MANUAL – INSTALLATION + SERVICE

Underfloor ModuFlex Controller for Terminals

UMCB Series

v100 – Issue Date: 09/20/17

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

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UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

PRODUCT OVERVIEW

Introduction

In this manual, you will find technical descriptions and diagrams of underfloor system components along with their installation instructions. Practical guidelines and recommendations are also provided. If more information is required about this equipment, please contact a Price sales representative.

General Safety Guidelines

This document is intended for use by owner-authorized operating/service personnel who are expected to possess the required training to enable them to perform their tasks properly and safely. This individual must have read and understood this document and any referenced materials prior to performing any task on this equipment. Also, it is essential that this individual be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question. This individual must also verify that installation and connections comply with local building codes. It is the obligation and responsibility of the operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in severe personal injury or death to themselves and people at the site, as well as serious damage to the equipment and the property in which it is situated.

The equipment discussed in this manual is relatively complicated apparatus and must be handled with the necessary precautions. Individuals may be exposed to certain components or conditions such as refrigerants, oils, materials under pressure, rotating components, and both high and low voltage during installation, operation, maintenance or service of this equipment. If misued or mishandled, each item has the potential to cause bodily injury or death.

Safety Symbols

The following symbols are used in this document to alert the reader to areas of potential hazard:

WARNING

Failure to observe may result in personal injury, death or equipment damage.

CAUTION

Failure to observe may result in equipment damage.

NOTE: Used to highlight additional information helpful to the reader.

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

PRODUCT OVERVIEW

Underfloor Systems Control Zones

PERIMETER ZONES

Ducted Fan Heating and Cooling

This system utilizes a Fan Booster unit (FDBU), equipped with an ECM motor, ducted to remote terminal units. Airflow from the fan unit is controlled by the UMCB between pre-programmed maximum and minimum set points. In this mode, the ECM motor is programmed with a constant volume program therefore changes in static pressure will not cause changes in airflow and this results in pressure independent control.

The UMCB controls the ECM motor to modulate the airflow from minimum flow set point when the cooling load is 0% and maximum flow set point when the cooling load is 100%.

Ducted Fan Heating and Plenum Cooling

In areas where plenum cooling can be implemented the LFG-HC has a damper which modulates between cooling and heating positions. In this application, a fan terminal is only required in heating mode. Cooling is provided through the plenum while the fan is off, and heating is provided through the ducted fan terminal with a hot water coil or an electric heater. A thermostat monitors the room temperature, while the PCM on-board the fan terminal modulates the fan space and heating device to meet the space requirements.

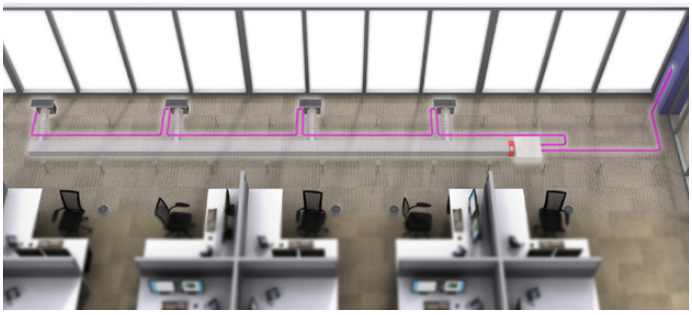
SPECIAL ZONE

Sub-Plenum Cooling Only - Variable Volume

The fan control system in this method works in a similar manner as the ducted system mentioned above however, ductwork is omitted and an entire zone is partitioned instead. The UMCB would control the FDBU to increase or decrease airflow according to the cooling demand. Use of the Fan Booster Unit allows for independent pressure control of the partitioned plenum from the open plenum. The FDBU would pull air from the pressurized plenum (pressurized by the AHU) and discharge air into the partitioned plenum thereby forcing more air through the floor diffusers. This strategy is useful for rooms with large temperature swings and higher occupancy, versus smaller break-out style conference spaces. The Fan Booster Unit is equipped with a back draft damper, ensuring reduction of airflow or shut down capabilities when the zone is unoccupied.

DUCTED FAN AND COOLING ▼

DUCTED FAN HEATING AND PLENUM COOLING ▼



SUB-PLENUM COOLING ONLY: VARIABLE VOLUME ▼

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

PRODUCT OVERVIEW

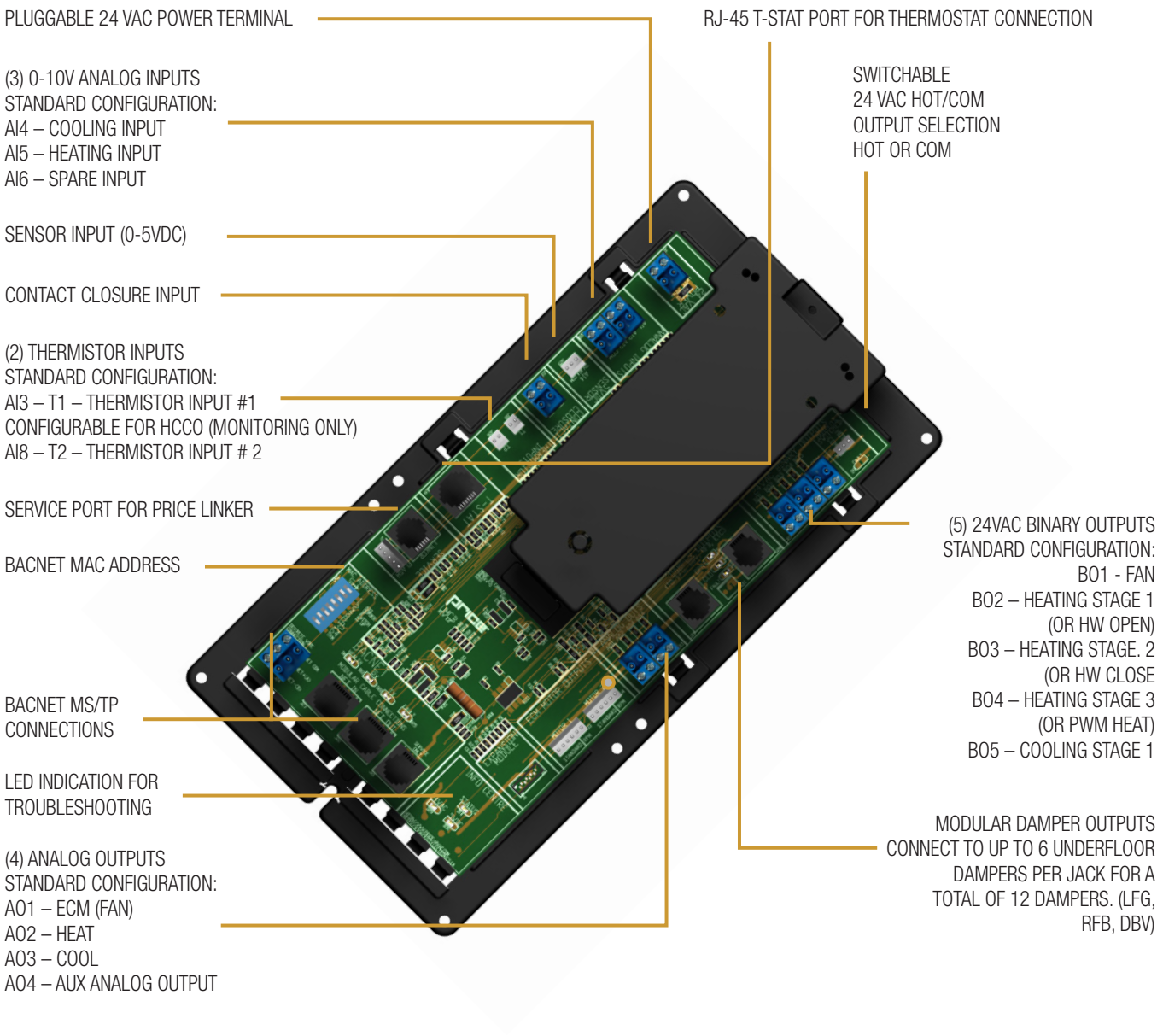
General Description

UMCB – Underfloor ModuFlex Controller for Fan Terminals

The Price Underfloor ModuFlex Controller (UMCB) is a direct digital controller for underfloor fan terminals in a pressurized underfloor plenum. The UMCB 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 UMCB is typically controlled by one of the four Price Thermostats, however it can also be controlled by a third party thermostat (using dual 0-10V inputs) or BAS system.

The UMCB typically comes factory mounted to Price FDBU underfloor terminals, but may also be ordered stand-alone for retrofit jobs.



UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

PRODUCT OVERVIEW

Features of the UMCB

- 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.
- Modular connections to dampers – Use RJ-12 cables included with dampers to connect underfloor dampers to UMCB.
- Outputs protected by self-resetting thermal fuses – prevents damage to circuit board in the event of a shorted output or damaged damper cable. Fault LEDs light up when shorted/overloaded output is attempting to engage, or when dampers are trying to drive on an output with a damaged cable.
- Analog Outputs (4) – Fully configurable (2-10VDC, 0-10VDC, 10-2VDC etc.) outputs for heating, cooling, fan operation, and auxiliary, rated at maximum 10mA each.
- Analog Input 0-10VDC (4) – Used for sensor voltage monitoring, or can be configured to control the UMCB using dual 0-10VDC cooling/heating inputs instead of a Price Thermostat.
- Sensor Input (5VDC) – Available for monitoring and control with custom control sequences.
- Therm Sensor Input (2) 10K Type J Thermistor – Used for temperature monitoring, the 2 Thermistor values can be viewed over the BACnet network. Heat/cool changeover is also possible with custom control sequences.
- Contact Closure Input (1) – Night setback or damper override.
- Native BACnet MS/TP communication – providing a native BACnet MS/TP interface. Connect using RJ-45 cable, or use discrete twisted-pair wire to terminal block. Available speeds: 9600, 19200, 38400, 76800 (Default).
- T-Stat Port - for RJ-45 connection to thermostat from the UMCB 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.
- Pluggable terminal blocks – for ease of installation and wiring.

Operation

The UMCB is an advanced and fully configurable underfloor moduflex controller. It is typically interfaced with one of the four Price Thermostats to determine room load and allow for setup functions. With a variety of output configurations, the UMCB can control fan terminals with modulating or binary (on/off) fan functions, electric or hydronic reheat, and up to twelve plug and play modulating dampers.

The UMCB is typically factory calibrated with one of the Price standard underfloor sequence of operations (9800 series).

The UMCB can be used as a stand alone unit, or can be interfaced into a BAS with the MS/TP BACnet network.

The UMCB offers four thermostat options that provide a range of control; from simple room temperature sensing, all the way to occupancy detection via motion and CO2 sensors. With the use of the LCD Thermostat, balancing and system setup can be achieved. Further, with the use of the LCD Thermostat with Motion, the UMCB can be used as a motion-occupied zone and lighting controller. The LCD Thermostat with Motion offers different levels of sensitivity and still performs all the functions of the regular LCD Thermostat.

The UMCB can also be configured to accept 0-10V input signals from a BAS system or third party thermostat for room load calculations instead of data from the Price Thermostat.

A single Price LCD Thermostat and cable is suggested to be ordered along with the controllers for easy variable adjustment on site.

Installing the UMCB

1. Mount the controller to the fan terminal in a protective controls enclosure free of dust and other contaminants.
2. 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 BO5 output to select HOT or COMMON outputs.
3. Power the UMCB using 24VAC, the secondary 24VAC COMMON of the transformer must be earth grounded.

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

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

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

Service Port: The UMCB 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 - Flow Response Chart

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

NOTE 1: By default the UMCB is shipped configured for COLD SUPPLY AIR ONLY. This can be changed to enable HCCO with T1 Thermistor probe (however this will almost NEVER be the case).

NOTE 2 : PI = Proportional Integral = Room Load (either cooling/neutral/heating). Above is a Flow Response chart for the UMCB, 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.

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

NOTE: In all cases, the damper position is set in reference to the plenum air.

Therefore, when using LFG-HC dampers (ducted from terminal on one side, open the plenum on the other), 100% would mean open to plenum, and closed to fan terminal. 0% would mean closed to plenum, and fully open to the fan terminal.

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

INSTALLATION & MOUNTING INSTRUCTIONS

Input/Output Description

24VAC Binary Outputs	Description
BO1 - Fan	Intermittent Heating – Fan runs when there's a call for heating to move air across reheat coils and into the occupied space. Intermittent Heating and cooling – Fan runs when there's a call for heating or cooling to deliver conditioned air into the occupied space. More configurations available with custom sequences.
BO2 – Heat Stage 1	Binary (electric, or binary hot water) Tristate (floating) open signal of hot water valve
BO3 – Heat Stage 2	Binary (electric, or binary hot water) Tristate (floating) open signal of hot water valve
BO4 – Heat Stage 3	Binary (electric, or binary hot water) 24VAC PWM to SSR (10 second period – requires solid-state relay)
BO5 – Cool Stage 1	Binary Output for one stage of cooling if required. Can be used as an auxiliary binary output with custom sequence if required.

Analog Outputs	
AO1 – Fan	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 – Open	Aux Analog Output available (0-10VDC = 0-100%)

Analog 0-10VDC Inputs	
AI4 – Cooling Input	Can be configured (along with AI5) to control the UMCB from a 3rd party T-Stat. In this configuration, AI4 is the 0-10VDC cooling load input. Can also be used for simple voltage monitoring when analog inputs not configured as control source.
AI5 – Heating Input	Can be configured (along with AI4) to control the UMCB from a 3rd party T-Stat. In this configuration, AI5 is the 0-10VDC heating load input. Can also be used for simple voltage monitoring when analog inputs not configured as control source.
AI6 – Auxiliary	Typically used for voltage monitoring over BACnet network.

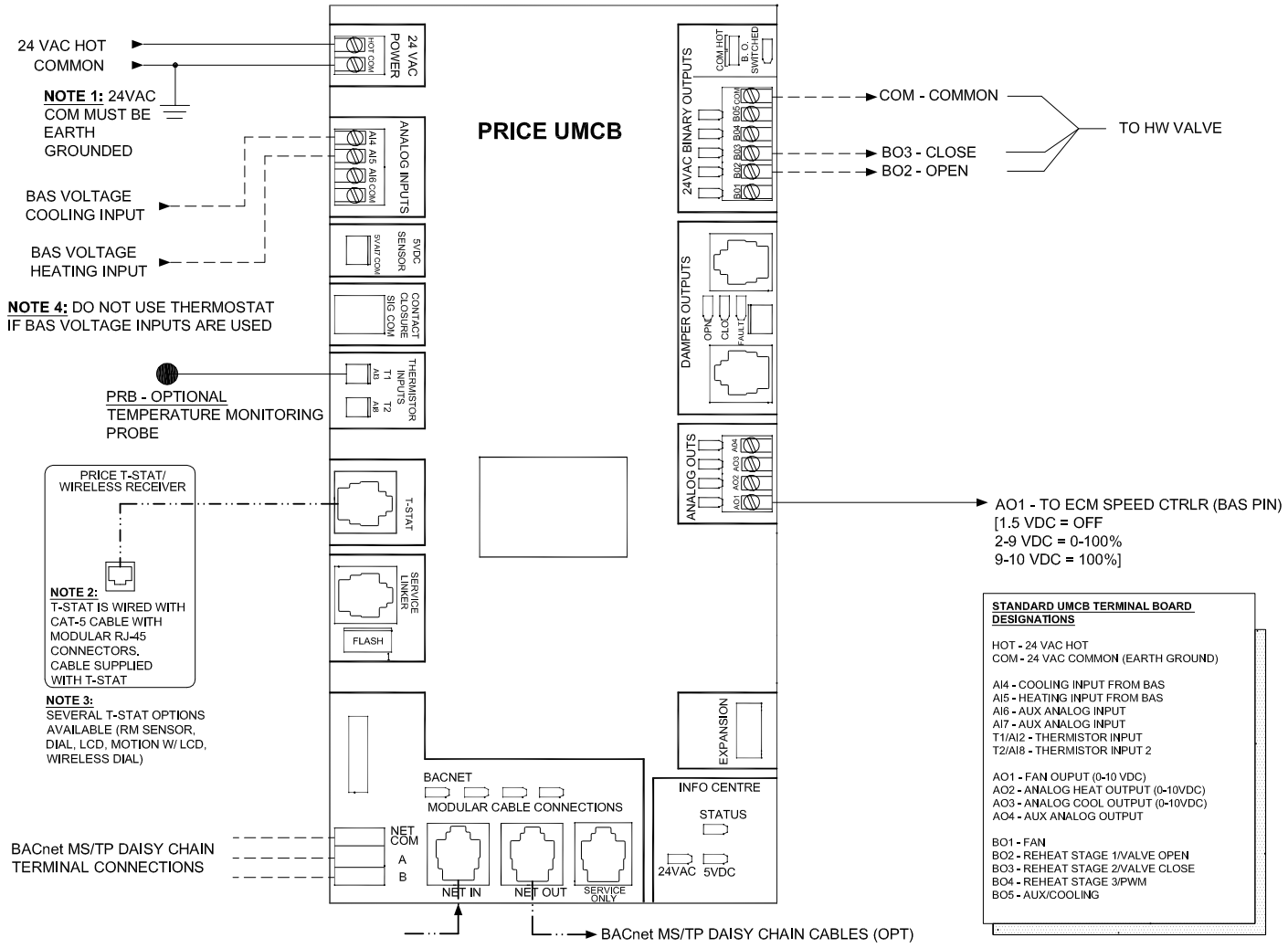
Additional Inputs	
AI7 – 5VDC Sensor	Typically used for voltage monitoring over BACnet network.
Contact Closure	Configurable Binary Input can be used for night setback, damper force open/close etc.
AI3 – T1 Thermistor	Analog Input for temperature probe hookup with 10k Type J Thermistor. Typically used for temperature monitoring over BACnet network. Can also be configured for heat/cool changeover if required.
AI8 – T2 Thermistor	Typically used for temperature monitoring over BACnet network.

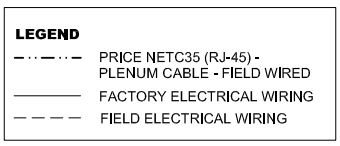
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

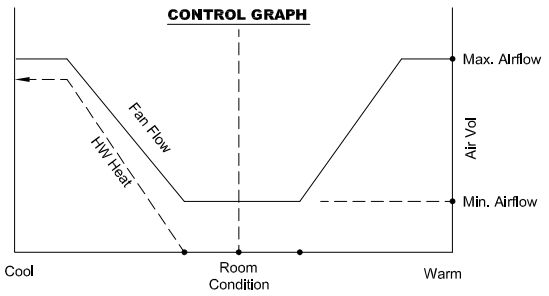
INSTALLATION & MOUNTING INSTRUCTIONS

Example UMCB Wiring Diagram

UNDERFLOOR DIGITAL CONTROLS ▼







Sequence of Operation – Cooling with Modulating Fan; Tristate Heat with Modulating Fan.

Cooling: On an increase in space temperature the controller modulates the fan speed to increase the flow of cool air. On an increase in space temperature greater than the cooling proportional band the fan speed is maintained at its pre-selected maximum setting.

Heating: On a decrease in space temperature the controller modulates the heating valve to increase the heat proportionally to the room demand. The fan speed is modulated to increase the flow of warm air. On an increase in space temperature greater than the heating proportional band the fan speed is maintained at its pre-selected maximum setting.

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

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

INSTALLATION & MOUNTING INSTRUCTIONS

Thermostat Installation

General Description

The UMCB Thermostat are all physically the same size and mounting instructions will be typical.

Location

1. Thermostat must be mounted to a wall and wired to the controller via the supplied plenum rated 35 ft. CAT-5 cable. This cable plugs into the thermostat and the UMCB with the ease of RJ-45 connections. **NOTE:** the cable can be extended to 70 ft. using a Price Cable Coupler and additional 35 ft. 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.

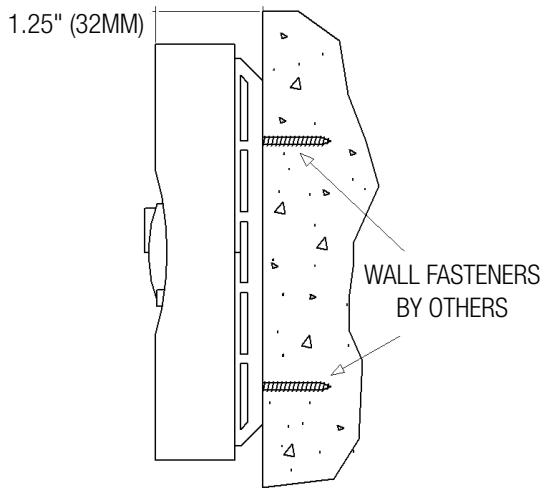
Installation

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: C25 Cable**

SURFACE MOUNT DETAIL ▼



35 FOOT NETC35 CABLE ▼

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

INSTALLATION & MOUNTING INSTRUCTIONS

How to Use Thermostats

Room Sensor Thermostat

- 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.

ROOM SENSOR THERMOSTAT ▼

Dial & Wireless Thermostat

Dial Thermostat

- 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.

DIAL & WIRELESS THERMOSTAT ▼

Wireless Thermostat

- Functionally identical to the Dial Thermostat.
- Requires wireless receiver, see Wireless Thermostat manual for details on installation.

LCD THERMOSTAT ▼

LCD Thermostat

- 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.

LCD THERMOSTAT W/ SENSOR ▼

LCD Thermostat with Motion Sensor

- 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.

NOTE: All Price Thermostats are powered via the RJ-45 connection to the controller

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Initial Startup

(LCD & Motion Thermostat only)

When the LCD Thermostat is powered from the UMCB, 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
UMCB 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. XXXXXXX	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...

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

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.

The User Menu is accessed by hitting the 'Enter/Menu' button. Scroll through with the UP and DOWN buttons.

OCCUPANCY ON - AIRFLOW	**Occupancy** The Occupancy can be determined by airflow, contact closure, motion or by a user pressing a button
COOLING MODE LOAD	**Room Load** Cooling Mode is shown as a load from -1 to -100%. (-100% = max) Heating Mode is shown as a load from 0 to 100%. (+100% = max) Dead band Mode will be shown as 0%, where the room is satisfied
THERM READING 62.0˚F	**Thermistor #1 Input Reading** If no probe is present, LCD will display No Probe If probe present, LCD will display temperature
DAMPER POS. 50%	**Damper Position** This indicates the current position of the damper in percent (%) Range is 0-100% (100% = full open or maximum air)
DAMPER TARGET 50%	**Damper Target** This indicates the current target of the damper in percent (%) This target is where the damper is currently driving towards
MAC ADDRESS 10	**MAC Address (MAC Address must be unique on the network segment)** Shows the BACnet MAC Address. Range 1-99 MAC Address can be set via DIP switch If no BACnet module attached, LCD will display MAC Address None
DEVICE INST. 210	**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	This will exit the Info menu if you press the Menu button **NOTE:** Info menu will automatically time out after 60 seconds

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Service Menu

(LCD Thermostat only)

The Service Menu allows the balancer/installer to perform setup operations and change settings, such as adjusting flows, heating outputs, etc.

Hold 'Enter Menu' button for 5 seconds. Display will show '**Passcode:'**

Use 'Up' and 'Down' buttons to enter this passcode: **Down - Up - Up - Down**

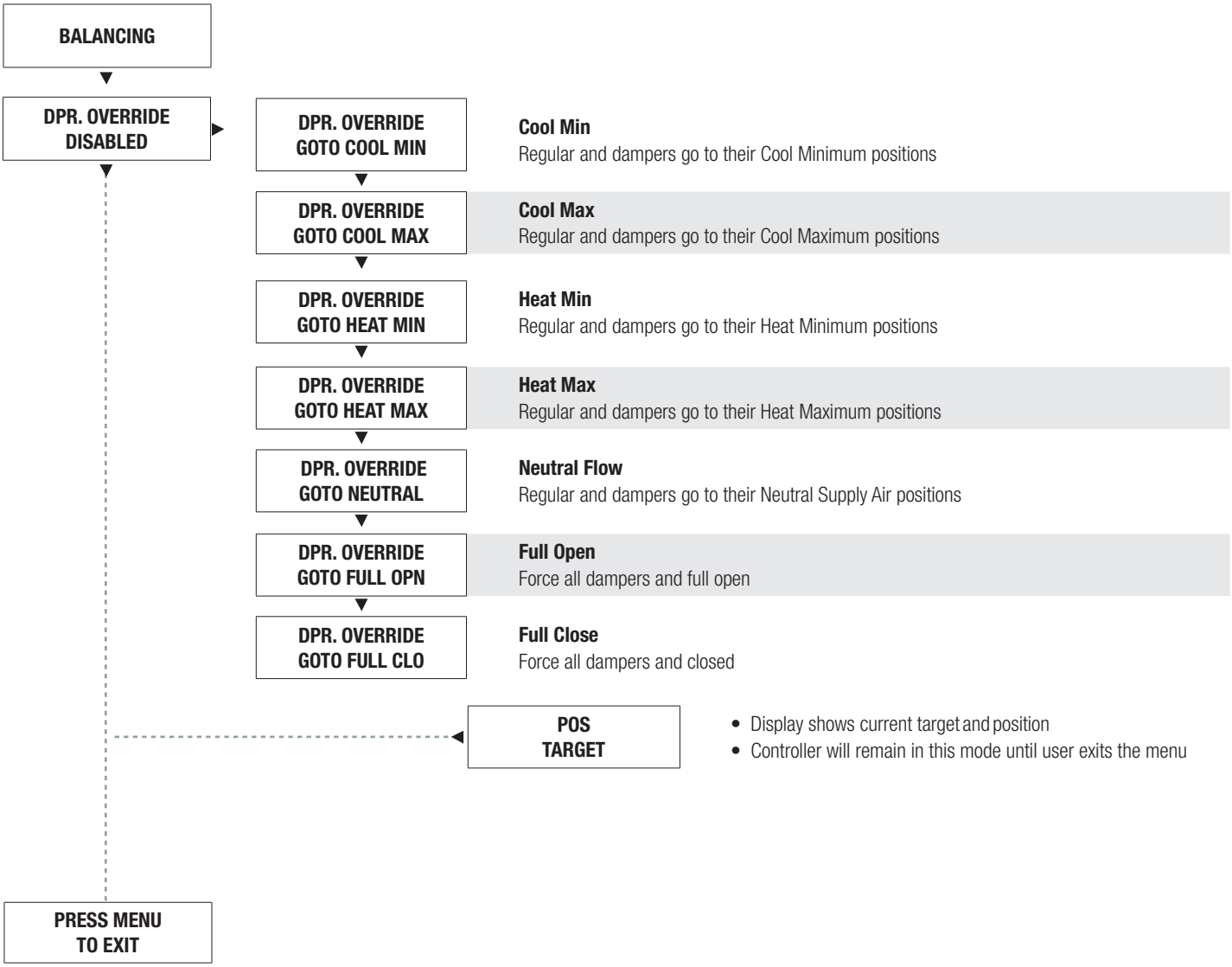
BALANCING	Allows you to force damper open/close/min/max
VVT	Allows you to set limits (%) in VVT Mode
SETPOINT	Setup of Setpoint limits (day minimum/maximum) °F / °C selection
INPUT	Shows thermistor reading Allows setting of HCCO if desired
OUTPUT	Allows setup of auxiliary binary and analog outputs Allows setup of room light output (motion stat only)
ADDRESS	Allows setup of BACnet addresses MAC Address, Device Instance Baud Rate
STAT SETUP	Allows setup of LCD back lighting, sounds, motion sensor Adjustment of HVAC and room lighting timeouts
PRESS MENU TO EXIT	This will exit the Service menu if you press the Menu button **NOTE:** Service menu will automatically time out after 20 seconds

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Balancing Menu

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

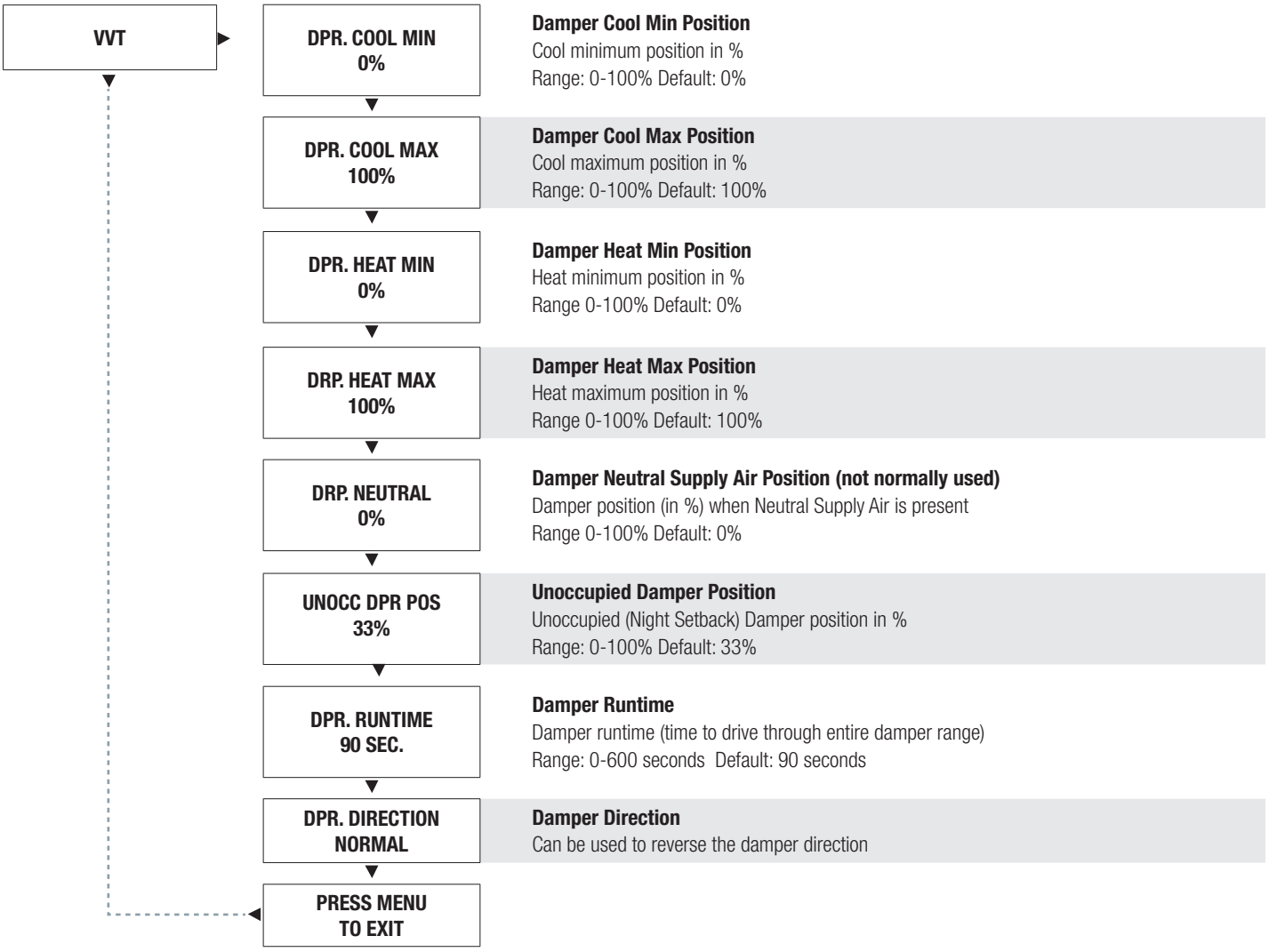
DISPLAY NAVIGATION

VVT Menu

Pressure Dependent Mode

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.

NOTE: In all cases, the damper position is always set in reference to the plenum air. Therefore, when using LFG-HC dampers (ducted from terminal on one side, open the plenum on the other), 100% would mean open to plenum, and closed to fan terminal. 0% would mean closed to plenum, and fully open to the fan terminal.



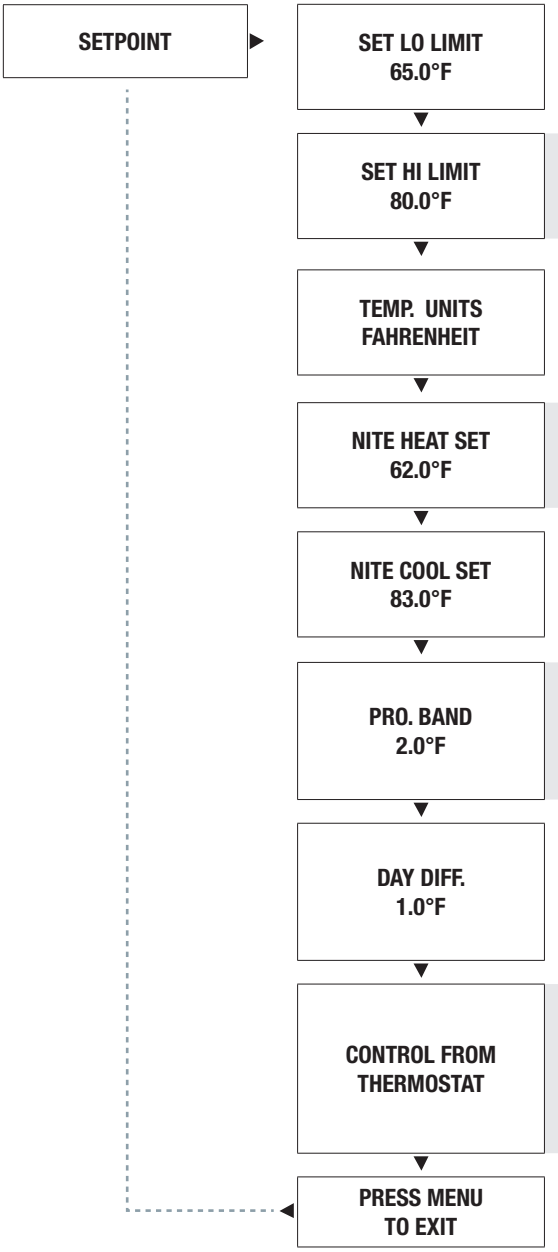
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Setpoint Menu

Setpoint Limits and Temperature Units

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



Day Setpoint Low Limit
This is the lowest Setpoint allowed
Range: 10.0°F – 100.0°F Default: 65.0°F

Day Setpoint High Limit
This is the lowest Setpoint allowed
Range: 10.0°F – 100.0°F Default: 80.0°F

Temperature Units
Fahrenheit or Celsius
Default: °F

Night Heat Setpoint
UMCB will maintain this heating Setpoint when unoccupied
Range: 10.0°F – 100.0°F Default: 62.0°F

Night Cool Setpoint
UMCB will maintain this cooling Setpoint when unoccupied
Range: 10.0°F – 100.0°F Default: 83.0°F

Proportional Band
The Proportional Band is the temperature range through which the controller calculates a 0-100% load
Range: 0.5°F – 25.0°F Default: 2°F

Day Differential
This is the maximum allowed “error” on either side of the room Setpoint before the controller will enter its heating or cooling proportional bands
Range: 0.5°F – 25.0°F Default: 1.0°F

Control Source
Thermostat: Controller uses thermostat temperature and Setpoint to determine room load and control
Analog Input: Controller uses 0-10VDC inputs to determine room load and control . Use this control source type for a 0-10VDC signal by others.

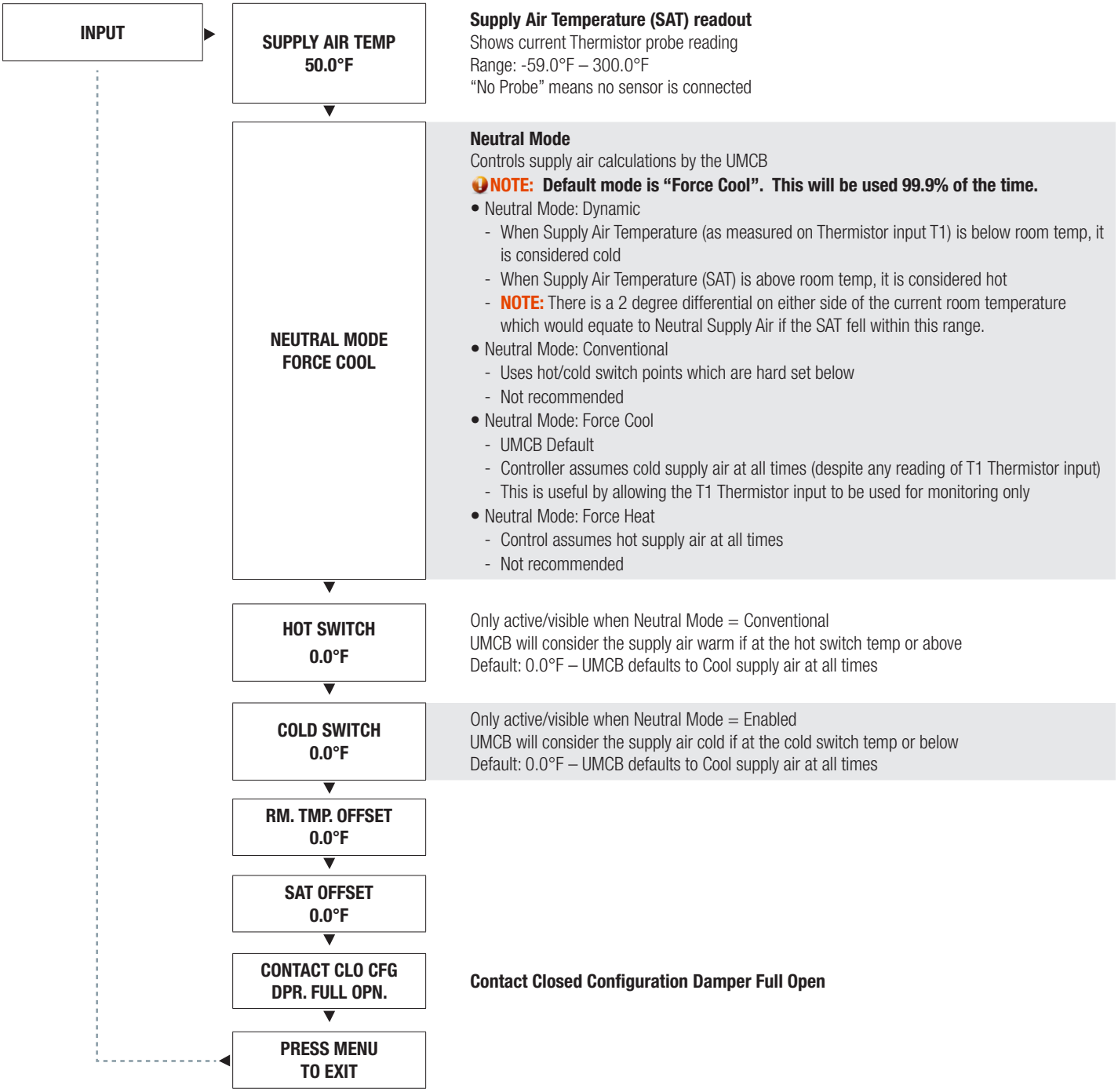
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Input Menu

Supply Air Temp and Neutral Mode

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



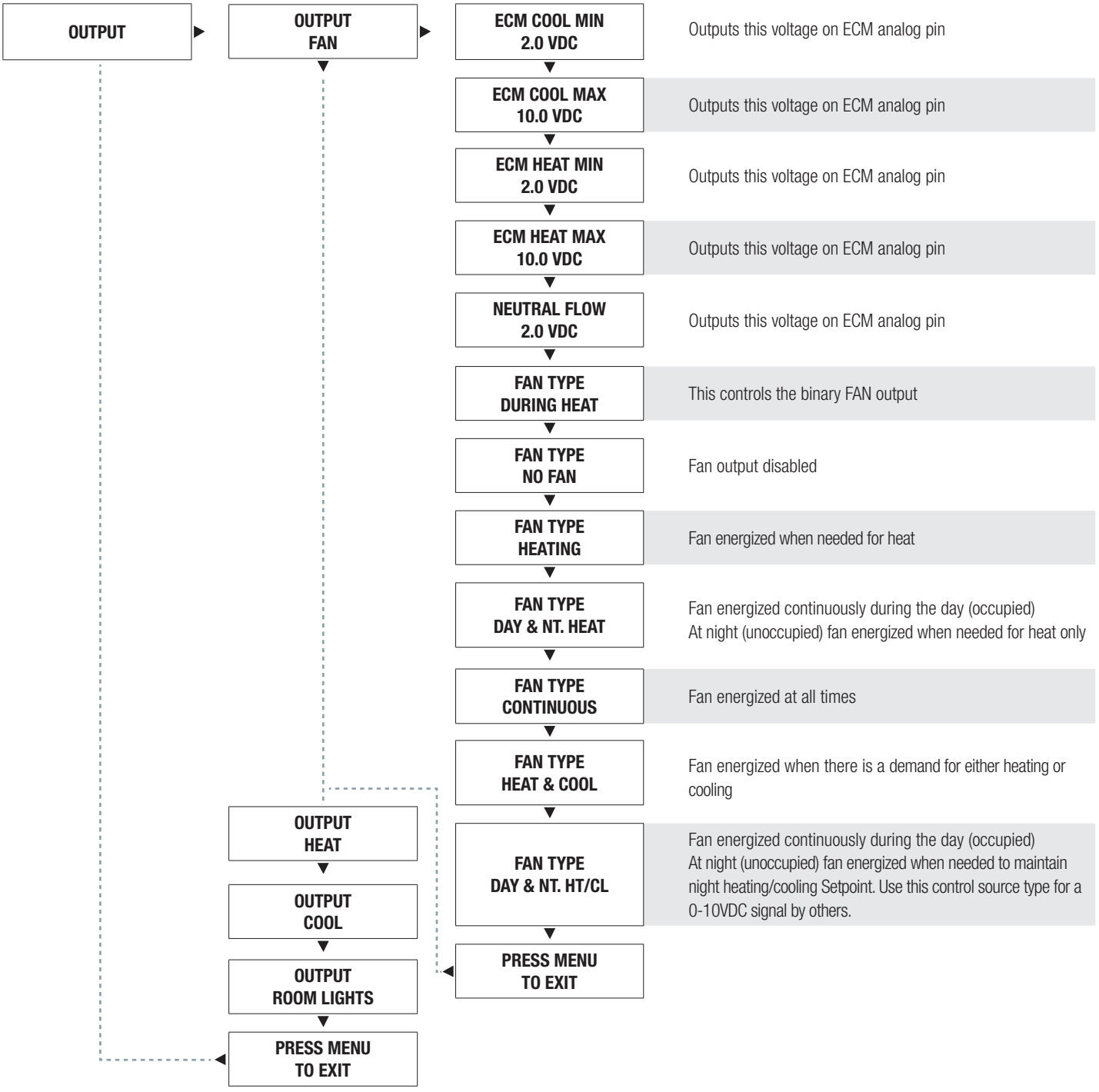
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Output Menu - Fan

Setup of Fan Outputs

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



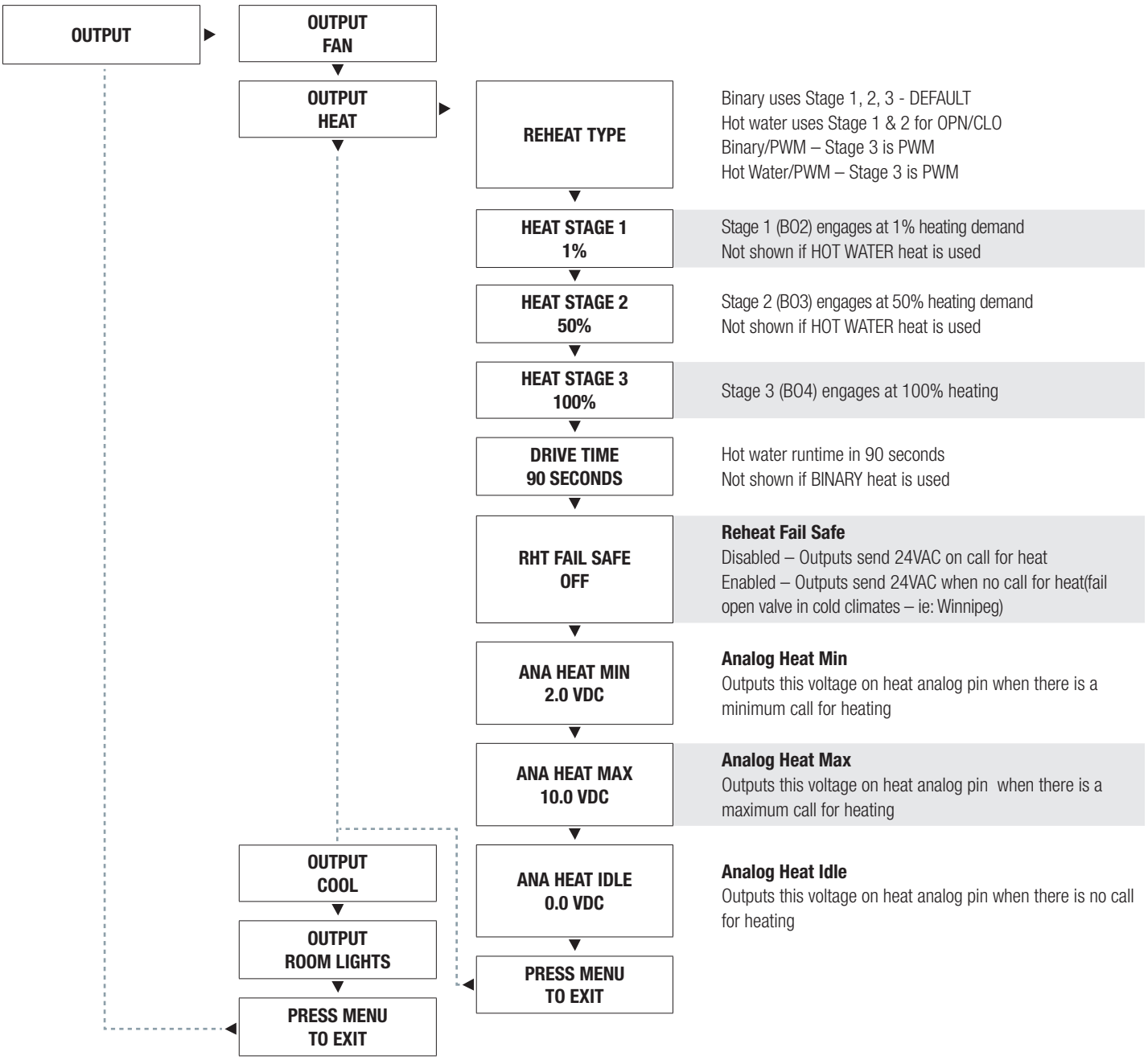
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Output Menu - Heat

Setup of Heat Outputs

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



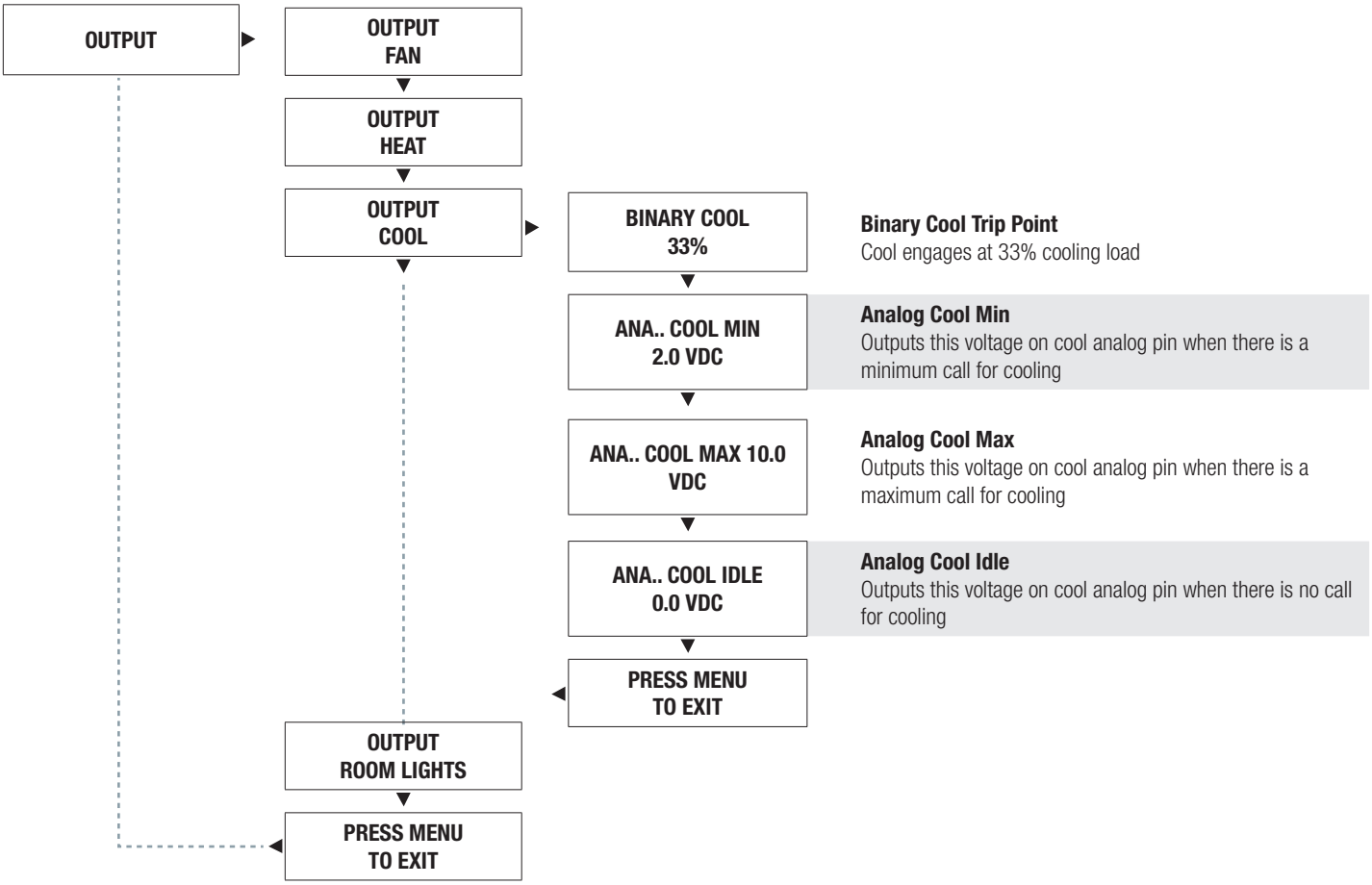
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Output Menu - Cool

Setup of Cooling Outputs

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



Binary Cool Trip Point
Cool engages at 33% cooling load

Analog Cool Min
Outputs this voltage on cool analog pin when there is a minimum call for cooling

Analog Cool Max
Outputs this voltage on cool analog pin when there is a maximum call for cooling

Analog Cool Idle
Outputs this voltage on cool analog pin when there is no call for cooling

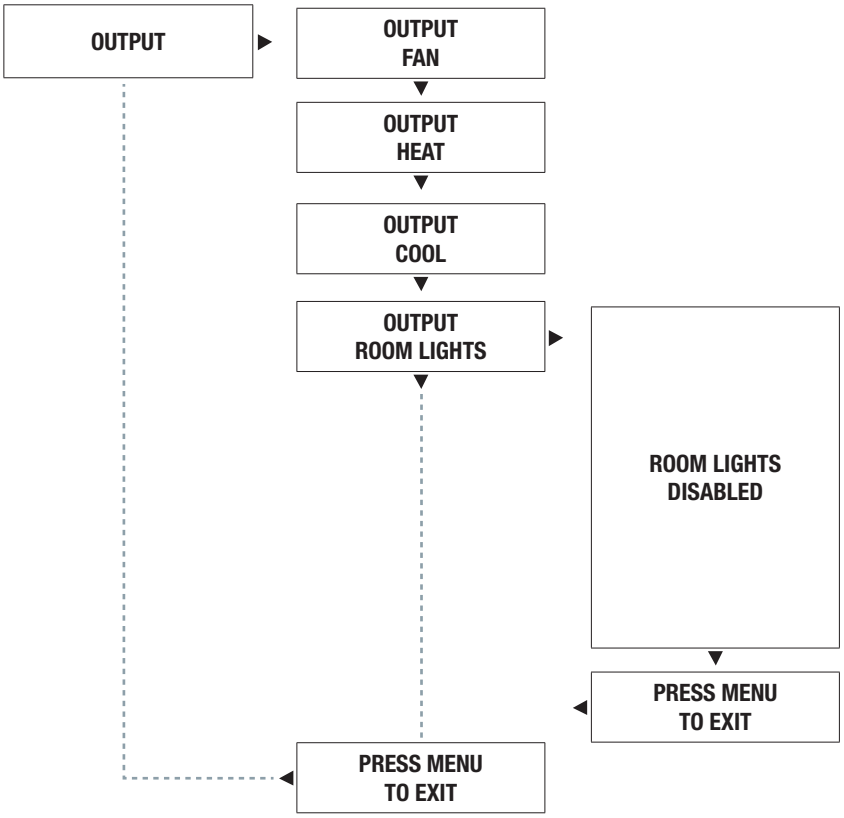
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Output Menu - Room Lights

Setup of Lighting Output (Motion Thermostat Option only)

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



Disabled – no outputs used-DEFAULT
Fan (BO1) – will trigger room lights
Heat Stage 3 (BO4) – will trigger room lights
Binary Cool (BO5) – will trigger room lights
B09 – 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.

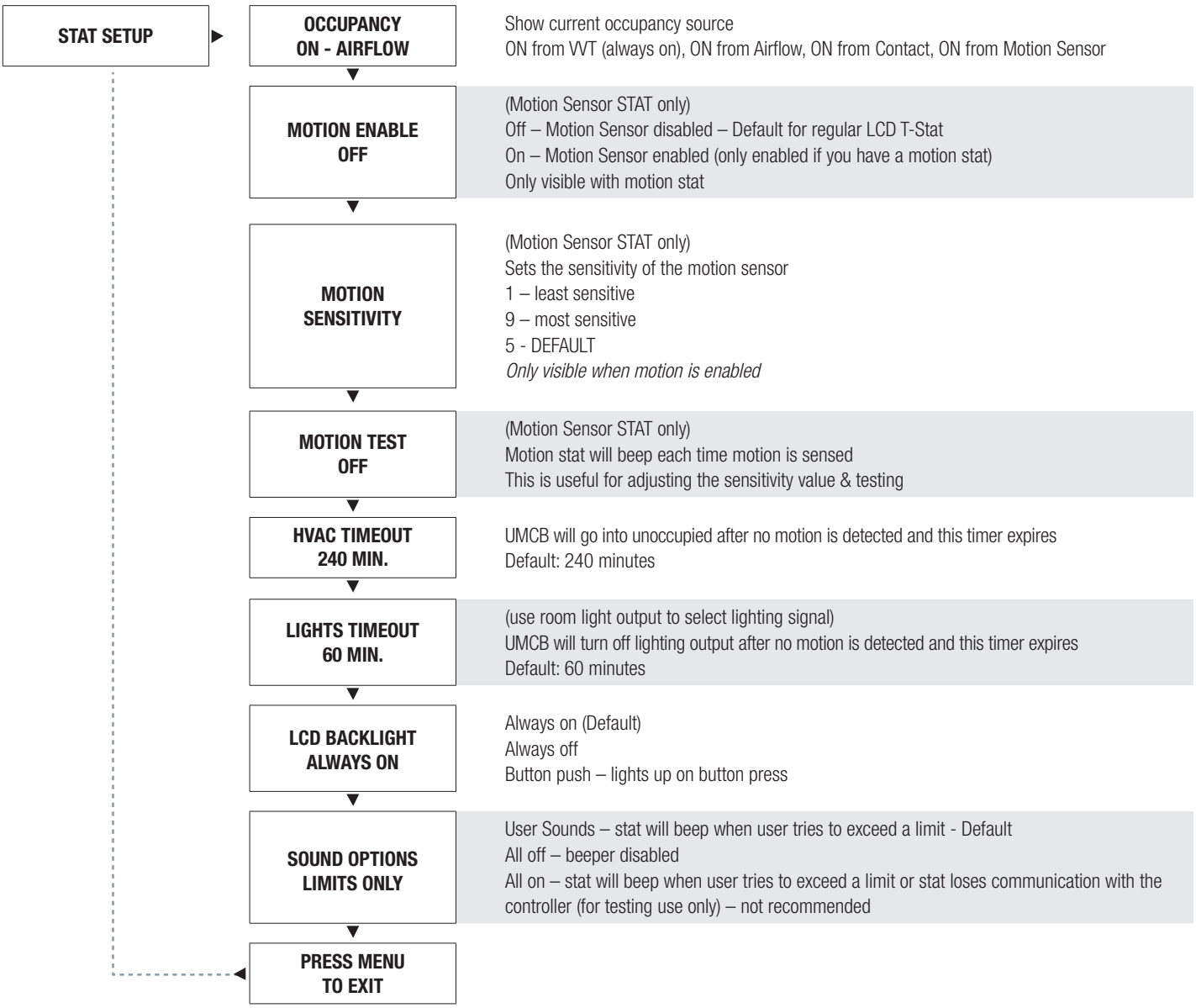
MOTION STAT (PIC-TS) MOTION ▼

DISPLAY NAVIGATION

Stat Setup Menu

Stat Options

Scroll through with the up and down buttons.
Press Enter/Menu to apply your changes. 'Saving' will display as your changes are applied.



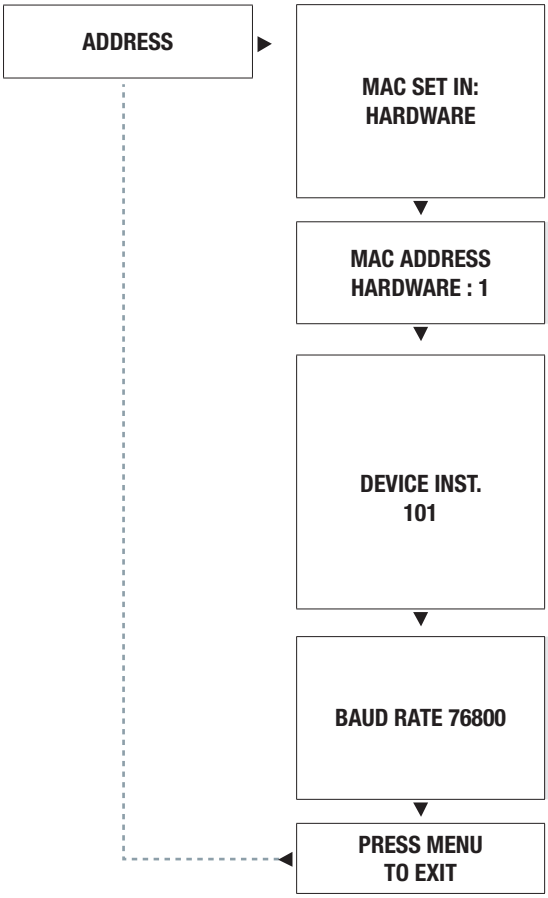
UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

DISPLAY NAVIGATION

Address Menu

BACnet Addressing Setup

Scroll through with the up and down buttons.
Press Enter/Menu 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 UMCB would be 101

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

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 UMCB 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

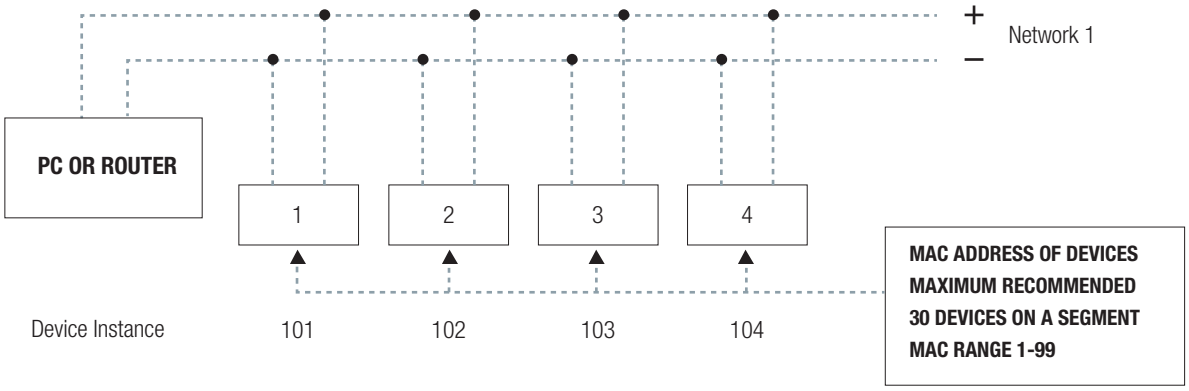
This sets the BACnet MS/TP Baud Rate
9600 baud (all BACnet devices must at least support at least this speed) - slowest
19200 baud
38400 baud
76800 baud (Default baud rate for PRICE products) - fastest

BACnet Networking and Setup

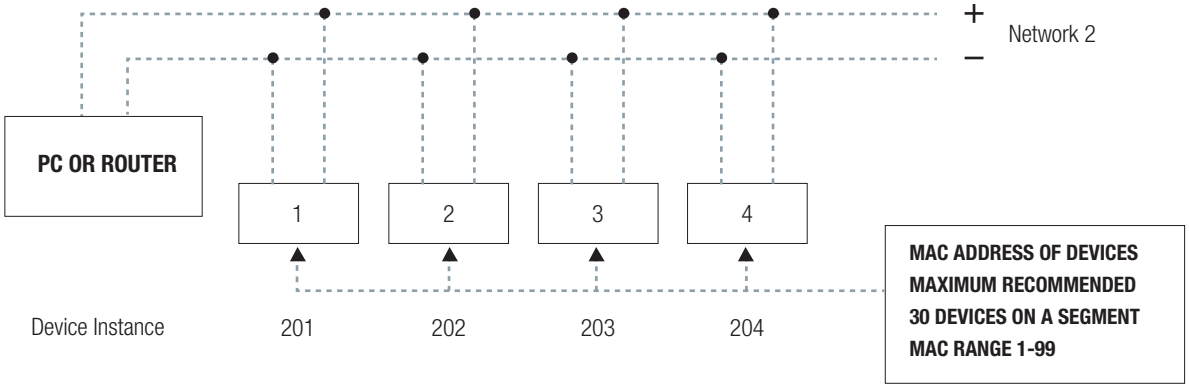
Setting the MAC Address:

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 #2 ▼



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.

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

  Final Device instance =

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

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

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 UMCB. 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

▶

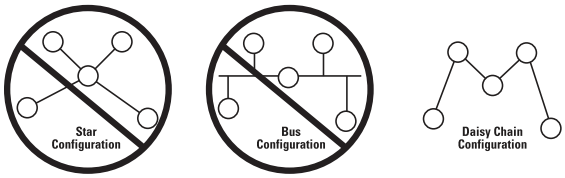
Dial Thermostat

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

MAINTENANCE

Troubleshooting

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

Fault	Solution
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.	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.
Dampers don't move, and red FAULT light is illuminated.	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.
Damper acts erratically	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.
24 VAC Binary Outputs not functioning	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
Analog Outputs not functioning	Ensure that the UMCB 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.
SAT Sensor Analog Input not functioning	Ensure that there is a sensor wired to the input on the UMCB controller. Check the type of sensor, should be a 10k Ohm Type Thermistor.
BACnet Communication Errors	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.

Troubleshooting - Continued

Fault	Solution
BACnet Communication Errors	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. The network speed or baud rate must be the same throughout the network. **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.
BACnet Communication Errors	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 UMCB.
BACnet Communication Errors	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.
BACnet Communication Errors	**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. **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!

UNDERFLOOR MODUFLEX CONTROLLER FOR TERMINALS

MAINTENANCE

Hardware Specifications

Power Requirements	24VAC, 47-63 Hz 6VA (not including output loading) NEC Class II
Ambient Ratings	32º to 131º F (0º to 55º C) 10 to 90% RH (non-condensing)
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 90º maximum angle of rotation. External slide knob for manual override. Less than 35 db (A) noise level.
Actuator Specifications	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
Board Size	11 in. x 5.75 in. x 2.75 in.
Board Weight	1.8 lbs. (816 kg)

NOTES

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