGE 3**
  - **ROOM LIGHTS BINARY COOL**
    - Binary Cool: Will trigger room lights.
  - **ROOM LIGHTS BO9**
    - BO9: Output will trigger room lights (future expansion board).

**NOTE:** The room lights option will override the selected output to control a 24VAC relay which is intended to control lighting. Use a spare output so there is no conflict with your current sequence of operations.
**Address Menu**  
*(BACnet Addressing Setup)*

Scroll through with the ‘Up’ and ‘Down’ buttons. Press ‘Enter Menu’ button to apply your changes. ‘Saving...’ will display as your changes are applied.

- Hardware – uses DIP switch on BACnet module for MAC Address – Default - recommended.
- Software – uses STAT to set MAC Address – this OVERRIDES the hardware switches and could be confusing if you’re not careful.

**NOTE:** the MAC Address (range 1-99) is added to the Device Instance  
Example: MAC Address = 1, Device Instance = 100 – total Address for this PIC would be 101

- Display current MAC Address.  
**NOTE:** DIP switches and software MAC Address are only read on startup! See Device Instance below.

- When changing the MAC address in Software, MAC address will flash 0 until a new address is entered. This will override the Hardware MAC address set on the BACnet board at the dip switches.

- This is the ‘software’ BACnet Address & MUST be unique on your building site.  
- Range: 1 – 4,194,303  
**NOTE:** After changing Device Instance the STAT will send a RESET command to the PIC to apply the ADDRESS changes. Addresses are only READ on startup, so after any changes you must reset the controller either via STAT (which is automatic) or cycle 24VAC power.  
**NOTE:** Addresses are only read on startup to prevent a controller with faulty damaged/improperly set DIP switches from popping up all over a network, which would be extremely difficult to troubleshoot.

- This sets the BACnet MS/TP baud rate.  
- 9600 baud (all BACnet devices must at least support this speed) - slowest  
- 19200 baud  
- 38400 baud  
- 76800 baud (Default baud rate for PRICE products) - fastest

Setting the MAC address using the Dip Switches:  
The MAC address is set in binary.  
Eg. to set the Address of 3, switch 1 & 2 must be in the ON position.
# PCM - PLENUM PRESSURIZATION

## DISPLAY NAVIGATION

### Stat Setup Menu

*(Stat Options)*

Scroll through menu with Up and Down keys.

Press ‘Enter/Menu’ button to apply your changes. *---Saving---* will display as your changes are applied.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OCCUPANCY ON – VVT MODE</strong></td>
<td>Show current occupancy source. ON from VVT (always on), ON from Airflow, ON from Contact, ON from Motion Sensor</td>
</tr>
<tr>
<td><strong>MOTION ENABLE OFF</strong></td>
<td><em>(Motion Sensor STAT only)</em>&lt;br&gt;Off – motion sensor disabled – Default for regular LCD T-Stat.&lt;br&gt;On – motion sensor enabled (only enabled if you have a motion stat).&lt;br&gt;Only visible with motion stat.</td>
</tr>
<tr>
<td><strong>MOTION SENSITIVITY 5</strong></td>
<td><em>(Motion Sensor STAT only)</em>&lt;br&gt;Sets the sensitivity of the motion sensor.&lt;br&gt;1 – least sensitive&lt;br&gt;9 – most sensitive&lt;br&gt;5 – DEFAULT&lt;br&gt;Only visible when motion is enabled.</td>
</tr>
<tr>
<td><strong>MOTION TEST OFF</strong></td>
<td><em>(Motion Sensor STAT only)</em>&lt;br&gt;Motion stat will beep each time motion is sensed.&lt;br&gt;This is useful for adjusting the sensitivity value &amp; testing.</td>
</tr>
<tr>
<td><strong>LIGHTS TIMEOUT 60 MINUTES</strong></td>
<td><em>(Use room light output to select lighting signal)</em>&lt;br&gt;PIC will turn off lighting output after no motion is detected and this timer expires.&lt;br&gt;Default: 60 minutes</td>
</tr>
<tr>
<td><strong>LCD BACKLIGHT ALWAYS ON</strong></td>
<td>Always on (Default)&lt;br&gt;Always off&lt;br&gt;Button push – lights up on button press</td>
</tr>
<tr>
<td><strong>SOUND OPTIONS USER SOUNDS</strong></td>
<td>User Sounds – stat will beep when user tries to exceed a limit – Default.&lt;br&gt;All off – beeper disabled.&lt;br&gt;All on – stat will beep when user tries to exceed a limit or stat loses communication with the controller (for testing uses only) – not recommended.</td>
</tr>
<tr>
<td><strong>DISPLAY OPTIONS TEMP AND SETUP</strong></td>
<td>See Display Options menu.</td>
</tr>
<tr>
<td><strong>CONTROLLER NAME</strong></td>
<td>Set a custom name for the Stat.</td>
</tr>
<tr>
<td><strong>RESETCONTROLR</strong></td>
<td>Rests the controller.</td>
</tr>
</tbody>
</table>
**PCM - PLENUM PRESSURIZATION**

**NETWORKING & SETUP**

**BACnet Networking and Setup**

**Setting the MAC Address:**

MAC Address must be UNIQUE on an MS/TP network segment within building. An installer setting up an MS/TP segment with up to 30 devices must ensure each device has a UNIQUE MAC Address (Range 1-99). The MAC Address is set with DIP switches on the BACnet Module. This is the hardware setup for the MAC Address. The MAC Address can also be set in software, through the LCD Thermostat. This option of setting the address through the software is available when the controller is not accessible to the user (finished drywall ceiling for example).

---

**NETWORK SEGMENT #1 ▼**

![Network Segment #1 Diagram]

**NETWORK SEGMENT #2 ▼**

![Network Segment #2 Diagram]

---

**TECH TIP ▼**

Each device needs a unique MAC and Device Instance. All devices must be at the same baud rate. 24VAC HOT and COMMON polarities are critical and must not be reversed on ANY devices! Reverse polarity will stop communication on that MS/TP segment.
### NETWORKING & SETUP

#### Setting the Device Instance

**Device Instance:**

A device instance number identifies a device within an entire building, therefore giving it a unique number or address, much like a telephone ext. number. A building can have one telephone number, but all the extensions have a unique number to identify them. A device instance number would work the same way and must be unique throughout the building. The Device Instance number is user set through the LCD Thermostat or the USB LINKER tool.

Below is a table defining how a device instance number is obtained

**NOTE:** Each device on a network segment must be set to run at the same speed or baud rate.

<table>
<thead>
<tr>
<th>Description</th>
<th>Default Value (Factory)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC Address</td>
<td>Set by DIP switch</td>
<td>Value: limited to 1-99</td>
</tr>
<tr>
<td>Tier 1 (x100)</td>
<td>58</td>
<td>Value: limited to 0-99</td>
</tr>
<tr>
<td>Tier 2 (x10,000)</td>
<td>1</td>
<td>Value: limited to 0-99</td>
</tr>
<tr>
<td>Tier 3 (x1,000,000)</td>
<td>0</td>
<td>Value: limited to 0-4</td>
</tr>
</tbody>
</table>

**Example Device Instance setup with Default settings:**

- MAC Address = 4 (4 x 1 = 4) – Set by DIP Switches on BACnet module, or through software.
  
  + TIER 1 = 58 (58 x 100 = 5800) – Set through software
  
  + TIER 2 = 1 (1 x 10,000 = 10,000) – Set through software
  
  + TIER 3 = 0 (0 x 1,000,000 = 1,000,000) – Set through software
  
  = Final Device instance = 0,015,804

Final Device instance =

```
01-58-04
```

Tier3 Multiplier Tier2 Multiplier Tier1 Multiplier MAC Address
PCM - PLENUM PRESSURIZATION

NETWORKING & SETUP

LINKER - USB Service Tool

The Price USB LINKER is the interface that can be used with any of the Price Thermostat for the PCM. The LINKER connects to a laptop (not supplied) via a USB A to B cable supplied by Price, and then connects to the service jack of the thermostat via an RJ-12 cable supplied by Price. Setup of the controller can then be performed using the connected laptop.

**LAPTOP CONNECTION** ▼

- Laptop
- Setup Tool
- USB A-B Cable
  - Connects into laptop & LINKER
- LINKER Interface
- RJ-12 Cable
  - Plugs into LINKER & then into bottom of thermostat
- Dial Thermostat

An LCD Thermostat can be purchased as an upgrade and used to perform setup/balancing instead of a laptop/LINKER Tool. The LCD Thermostat provides full functionality for system setup.

**LCD CONNECTION** ▼

- LCD Thermostat
- Setup Tool
- RJ-12 Cable
- Dial Thermostat
**PCM - PLENUM PRESSURIZATION**

**MAINTENANCE**

**Troubleshooting**

The following information is provided in the event that the PCM does not appear to function properly after installation.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller appears to be not responding or have no power. Green light on the controller is not blinking. Thermostat green indication light not on, or LCD screen is blank.</td>
<td>Check thermostat first for either green indication light, or LCD display. If either of these does not appear, then check the controller for power (green blinking light). If no power is present, check 24VAC power with a multimeter. Cycle power to the controller. If this doesn’t restore power, check the power that is feeding that controller for your problem.</td>
</tr>
<tr>
<td>Dampers don’t move, and red FAULT light is illuminated.</td>
<td>Red fault light means there is a short in the cable from CW/CCW to COM. Find shorted cable(s) in that string of dampers and replace.</td>
</tr>
<tr>
<td>Damper acts erratically</td>
<td>If the CW/CCW lines in the cable are shorted together (and not shorted to the COMMON), it could cause the dampers in a string to act erratically and drive in random directions. Find bad cable(s) in the string, and replace.</td>
</tr>
<tr>
<td>24 VAC Binary Outputs not functioning</td>
<td>Ensure that the controller has 24VAC power. Ensure that there is a call for heating or for cooling, room lights, etc. If so, check to see that the GREEN indication light is on for the output. The next step would be to check the device that is triggering the output like a relay. Ensure that the relay has engaged (pulled in) for either heating or cooling application. Check the output configuration</td>
</tr>
<tr>
<td>Analog Outputs not functioning</td>
<td>Ensure that the PCM has 24VAC power. Check the analog output for voltage with a multimeter. You should see a voltage in the range of 0-10VDC. Direct Acting Output – 0VDC indicates that the field device is closed or at a minimum position. 10VDC indicates that the field device is open or at a full open position. Direct Acting is typical with cooling applications. Reverse Acting Output – 0VDC indicates that the field device is fully opened or maximum position, and 10VDC indicates fully closed or minimum position. Reverse acting is typical with heating applications.</td>
</tr>
<tr>
<td>SAT Sensor Analog Input not functioning</td>
<td>Ensure that there is a sensor wired to the input on the PIC controller. Check the type of sensor, should be a 10k Ohm Type Thermistor.</td>
</tr>
<tr>
<td>BACnet Communication Errors</td>
<td>BACnet - MS/TP is based on a RS-485 network. It must be wired in a daisy chain configuration. A daisy chain means that there is only one main cable, and every network device is connected directly along its path. DO NOT use Star, Bus, “T”, or any other type of network configuration. Any of these other network configurations will result in an unreliable network, and make troubleshooting almost impossible. Correct polarity is imperative on MSTP wiring. Always ensure that the positive terminal on a device has the same color wire connected to it throughout the network, same for the negative terminal. E.g. two wire conductor with black and white wires – black to the positive terminal, and white to the negative terminal. Keep this consistency throughout the network.</td>
</tr>
</tbody>
</table>
## Troubleshooting - Continued

<table>
<thead>
<tr>
<th>Fault</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BACnet Communication Errors</strong></td>
<td>Price does not use EOL or termination on their devices. Terminating a device is almost never required at the low baud rate of MS/TP devices. In fact terminating can create more problems than it solves.</td>
</tr>
<tr>
<td></td>
<td>The network speed or baud rate must be the same throughout the network.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The default speed for Price BACnet MS/TP controls is 76800. BACnet MS/TP currently supports 4 standard speeds which are: 9600, 19200, 38400 and 76800.</td>
</tr>
<tr>
<td><strong>BACnet Communication Errors</strong></td>
<td>Binary Address must be unique for each device on the network. No two devices can have the same Address. This includes if you are incorporating a Price product into an existing network. Determine the existing Addressing scheme for the existing network. The Address is set on the Addressable DIP switches on the PCM.</td>
</tr>
<tr>
<td><strong>BACnet Communication Errors</strong></td>
<td>Grounding and 24VAC polarity: Proper grounding is absolutely essential when wiring the MS/TP BACnet Network. Proper grounding will prevent many potential problems that can occur in a network of devices. Common symptoms of a poorly grounded network can include inconsistent BACnet MS/TP communications and damage from voltage spikes. The most practical method of grounding is to ground every 24VAC transformer common/neutral used to power the controls. Connect the “common/neutral” wire of the SECONDARY side of the transformer to earth ground – such as the ground screw on in the electrical box.</td>
</tr>
<tr>
<td><strong>BACnet Communication Errors</strong></td>
<td><strong>NOTE:</strong> Flipping 24VAC HOT and COMMON will cause the BACnet MS/TP Network to stop communicating!!! Ensure HOT and COMMON are not reversed on ANY controllers.</td>
</tr>
<tr>
<td></td>
<td><strong>WARNING:</strong> Controllers will still power up and run even if HOT and COMMON are reversed. However output signals to other devices such as heaters, relays, etc will not work as intended!</td>
</tr>
</tbody>
</table>
## PCM - PLENUM PRESSURIZATION

### MAINTENANCE

#### Hardware Specifications

<table>
<thead>
<tr>
<th>Power Requirements</th>
<th>24VAC, 47-63 Hz 6VA (not including output loading) NEC Class II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Ratings</td>
<td>32° to 131° F (0° to 55° C) 10 to 90% RH (non-condensing)</td>
</tr>
</tbody>
</table>

#### Outputs

- 24VAC Binary (x7). Max 0.5Amps each, Max 1.85A total switched HOT or switched COMMON
- Stages of heat or heat open/close (x3)
  - Fan
  - Cooling
  - Damper CW
  - Damper CWW
- Analog 0-10VDC (x4). Max: 10mA each.
  - Fan (ecm)
  - Heat
  - Cool
  - Aux

#### Inputs

- 0-10VDC analog inputs (x3)
- 0-5VDC sensor input (x1)
- Termistor inputs (x2) (10k Type J termistor)
- Contact closure (x1) (night setback)
- Thermostat inputs
  - Room Setpoint Dial
  - Temperature sensor (10K Type J Thermistor)
- Accuracy of +/- 0.5°F from 55°F to 85°F (+/- 0.25°C from 13°C to 25°C

#### Communication ports

- BACnet MS/TP Connection (optional)
  - Communication speeds: 9,600, 19,200, 38,400, 76,800 (default)
  - Maximum recommended devices per MS/TP segment: 30
- LINKER port
  - For local setup using Price USB LINKER service tool

#### Actuator Specifications

- 40 in-lbs (nominal torque), 90 seconds running time 90° maximum angle of rotation. External slide knob for manual override. Less than 35 db (A) noise level.
- Mems technology Optional 0-1 SLM flow sensor.
  - (0-1" W.C. equivalent) Not position sensitive.

#### Tubing Specifications

- Flow Sensor tubing must be 1/4 inch outside diameter

<table>
<thead>
<tr>
<th>Size</th>
<th>15.5 in. x 12.75 in. x 4 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>15 lbs. (6.8kg)</td>
</tr>
</tbody>
</table>