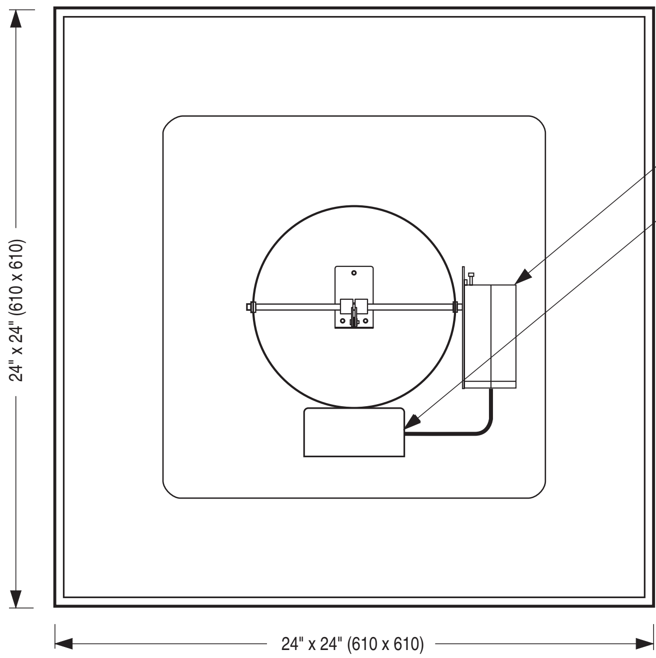
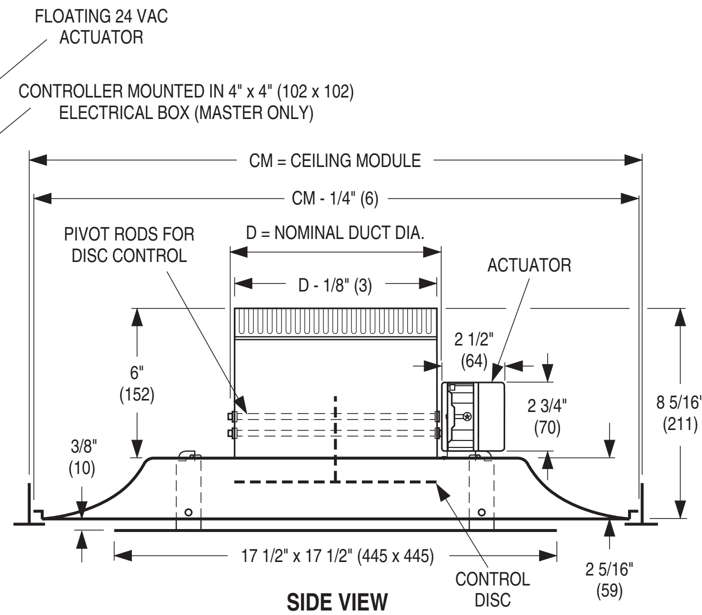
VARIABLE AIR VOLUME (VAV) DIFFUSER
SQUARE PLAQUE • CORNER POSTS
ROUND NECK • STEEL
MODEL: UNI2-VAV



TOP VIEW



SIDE VIEW

Dimensional Data

CM	Neck Size D	B
24 x 24 (610 x 610)	6, 8, 10, 12, 14 (152, 203, 254, 305, 356)	22 (559)

DESCRIPTION:

1. The UNI2-VAV is a variable volume diffuser that regulates the amount of supply air into the space. The diffuser incorporates an integral modulating disc damper that continuously regulates the volume of supply air in response to a wall mounted thermostat. The master diffuser has a factory mounted controller, heat/cool changeover sensor and 24 Vac, 3-wire floating point actuator (2 VA).
2. The UNI2-VAV Diffuser design provides both an unobtrusive appearance for architectural excellence and engineered performance. The diffuser features a stamped one-piece outer-cone backpan which eliminates mitered corners. The inner face panel features a hemmed edge for strength and a clean appearance.
3. A compatible thermostat is required and supplied as standard on master units and can control up to 19 auxilliary diffusers (with a 40 VA transformer). The standard standalone electronic thermostat provides P + I control and features a LCD digital display. A BACnet option is available.
4. The diffuser delivers a tight 360° radial horizontal pattern allowing high turn down ratios with no dumping.
5. The face panel is held in place by four hook corner posts that positively engage into slots in the backpan and can be removed from the backpan for diffuser installation.
6. Material: Corrosion-resistant steel.
7. Standard finish is AW Appliance White.

SCHEDULE TYPE:				
PROJECT:				
ENGINEER:	DATE	B SERIES	SUPERSEDES	DRAWING NO.
CONTRACTOR:	12 - 20 - 23	UNI	12 - 12 - 23	UNI2-VAV

Dimensions are in inches (mm).

VARIABLE AIR VOLUME (VAV) DIFFUSER
SQUARE PLAQUE • CORNER POSTS
ROUND NECK • STEEL
MODEL: UNI2-VAV

REQUIRED SELECTIONS:

Configuration:
- ❑ MSTE Master, Electronic
- ❑ AUXE Auxiliary, Electronic
- ❑ MSTB Master, BACnet
- ❑ AUXB Auxiliary, BACnet

Thermostat (Master only):
- ❑ TE Electronic, Digital Display (deg. F or C) (default for MSTE)
- ❑ TBNF BACnet, Digital Display (deg. F) (default for MSTB)
- ❑ TBNC BACnet, Digital Display (deg. C)
- ❑ TBO None (by others)

Finish:
- ❑ AW Appliance White (default)
- ❑ SP Special finish Specify ____________ .

BC Sizes:

Ring Diameter	Diffuser Neck Diameter
BC06 - 06" (152)	10" (254)
BC08 - 08" (203)	12" (305)
BC10 - 10" (254)	12" (305)
BC12 - 12" (305)	14" (356)

OPTIONS:

Transformer:
- ❑ TR20 20VA 120/24 Vac
- ❑ TR40 40VA 120/24 Vac
- ❑ TR50 50VA 480/277/240/208/120 to 24 Vac

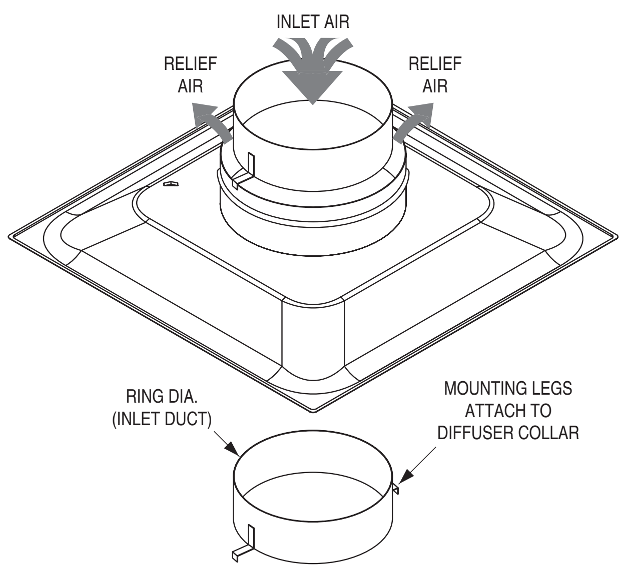
BC Bypass Collar:
- ❑ – None (default)
- ❑ BC06 6" dia.
- ❑ BC08 8" dia.
- ❑ BC10 10" dia.
- ❑ BC12 12" dia.

QB Quadrant Blanks:
- ❑ – None (default)
- ❑ QB3 3-Way Blow
- ❑ QB2 2-Way Opposite Blow
- ❑ QC2 2-Way Corner Blow
- ❑ QB1 1-Way Blow

Blanket:
- ❑ – None (default)
- ❑ MIB Molded Insulation Blanket, R-6.0

BC Bypass Relief Collar

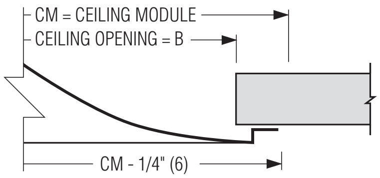
This accessory relieves excess static pressure when throttling airflow and limits diffuser noise by bypassing excess air into the ceiling plenum. At maximum flow (damper fully open) no air is bypassed and at zero flow (damper fully closed) all air is bypassed.
The diffuser neck size must be selected larger than the required ring diameter (inlet duct connection). See table.



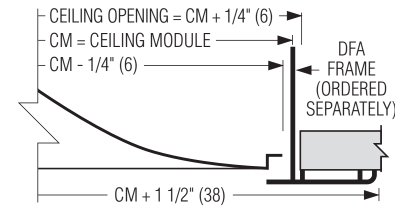
Bypass Relief Collar

Frame / Border Type:

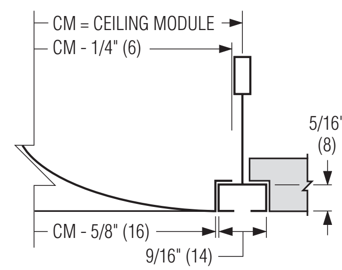
❑ **TYPE L Surface Mount**
Hard duct connection recommended.



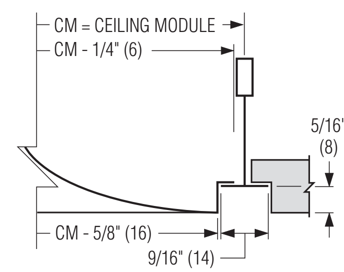
❑ **TYPE L Surface Mount With DFA**
Drywall/Plaster frame. Recommended for flexible duct connection and ceiling access.



❑ **TYPE F Fineline® 9/16" Bolt Slot T-Bar**



❑ **TYPE F Fineline® 9/16" Tegular T-Bar**



Fineline® is a registered trademark of USG Interiors Inc.

SCHEDULE TYPE:	
PROJECT:	
ENGINEER:	
CONTRACTOR:	

Dimensions are in inches (mm).

DATE	B SERIES	SUPERSEDES	DRAWING NO.
12 - 20 - 23	UNI	12 - 12 - 23	UNI2-VAV

PERFORMANCE DATA:

Model UNI2-VAV • 24 x 24 (600 x 600) Face Size • 4-Way Blow (360° Pattern)

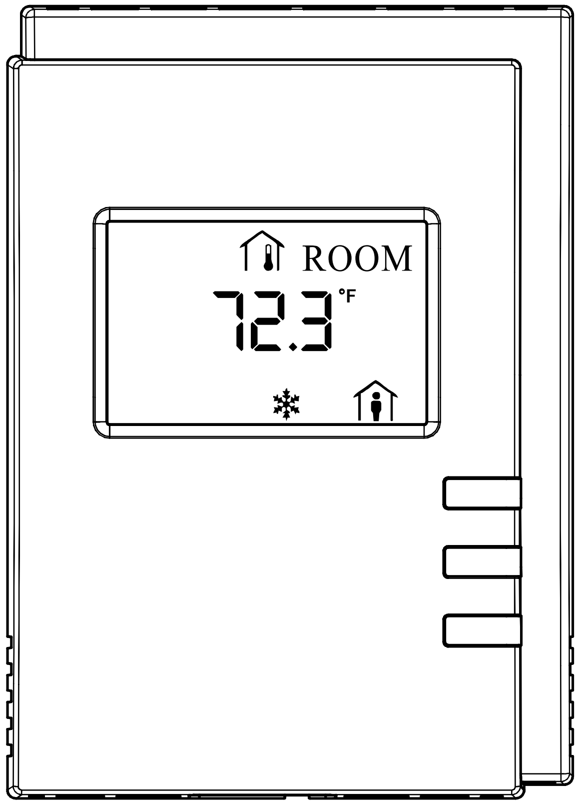
Nominal Neck Size	Neck Velocity, FPM	300	400	500	600	700	800	900	1000	1200	1400
	Velocity Pressure	**.005**	**.010**	**.016**	**.023**	**.031**	**.040**	**.051**	**.063**	**.090**	**.122**
6" Dia.	Total Pressure	.009	.011	.017	.025	.034	.044	.057	.070	.100	.135
	Airflow, CFM	**60**	**80**	**100**	**120**	**140**	**160**	**180**	**200**	**240**	**280**
	Horizontal Throw	1-1-2	1-1-4	1-2-4	1-3-5	2-3-6	2-4-7	3-4-8	3-4-9	4-5-11	4-6-11
	Noise Criteria	—	—	—	—	—	13	17	21	28	34
8" Dia.	Total Pressure	.011	.018	.028	.040	.055	.072	.091	.112	.162	.220
	Airflow, CFM	**105**	**140**	**175**	**210**	**245**	**280**	**315**	**350**	**420**	**490**
	Horizontal Throw	1-2-4	2-3-6	2-4-7	3-4-9	3-5-10	4-6-12	4-6-12	5-7-13	6-9-14	7-10-15
	Noise Criteria	—	—	—	—	—	17	21	25	32	38
10" Dia.	Total Pressure	.017	.029	.043	.060	.082	.108	.136	.168	.243	.331
	Airflow, CFM	**165**	**220**	**275**	**330**	**385**	**440**	**495**	**550**	**660**	**770**
	Horizontal Throw	2-3-7	3-4-8	3-5-10	4-6-12	5-7-13	5-8-14	6-9-15	7-10-16	8-12-18	10-13-19
	Noise Criteria	—	—	—	—	15	20	24	28	35	41
12" Dia.	Total Pressure	.023	.037	.059	.085	.115	.151	.191	.237	.338	.461
	Airflow, CFM	**240**	**310**	**390**	**470**	**550**	**630**	**710**	**790**	**940**	**1100**
	Horizontal Throw	2-4-7	4-5-11	5-7-14	5-8-15	6-9-16	7-11-17	8-12-18	9-14-19	11-15-21	13-16-23
	Noise Criteria	—	—	—	—	18	23	27	31	38	43
14" Dia.	Total Pressure	.031	.050	.078	.114	.155	.202	.256	.316	.453	.619
	Airflow, CFM	**320**	**430**	**530**	**640**	**750**	**860**	**960**	**1070**	**1280**	**1500**
	Horizontal Throw	3-4-8	4-7-13	6-8-16	7-10-17	8-12-19	9-13-20	10-15-21	11-16-23	13-17-25	15-19-27
	Noise Criteria	—	—	—	—	20	25	29	33	40	45

Performance Notes:

1. Throws are given at 150, 100 and 50 fpm terminal velocities under isothermal conditions.
2. All pressures are in inches w.g.. To obtain static pressure, subtract the velocitiy pressure from the total pressure.
3. Noise Criteria (NC) values are based upon 10dB room absorption, re 10^{-12} watts. Dash (—) in space indicates an Noise Criteria of less than 15.
4. Diffusers were tested with disc damper in the fully open position.
5. Data derived from tests conducted in accordance with ANSI/ASHRAE Standard 70 – 2006.
6. Flow hoods are recommended for system balancing.

IOM – BACnet® UNI2-VAV Diffuser Assembly

TNB Interface:



Button Navigation Guide:

	☰ (Menu)	△ and ▽
Advanced Menu	- Enters Advanced Menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter - Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

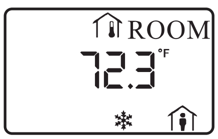
Setting up the Network Parameters

From the TBN General Configuration submenu, the controller's network parameters can be set.

How to enter the General Configuration submenu

To enter the General Configuration submenu:

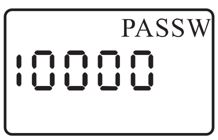
1. Hold the **Menu** button for five seconds.



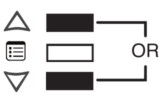
Screen timeout: none

The password field appears.

2. Use the arrow keys to increase or decrease the displayed number until it matches the configured password.



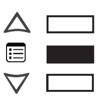
Screen timeout: 15 sec



By default, the password is 9995.

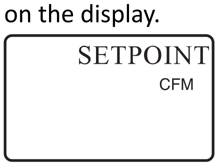
3. Press the **Menu** button to submit the password.

Screen timeout: 15 sec

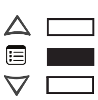


Upon submitting the correct password, the Advanced Menu is entered and the Setpoints submenu is displayed.

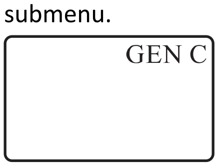
4. Press the **Menu** button several times until **GEN CFG** appears on the display.



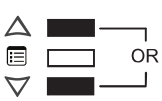
Screen timeout: 15 sec



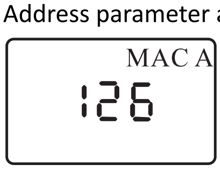
5. Press either of the arrow keys to enter the Configuration submenu.



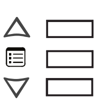
Screen timeout: 30 sec.



Upon entering the General Configuration submenu, the MAC Address parameter appears.



Screen timeout: 30 sec



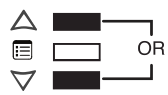
How to set up the BACnet® MS/TP communication network parameters

The TBN can be used to set the controller's BACnet® MAC address and baud rate. In doing so, the TBN must have a subnet ID of 1.

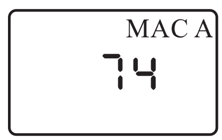
To set up the network parameters:

1. Use the arrow keys to enter the controller's MAC address.

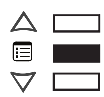
Screen timeout: 30 sec



2. Press the **Menu** button to submit the MAC address.

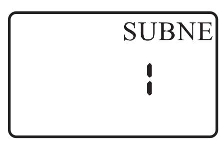


Screen timeout: 30 sec

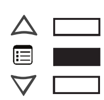


The TBN subnet ID of 1 appears on the display.

3. Press the **Menu** button once to move onto the next parameter.



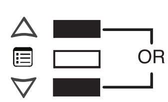
Screen timeout: 30 sec



The Baud Rate parameter appears on the display.

4. Use the arrow keys to set the baud rate.

Screen timeout: 30 sec

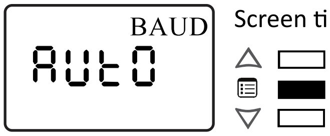


Keep in mind that all the devices on the data bus must be set to the same baud rate. Typically, the baud rate is set at the router level. Therefore, it is recommended to set the baud rate to AUTO so that the baud rate being used on the data bus is automatically detected and applied to the controller accordingly.

5. Press the **Menu** button to submit the baud rate.

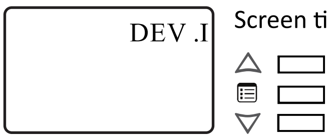
Button Navigation Guide:

	☰ (Menu)	△ and ▽
Advanced Menu	- Enters Advanced Menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter - Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu



Screen timeout: 30 sec

The TBN hardware information appears on the display.



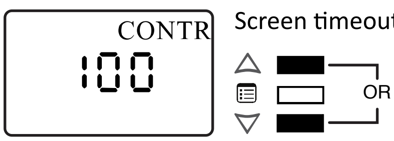
Screen timeout: 30 sec

The TBN's hardware information may be required by Nailor Technical Support for troubleshooting purposes.

How to adjust the screen contrast

1. Navigate to the contrast parameter.

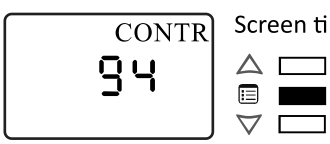
2. Use the arrow keys to adjust the screen contrast.



Screen timeout: 30 sec

The Contrast parameter ranges from 0 to 100, where smaller values give a dimmer contrast than larger ones.

3. Press the **Menu** button to submit the new contrast level.



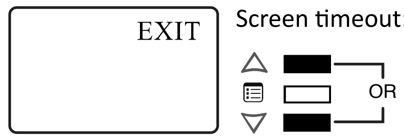
Screen timeout: 30 sec

The screen contrast changes according to the new value submitted.

How to exit the General Configuration submenu

To exit the General Configuration submenu and go up one level, do one of the following:

1. Press the **Menu** button several times until the Exit screen appears. Then press either of the arrow keys.



Screen timeout: 30 sec

2. Press and hold the **Menu** button for 5 seconds.

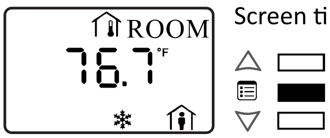
Button Navigation Guide:

		△ and ▽
Advanced Menu	- Enters Advanced Menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter - Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

How to enter the Configuration submenu

To enter the Configuration submenu:

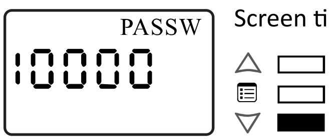
1. Hold the **Menu** button for five seconds.



Screen timeout: none

The password field appears.

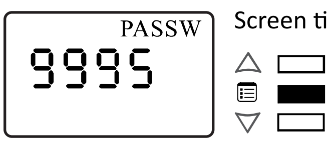
2. Use the down arrow key to decrease the display number until it matches the configured password.



Screen timeout: 15 sec

By default, the password is 9995.

3. Press the **Menu** button to submit the password.

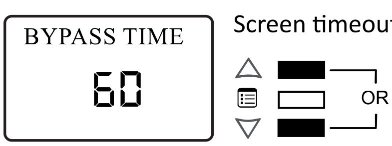


Screen timeout: 15 sec

4. Once the password is accepted, press the **Menu** button again and SETPOINT will appear on the screen.

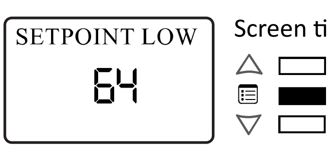
Screen timeout: 30 sec

5. Press the up or down arrow key and the Bypass Time will appear. The default setting is 60 minutes. To change the default setting, use the arrow keys.



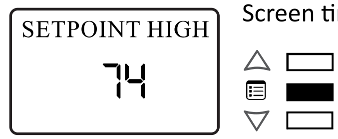
Screen timeout: 30 sec

6. Press the **Menu** button again and the Setpoint Low Limit will appear. The default setting is 64°F. To change the default setting, use the arrow keys.



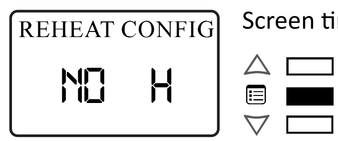
Screen timeout: 30 sec

7. Press the **Menu** button again and the Setpoint High Limit will appear. The default setting is 74°F. To change the default setting, use the arrow keys.



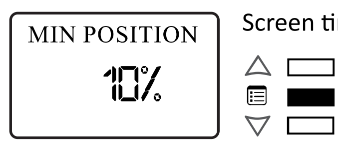
Screen timeout: 30 sec

8. Press the **Menu** button again an Reheat Config will appear. The default setting is No Heat. To change the default setting, use the arrow keys.



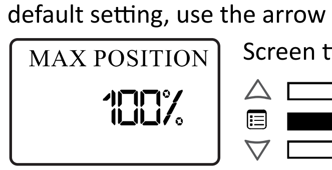
Screen timeout: 30 sec

9. Press the **Menu** button again and Min Position Heat will appear only if 1 or 2 stage heating or 0-10/2-10 volts was selected on the previous screen. The default setting is 10%. Use the arrow keys to change the default setting. <u>This screen will be skipped if no reheat is selected and the next screen to appear will be Min Damper Position.</u>



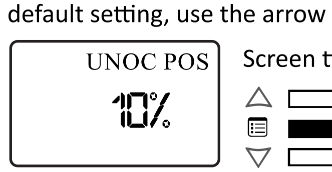
Screen timeout: 30 sec

10. Press the **Menu** button again and the Minimum Damper Position will appear. The default setting is 100%. To change the default setting, use the arrow keys.



Screen timeout: 30 sec

11. Press the **Menu** button again and the Maximum Damper Position will appear. The default setting is 100%. To change the default setting, use the arrow keys.



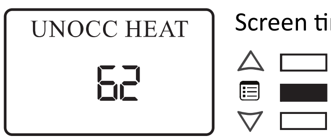
Screen timeout: 30 sec

12. Press the **Menu** button again and the Unoccupied Damper Position will appear. The default setting is 10%. To change the default setting, use the arrow keys.

Button Navigation Guide:

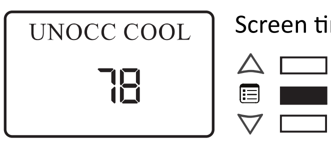
	☰	△ and ▽
Advanced Menu	- Enters Advanced Menu, when held for 5 sec - Navigates between parameters - Submits a modified parameter - Goes up one level, when held for 5 sec - Cancels a modified parameter, when held for 5 sec	- Modifies a parameter - Goes up one level when pressed in Exit screen - Releases an override when both are pressed - Enters into a submenu

13. Press the **Menu** button again the Unocc Heat Setpoint will appear. The default setting is 62°F. To change the default, use the arrow keys.



Screen timeout: 30 sec

14. Press the **Menu** button again the Unocc Cool Setpoint will appear. The default setting is 78°F. To change the default, use the arrow keys.

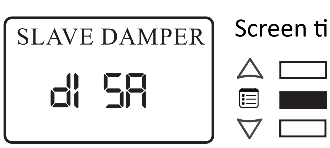


Screen timeout: 30 sec

15. Press the **Menu** button again and the Max Duct Temp will appear if either 1 or 2 stage reheat or 0-10/2-10 volts was enabled. The default setting is 80°F. To change the default setting, use the arrow keys. <u>This screen will be skipped if no reheat is selected.</u>

16. Press the **Menu** button again and the Max Duct Discharge will appear if either 1 or 2 stage reheat or 0-10/2-10 volts was enabled. The default setting is 120°F. To change the default setting, use the arrow keys. <u>This screen will be skipped if no reheat is selected.</u>

17. Press the **Menu** button again and the Slave Damper Enable will appear. The default setting is Disable. To change the default, use the arrow keys.



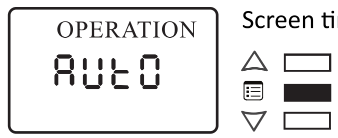
Screen timeout: 30 sec

18. Press the **Menu** button again and Motion Bypass will appear if the TBN has a motion detector on board. The default setting is Enable. To change the default setting, use the arrow keys.

19. Press the **Menu** button again and Motion Bypass Time will appear if the TBN has a motion detector on board. The default setting is 60 Minutes. To change the default setting, use the arrow keys.

20. Press the **Menu** button again and CO_2 Setpoint will appear if the TBN has CO_2 detection on board. The default setting is 800 ppm. To change the default setting, use the arrow keys.

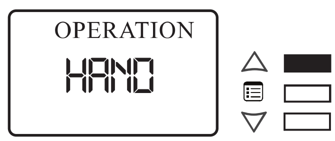
21. Press the **Menu** button again and Operation - Auto will appear. This is the default for automatic damper operation.



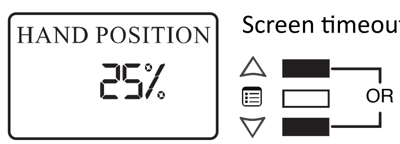
Screen timeout: 30 sec

22. To use Hand Positions, press the UP arrow button until the display reads Operation - Hand. This allows Hand Position to be active.

If the UP arrow button is pressed again, the display will toggle back to Auto. Press **Menu** to advance to next screen.



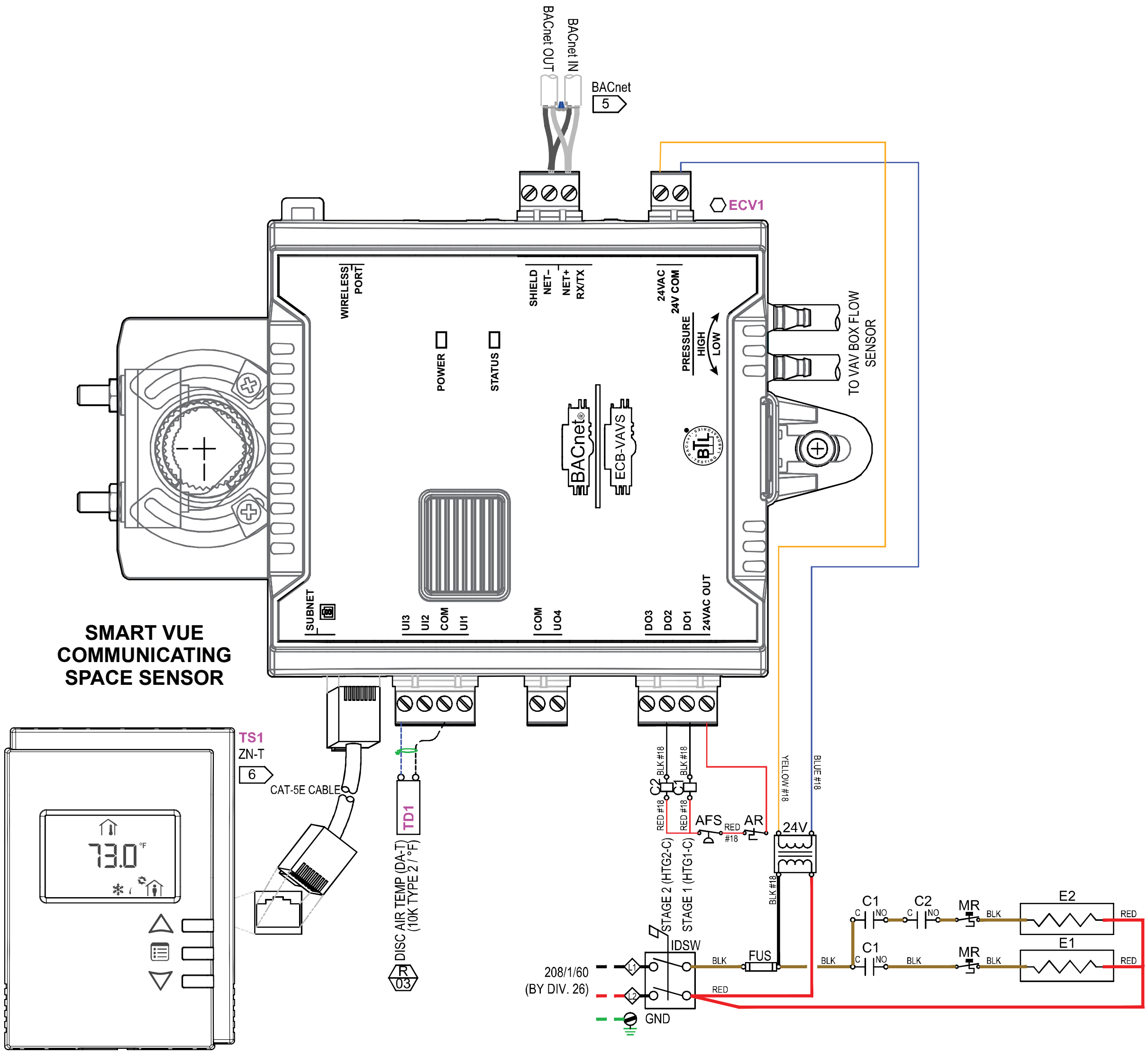
23. When in Hand Position, use the arrow buttons to increase or decrease the damper position value. The default percentage is 25% which is the fixed position the damper will open.



Screen timeout: 30 sec

24. Exit the submenu via the arrow keys or let stat timeout.

TBN Wiring Diagram:



NOTE:

1. Dashed lines indicate new field wiring. Sold lines indicate existing wiring to remain or new field wiring by others.

2. All field wiring must meet or exceed the requirements of the National Electrical Code (NEC) and the Sate Local requirements.

3. For inputs and outputs, the shield wire is grounded at the controller end only.

4. Wiring for inputs and outputs is 18 AWG, shielded, twisted pair with stranded tinned copper conductors.

5. The BACnet® MS/TP network wire is 24 AWG (0.65 mm) stranded, twisted shield pair (Jackson system part#: 24/2 BACnet®). The BACnet® MS/TP communication wire is polarity sensitive and the only acceptable topology is to Daisy-chain the cable from one controller to the next.

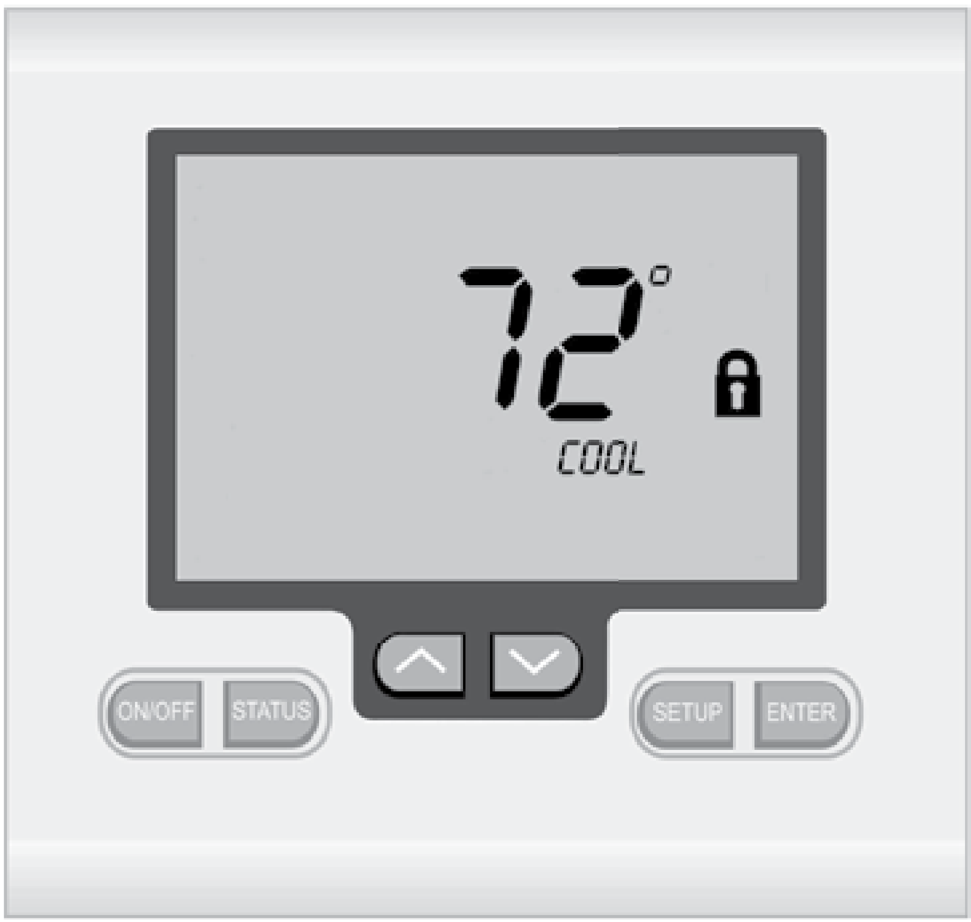
6. Mount space temperature sensor per ADA requirements. Field verify location and coordinate with other trades.

Nailor® Industries Inc.

IOM

Installation and Operation Manual

UNI2-VAV Electronic Thermostat



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CONTENTS

UNI2-VAV ELECTRONIC THERMOSTAT

True modulating control of forced air zone dampers and VAV diffusers. Effectively regulates the amount of supply air into the space to maintain desired temperature. Automatic heat/cool changeover.

HOW IT WORKS:

The UNI2-VAV Electronic Thermostat is designed to wire to a factory mounted actuator board on a zone damper or VAV diffuser that uses a 3-wire floating point actuator. A duct sensor is also wired to the actuator board. The thermostat uses the sensor to determine whether the temperature in the duct is compatible with the thermostat call. For example, if the thermostat calls for cooling and there is cold air in the duct, the damper will be allowed to drive open; otherwise, the damper will maintain it minimum position. The same applies for a heating call.

The temperature in the duct must match the call or the thermostat will keep the damper at its minimum position.

The UNI2-VAV can be used in stand- alone applications as well as with the Z20, twenty zone logic panel that controls the HVAC equipment based on zone thermostat demand.

FEATURES:

- Selectable modulating or two- position damper control
- Selectable Fahrenheit or Celsius display
- Single setpoint control for heating and cooling
- Adjustable minimum and maximum damper position
- Adjustable damper actuator speed setting
- Adjustable high and low setpoint limits
- Adjustable temperature calibration offset
- Damper override for system balancing
- Assignable unit number
- Assignable zone number
- Assignable Modbus address
- Locking keyboard
- Backlit LCD display
- Remote indoor sensor terminals
- Realtime status display of:
  - Unit number
  - Zone number
  - Duct temperature
  - Damper position

The UNI2-VAV electronic thermostat is designed to work with the VAV diffuser. Depending on the application, the UNI2-VAV ELECTRONIC THERMOSTAT can be configured to modulate the damper actuator or provide two- position control. The UNI2-VAV ELECTRONIC THERMOSTAT should be installed in a zone being served by the damper or diffuser and in a location that represent the ambient space temperature. It should not be installed in an area where drafts are present, near the floor, behind doors or on an external wall.

The UNI2-VAV ELECTRONIC THERMOSTAT contains a set of dip switches numbered 1 through 8. Only dip switches 1, 2, 3, 6 and 7 are active. Switch 1 is used to lock the thermostat after setup is complete. When the thermostat is locked, only setpoint changes and status functions can be accessed by the user. Switch 2 is used to display the space temperature, duct temperature and setpoint in Celsius or Fahrenheit. Switch 3 is used to select two-position or fully modulating damper control. Switch 6 is used to control the display of Heat and Cool. Switch 7 is used to control the display of the space temperature.

HOW IT WORKS:

The UNI2-VAV ELECTRONIC THERMOSTAT is a single setpoint, auto-changeover thermostat. The thermostat wires to a factory mounted actuator board on a zone damper of VAV diffuser that uses a 3-wire, floating point actuator. A duct sensor is wired to the actuator board. The thermostat uses the sensor to determine whether the temperature in the duct is compatible with the thermostat call. For example, if the thermostat calls for cooling and the duct temperature is below 72° F, the damper will be allowed to drive open; otherwise, the damper will maintain its minimum position. The same applies for a heating call. The temperature in the duct must be above 72° F or the thermostat will keep the damper at its minimum position.

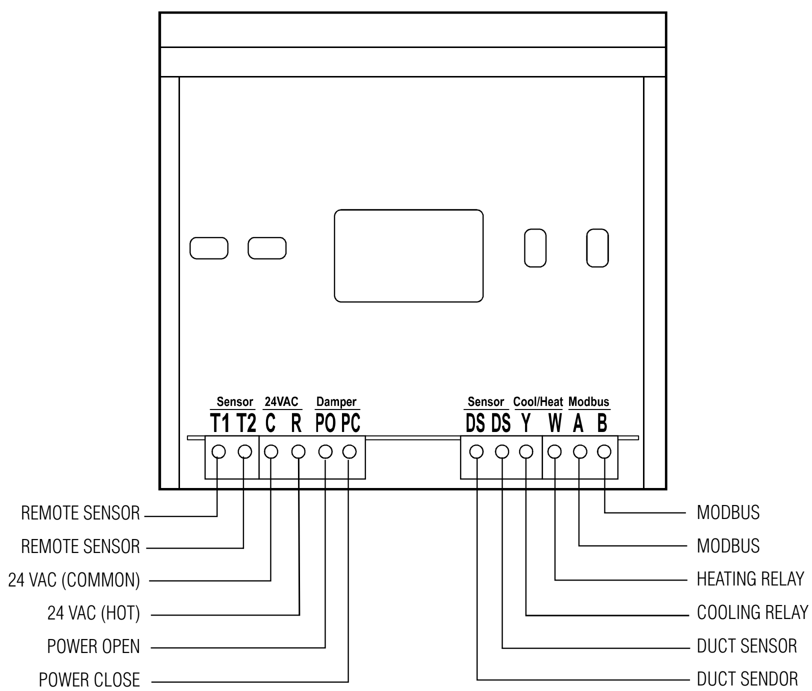
SPECIFICATIONS

UNI2-VAV Electronic Thermostat specifications are subject to change without notice.

Input voltage:	24 VAC 50/60 Hz +/- 15%	**Temperature sensor:**	10K NTC Type II
Relay rating:	24 VAC @ 1A maximum per relay	**Control range:**	36° F to 96° F
Operating temperature:	32° to 122° F	**Backlight:**	Blue Electro Luminescent
Operating RH:	0 - 95% (non-condensing)	**Backlight life:**	3,000 hours to half brightness
LCD Display size:	2-3/4" W x 1-7/8" H	**Approvals:**	FCC Part 15 C-tick
Accuracy:	+/- 1° @ 77° F	**Dimensions:**	4.0" H x 4.375" W x 0.875" D

TERMINAL DESIGNATIONS

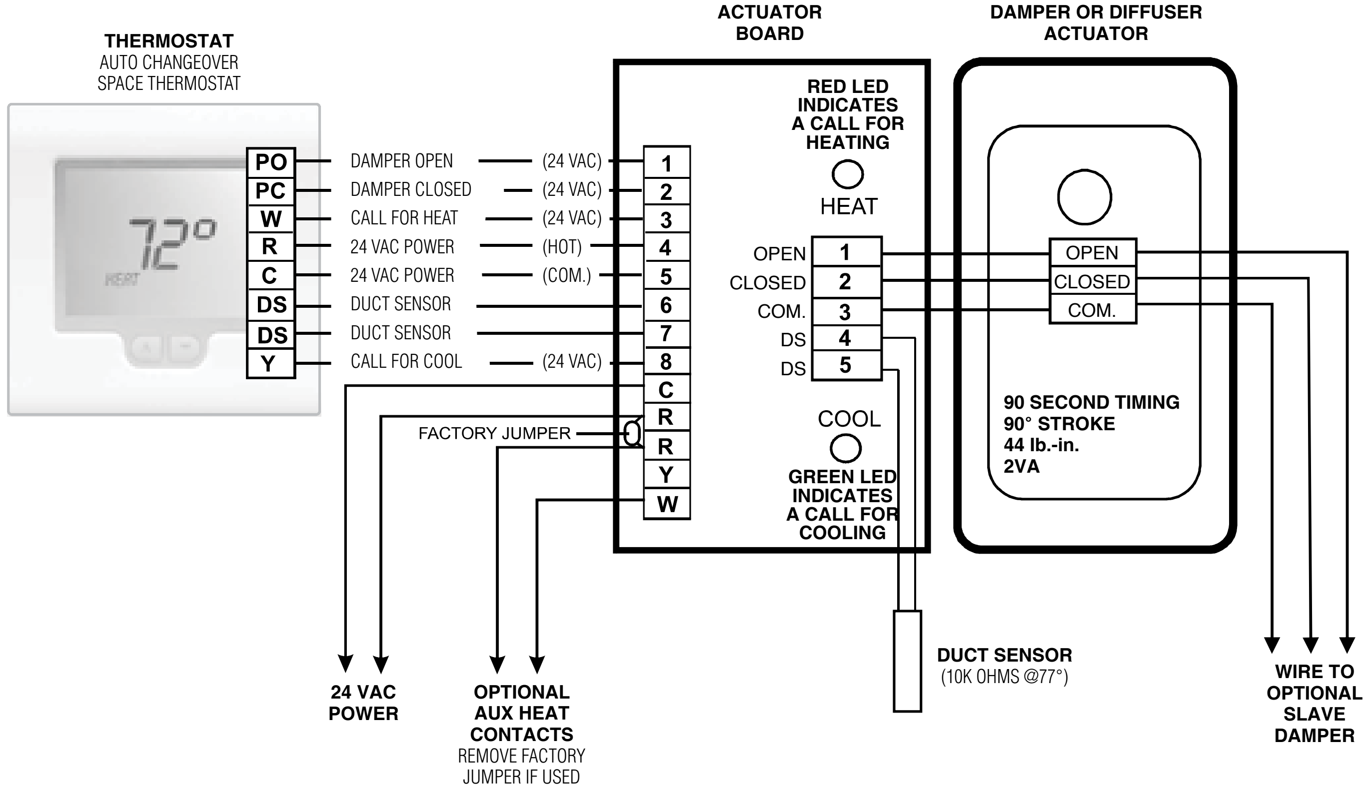
Thermostat Subbase



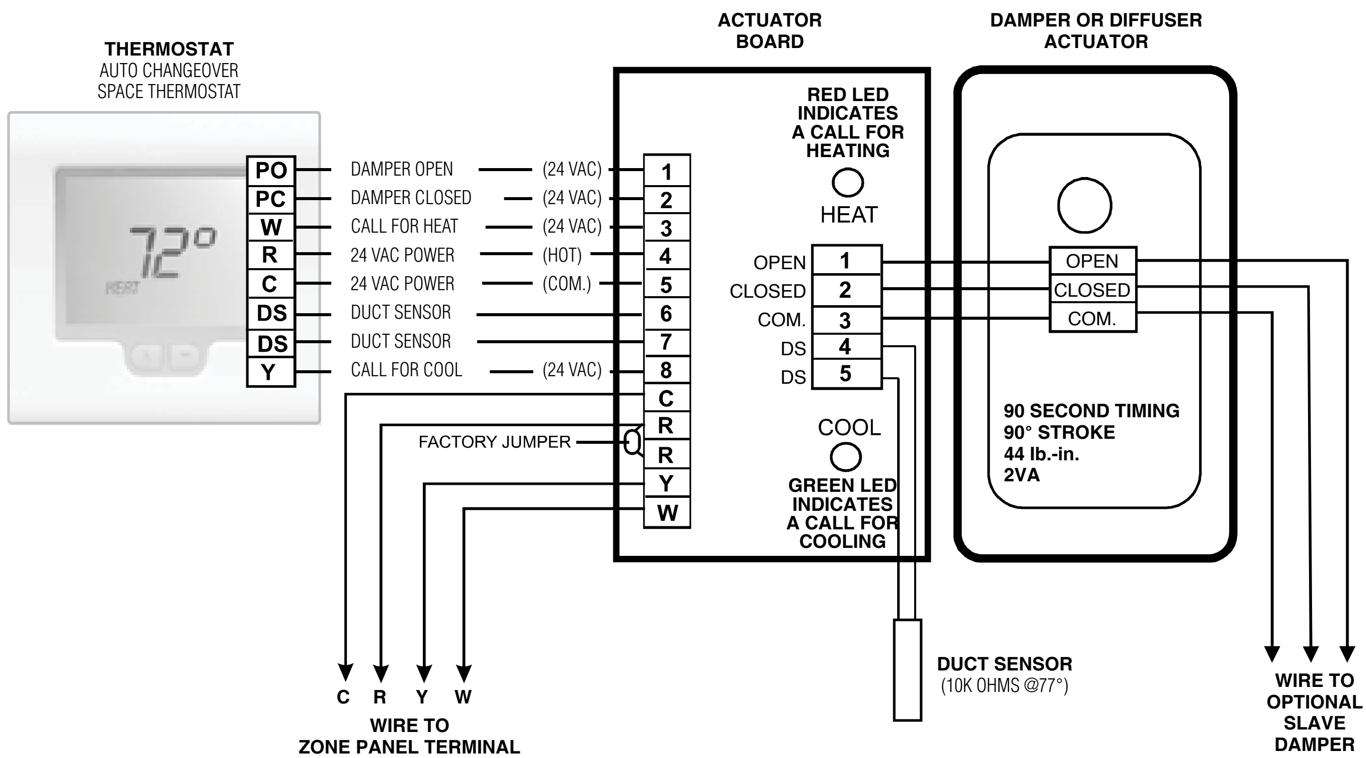
The thermostat has dedicated screw terminals located on the subbase to facilitate ease of wiring to the actuator board mounted on the damper of diffuser. When wiring the thermostat to the actuator board, use standard 18-8 thermostat wire (verify with local codes if plenum-rated wire is required).

SYSTEM WIRING DIAGRAMS

Typical Stand-alone Zone Damper or Diffuser



Typical Zone Control System



SUBBASE

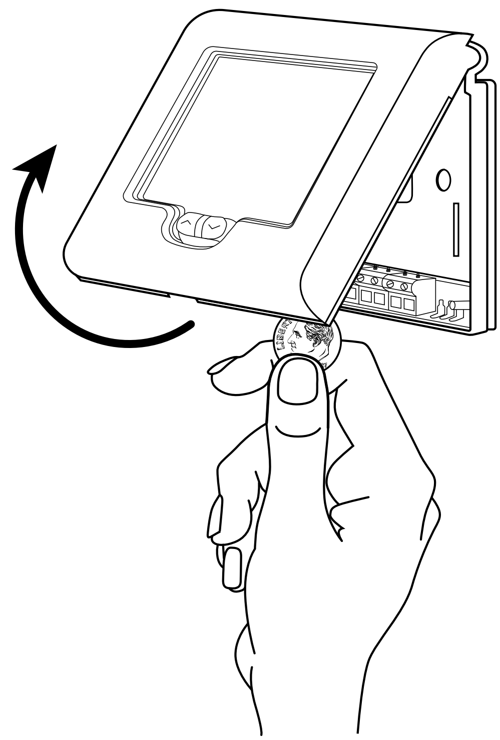
Removing the thermostat from the subbase

The thermostat contains a release slot located on the bottom. Insert a small coin (dime) in the release slot and gently twist the coin to release the thermostat from the subbase. Avoid twisting the case, as this may stress the LCD or bend the terminal connector pins.

The top of the thermostat is hinged to the subbase and will release when rotated upward.

When attaching the thermostat to the subbase, first place the hinged access cover on by fitting the plastic molded pins into the grooves at the top of the thermostat.

Carefully align the two standoffs located at the top of the thermostat with the slots in the top of the subbase. Allow the thermostat to swing downward and gently push until the connector pins are fully seated into the terminal blocks.

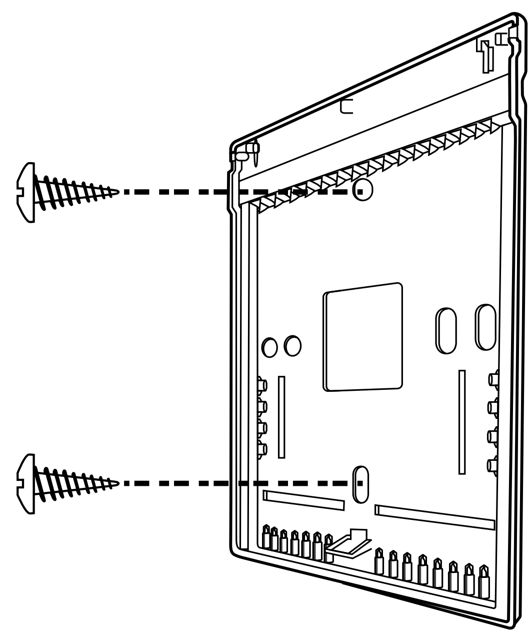


Mounting the thermostat subbase

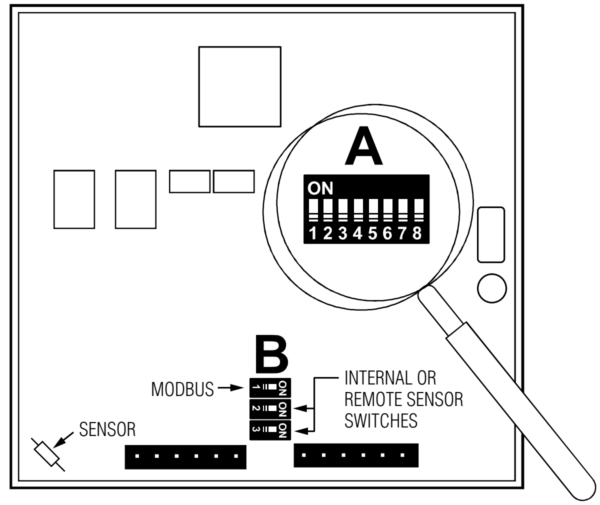
The thermostat should be installed in a location that represents the ambient room temperature. Do not install the thermostat in an area where drafts are present, near the floor, behind doors, or on an external wall. Avoid placing the thermostat in areas where the air movement is limited, affected by direct sunlight, or other areas not typical of the temperature of the room.

When mounting the thermostat, be aware that drafts may travel down cavity walls and enter the back of the thermostat through the control wire holes in the wall. It is important to seal these holes to prevent any drafts from affecting the internal temperature sensor.

Pull the control wires through the large opening in the thermostat subbase then level and mount the subbase on the wall using the supplied anchors and screws. **Do not over-tighten the mounting screws as the subbase may warp causing improper seating of the thermostat connecting pins to the terminal blocks.** Use a properly sized screwdriver and land each wire to its dedicated terminal. Check to see that all wires are landed correctly and dressed properly to prevent any shorts.



SWITCH FUNCTIONS



(A) SWITCH 1 is used to lock the thermostat. When the thermostat is locked (ON position) a padlock icon will show on the LCD. When locked, only setpoint changes and status functions can be accessed by the user. **Do not set Switch 1 in the ON position until all SETUP functions are completed.**

(A) SWITCH 2 displays the space temperature and setpoint in Fahrenheit (OFF position - factory default) or Celsius (ON position. Select For C before proceeding to SETUP menu.

(A) SWITCH 3 is used to select fully modulating

(OFF position - factory default) or two-position (ON position) damper control to best suit the specific application requirement.

(A) SWITCH 4 & 5 have no function.

(A) SWITCH 6 Switch 6 is used to display or hide the **Heat** and **Cool** on the LCD. OFF position displays Heat and Cool. ON position hides **Heat** and **Cool**.

(A) SWITCH 7 When switch 7 if OFF, both the space temperature and set temperature are displayed. When switch 7 is ON, only the set temperature is displayed.

(A) SWITCH 8 has no function.

(B) SWITCH 1

Switch 1 should remain OFF for Modbus. It is only used as an end of the line resistor on a large network where communications issues might exist. Consult factory for additional information.

(B) SWITCH 2 & 3

When the internal sensor is used, Switch 2 is ON and Switch 3 is OFF.

When a remote sensor is used, Switch 2 is OFF and Switch 3 is ON.

KEY FUNCTIONS

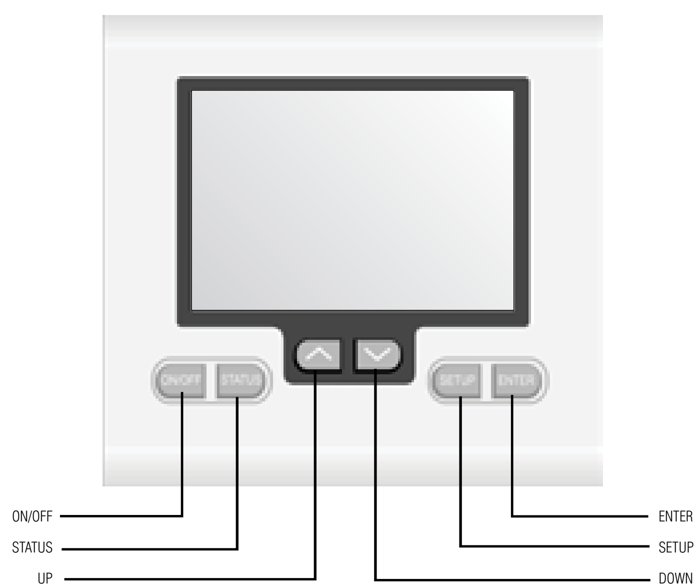
ON/OFF KEY - When the thermostat is not locked, this key allows the thermostat to be turned ON and OFF. When in the OFF position, the damper is also driven closed.

STATUS KEY - Pressing the STATUS key displays the UNIT number, ZONE number, DUCT temperature and DAMPER position.

UP(△) and **DOWN** (▽) **KEYS** - These keys are used to increase or decrease the setpoint as well as change thermostat setup values.

SETUP KEY - This key allows the installer to toggle through the thermostat setup menu.

ENTER KEY - This key is used to enter changes as well as exit the setup menu.



SETUP

Startup

Replace the thermostat on the subbase and apply 24 Volts power. The LCD will momentarily display all icons (Figure 1).

Figure 1

Entering the setup menu

Press and hold the **SETUP** key until the word DAMPER appears on the LCD (Figure 2).

Figure 2

Setting the minimum damper position

Press the **SETUP** key again and the LCD will display the minimum damper position. The factory default is 10% which means the damper is driven 90% closed. Press the (∆) and (∇) keys to change the minimum damper position. Position may be adjusted in 10% increments (Figure 3).

Figure 3

Setting the maximum damper position

Press the **SETUP** key again and the LCD will display the maximum damper position for heating and cooling. The factory default is 100% which means the damper can drive fully open. Press the (∆) and (∇) keys to change the maximum damper position. Position may be adjusted in 10% increments (Figure 4).

Figure 4

Helpful Hint:
The maximum damper position setting can help with air balancing when no manual balancing dampers have been installed.

SETUP (CONT.)

Setting a unit number

The **SETUP** key again and the LCD will display the word UNIT. The factory default is 00. This number can be used to assign the thermostat to a particular HVAC unit. Use the (∆) or (∇) key to assign a UNIT number from 00 to 99 (Figure 5).

Figure 5

Setting a zone number

Press the **SETUP** key again and the LCD will display the word ZONE. The factory default is 00. This number can be used to identify each thermostat wired to a zone control panel or when used in multiple stand-along applications . Use the (∆) and (∇) keys to assign a ZONE number from 00 to 99 (Figure 6).

If you chose not to change the unit and zone number defaults, it will not affect the thermostat.

Figure 6

Helpful Hint:

If it is necessary to exit the setup menu before all setup functions are completed, simply press the **ENTER** key and all settings will be saved. To re-enter the setup menu, press and hold the **SETUP** key until the word DAMPER appears and then continue pressing the **SETUP** key to toggle through the functions to where you left off.

Setting the heating limit

Press the **SETUP** key again and the LCD will display the heating limit. The factory default is 76° F. Press the (∆) and (∇) keys to change the heating limit setting. It is strongly recommended that the limit not be set above the factory default setting (Figure 7).

Figure 7

Setting the cooling limit

Press the **SETUP** key again and the LCD will display the cooling limit. The factory default is 68° F. Press the (∆) and (∇) keys to change the cooling limit setting. It is strongly recommended that the limit not be set below the factory default setting (Figure 8).

Figure 8

SETUP (CONT.)

Setting the actuator speed

Press the **SETUP** key again and the LCD will display the actuator speed. The factory default is 90 seconds which is the time it takes the actuator to drive the damper blade fully open or fully closed. This is a critical step in setup since the thermostat can be used with a variety of 24 Volt actuators. If you are unsure of the actuator speed, place the actuator in the fully closed position and then apply 24 Volts to common and power open. The time it takes to drive the damper blade fully open equals the actuator speed setting (Figure 9).

Figure 9

Setting the modbus address

Press the **SETUP** key again and the LCD will display the Modbus address. The factory default is 01.

The thermostat has integrated Modbus communication capabilities for remote monitoring and control. For more information, contact the factory (Figure 10).

Figure 10

Temperature calibration offset

Press the **SETUP** key again and the LCD will display the temperature calibration offset. The factory default setting is 0. Typically, it is not necessary to adjust the temperature calibration offset as the thermostat has been factory calibrated. If calibration is necessary, a high quality electronic digital thermometer must be used. Place the thermometer sensor probe next to the thermostat sensor and allow five minutes before comparing the temperature readings. Use the (∆) and (∇) keys to adjust the temperature calibration. The range is +/- 9° F (Figure 11).

Figure 11

Sensor Location

Saving settings and exiting the setup menu

Press the **ENTER** key again and the thermostat will save the setup menu settings and exit the program. The LCD will display the space temperature along with other normal operating functions. To review the thermostat settings, simply press and hold the **SETUP** key until the setup menu is displayed and then toggle through the settings. Press the **ENTER** key to exit the setup menu. Remove the thermostat from the subbase and set the Switch 1 in the ON position to lock the thermostat which will prevent setup changes from being made. When the thermostat is locked, a padlock icon will be displayed on the LCD (Figure 12).

Figure 12

CHECKING THERMOSTAT STATUS

After the thermostat is locked and operational, its status functions can be checked by pressing the **STATUS** key and toggling through the following status points:

UNIT - Displays the HVAC unit number assigned to the thermostat

ZONE - Displays the thermostat zone number

DUCT - Displays the duct temperature

POSITION - Displays the damper position in 10 degree increments. (0% = fully closed and 100% = fully open)

THERMOSTAT OPERATION

The thermostat is designed to provide accurate but simple temperature control for the user. When the thermostat is not calling, only the space temperature is displayed on the LCD along with the padlock icon that confirms the thermostat setup functions cannot be changed. The user can use the (△) and (▽) keys to change the thermostat setpoint within the setpoint limits and review the status points by pressing the **STATUS** key (Figure 13).

Figure 13

THERMOSTAT OPERATION (CONT.)

Changing the Setpoint

When the (△) and (▽) keys are pressed, the thermostat will display the word **SET**. The setpoint then can be changed within the setup limits (Figure 14).

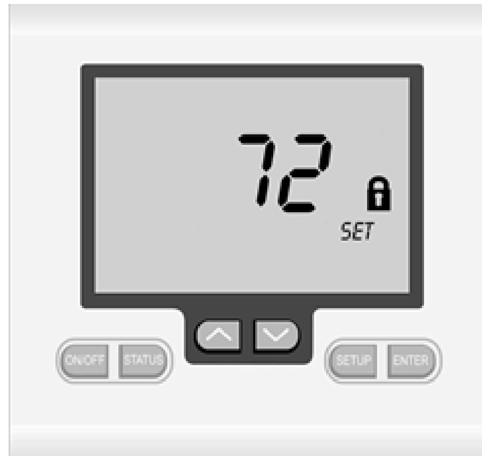


Figure 14

Call for heating

When the thermostat calls for heating, the word **HEAT** will be displayed on the LCD (Figure 15).

Figure 15

THERMOSTAT OPERATION (CONT.)

Call for cooling

When the thermostat calls for cooling, the word **COOL** will be displayed on the LCD (Figure 16).

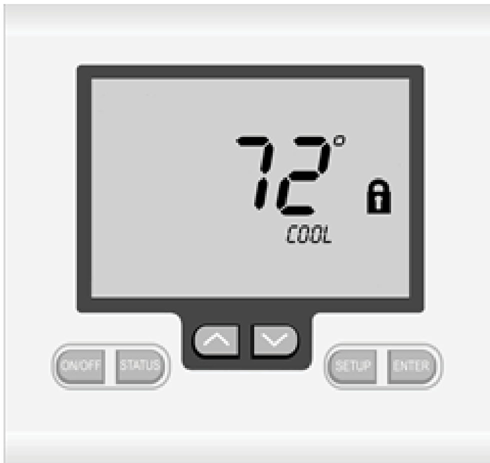


Figure 16

ADVANCED FUNCTIONS

Damper position override

The thermostat has a damper position override feature to assist in air balancing and bypass damper setup. With the thermostat unlocked, press and hold the **SETUP** key until the word **DAMPER** appears on the LCD (Figure 17).

Figure 17

ADVANCED FUNCTIONS (CONT.)

Override to open

Press the (∆) and (∇) keys until the word OPEN appears on the LCD and then press the ENTER key. The damper will drive open and remain in the open position until the override is canceled (Figure 18).

Figure 18

Override to close

Press the (∆) and (∇) keys until the word CLOSE appears on the LCD and then press the **ENTER** key. The damper will drive closed and remain in the closed position until the override is canceled (Figure 19).

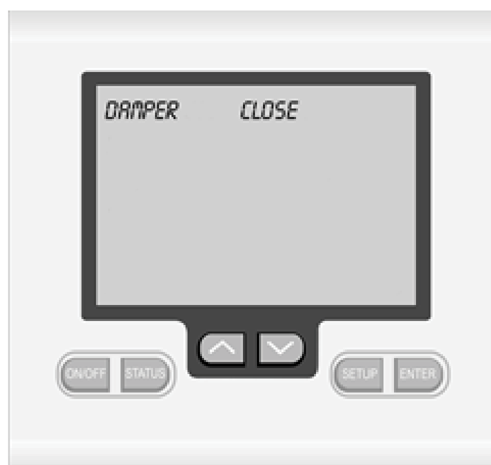


Figure 19

Canceling the damper override

In order for the thermostat to control normal damper operation, the override must be canceled. Press and hold the **SETUP** key until the word DAMPER OPEN or DAMPER CLOSE appears on the LCD. Use the (∆) and (∇) keys until only the word DAMPER is displayed and then press the **ENTER** key. The thermostat will then resume normal operation.