Z-2000-T Thermostat

Installation / Operation Manual

Version 2.0

HVAC CONTROLS

The Z-2000-T thermostat is designed to work with the Z-2000 modulating zone control system and the Zone One stand-alone modulating zone damper and diffuser. Please take time to read and understand this manual so that installation and testing is undertaken in an efficient and effective manner.

Although great care has been taken in the preparation of this manual, iO HVAC Controls takes no responsibility for errors or omissions contained herein. It is the responsibility of the installer to ensure that this thermostat and the equipment connected to it operate in a safe and efficient manner.

Due to ongoing product improvements, iO HVAC Controls reserves the right to change the specifications of the Z-2000-T or its components without notice.

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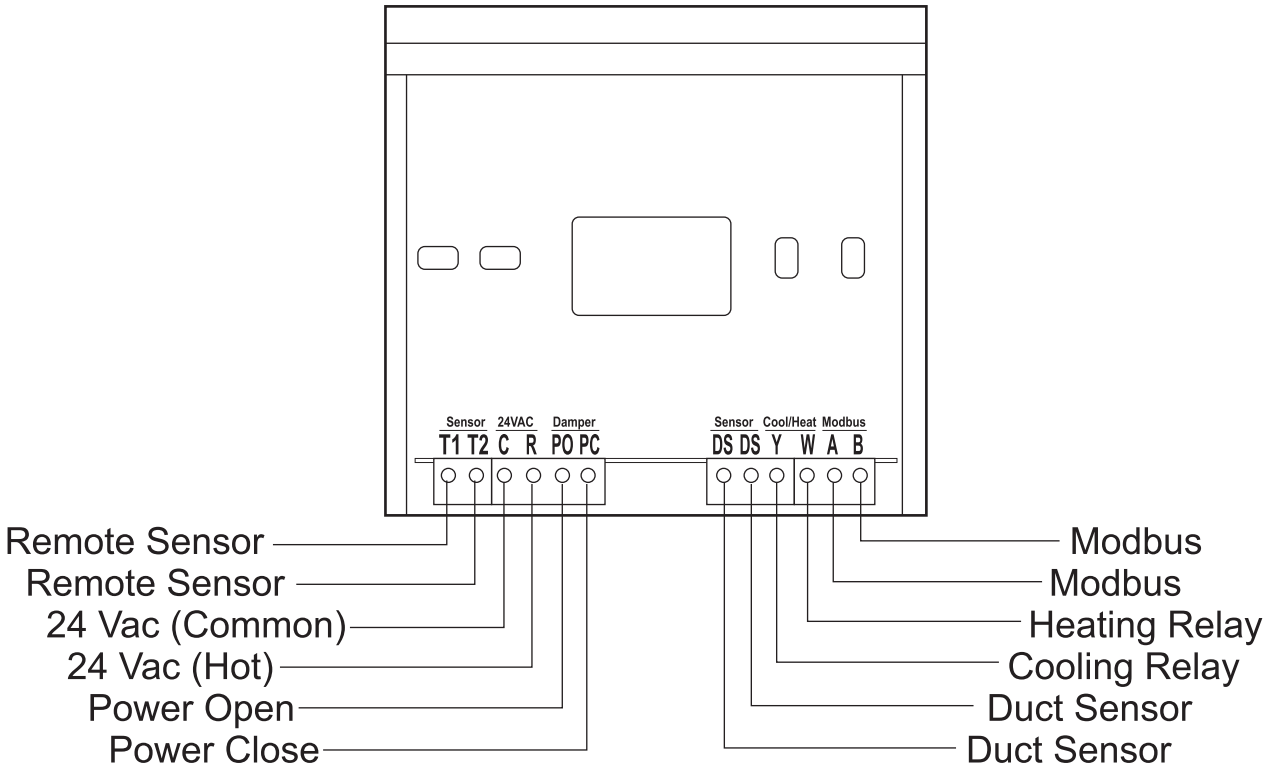
Terminal Designations

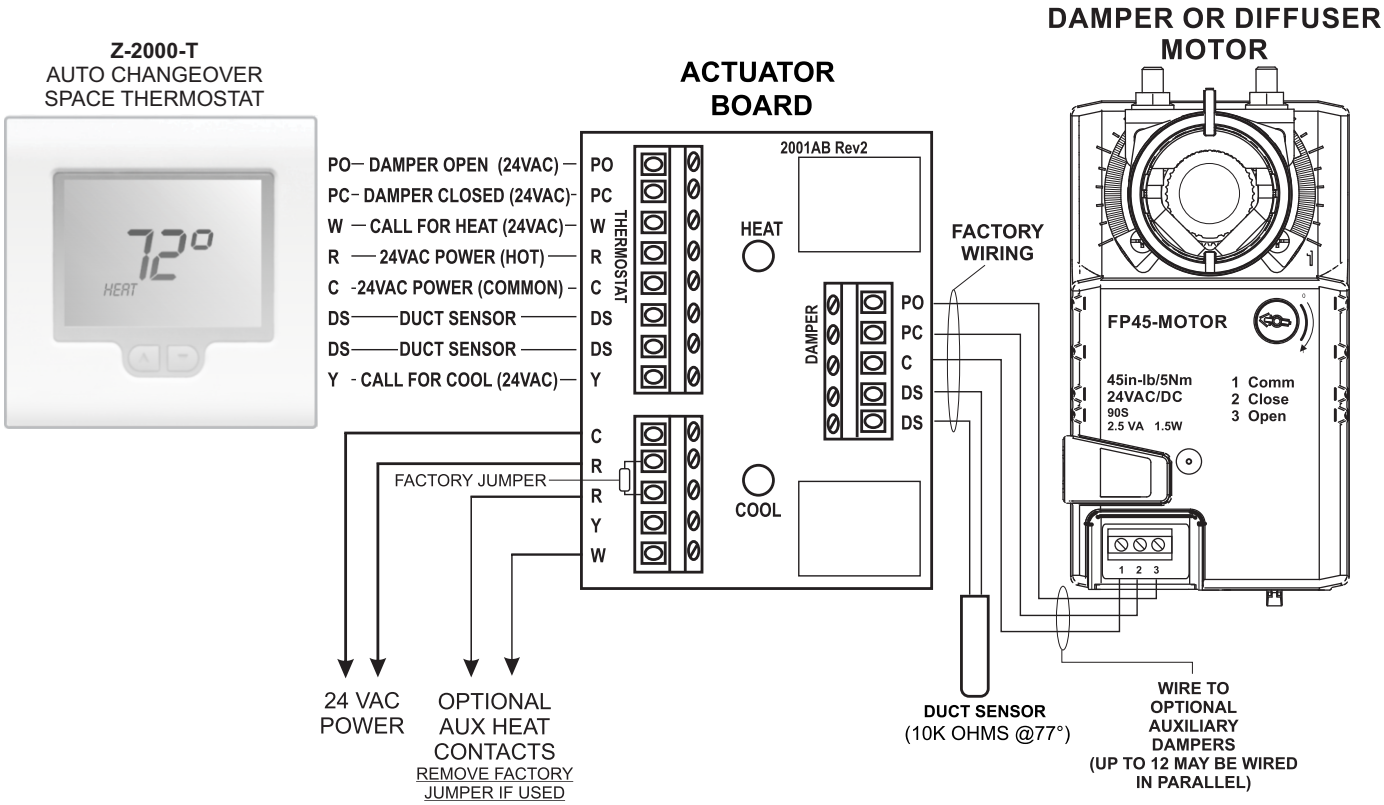
Thermostat Subbase



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).

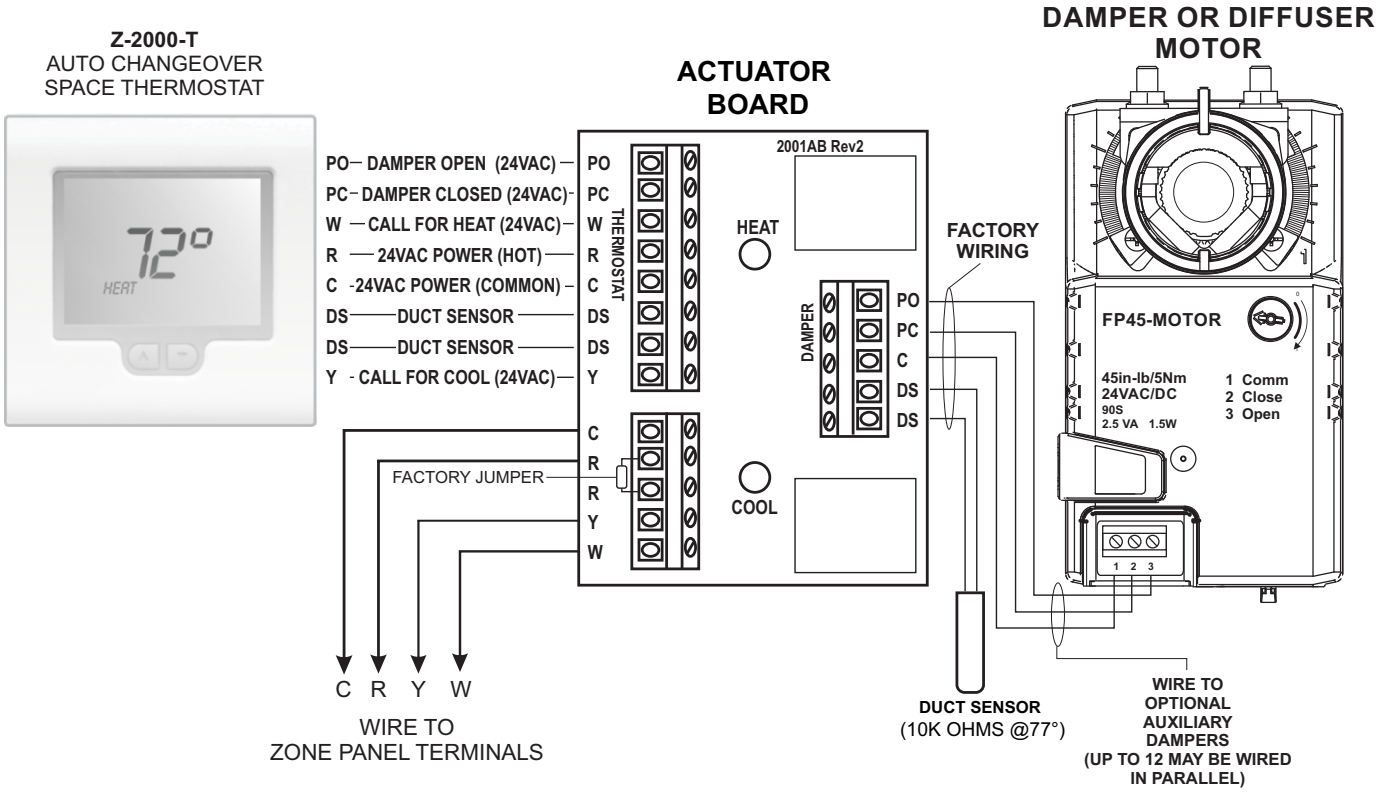
System Wiring Diagrams

Typical Stand-alone Zone Damper or Diffuser



System Wiring Diagrams

Typical Zone Control System

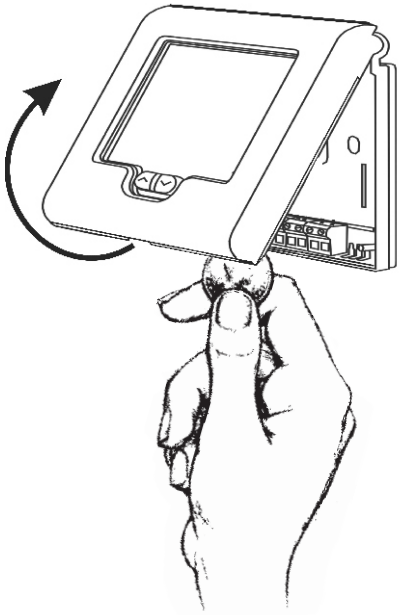


Removing the thermostat subbase

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.

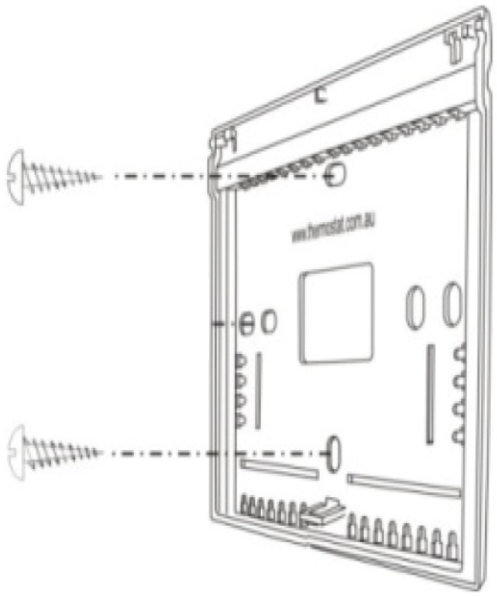


When attaching the thermostat to the subbase, first place the hinged access cover on by fitting the plastic molded pins into the grooves at the top of the thermostat. Carefully align the two standoffs located at the top of the thermostat with the slots in the top of the subbase. Allow the thermostat to swing downward and gently push until the connector pins are fully seated into the terminal blocks.

Mounting The Thermostat Subbase

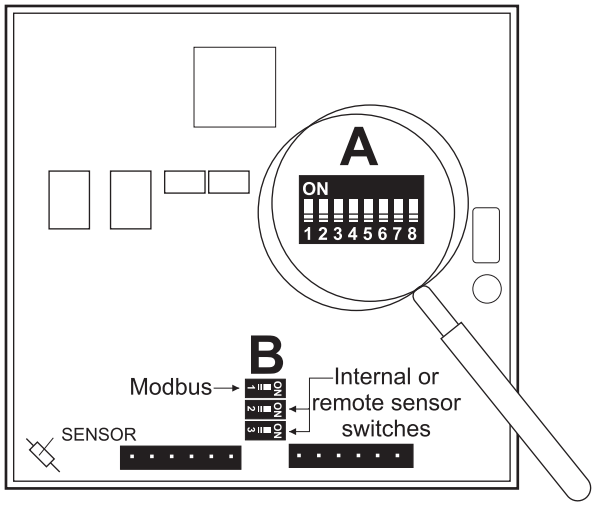
The thermostat should be installed in a location that represents the ambient room temperature. Do not install the thermostat in an area where drafts are present, near the floor, behind doors, or on an external wall. Avoid placing the thermostat in areas where the air movement is limited, affected by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

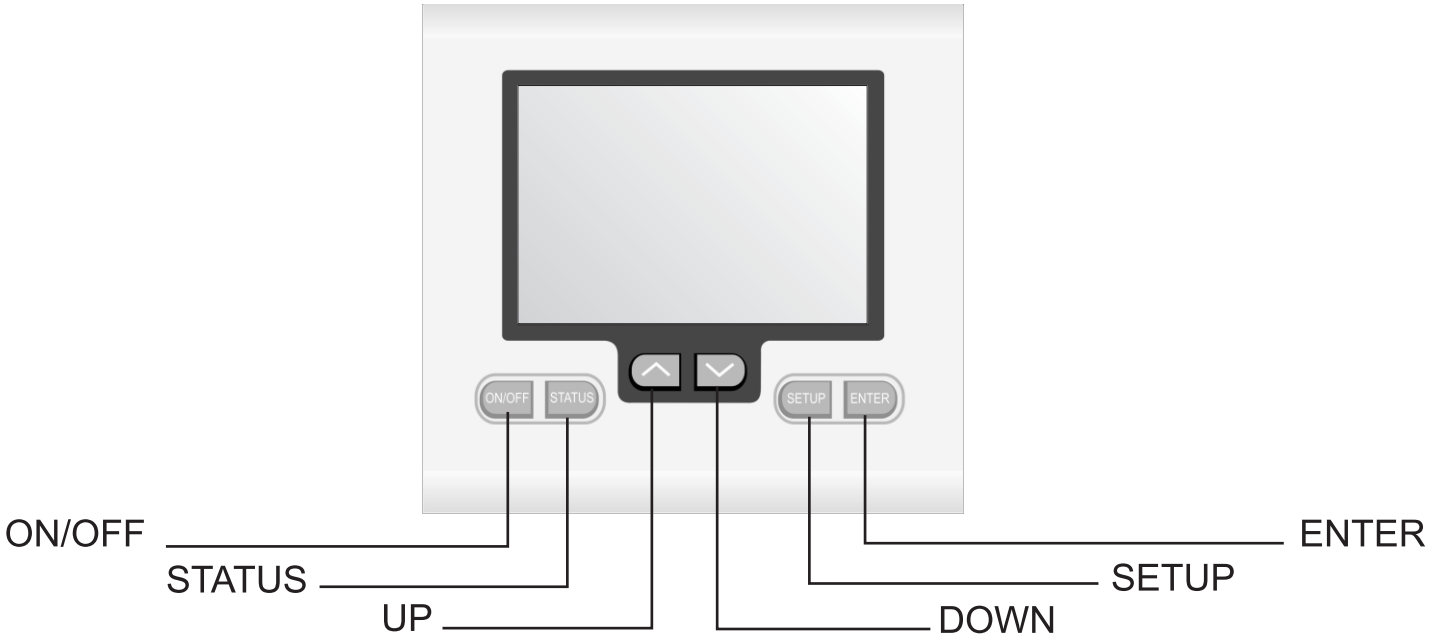
(B) SWITCH 1

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

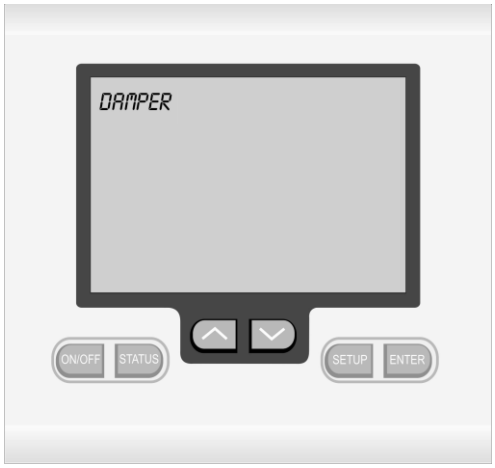


FIGURE 2

Entering the setup menu
Press and hold the **SETUP** key until the word DAMPER appears on the LCD. (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

Setup

FIGURE 4

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)

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

Setup

Setting a unit number
Press 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

FIGURE 6

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.

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.

Setup

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

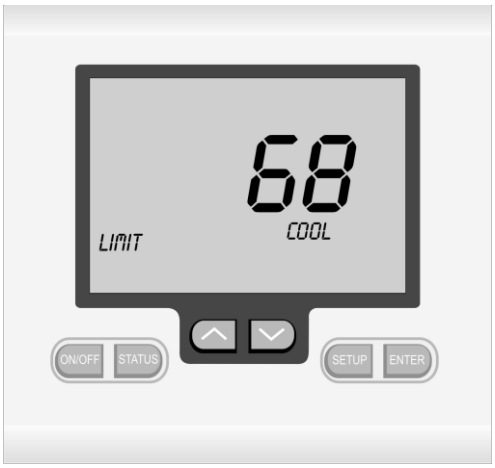


FIGURE 8

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)

Setup

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

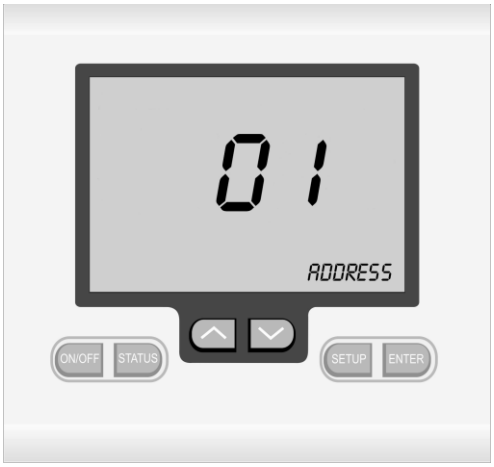


FIGURE 10

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)

Setup

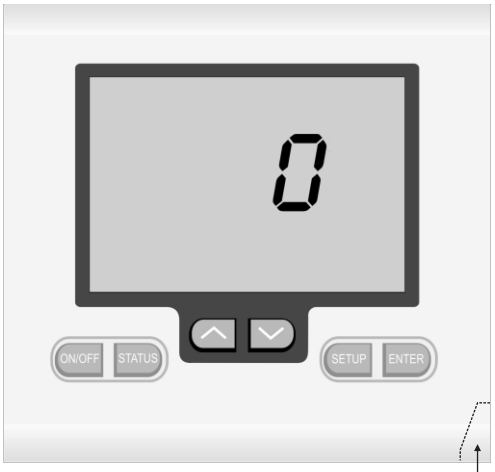


FIGURE 11

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)

Saving settings and exiting the setup menu
Press the **ENTER** key 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

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

FIGURE 15

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

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

FIGURE 16

Helpful Hint: The thermostat can only be turned off when unlocked.

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)

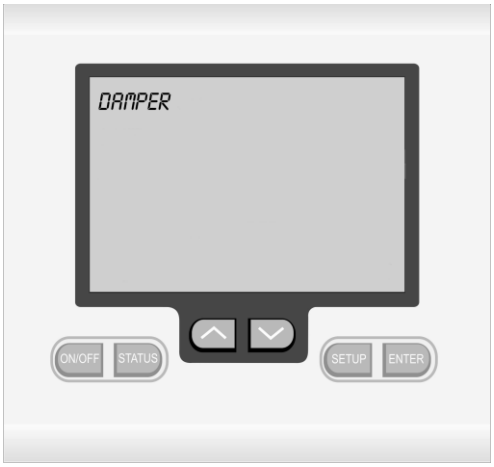


FIGURE 17

FIGURE 18

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 cancelled (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 cancelled. (Figure 19)

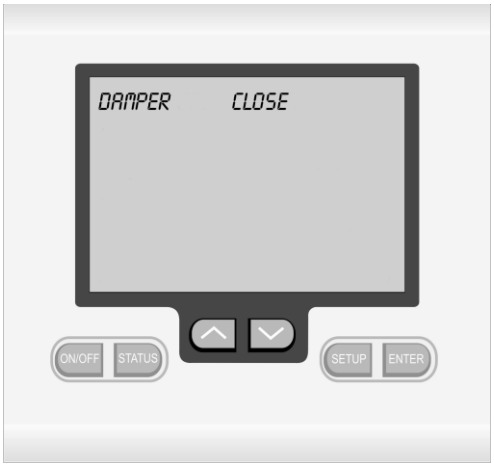


FIGURE 19

Cancelling the damper override

In order for the thermostat to control normal damper operation, the override must be cancelled. 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.

Specifications

Input Voltage	24VAC 50/60 Hz
Relay Rating	24VAC @ 1Amp maximum per relay
Operating Temperature	23° F to 122° F
Operating RH	0-95% (non-condensing)
Size	4-7/16” W x 4-1/16” H x 7/8” D
LCD Display Size	2-3/4” W x 1-7/8” H
Internal Temperature Sensor	10K NTC type 3
Remote Sensor (Optional)	10K NTC type 3
Accuracy	+/- 1° F @ 77° F
Display Resolution	1° F
Control Range	36° F to 96° F
Back Light	Blue EL (Electro Luminescent)
Communications Protocol	Modbus
Approvals	FCC (Part 15) (Pending) C-tick
Warranty	5 years