

MANUAL – INSTALLATION + SERVICE

Price Intelligent Controller

PIC Series

v400 – Issue Date: 05/23/17

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PRICE[®]

PRICE INTELLIGENT CONTROLLER

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SUPPORT ▼

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

Application Support

204.654.5613

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priceindustries.com/literature

PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

General

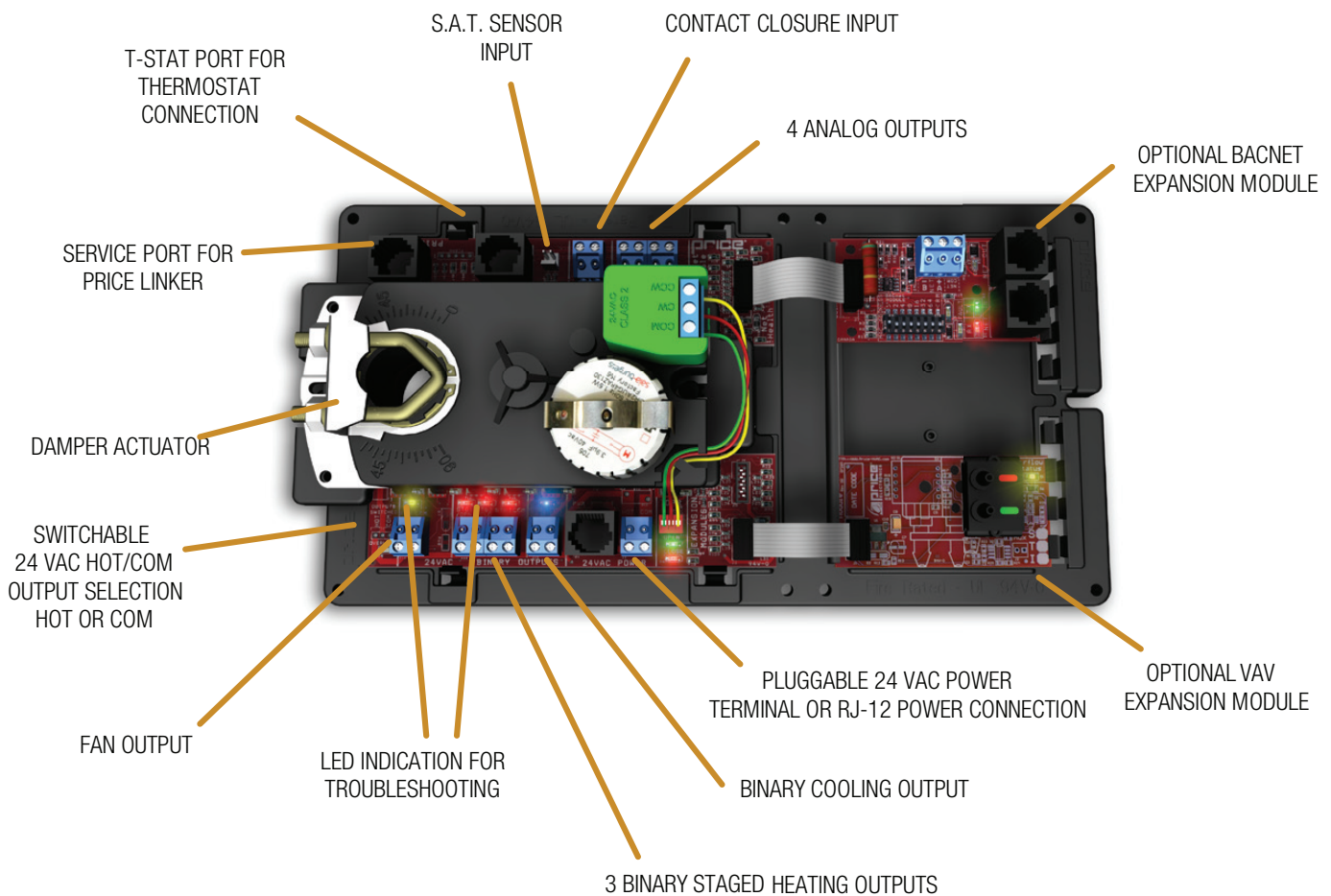
PIC - Price Intelligent Controller

The Price Intelligent Controller (PIC) is a direct digital controller for VAV terminals or fan coils that offers cutting edge zone control. The PIC combines the accuracy of direct digital control with the flexibility of an individual room control system, providing

maximum control and efficiency. An advanced and configurable proportional integral controller allows for exceptional user comfort and energy efficiency. Installation of the controller and thermostat is simple and error proof with RJ-45 (network type) connections to the thermostat and BACnet network.

The PIC typically comes factory mounted to Price VAV boxes, but may also be ordered stand-alone for retrofit jobs.

PIC - PRICE INTELLIGENT CONTROLLER ▼



PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

The PIC controller is an advanced and fully configurable VAV terminal controller that can be used as either a pressure dependant or a pressure independent zone control system.

When used as a pressure dependant controller, the flow rate is dependant on inlet static pressure and damper position.

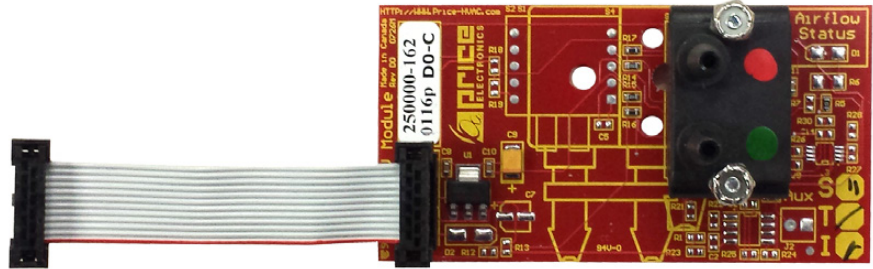
When used as a pressure independent controller, flow rate is constant with the use of the VAV Expansion Module (PIC-VAV) and airflow sensor. The PIC can be used as a stand alone unit, or can be interfaced into a BAS with MS/TP BACnet capability using the BACnet module (PIC-BAC). The PIC controller offers 5 thermostat options that provide a range of control from room temperature sensing, all the way to wireless control. With a variety of output configurations, the PIC controller can control analog heating and cooling valves, fan motors, and other types of analog devices. As well as On/Off heating and cooling stages, On/Off fan operation, fan coils, etc. With the use of the LCD Thermostat with Motion, the PIC can be used as a motion sensor and lighting controller with different levels of sensitivity, as well as system balancing tool.

Expansion Modules

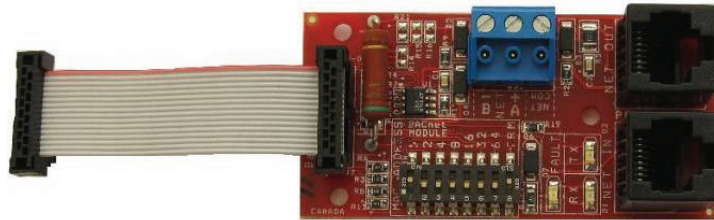
The Price Intelligent Controller is also expandable for BACnet networking capabilities, and for Pressure Independent control. The expansion modules come equipped with a ribbon cable that is easy to plug in from the PIC to the selected module.

- PIC-VAV: VAV module (optional) provides airflow sensing for true VAV control.
- PIC-BAC: BACnet module (optional) provides a native BACnet MS/TP interface for networking.

PIC-VAV ▼



PIC-BAC ▼



PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

Installing the PIC

1. Mount the controller onto the duct with the damper shaft going through the PIC's actuator, and tighten the screws on the actuator.
2. 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.
3. 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.
4. Power the PIC using 24VAC, the secondary 24VAC common of the transformer must be earth grounded.

Features of the PIC controller

24 VAC power terminal or RJ-12 power connection.

24VAC Binary Outputs (7): A variety of binary outputs for heating, cooling or fan operation which are rated for maximum 0.5 amps each. Max: 1.85 amps total. Field switchable from HOT to COM.

Analog Outputs (4): Fully configurable (2-10VDC, 0-10VDC, 10-2VDC, etc.) outputs for heating, cooling, fan operation, and auxiliary, rated at maximum 10 mA each.

S.A.T. Sensor Input (1) 10K type J Thermistor: When heat/cool changeover is required a temperature probe must be connected.

Contact Closure Input (1): Night setback

BACnet Expansion Module (optional): Providing a native BACnet MS/TP interface.

VAV Expansion Module (optional): Provides airflow sensing for true VAV control.

Integrated Damper Actuator: Default stroke time of 95 seconds.

T-stat port: for RJ-45 connection to thermostat from the PIC controller.

Service Port: RJ-12 port used to connect Price Linker for system balancing and setup, or to connect an LCD Thermostat for system balancing and setup. The LINKER is a USB 2.0 interface to Price controls and is used in conjunction with FREE setup and balancing software available from Price.

LED indication: For ease of troubleshooting.

PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

Input/Output Description

24VAC Binary Outputs	
Fan Output	Binary Output for On/Off control of a fan, three types: Intermittent - Fan runs when there's a call for heating or cooling. Day/Night - During the Day cycle the fan is on, during the Night cycle the fan is off. Constant - Fan runs continuously
Stage 1	Binary (electric, or binary hot water) Tristate (floating) close signal of hot water valve
Stage 2	Binary (electric, or binary hot water) Tristate (floating) close signal of hot water valve
Stage 3	Binary (electric, or binary hot water) 24VAC PWM to SSR (10 second period)
Cool/Aux	Binary Output for one stage of cooling if required. Can be used as an auxiliary binary output if required.
Analog Outputs	
ECM AO1	Analog Output for any type of modulating fan (0-10VDC, 2-10VDC, 10-2VDC, etc.)
AO2 Heat	Analog Output for modulating heating valve (0-10VDC, 2-10VDC, 10-2VDC, etc.)
AO3 Cool	Analog Output for modulating cooling valve (0-10VDC, 2-10VDC, 10-2VDC, etc.)
AO4 - Spare	Spare analog output - normally indicates damper position (0-10VDC = 0-100%)
Inputs	
Contact Closure	Configurable Binary Input can be used for night setback, damper force open/close etc.
SAT Sensor	Analog Input for temperature probe hookup for heat/cool changeover if required. 10k Type J Thermistor

Switched HOT/COM Jumper: PIC offers a jumper selectable HOT/COM switch that allows the binary output to be switched HOT or switched COMMON.

COM Terminals: All COM terminals on the PIC controller are internally connected, which allows for a common reference point throughout the board.

Damper Actuator: Factory installed and wired, the PIC offers LED indication of the damper direction, (either OPEN or CLOSE). Default drive time of the actuator is 90 seconds, but is configurable through software, or by using the LCD Thermostat.

T-Stat RJ-45 Port: The PIC comes equipped with an RJ-45 port to provide ease of plugging in a thermostat cable from the PIC to any of the selected thermostats. The thermostat cable is supplied by Price.

Service Port: The PIC comes equipped with an RJ-12 port to provide ease of plugging in an RJ-12 cable to the Price Linker for system balancing and setup, or to connect an LCD Thermostat for system balancing and setup. The LINKER is a USB 2.0 interface to Price controls, and is used in conjunction with FREE setup and balancing software available from Price.

PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

Price - Flow Response Chart

HCCO box		Cooling Min	Cooling Flows	Heating Min	Heating Flows	Neutral Supply Air Flow
PI = Cooling	Duct Air = Cold		x			
PI = Heating	Duct Air = Cold			x		
PI = Neutral	Duct Air = Cold	x				
PI = Cooling	Duct Air = Hot	x				
PI = Heating	Duct Air = Hot				x	
PI = Neutral	Duct Air = Hot	x				
PI = Cooling	Duct Air = Neutral					x
PI = Heating	Duct Air = Neutral			x		
PI = Neutral	Duct Air = Neutral					x

NOTE 1: If no Temperature Probe is present, the PIC controller assumes cold duct air.

NOTE 2: PI = Proportional Integral = room load (either cooling/neutral/heating)

Above is a Flow Response chart for the PIC controller, showing the demand, Duct Air condition, and the controller's output.

E.g. PI = Cooling, Duct Air = Cold, Output = Cooling Flows. This indicates that the Room Demand is in Cooling, the Duct Air is Cold, and the controller would modulate between the Cool Min and Cool Max values.



TECH TIP ▼

Use the above table to determine what airflows are being chased in certain modes.

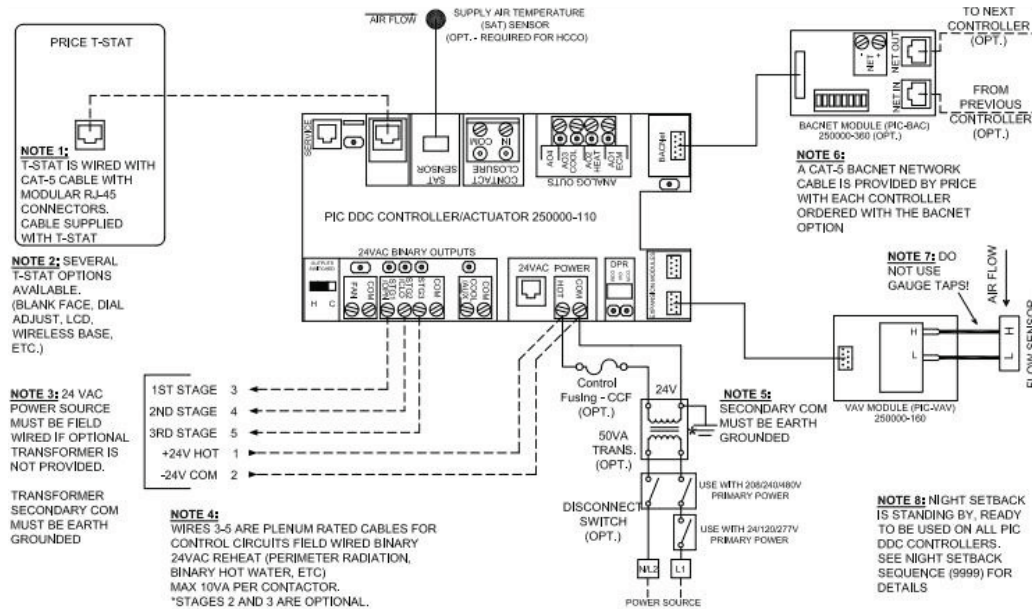
Examples: If PIC is trying to heat the room (PI = heating) and cool air is being supplied (Duct air = Cold) it will chase its heating min flow.

PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

Wiring

Below is an example of a typical PIC sequence diagram - Single duct box with 3 stages of binary heat. Each PIC 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.



NOTE: Suitable min and max heating flow must be selected in order to maintain flow through energized electric coils of at least 200fpm and at least 70cfm/kW throughout the entire operating range.

Sequence of Operation - Heat/Cool changeover OR cooling with up to 3 stage binary reheat - Pressure Independent. On power up the damper will calibrate closed for 2 minutes. **If no SAT sensor is present, the controller assumes Cool supply air at all times.**

Cool Supply Air: On an increase in space temperature, the controller regulates the actuator to open the VAV damper and increase the flow of cool air. On an increase of space temperature greater than the cooling proportional band, the airflow is maintained and its pre-selected maximum setting.

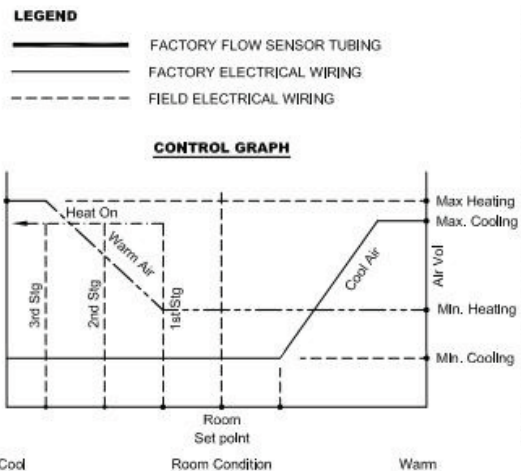
On a decrease in space temperature the controller regulates the actuator to close the VAV damper and reduce the flow of cool air. If the space temperature decreases to less than the cooling proportional band, the airflow is maintained at the pre-selected minimum setting.

Warm Supply: On a decrease in space temperature, the controller regulates the actuator to open the VAV damper and increase the flow of warm air. On a decrease of space temperature greater than the heating proportional band, the

airflow is maintained at the pre-selected maximum setting.

On an increase in space temperature, the controller regulates the actuator to open the VAV damper and increase the flow of warm air. If the space temperature increases above the heating proportional band, the airflow is maintained at the pre-selected minimum setting.

Reheat Operation: On a decrease in space temperature into the heating proportional band, the first stage binary 24VAC reheat output will energize. Upon further decreases, the second then third stages of reheat (if used) will energize.



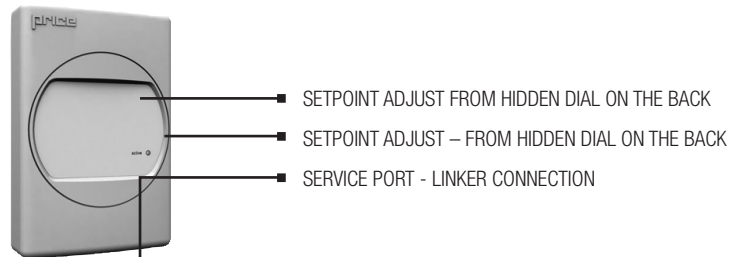
PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

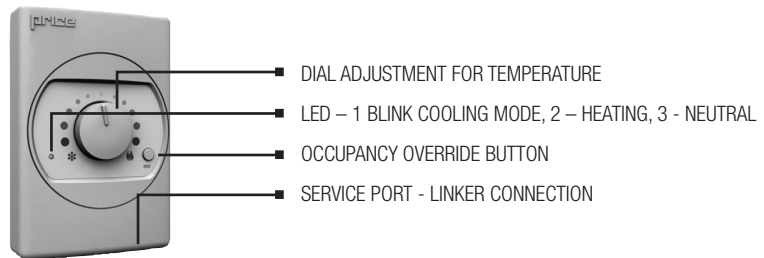
PIC - Price Intelligent Controller Thermostat Options x 5

All thermostats are connected with a CAT-5 cable (RJ-45) connection from the PIC to the back of the selected thermostat. Each thermostat has an RJ-12 Service Port on the bottom, providing a computer interface using the USB LINKER service tool for setup and balancing, and without having to access the plenum.

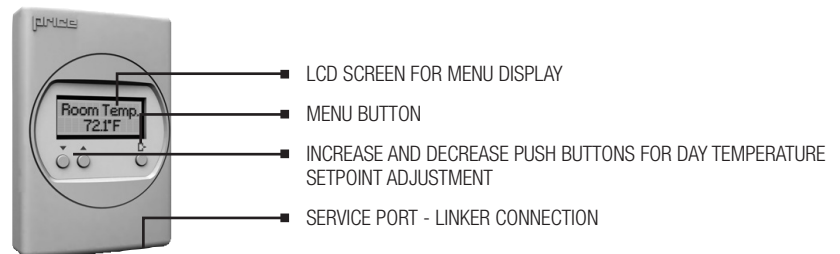
ROOM SENSOR THERMOSTAT: PIC-TS-SENS ▼



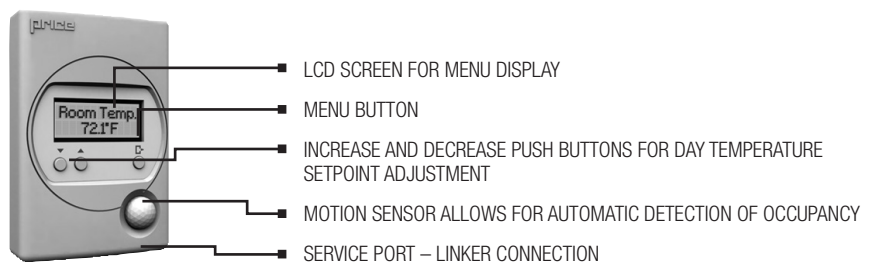
DIAL THERMOSTAT: PIC-TS-DIAL ▼



LCD THERMOSTAT: PIC-TS-LCD ▼



LCD THERMOSTAT WITH MOTION SENSOR: PIC-TS-MOTION ▼



PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

The Price Wireless Thermostat System provides both sensor inputs and a point of control for Price controllers.

The System consists of 2 units:

WIRELESS REMOTE T-STAT - Transmitter - Room sensor T-Stat with dial setpoint adjust, LED and push button.

WIRELESS BASE - Receiver - Unit with LCD and 3 push buttons.

REMOTE T-STAT and BASE units talk between each other wirelessly in the 2.4GHz range (FCC and IC certified). BASE unit connects to main controller using the supplied plenum-rated CAT-5 cable. No other connections are required.

WIRELESS THERMOSTAT ▼



Base (Receiver) Mounted in Plenum

- LCD Screen for menu display
- Increase and decrease push buttons for day temperature setpoint adjustment
- Service Port - Linker Connection
- Menu Button

Remote (Transmitter) User Thermostat

- Dial Adjustment for Temperature
- LED – 1 blink cooling mode, 2 – heating, 3 – neutral
- Occupancy Override Button
- Service Port - Linker Connection

PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

Thermostat Installation

General Description

The PIC thermostats are all physically the same size and mounting instructions will be typical.

Location

1. The Price Intelligent Controller (PIC) Thermostats must be mounted to a wall and wired to the controller via the supplied plenum rated 35ft CAT-5 cable. This cable plugs into the thermostat and the PIC controller with the ease of RJ-45 connections. **NOTE:** the cable run can be extended to 70 ft using a Price Cable coupler and additional 35ft 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 direct blow onto the thermostat's temperature sensor causing 'bad' readings.

Installation

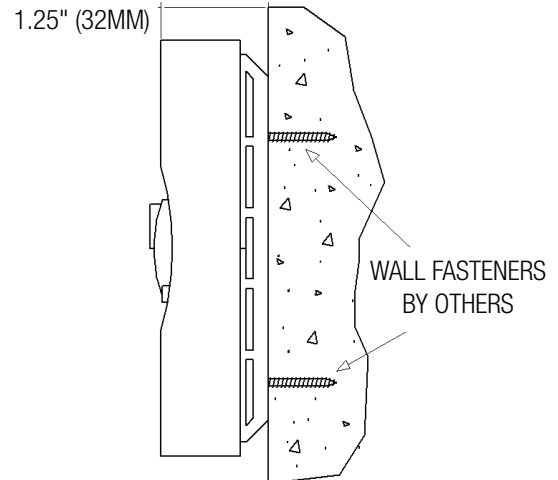
1. The back plate on each thermostat is removable and can be mounted to a standard electrical box or directly to drywall using anchors supplied by others.
2. Run the CAT-5 cable through the center hole in the plate. Connect the cable to the thermostat, then secure the thermostat onto the wall plate inserting top portion of the thermostat first, then snapping the bottom half in.
3. All thermostats will come equipped with a 0.050" 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

SURFACE MOUNT DETAIL ▼



35 FOOT PIC-CABLE ▼



PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Thermostat Overview

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 T-Stat 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 to 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.

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 T-Stat setup menu, free setup software using the Price LINKER, or through a BACnet system.
- The LCD Thermostat can be used as a balancing tool for the controller system by connecting the RJ-45 cable to the back of the thermostat.

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 T-Stat setup menu, free setup software using the Price LINKER, or through a BACnet system.
- Balancing and additional setup functions are also available through the menus.
- This thermostat can also be used as a motion sensor for occupied and unoccupied times in a space. It also has the capability to act as a lighting controller for occupied/unoccupied schedules.

ROOM SENSOR THERMOSTAT ▼



DIAL THERMOSTAT ▼



LCD THERMOSTAT ▼



LCD THERMOSTAT W/ MOTION SENSOR ▼



PRICE INTELLIGENT CONTROLLER

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
PIC 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. XXXXXXXX	Displays current Device Instance
ROOM TEMP. 75.0°F	(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...

PRICE INTELLIGENT CONTROLLER

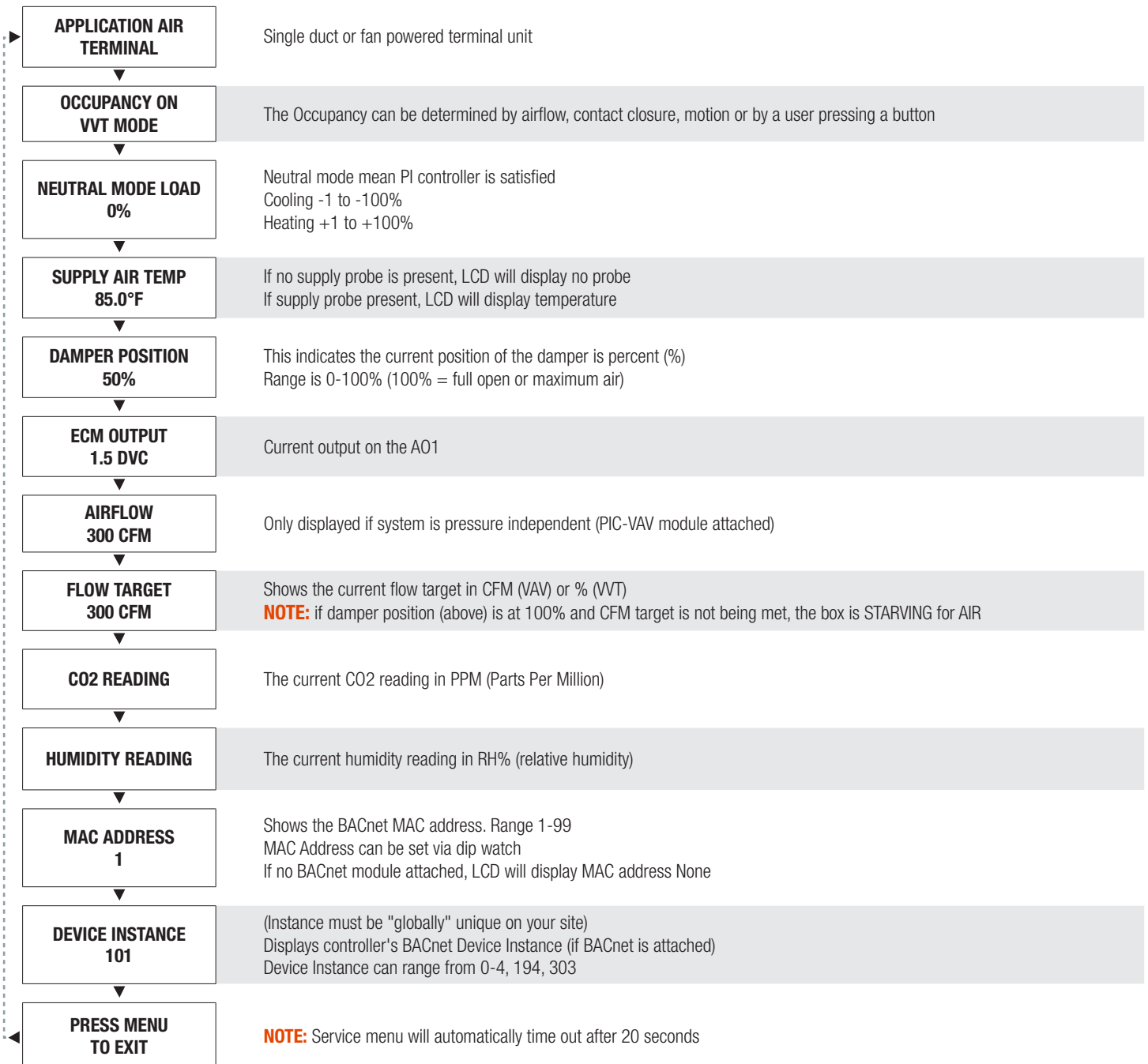
DISPLAY NAVIGATION

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.



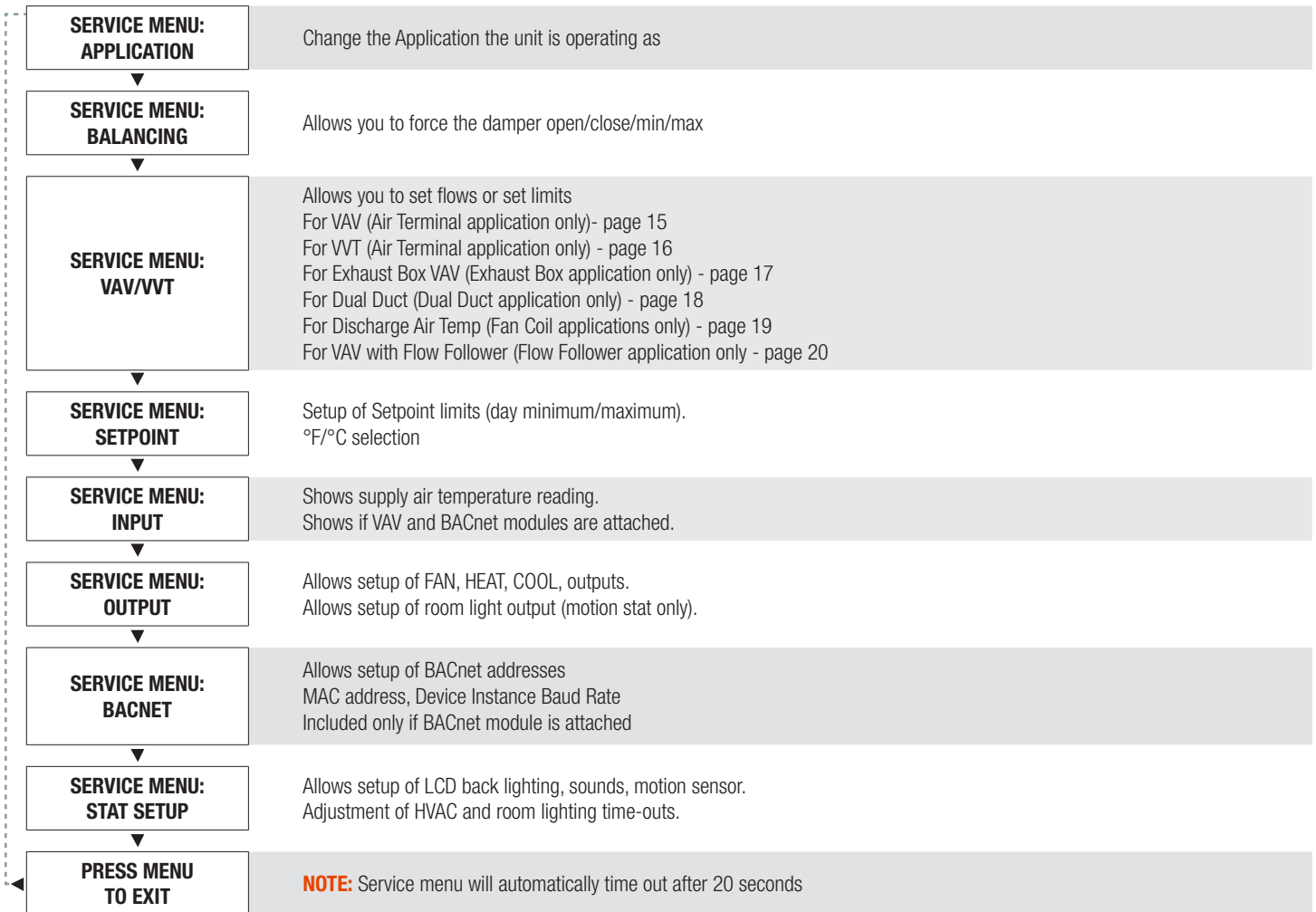
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Service Menu

(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**.

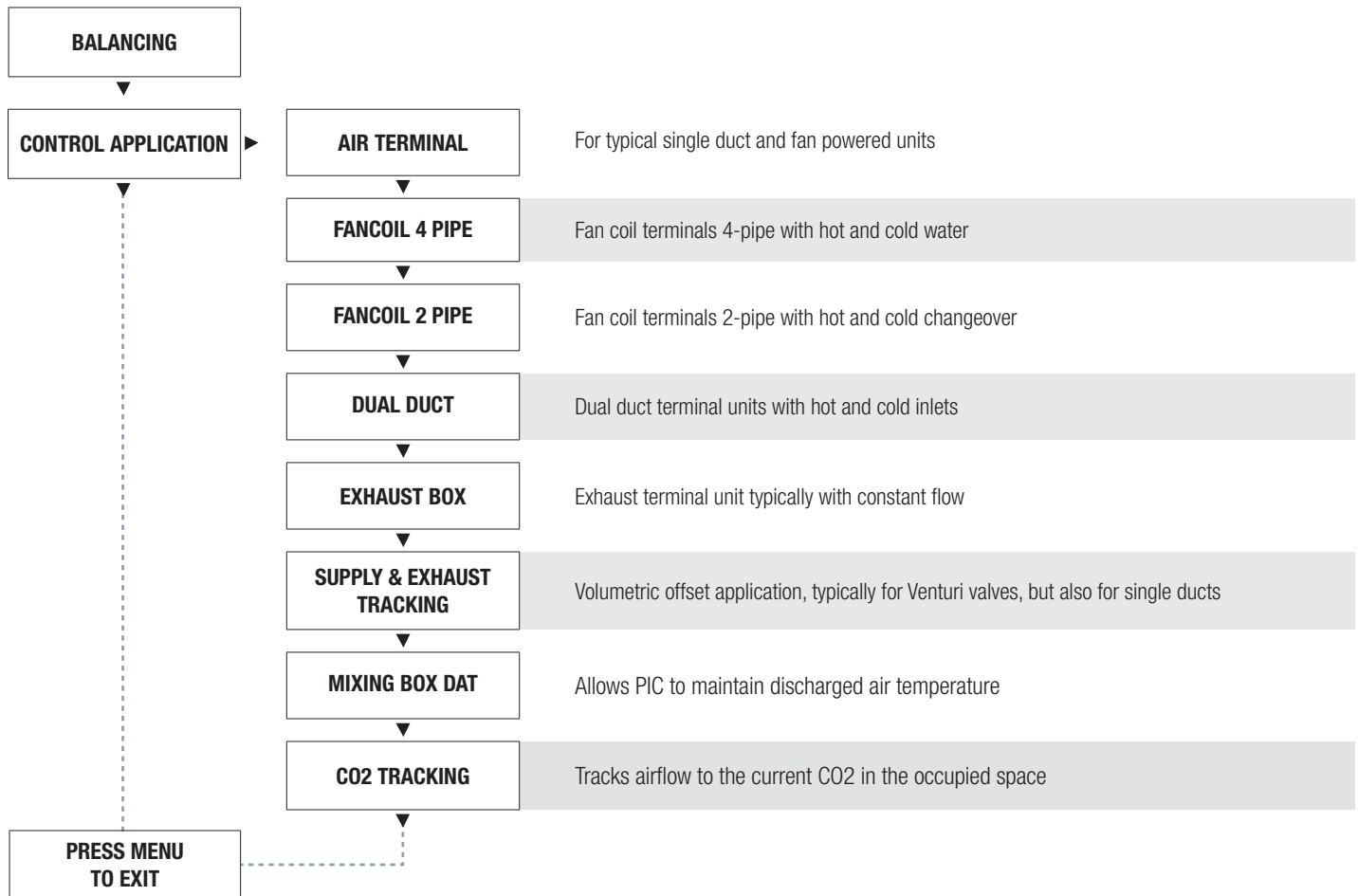


PRICE INTELLIGENT CONTROLLER

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.



TECH TIP ▾

Depending on which application is selected, determines whether some menus with appear. Each menu item that is affected specifically states when it is visible.

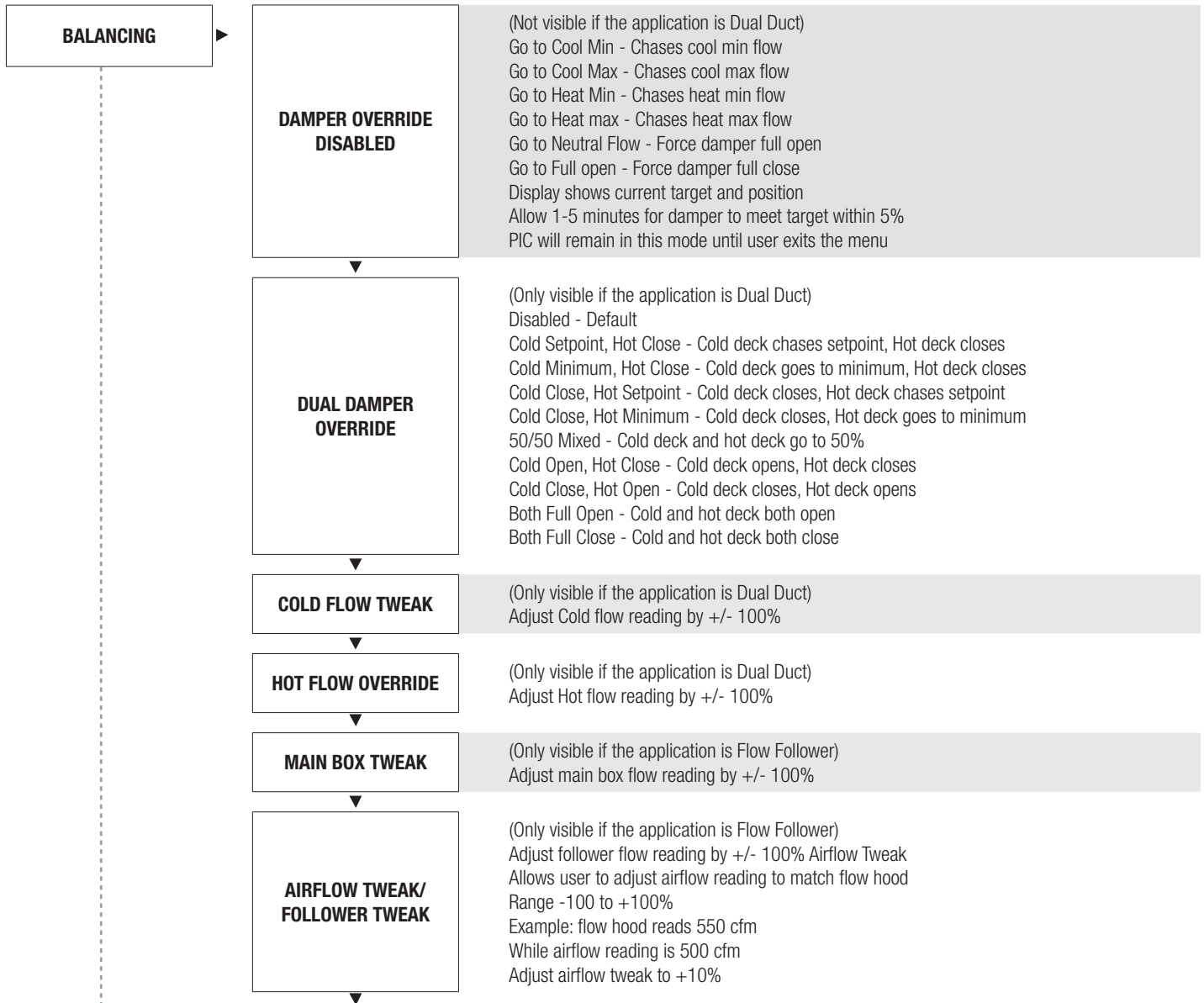
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Balancing Menu

Scroll through menu with 'Up' and 'Down' keys. Press Enter/Menu' button to apply your changes.

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PRICE INTELLIGENT CONTROLLER

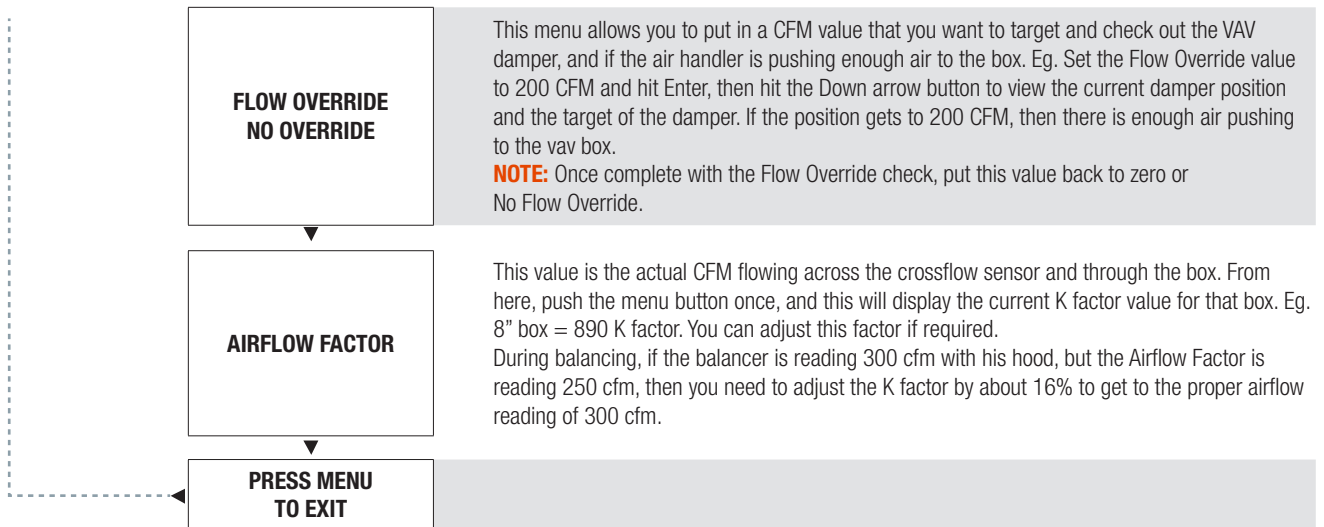
DISPLAY NAVIGATION

Balancing Menu

Scroll through menu with 'Up' and 'Down' keys. Press Enter/Menu' button to apply your changes.

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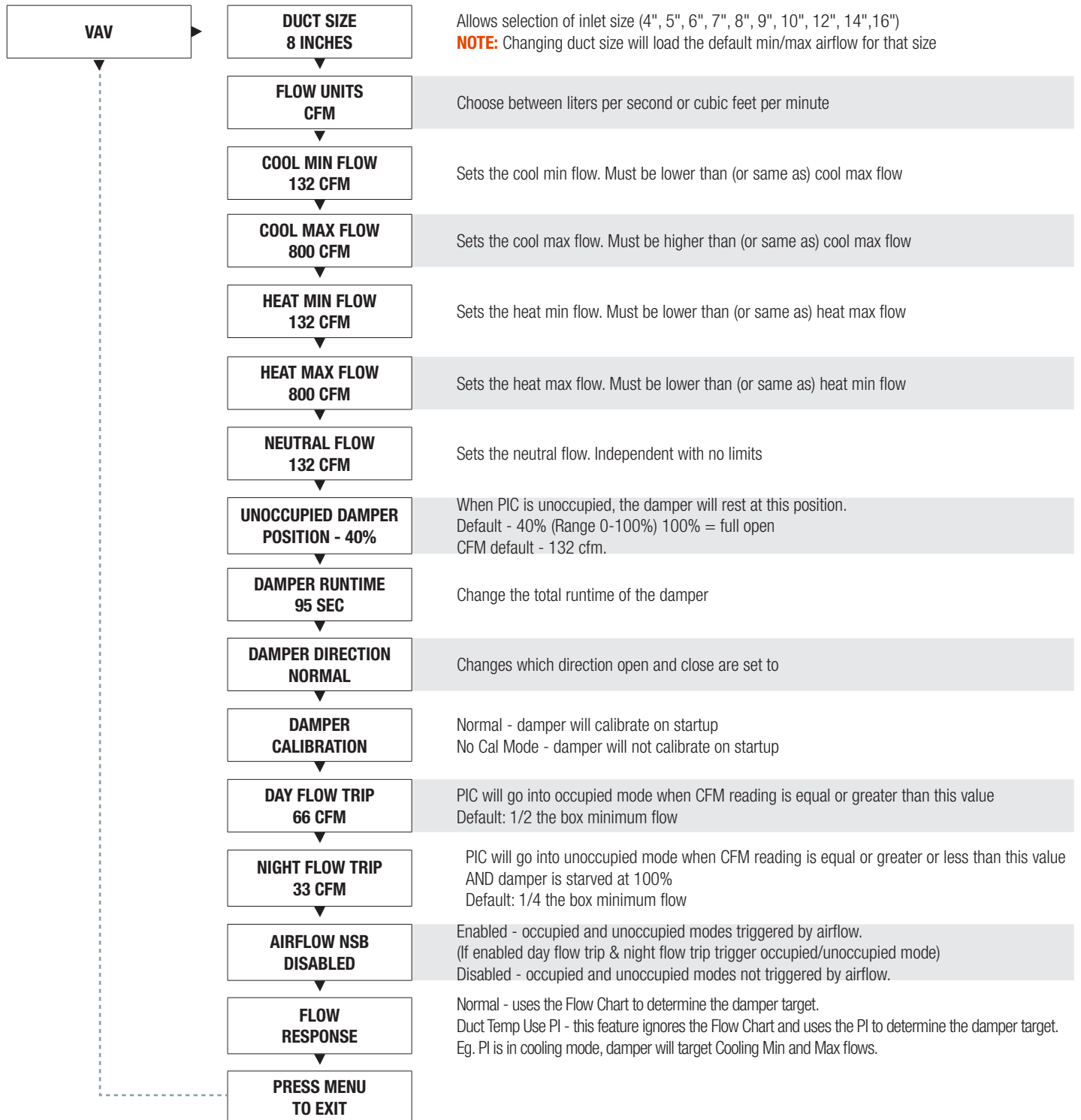
PRICE INTELLIGENT CONTROLLER

PRODUCT OVERVIEW

VAV Menu

(Pressure Independent Mode)

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



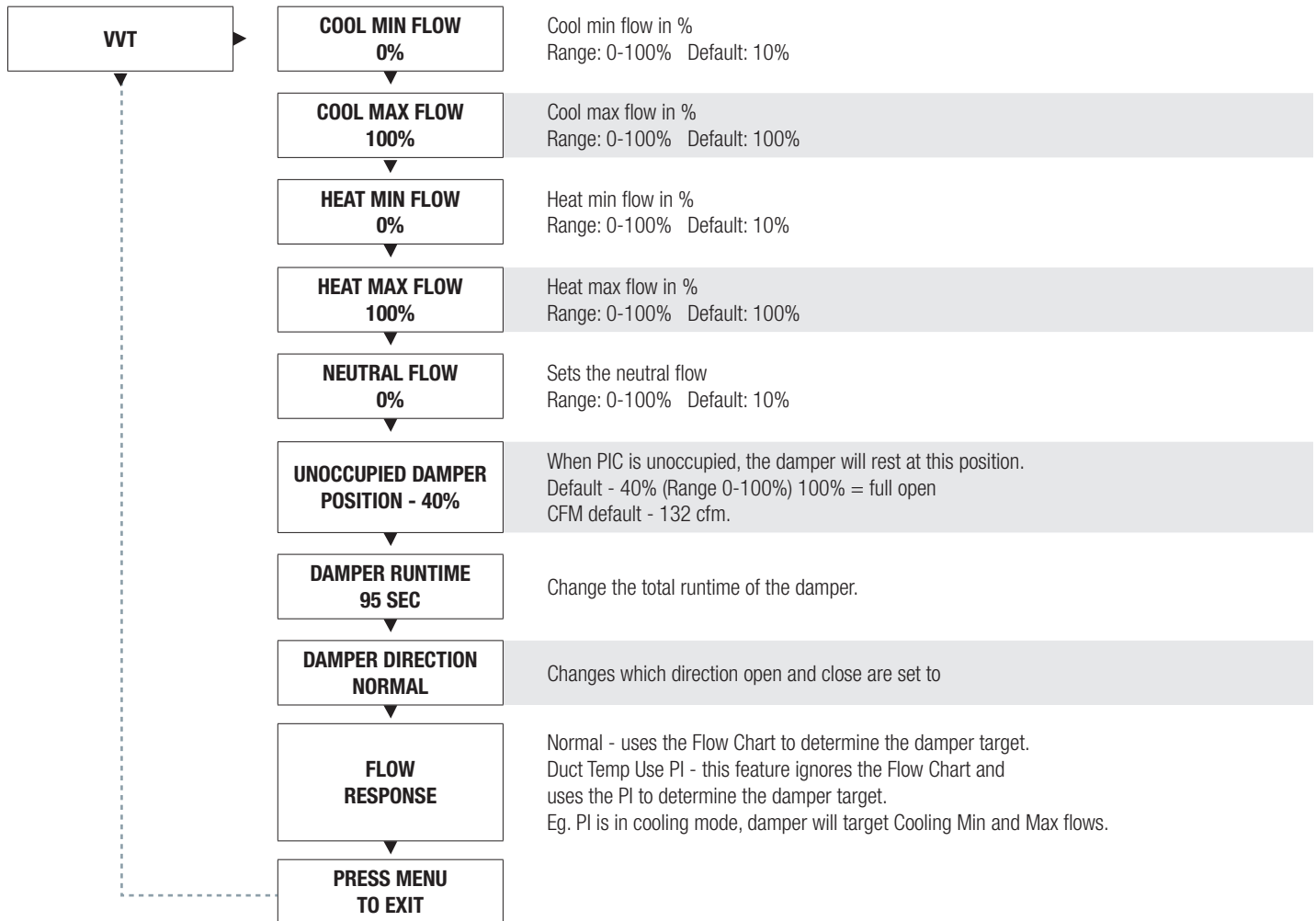
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

VVT Menu

(Pressure Dependent Mode)

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



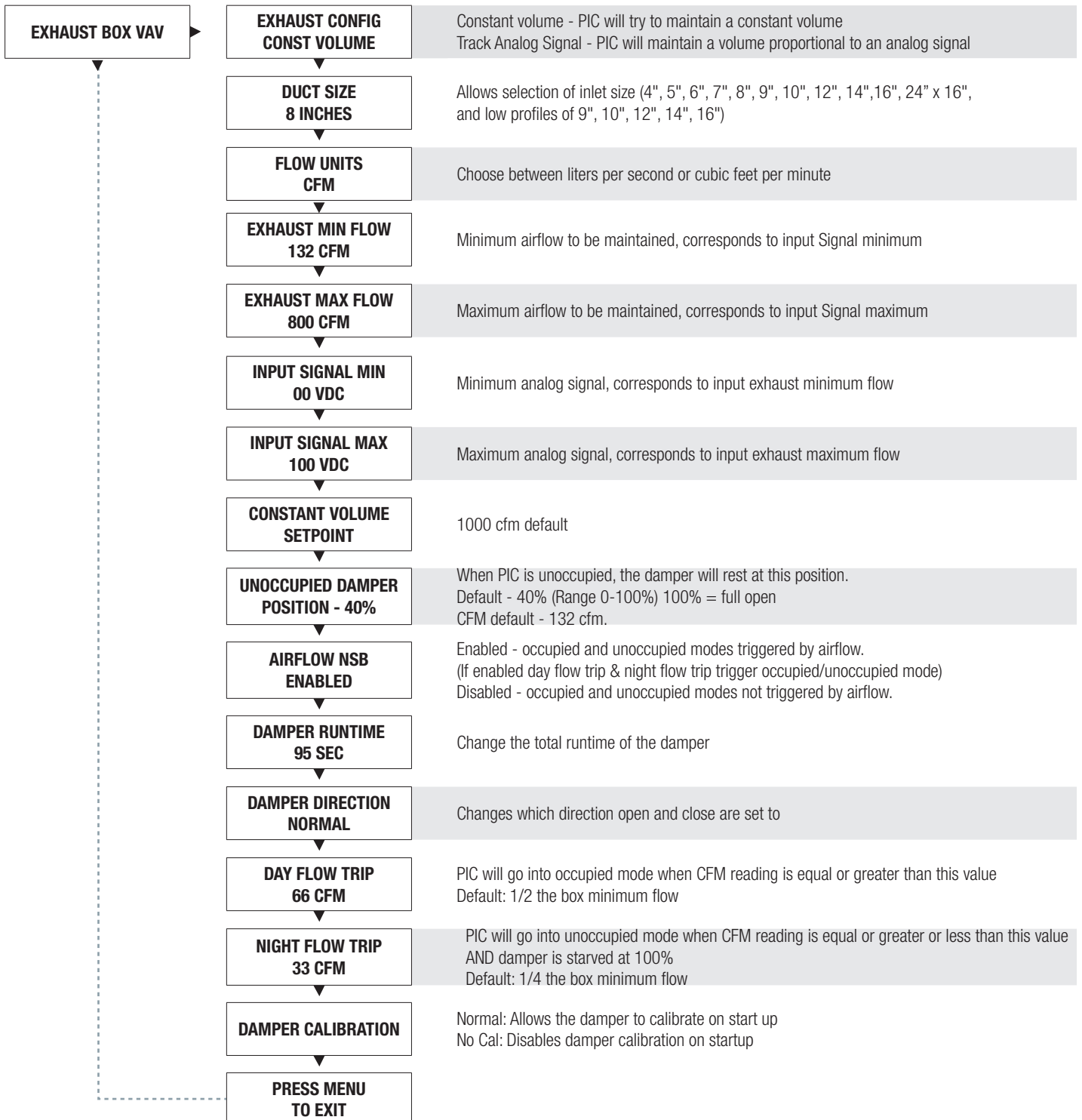
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DISPLAY NAVIGATION

Exhaust Box VAV Menu

(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.



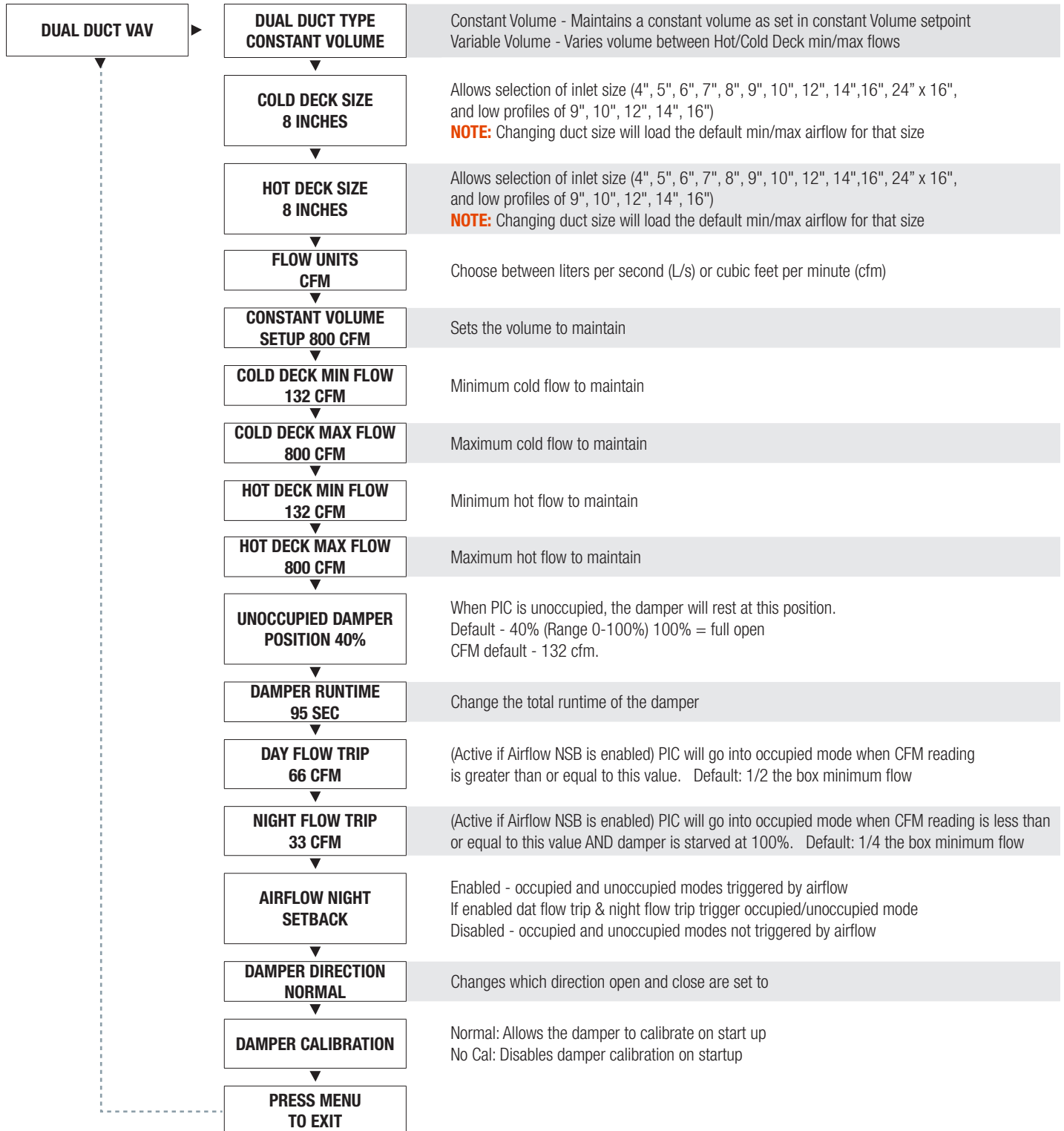
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Dual Duct VAV Menu

(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.



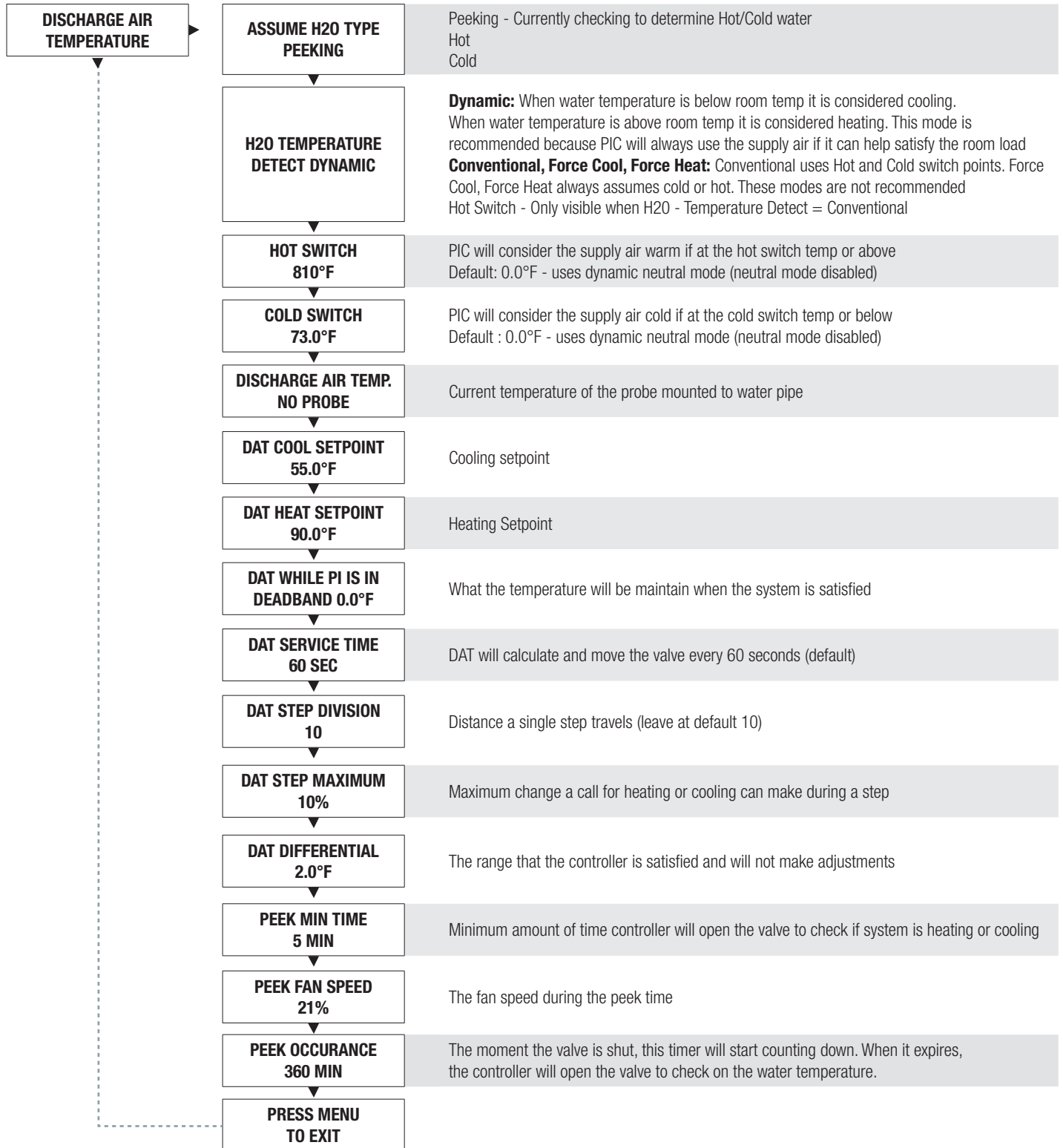
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Discharge Air Temperature Menu

(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.



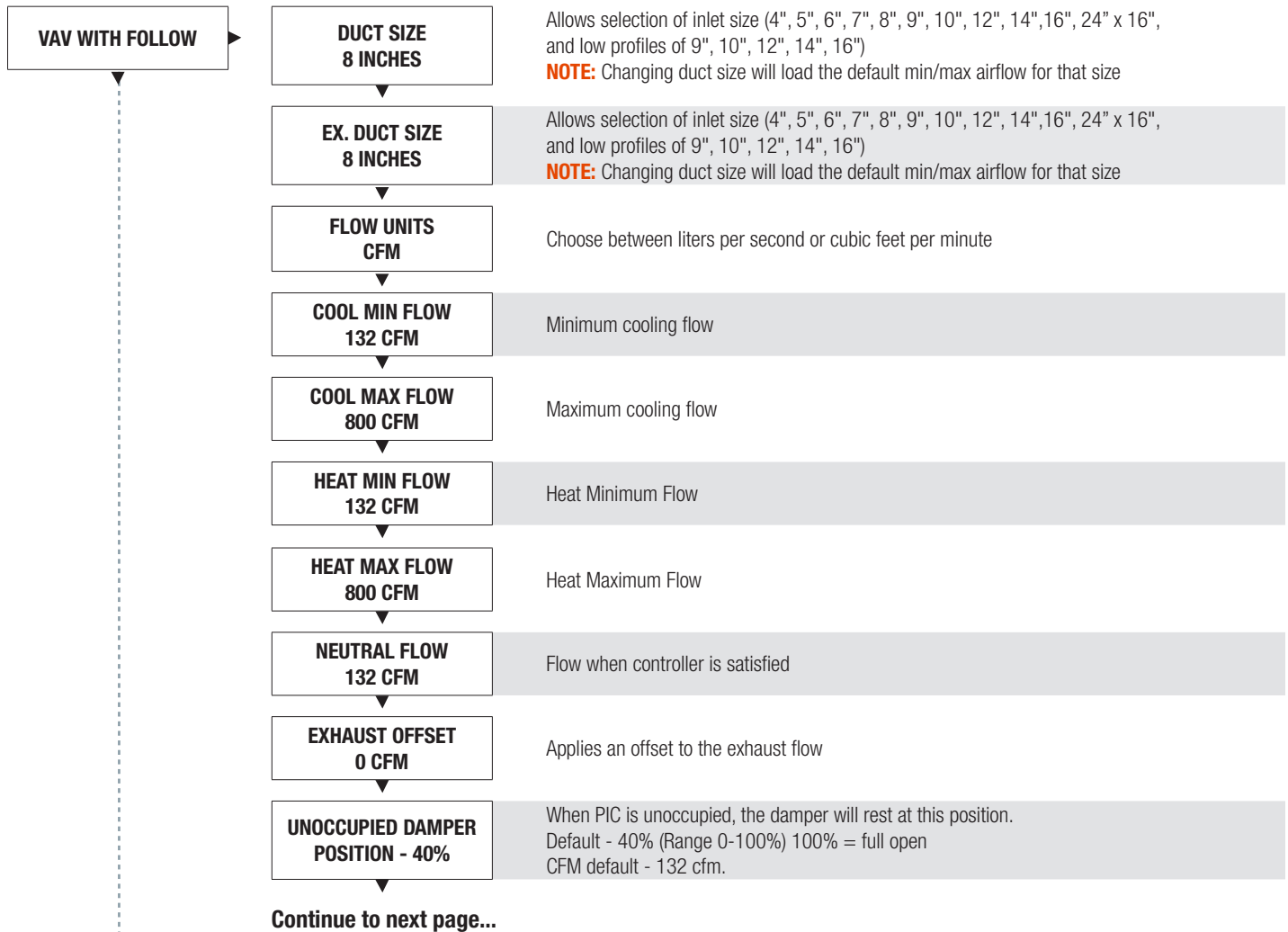
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

VAV with Supply Exhaust Tracking Menu

(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.



PRICE INTELLIGENT CONTROLLER

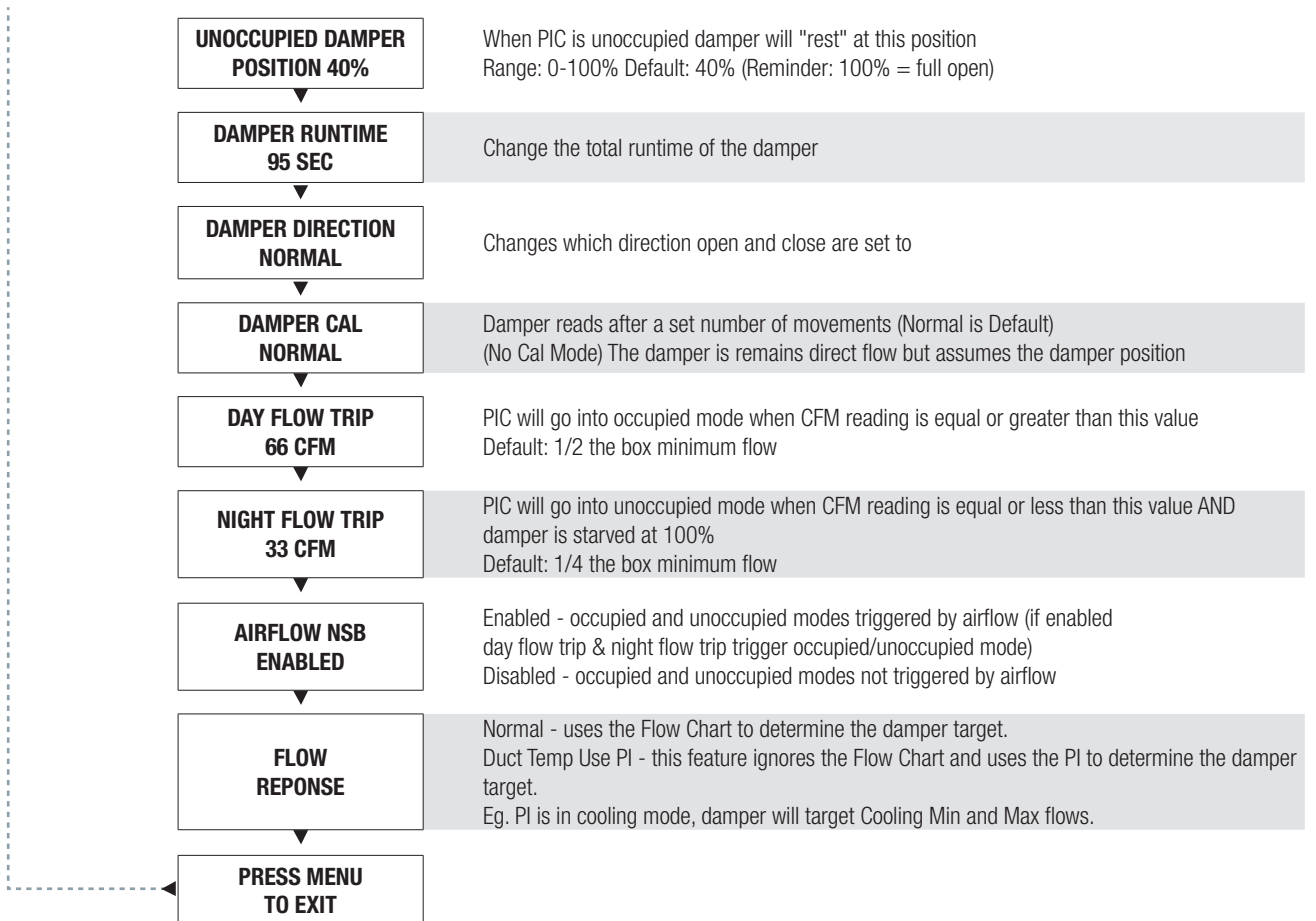
DISPLAY NAVIGATION

VAV with Follower Menu

(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.

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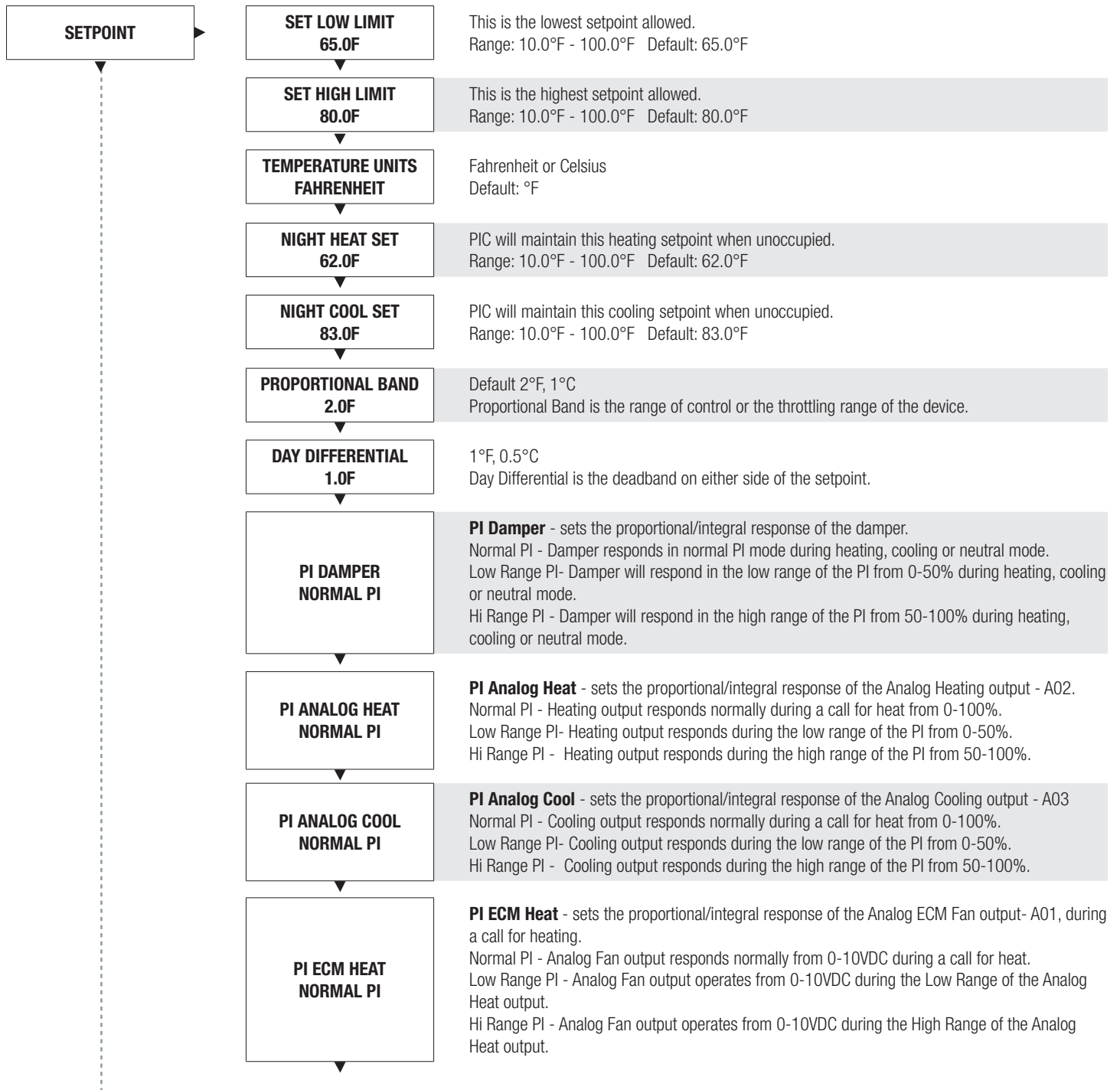
PRICE INTELLIGENT CONTROLLER

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.



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PRICE INTELLIGENT CONTROLLER

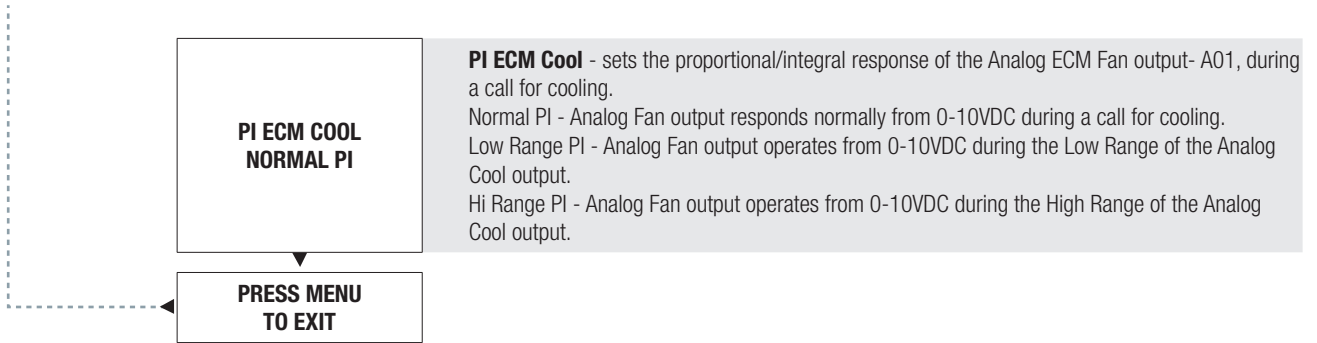
DISPLAY NAVIGATION

Setpoint Menu Continued

(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.

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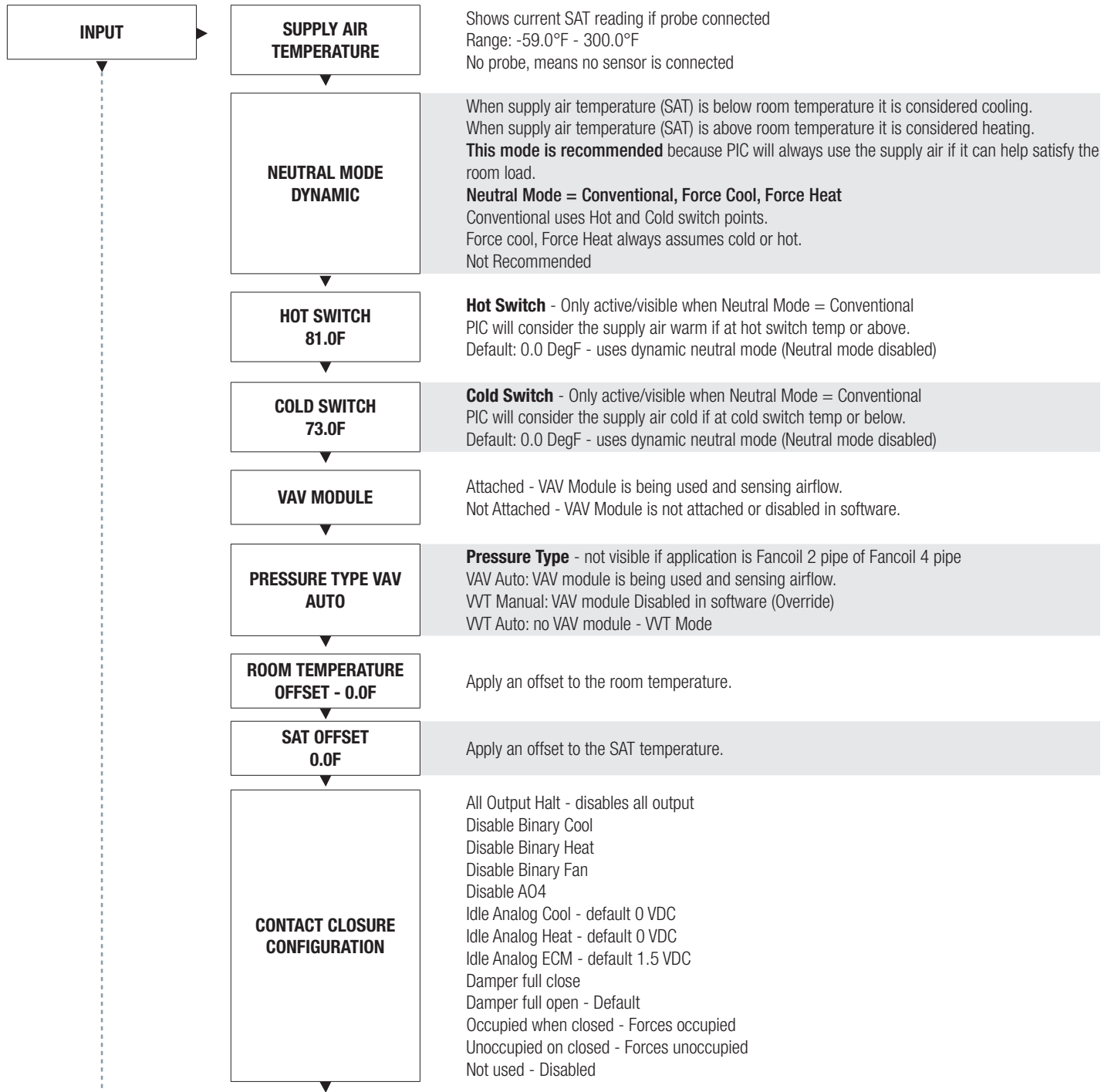
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Input Menu

(Supply Air Temperature and Neutral Mode)

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



Continue to next page...

PRICE INTELLIGENT CONTROLLER

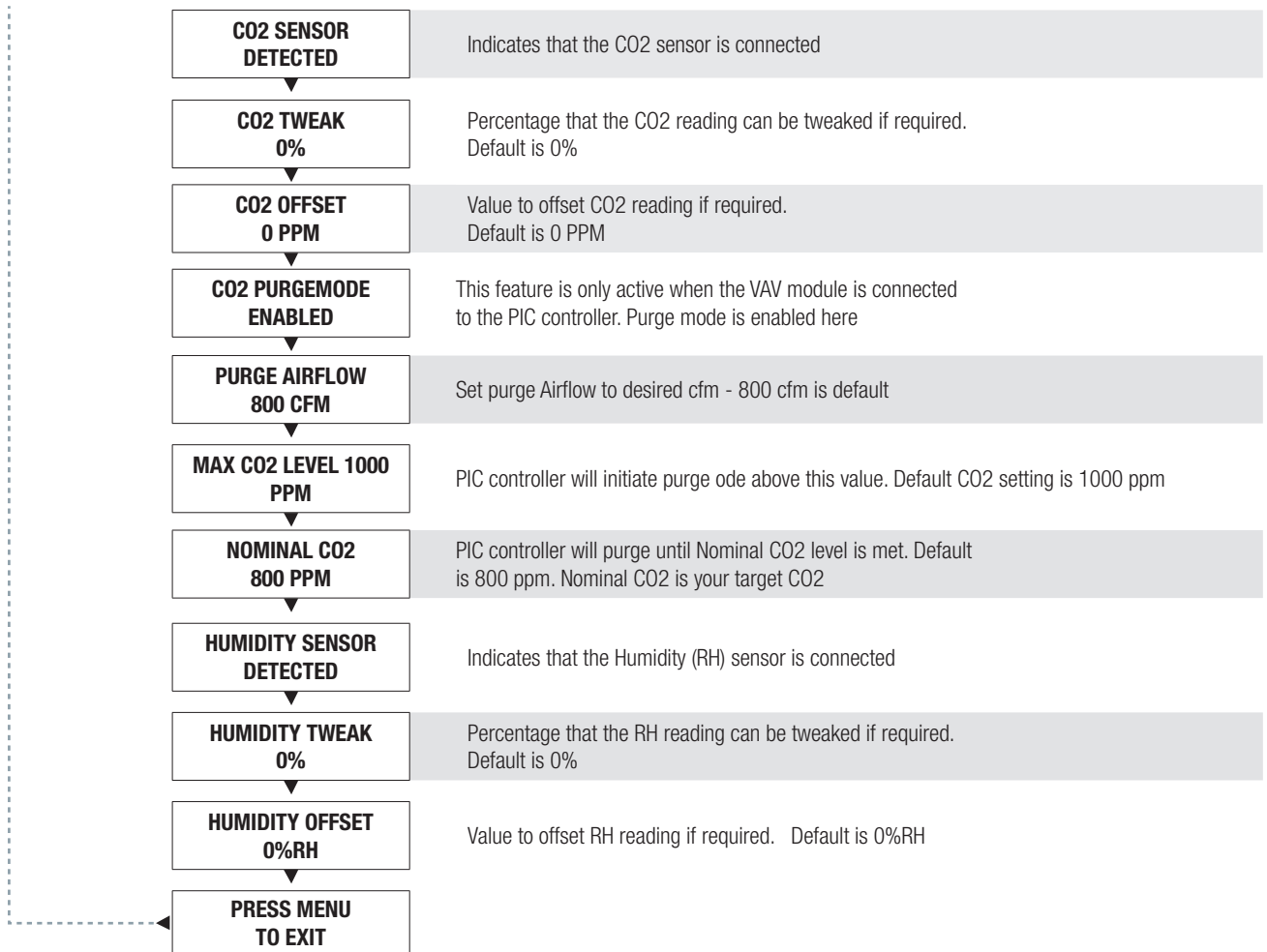
DISPLAY NAVIGATION

Input Menu Continued

(Supply Air Temperature and Neutral Mode)

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

Continued from previous page...



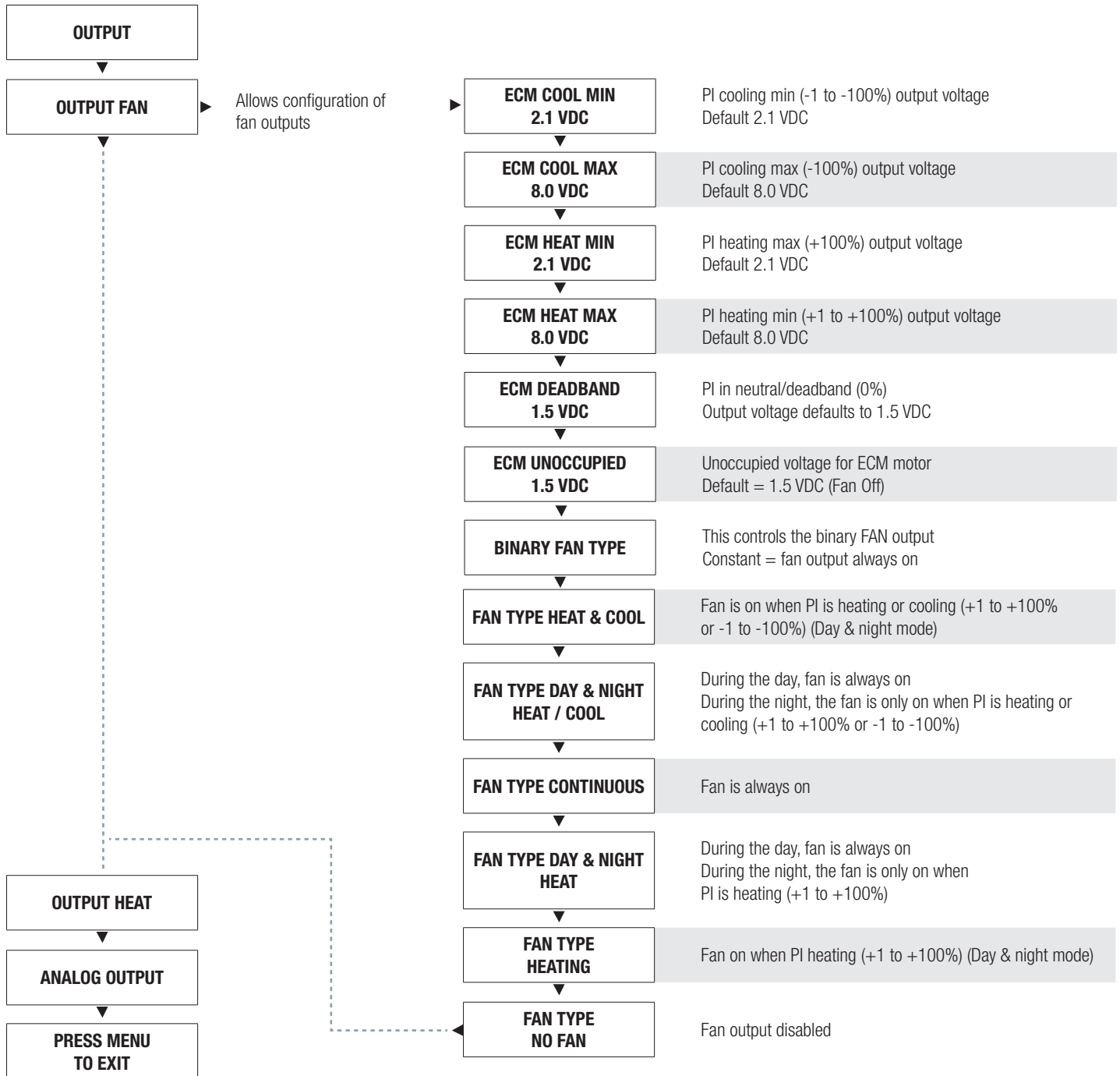
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Output Menu - FAN

(Setup of Fan 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.



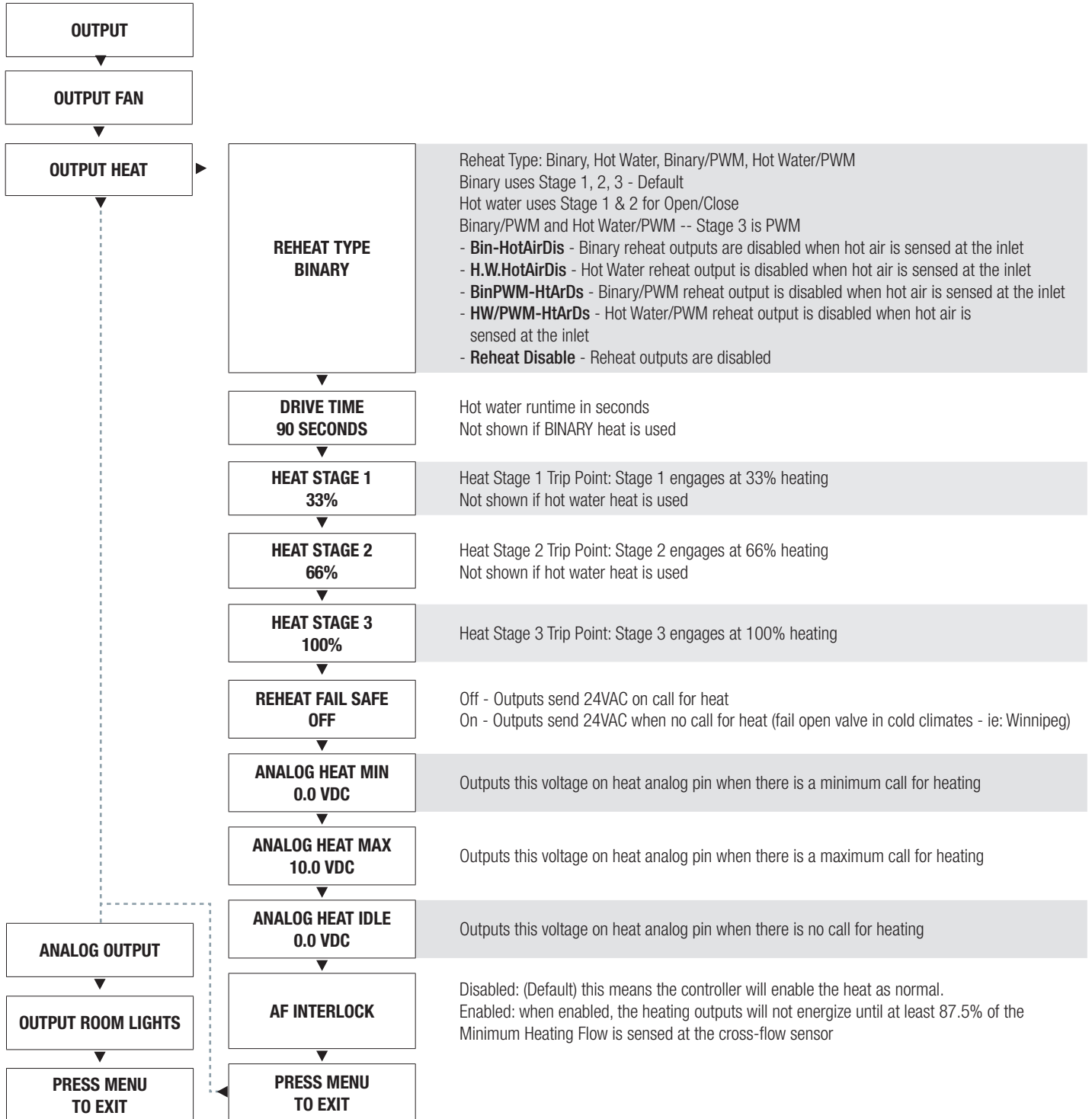
PRICE INTELLIGENT CONTROLLER

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.



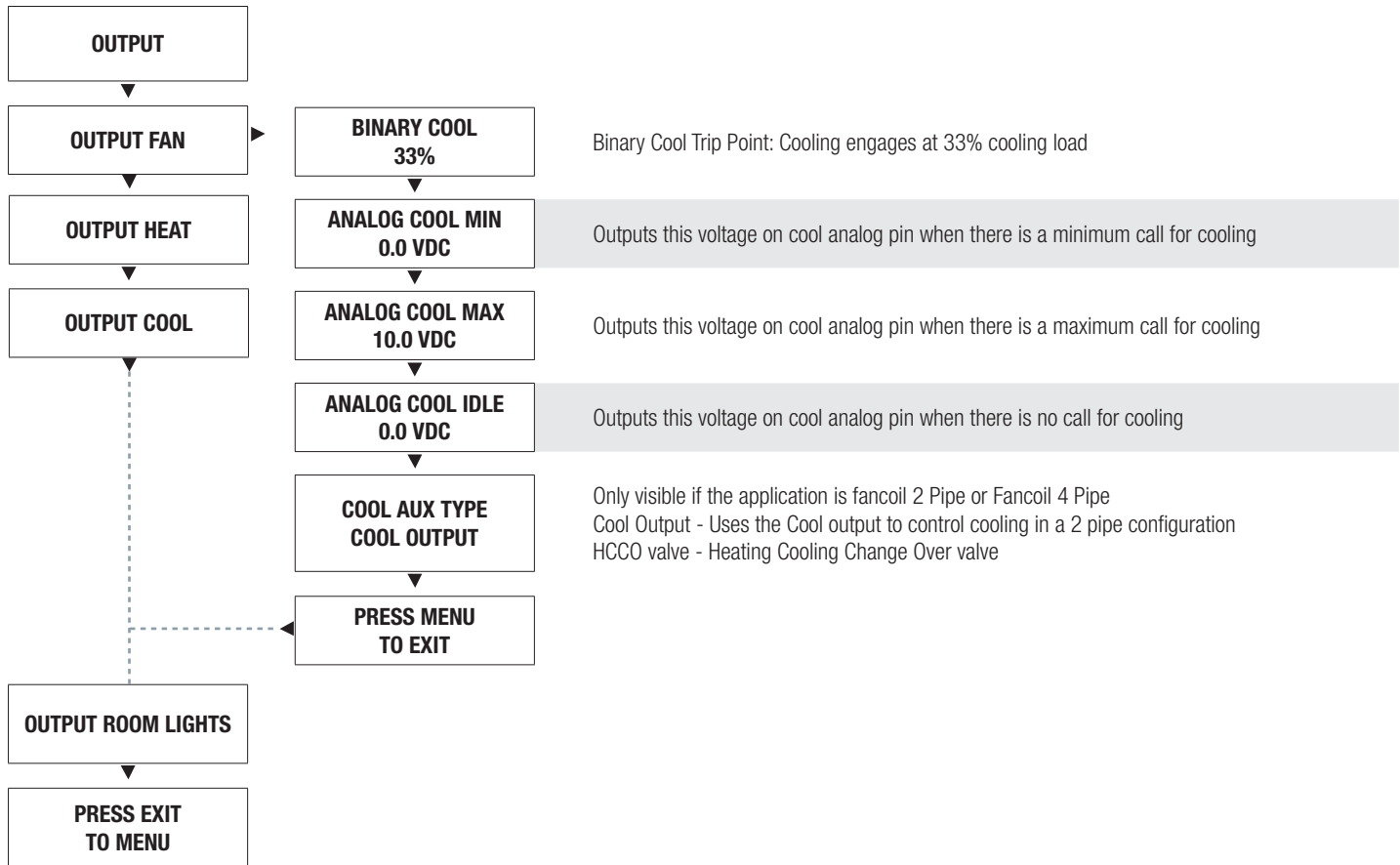
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Output Menu - Cool

(Setup of Fan 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.



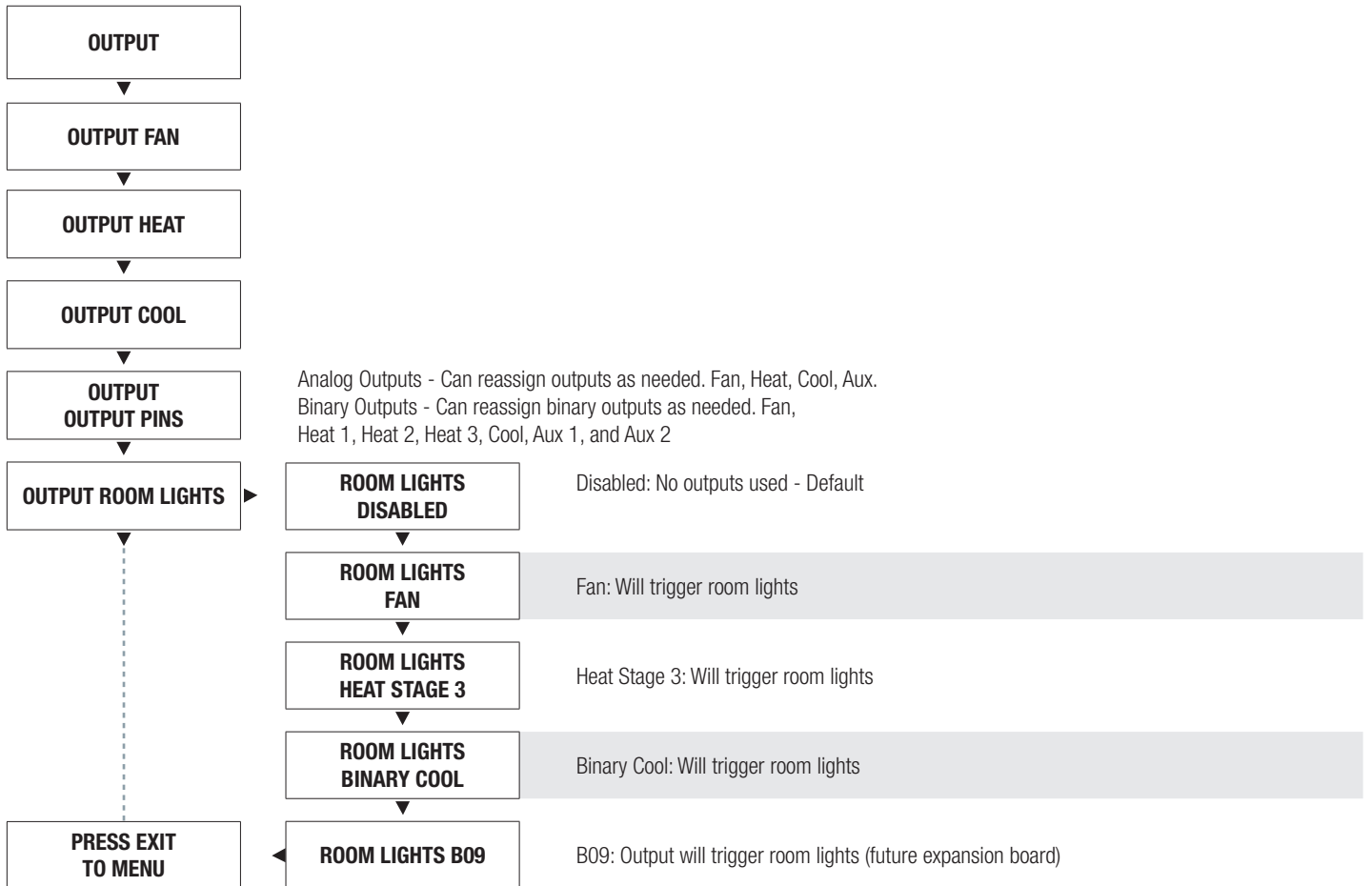
PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

Output Menu - Room Lights

(Setup of 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.



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.



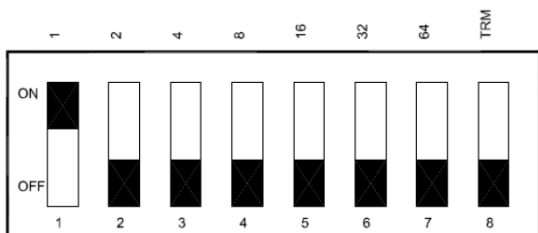
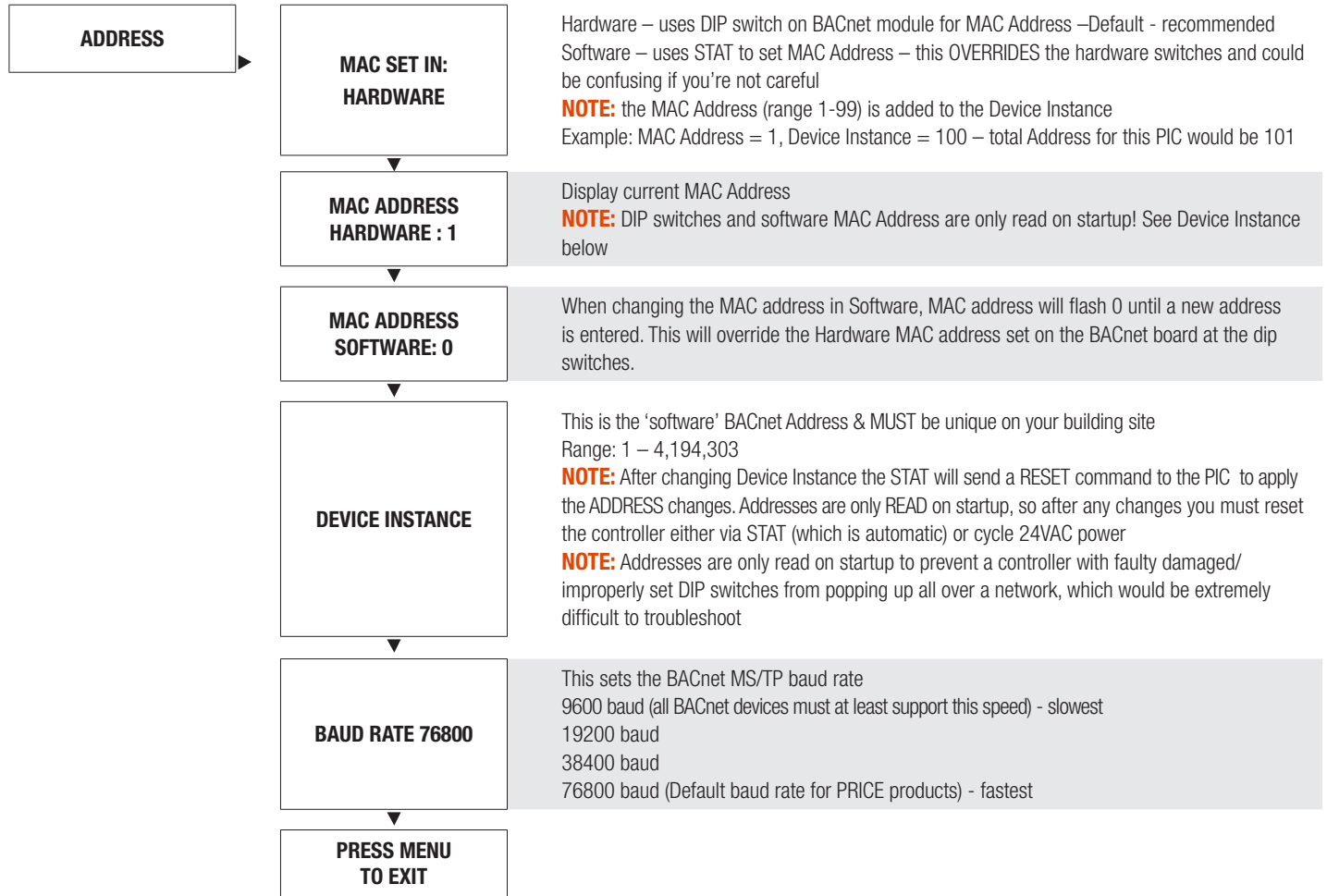
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DISPLAY NAVIGATION

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.



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.

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

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

PRICE INTELLIGENT CONTROLLER

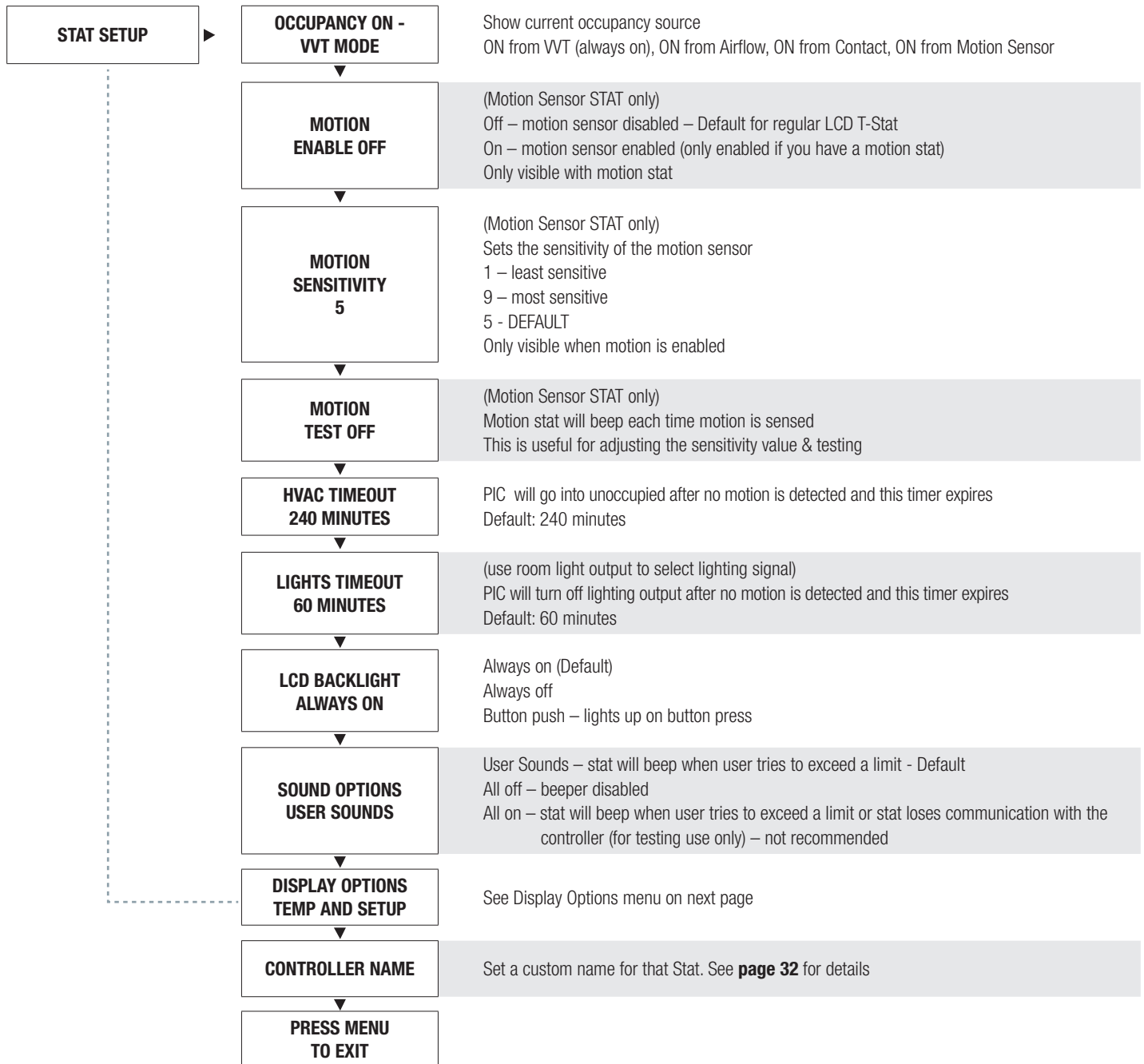
DISPLAY NAVIGATION

Stat Setup Menu

(Stat Options)



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



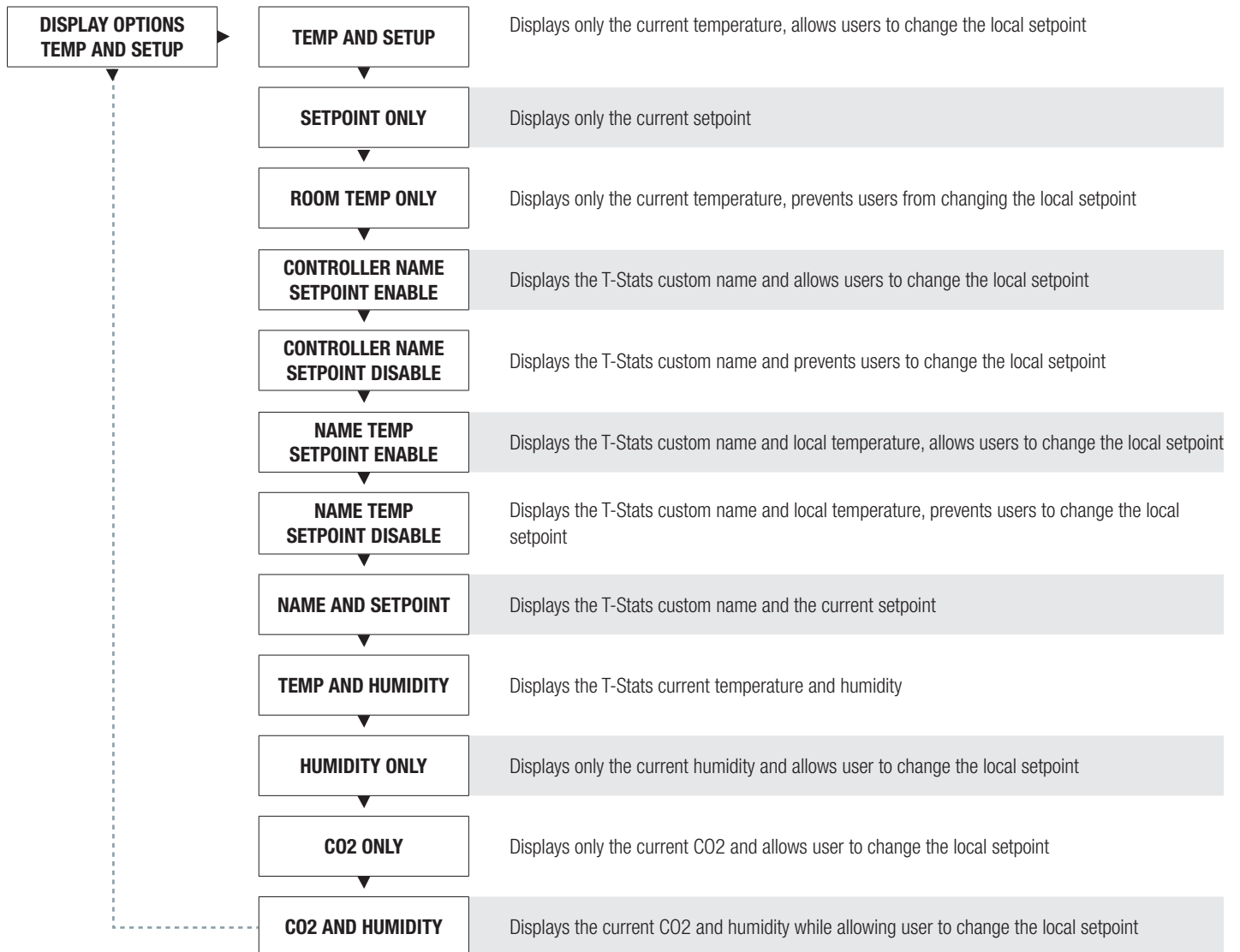
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DISPLAY NAVIGATION

Display Options 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.



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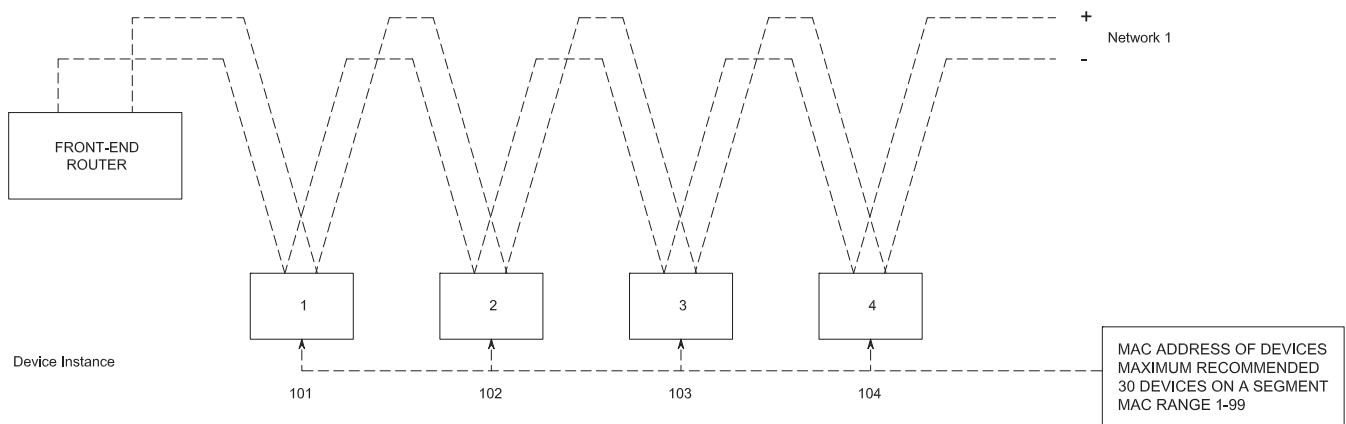
DISPLAY NAVIGATION

BACnet Networking and Setup

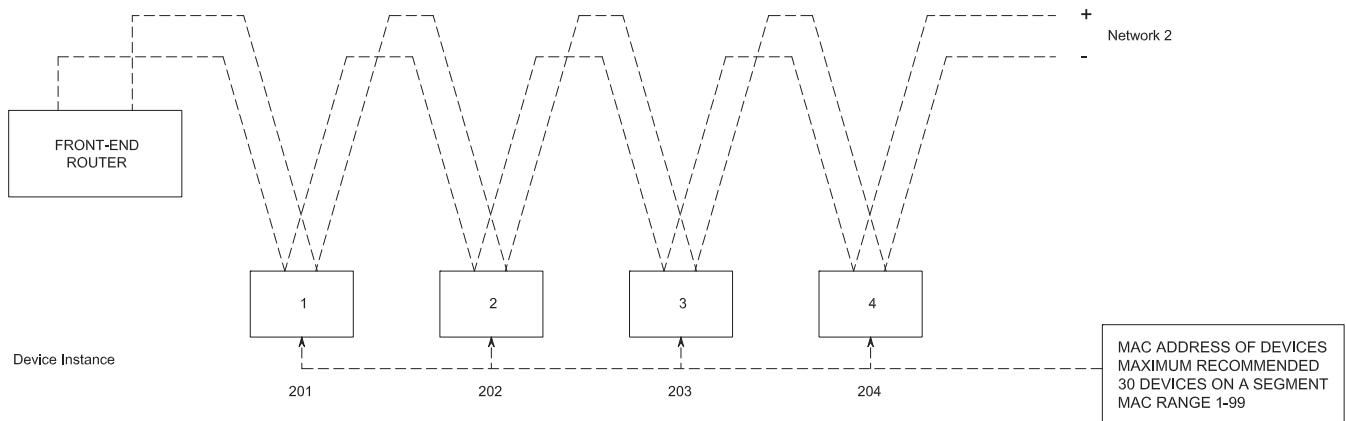
Setting the MAC Address:

MAC (media access control) must be UNIQUE on an MS/TP network segment within building. An installer setting up an MS/TP segment with 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 #2 ▼



TECH TIP ▼

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

PRICE INTELLIGENT CONTROLLER

DISPLAY NAVIGATION

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.

Description	Default Value (Factory)	Notes
MAC Address	Set by DIP switch	Value: limited to 1-99
Tier1 (x100)	58	Value: limited to 0-99
Tier2 (x10,000)	1	Value: limited to 0-99
Tier3 (x1,000,000)	0	Value: limited to 0-4

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

0	01	58	04
Tier3	Tier2	Tier1	MAC
Multiplier	Multiplier	Multiplier	Address

Final Device Instance =

PRICE INTELLIGENT CONTROLLER

MAINTENANCE

LINKER - USB SERVICE TOOL ▼



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

The Price USB LINKER is the interface that can be used with any of the Price thermostats for the PIC. The LINKER connects to a laptop (not supplied) via a Type 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. The laptop is required as a setup tool to setup up your parameters for your VAV application. If a laptop is not available, an LCD Thermostat can be purchased as an upgrade and used as a setup/balancing tool. The LCD Thermostat provides full functionality for setting up system parameters.

Upgrade if laptop is not available

LCD-SETUP ▼

TECH TIP ▼

When using a PIC controller with a DIAL thermostat, the USB Linker device is an option for setting parameters within the PIC. Or you can purchase a setup tool in AIO known as LCD-SETUP and use this to configure the PIC controller. Remember, all settings are stored in the PIC controller and not the thermostat.

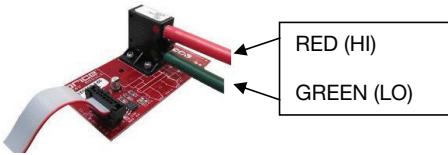
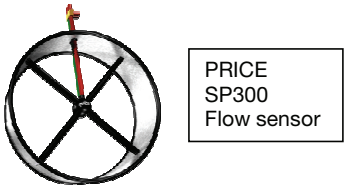


PRICE INTELLIGENT CONTROLLER

MAINTENANCE

Troubleshooting


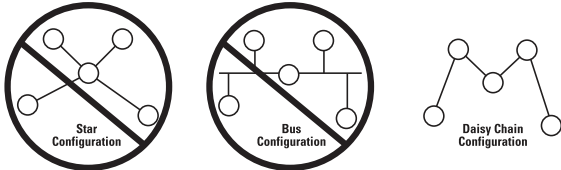
The following information is provided in the event that the PIC does not appear or function properly after installation.

Fault	Solution
<p>PIC 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 PIC 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>Also, ensure the 3 wires in the actuator itself are wired correctly. Green to COM, red to CW, and yellow to CCW.</p>
<p>Airflow readings not as specified</p> 	<p>On PIC controllers ordered with VAV module option, ensure that the tubing is correct. Red tube from the Price SP300 sensor to the HI Port on the transducer, and the Green tube from the SP300 to the Lo Port on the transducer. Also, ensure that the tubes are fully over the barbed fitting on the sensor, and that the tubes are not pinched in any way.</p> <p>Check inlet size of duct and ensure that size is correctly set in the controller.</p> <p>NOTE: The STAT does not store the duct size, it is stored in the PIC.</p>
<p>24VAC Binary Outputs not functioning</p>	<p>Ensure that the PIC has 24VAC power.</p> <p>Ensure that there is a call for heating or for cooling, if so, check to see that the indication lights is on for the output.</p> <p>The next step would be to check the device that is triggered the output like a relay. Ensure that the relay has engaged (pulled in) for either heating or cooling application.</p> <p>The next item to check for would be the Hot/COM jumper on the PIC. Make sure that if you're switching the Hot side, that the jumper is on the Hot, likewise for switching a common, ensure the jumper is on the COM.</p>

PRICE INTELLIGENT CONTROLLER

MAINTENANCE

Troubleshooting - Continued





Fault	Solution
Analog Outputs not functioning	<p>Ensure that the PIC has 24VAC power. Check the analog output for voltage with a multimeter. You should see a voltage in the range of 0-10VDC.</p> <p>Direct Acting Output - 0VDC indicates that the field device is closed or in the minimum position. 10VDC indicates that the field device is open or in the maximum position. Direct acting is typical with cooling applications.</p> <p>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.</p>
SAT Sensor Analog Input not functioning	<p>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.</p>
BACnet Communication Errors 	<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> <div style="text-align: center;">  </div> <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 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. 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>

PRICE INTELLIGENT CONTROLLER

MAINTENANCE

Troubleshooting - Continued

The following information is provided in the even that the Price Intelligent Controller (PIC) does not appear to function properly after installation.

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 ohm resistor across the A+ and B- lines, but most Price 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 PIC.</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>

PRICE INTELLIGENT CONTROLLER

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 0.5Amps each, MAX 1.85A total Switched HOT or Switched COMMON <ul style="list-style-type: none">• Fan• Stages of heat or heat open/close (x3)• Cooling• Damper CW• Damper CCW Analog 0-10VDC (x4). Max: 10mA each <ul style="list-style-type: none">• Fan (ECM)• Heat• Cool• Aux
Inputs	Thermistor Sensor (10k Type J thermistor) Analog 0-10V inputs (x2). 20k ohm input impedance <ul style="list-style-type: none">• 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) <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 Price USB LINKER 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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