



MANUAL – INSTALLATION + SERVICE

Pressure Control Valve

PCV Series

v001 – Issue Date: 23/09/2024
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price | VAV
DIFFUSERS

PRESSURE CONTROLLED DAMPER

TABLE OF CONTENTS

Product Overview

| | |
|--------------------------------|---|
| General | 1 |
| Installing the PCV™ unit | 2 |
| LCD Setup Tool | 2 |
| Balancing Procedure | 3 |

Display Navigation

| | |
|--------------------------------------|----|
| Quick Start Guide | 4 |
| Service Menu | 4 |
| Info Menu | 5 |
| Service Menu | 6 |
| Application Menu | 7 |
| Setpoint Menu | 8 |
| Discharge Air Temperature Menu | 9 |
| Input Menu | 10 |
| Output Menu – Heat | 11 |
| Address Menu | 12 |
| Stat Setup Menu | 13 |
| P/C Setup Menu | 14 |

Maintenance

| | |
|-------------------------------|----|
| Troubleshooting | 15 |
| Hardware Specifications | 17 |

SUPPORT ▼

Having difficulty installing this product? Price is here to help.

Application Support

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PRESSURE CONTROL VALVE

PRODUCT OVERVIEW

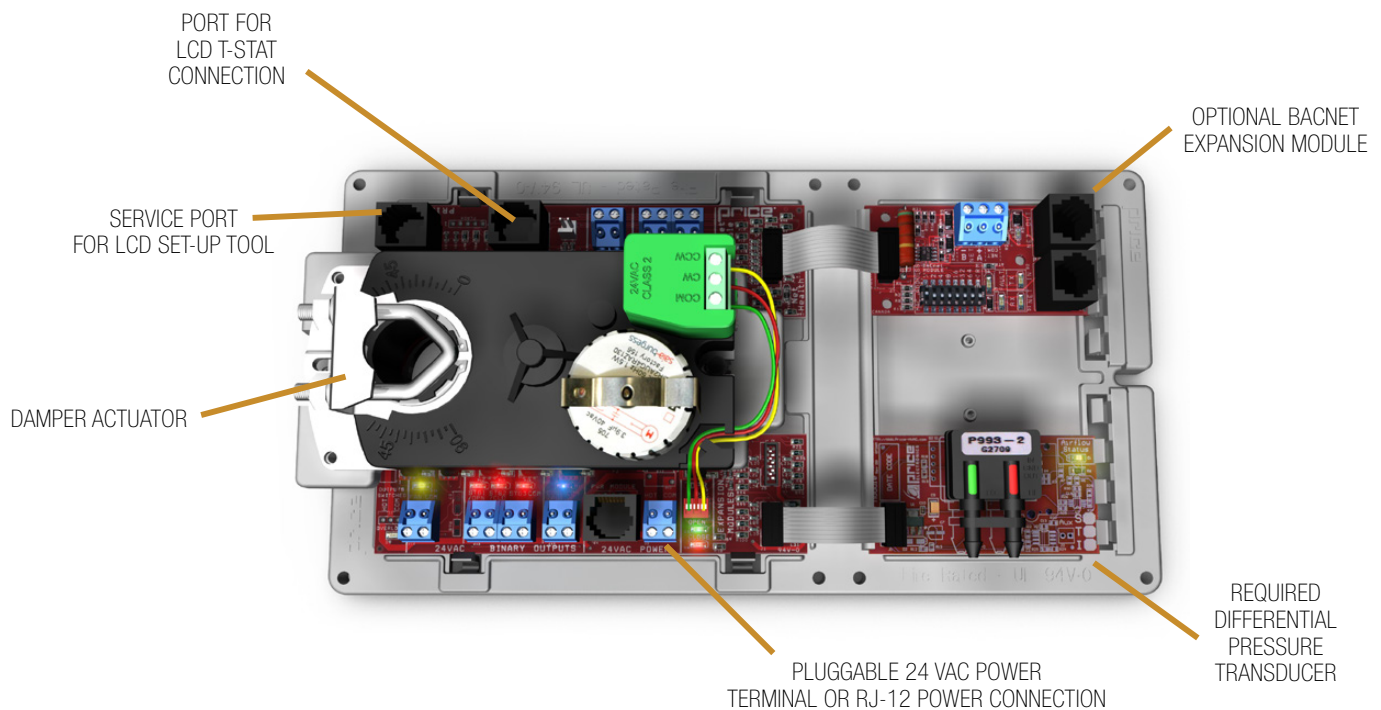
General

PCV - Pressure Controlled Damper

The Pressure Controlled Damper (PCV) is a device that controls pressure within a ducted system. The PCV can be setup for bypass control or for zone control.

- Bypass control maintains a constant pressure setpoint and bypasses the air from the supply to the return side. The return duct can either be ducted back to the main air handling unit or have an open return.
- Zone control would have the PCV unit in-line with the supply duct and modulates the damper to maintain a constant downstream pressure setpoint.

PCV CONTROLLER FEATURES ▼



PRESSURE CONTROL VALVE

PRODUCT OVERVIEW

Installing the PCV Unit

1. The PCV is a controller and actuator (with optional damper) that is programmed for pressure control. For bypass applications, the PCV is installed between the supply and return duct (return may be ducted or open directly to the ceiling plenum). For zone applications, the PCV is installed directly in the supply duct, before the first VAV diffuser.
2. For PCVs supplied without a damper:
 - i. Mount the controller onto the duct with the damper shaft going through the PIC's actuator, and tighten the screws on the actuator.
 - ii. Secure the back end of the controller using the supplied anti-rotational bracket. Do not mount the anti-rotation bracket tightly to the PIC casing, the intent is to allow the PIC to move slightly to allow for variations on the damper shaft.
 - iii. Connect any of the controller's outputs as required.
NOTE: When the output loads require a switched HOT or COMMON 24VAC signal. Use the jumper near the FAN output to select HOT or COMMON outputs.
 - iv. Power the PIC using 24VAC, the secondary 24VAC common of the transformer must be earth grounded.
3. Static Pressure Probe – the PCV unit will come with a static pressure probe. This probe needs to be installed 2/3 to 3/4 of the way down the main supply duct run. The

probe then needs to be connected to the HI side port of the transducer on the PCV board with 1/4" pneumatic tubing. This tubing needs to be provided by the onsite contractor. Also, leave the LO side port of the transducer open to the atmosphere.

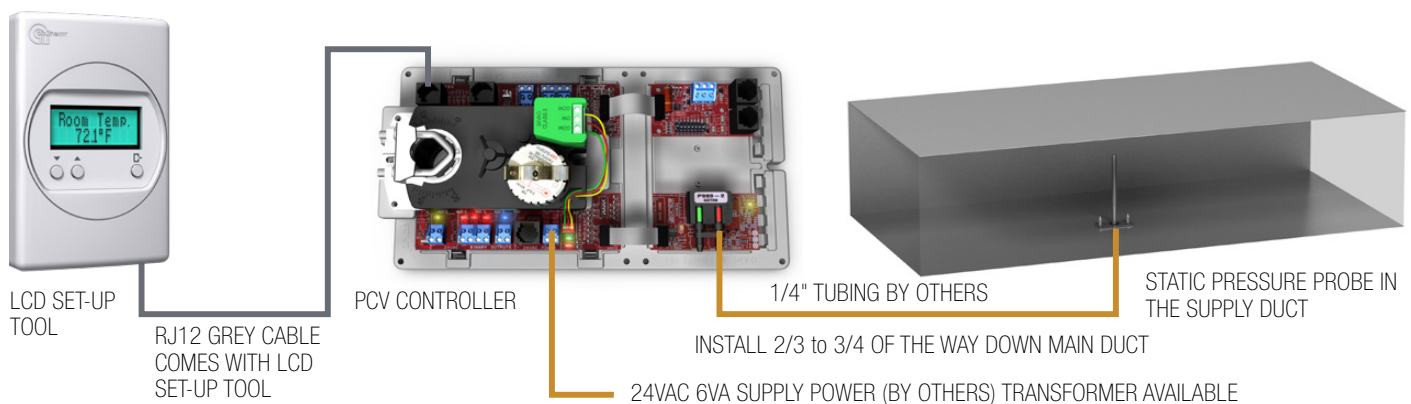
4. Power up the PCV controller with 24VAC 6VA supply, or if an optional transformer is supplied, then apply the appropriate line voltage to the transformer. If a Price Power Module (PPM) is being used, plug in the provided RJ12 cable into the power jack on the PCV controller. The secondary of either transformer must be earth grounded!

LCD Set-up Tool

The balancer will require an LCD set-up tool to set the static pressure setting on the PCV controller, and to change any parameters if needed. To connect the LCD set-up tool, the balancer must connect to the PCV controller on the bypass terminal in the ceiling, using the Service Port. (Note** the PCV does not come with an LCD t-stat, so the set-up tool is required). If an LCD set-up tool was not ordered for the job, an existing LCD t-stat onsite can be used as well; you just require a CAT-5E (NETC35) cable to connect the t-stat to the controller.

Below example shows how to connect the LCD set-up tool:

LCD SET-UP TOOL CONNECTION EXAMPLE ▼



PRESSURE CONTROL VALVE

PRODUCT OVERVIEW

Balancing Procedure

The objective when balancing a system with VAV diffusers is to ensure that design airflow is achieved at the diffuser with the highest pressure drop (typically the last diffuser downstream of the PCV), ensure that the static pressure at the inlet to the diffuser with the lowest pressure drop (typically the diffuser closest to the PCV) does not exceed 0.25"wg / 62Pa and to do so at the lowest possible static pressure to minimize the fan energy used. Satisfying the first two conditions will allow the VAV diffusers to modulate and control each space in a quiet and energy efficient manner.

Proportional Balancing Procedure

1. Adjust the fan speed to 100%
2. Adjust each PCV zone independently. Each PCV (and the diffusers downstream) is balanced as an independent zone and the PCV static pressure set point adjusted to maintain the design airflow at the VAV diffuser with the highest pressure drop.
 - a. Adjust the PCV set point to 0.15"wg / 37Pa.
 - b. Open all VAV diffusers in the PCV zone (see individual model of diffuser for opening instructions).
 - c. Ensure all manual volume (balancing) dampers are 100% open.
 - d. Allow a little time (5-10 minutes) for the PCV to control to the set point.
 - e. Measure the airflow at each diffuser.
 - f. Compare the measured airflow with the design airflow for each space and:
 - i. Determine which diffuser is the lowest with respect to the design airflow. This is the diffuser with the highest pressure drop.
 - ii. Determine which diffuser is the highest with respect to the design airflow. This is the diffuser with the lowest pressure drop.
 - g. Do not close the manual damper on the diffuser with the highest pressure drop. Keep this damper 100% open.
 - h. Adjust the manual volume damper on each of the other diffuser to match the percentage from the design airflow as that of the diffuser with the highest pressure drop.
 - i. Adjust the PCV set point until design airflow (+10% / -5%) is achieved at the diffuser with the highest pressure drop. Allow a little time (5-10 minutes) for the PCV to control to the set point.
3. Repeat for each PCV zone on the system.
4. Adjust the fan speed.

Once each PCV zone has been balanced and the PCV set points adjusted, identify the PCV zone with the highest pressure drop (typically the zone furthest from the fan or the PCV with the damper open the furthest).

 - a. Open all VAV diffusers in the PCV zone (see individual model of diffuser for opening instructions).
 - b. Establish the static pressure set point for the fan speed control by turning it down to the slowest speed that will maintain the design airflow at the highest pressure drop diffuser in the highest pressure drop PCV zone (PCV damper should be open to almost 100%).
 - c. Return all VAV diffusers in the zone to operation (see individual model for instructions).
5. Check the static pressure at the takeoff to the diffuser with the lowest pressure drop (static pressure should be less than or equal to 0.25"wg / 62Pa).
6. Check the remaining diffusers on the PCV zone to ensure all are supplying greater than or equal to design airflow.
7. Note the PCV set point.
8. Return all VAV diffusers in the zone to operation (see individual model for instructions).

NOTE: Diffuser noise is caused by higher velocity air through the diffuser which is caused by a high static pressure. Price recommends a static pressure no higher than 0.25"wg / 62Pa at the inlet to the diffuser. Some system designers may accept higher noise levels and opt for a higher static pressure. Care should be taken not to exceed the design maximum static pressure at the takeoff to the first diffuser after the PCV.

PRESSURE CONTROL VALVE

DISPLAY NAVIGATION

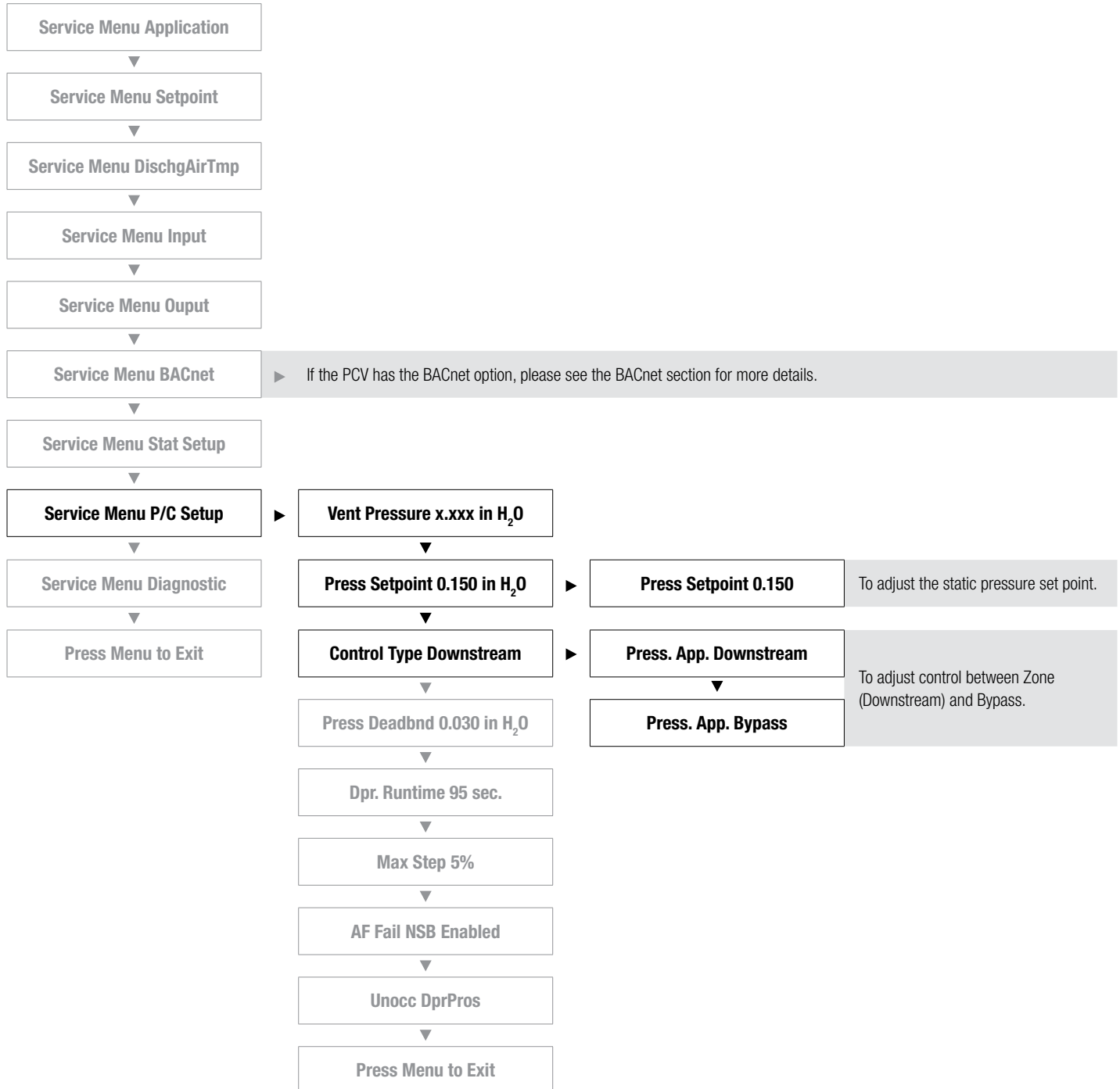
Quick Start Guide

The PCV uses a sophisticated PIC controller that has intelligence for many different applications. The full menu structure is described on the following pages. Below is a quick menu to the settings that are applicable to the PCV.

Service Menu

(LCD and LCD Setup Only)

Hold down 'Enter/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**.




PRESSURE CONTROL VALVE

DISPLAY NAVIGATION

Info Menu

(LCD & LCD Setup)

Once the PCV has 24VAC power applied to it and the LCD Setup Tool is plugged into the Service Port, the thermostat screen will go through the initial start-up screen. The display should indicate that this is a Pressure Controller, and not something different.

To view basic information on the PCV controller, press the 'Menu' button  once and scroll through with the 'Down' arrow button.

| | |
|---------------------------------------|---|
| APPLICATION PRESSURE CTRL | Air terminal, pressure controller, dual duct or fan powered terminal unit |
| VENT PRESSURE 0.150 IN H2O | Current pressure reading |
| SUPPLYAIRTEMP 85.0F | If supply probe is not present, LCD will display no probe. If supply probe is present, LCD will display temperature. |
| DAMPER POSITION 50% | This indicates the current position of the damper as percent (%) Range is 0-100% (100% = full open or maximum air) |
| AIR HANDLER IS ACTIVE | If Night Setback is enabled, occupied and unoccupied modes triggered by airflow |
| MAC ADDRESS 1 | Shows the BACnet MAC address – range is 1-99 MAC Address can be set via DIP switch If no BACnet module attached, LCD will display MAC address None |
| DEVICE INSTANCE 101 | (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 |

PRESSURE CONTROL VALVE

DISPLAY NAVIGATION

Service Menu

(LCD and LCD Setup Only)

Hold down 'Enter/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**.

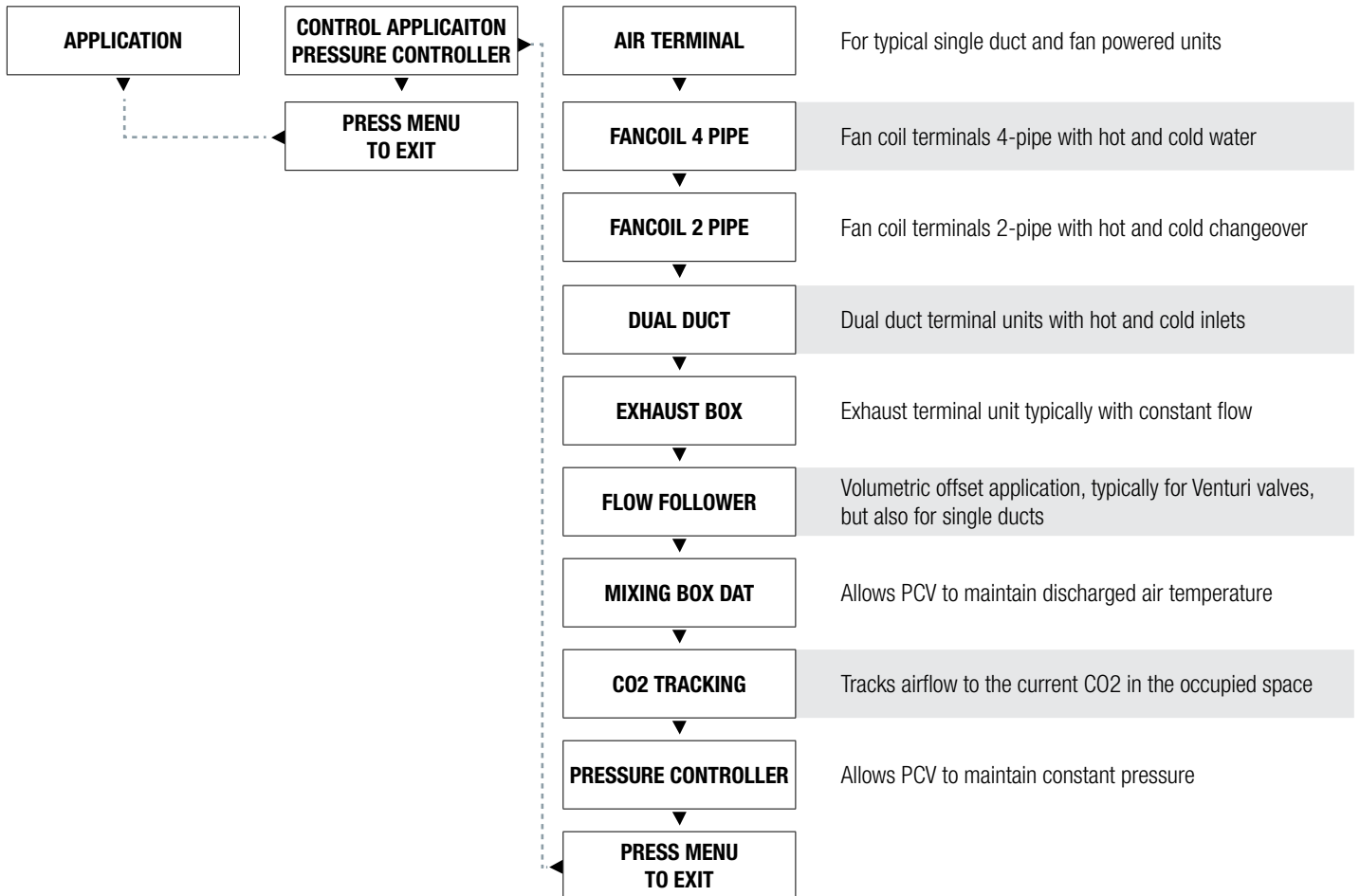
| | |
|--|--|
| SERVICE MENU: APPLICATION | Change the Application the unit is operating as |
| SERVICE MENU: SETPOINT | Setup of Setpoint limits (day minimum/maximum) °F/°C selection |
| SERVICE MENU: DISCHARGEAIR TEMP | Setup of DAT HEAT and COOL setpoints Shows discharge air temperature reading |
| SERVICE MENU: INPUT | Allows setup of contact closure |
| SERVICE MENU: OUTPUT | Allows setup of FAN, HEAT, COOL outputs Allows setup of room light output (motion stat only) Enable analog DAT control |
| SERVICE MENU: BACNET | Allows setup of BACnet addresses MAC address, Device Instance and Baud Rate Included only if BACnet module is attached |
| SERVICE MENU: STAT SETUP | Allows setup of LCD back lighting, sounds, motion sensor Adjustment of HVAC and room lighting time-outs |
| SERVICE MENU: P/C SETUP | Allows pressure setpoint and pressure deadband adjustment Allows adjustment of damper |
| SERVICE MENU: DIAGNOSTIC | Load defaults and resets controller (recommended not to change) |
| PRESS MENU TO EXIT | NOTE: Service menu will automatically time out after 20 seconds |

PRESSURE CONTROL VALVE

DISPLAY NAVIGATION

Application 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.



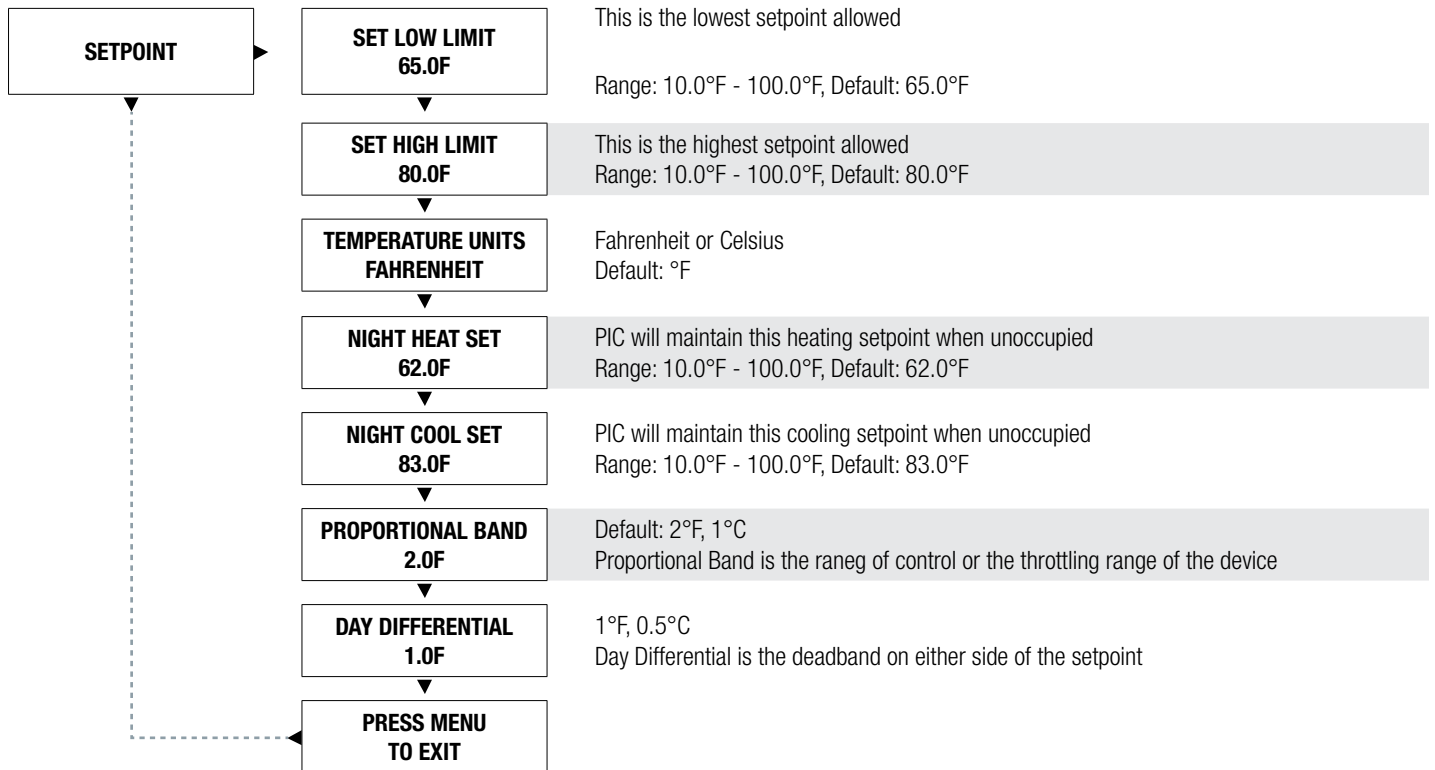
PRESSURE CONTROL VALVE

DISPLAY NAVIGATION

Setpoint Menu

(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.



PRESSURE CONTROL VALVE

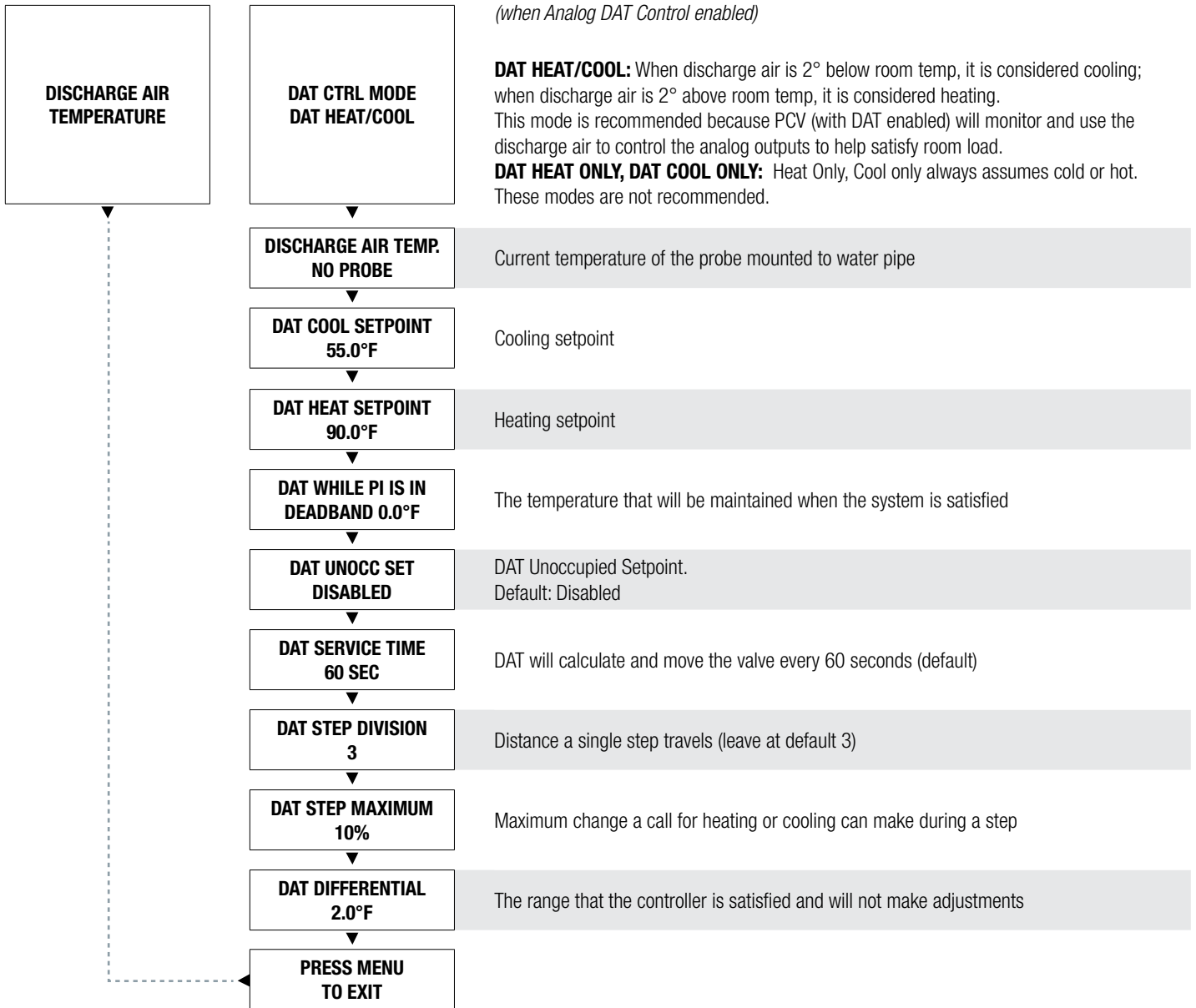
DISPLAY NAVIGATION

Discharge Air Temperature Menu

NOTE: Thermostat must remain connected in this application

(Application Specific 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.

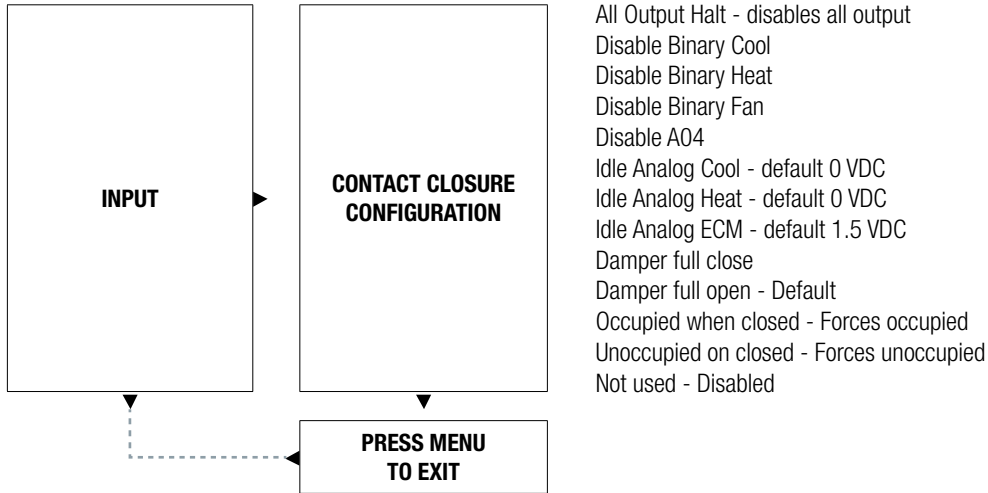


PRESSURE CONTROL VALVE

DISPLAY NAVIGATION

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.



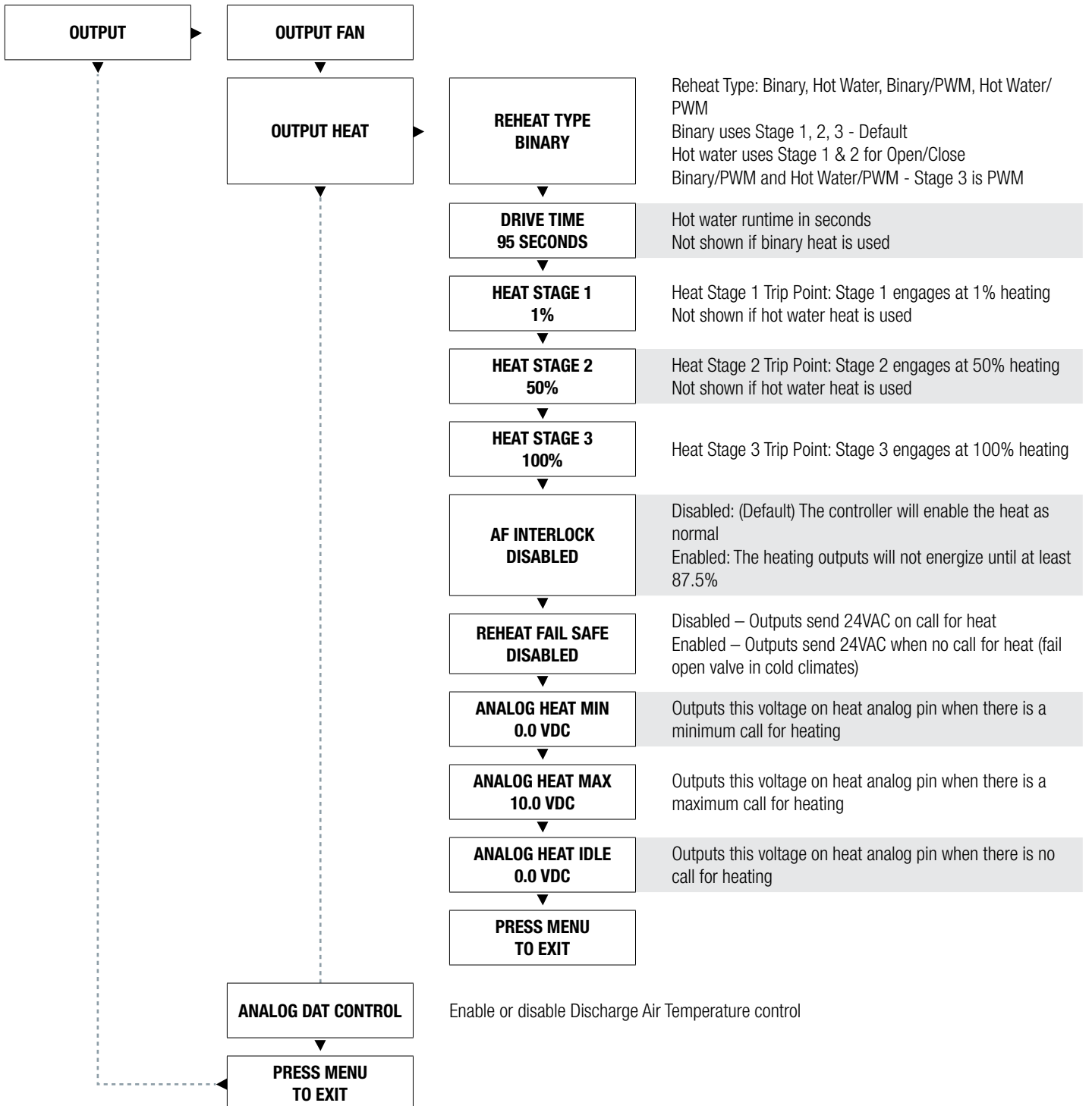
PRESSURE CONTROL VALVE

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.



PRESSURE CONTROL VALVE

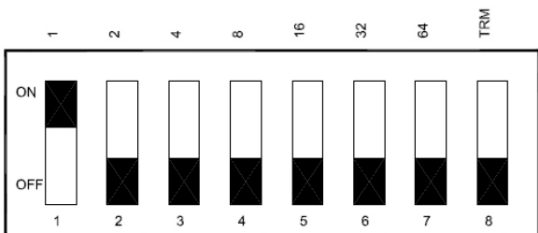
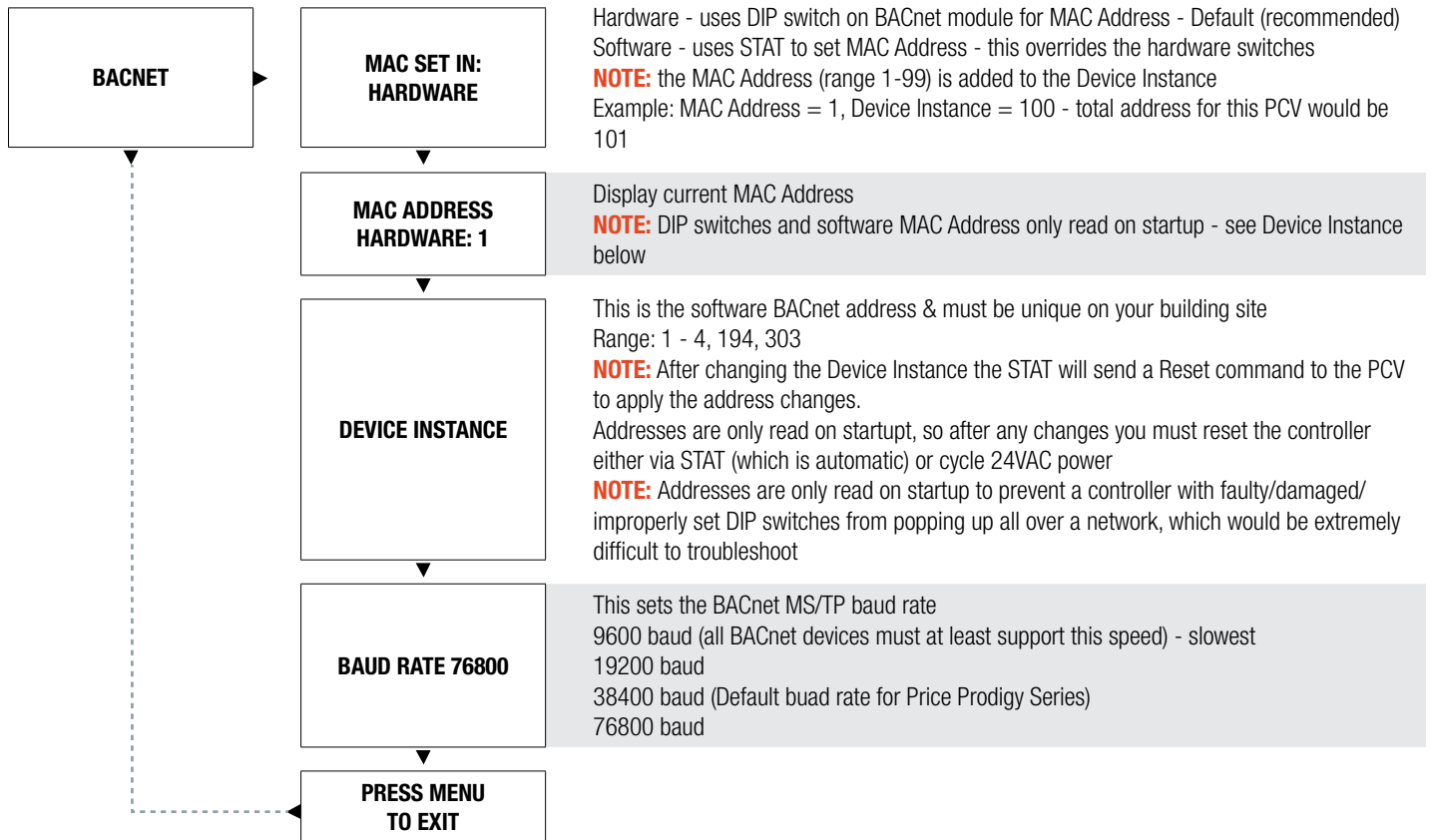
DISPLAY NAVIGATION

Address Menu

(BACnet Addressing Setup)



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



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.

Setting the Device Instance number (Max 4,194,302)

| | | | | | |
|---|---|---|---|---|----------------|
| x | x | x | x | x | x |
| | | | | | |
| | | | | | MAC address |
| | | | | | 3rd range 0-99 |
| | | | | | 2nd range 0-99 |
| | | | | | 1st range 0-4 |

| | T568B Color | Pins on plug face (socket is reversed) |
|-------|---------------------|--|
| PIN 1 | white/orange stripe | |
| PIN 2 | orange solid | |
| PIN 3 | white/green stripe | |
| PIN 4 | blue solid | |
| PIN 5 | white/blue stripe | |
| PIN 6 | green solid | |
| PIN 7 | white/brown stripe | |
| PIN 8 | brown solid | |

Price recommends using the Orange Compliment (A/+), Orange (B/-), Brown Compliment (NET COM) and Brown Compliment (NET COM) wire pairs from a standard CAT5E cable. The pinout used follows the 568-B Standard

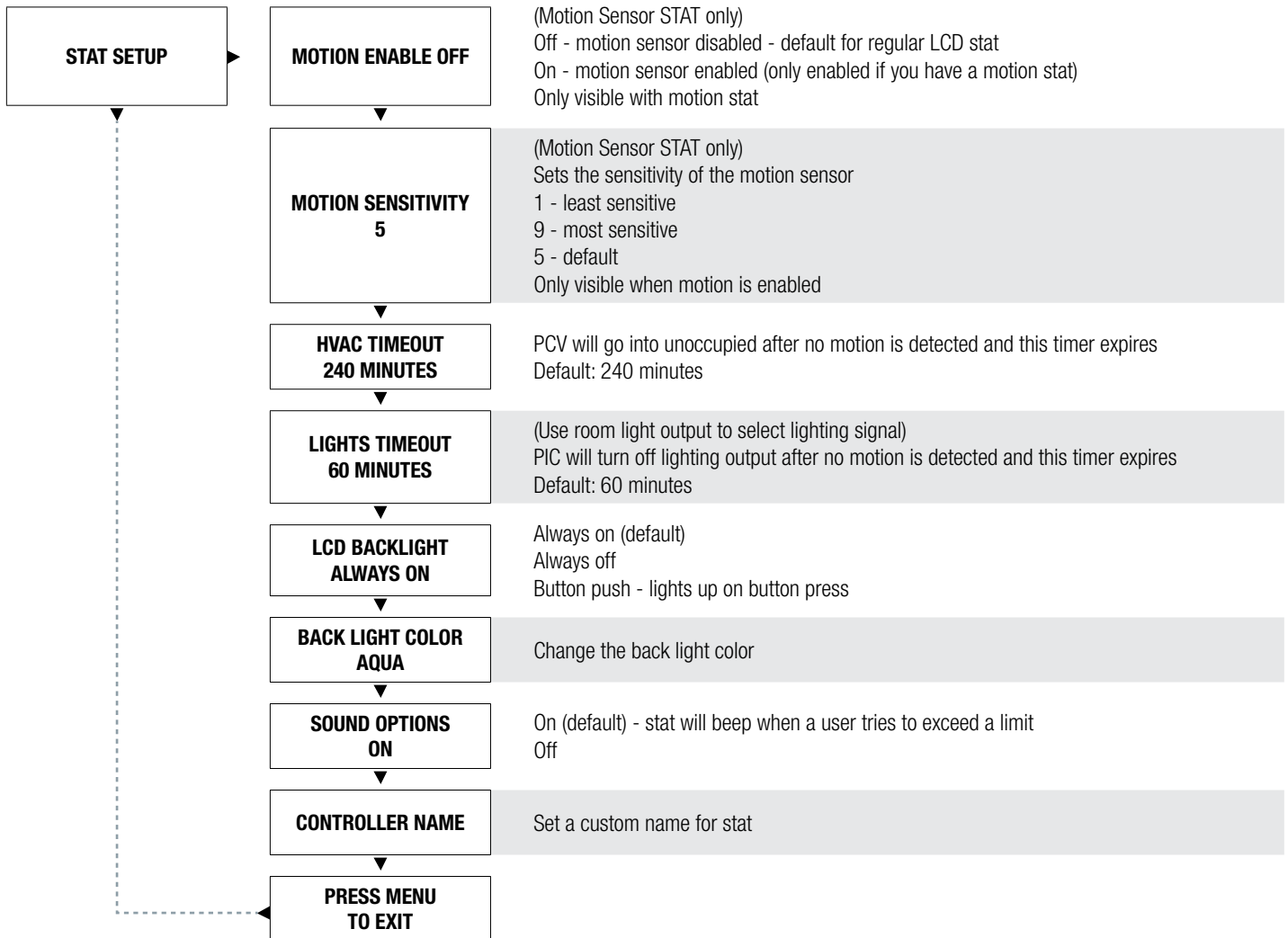
PRESSURE CONTROL VALVE

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.



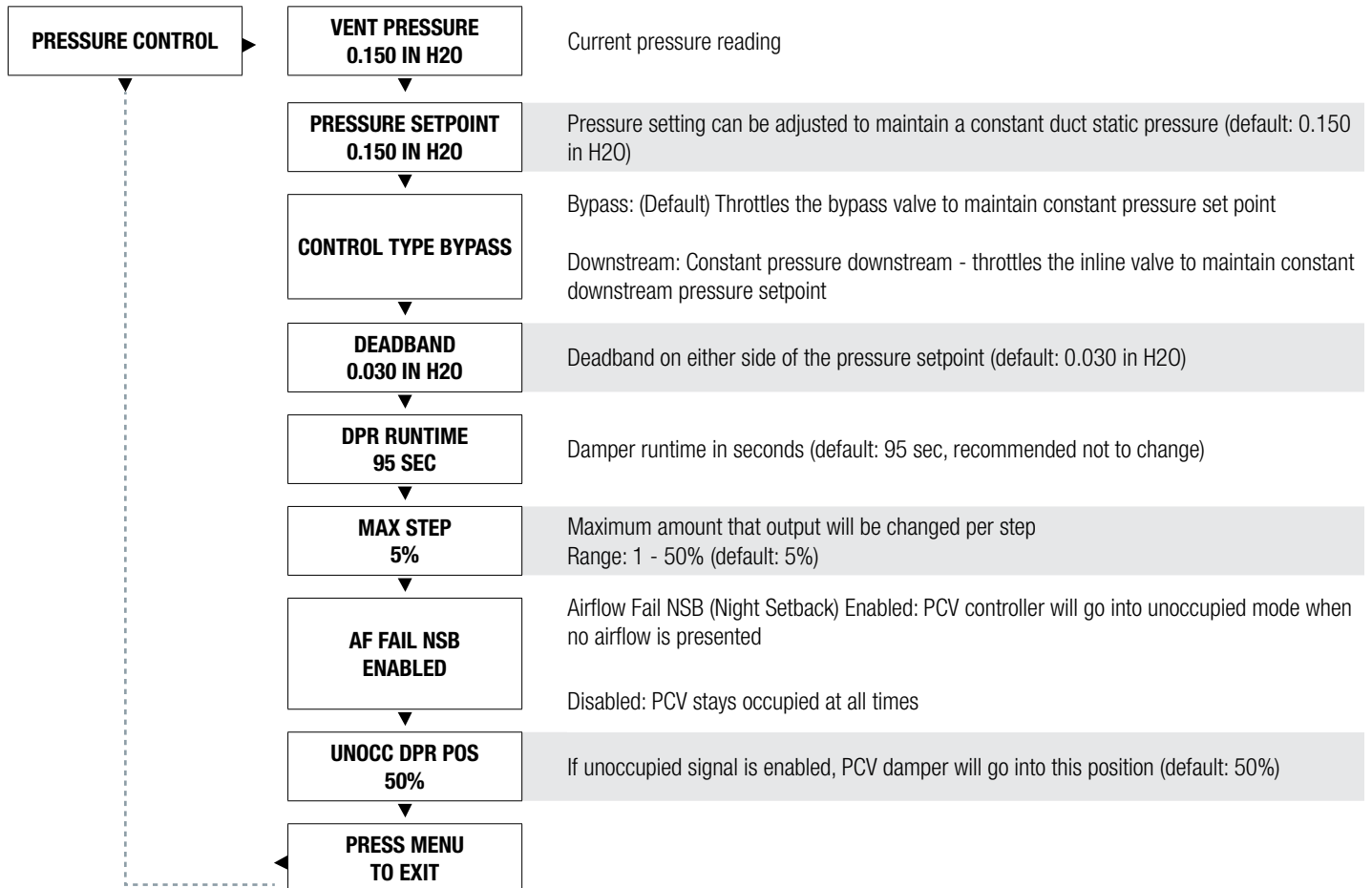
PRESSURE CONTROL VALVE

DISPLAY NAVIGATION

P/C Setup

(Pressure Controller Setup)

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



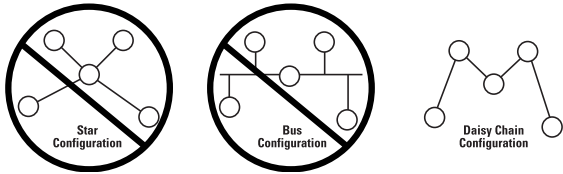


PRESSURE CONTROL VALVE

MAINTENANCE

Troubleshooting





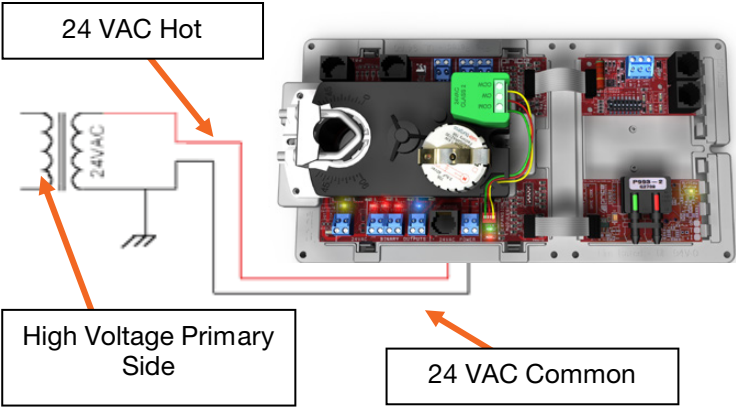
The following information is provided in the event that the Pressure Independence Module does not appear to function properly after installation.

| Fault | Solution |
|---|--|
| <p>PCV 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.</p> | <p>Check thermostat first for either green indication light, or LCD display. If either of these does not appear, then check the PCV 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.</p> |
| <p>Damper acts erratically</p>  | <p>Check actuator mounting; ensure that the damper is fully closed when the actuator is in the fully closed position. Pivot the grey release clutch on actuator and move by hand. Ensure that the set screw on the damper shaft is torqued down tight and no slipping is occurring.</p> <p>Ensure the static pressure probe is connected to the HI (RED) side port of the transducer. Leave the LO (Green) side port of the transducer open to atmosphere.</p> |
| <p>BACnet Communication Errors</p>  | <p>BACnet</p> <p>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.</p>  <p>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.</p> <p>Correct polarity is imperative on MS/TP 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. Eg. 2 wire conductor with black and white wires – black to the positive terminal, and white to the negative terminal. Keep this consistency throughout the network.</p> |

PRESSURE CONTROL VALVE

MAINTENANCE

Troubleshooting - Continued

| Fault | Solution |
|--|---|
| <p>BACnet Communication Errors</p>  | <p>BACnet MS/TP networks must be terminated to ensure proper operation. A network should be terminated twice, once at the beginning and once at the end. Termination helps reduce reflections and noise. The terminating can be done with a 100 Ω resistor across the A+ and B- lines, but PCV controllers have the option for enabling termination by flipping dip switch #8 to the ON position. The network speed or baud rate must be the same throughout the network.</p> <p>NOTE: 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.</p> |
| <p>BACnet Communication Errors</p>  | <p>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 binary Addressing scheme for the existing network. The Address is set on the Addressable dip switches on the PCV.</p> |
| <p>BACnet Communication Errors</p>  | <p>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.</p> <p>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.</p> |
| <p>BACnet Communication Errors</p>  | <p>NOTE: 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.</p> <p>WARNING: 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!</p>  <p>The diagram illustrates the correct wiring for a 24VAC transformer. The primary side is labeled 'High Voltage Primary Side'. The secondary side has two terminals: '24 VAC Hot' and '24 VAC Common'. The '24 VAC Common' terminal is connected to ground. The control unit is shown with internal wiring connecting to these terminals.</p> |

PRESSURE CONTROL VALVE

MAINTENANCE

Hardware Specifications

| | |
|----------------------------|---|
| Power Requirements | 24VAC, 47-63 Hz 6VA (not including output loading) NEC Class II |
| Ambient Ratings | 32° to 131° F (0° to 55° C) 10 to 90% RH (non-condensing) |
| Outputs | 24VAC Binary Output. Max 0.5A each (x7), MAX 1.85A total Switched HOT or Switched COMMON <ul style="list-style-type: none">• Damper CW• Damper CCW Analog 0-10VDC (x4). Max: 10mA each |
| Inputs | Thermistor Sensor (10k Type J thermistor) Analog 0-10V inputs (x2). 20k Ω input impedance <ul style="list-style-type: none">• Thermostat Inputs• Temperature Sensor (10K Type J Thermistor)<ul style="list-style-type: none">• 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) <ul style="list-style-type: none">• Communication speeds: 9,600, 19,200, 38,400, 76,800 (default)• Maximum recommended devices per MS/TP segment: 30 devices• For local setup using LCD set-up service tool |
| Size | 11" x 5.75" x 2.75" |
| Weight | 1.8lb. (816g) |

This document contains the most current product information as of this printing.
For the most up-to-date product information please go to priceindustries.com.

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