HVAC
CONTROLS

T32-VNP Atlas Vertical
Non-programmable Thermostat

72 °F Outside 75°
Cool Auto FAN On

▲ ▼

Mode Fan

Installation Manual

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INTRODUCTION

The T32-VNP Atlas is a feature-rich non-programmable thermostat that can be battery powered or hardwired to the HVAC equipment. Using a commonsense approach to the installation will ensure this product is installed properly and to the customer's satisfaction. Please take time to read and understand this manual so that installation and testing is performed in an efficient manner.

This manual is to be used in conjunction with the supplied User Manual.

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.

GETTING STARTED

As with any HVAC project, careful installation is the key to a successful outcome. Time taken during the installation process will be rewarded with fewer call-backs.

The steps required to install the T32-VNP Atlas thermostat are as follows.

1. Read and understand this Installation Manual and User Manual.
2. Mount and wire the subbase.
3. Install the batteries.
4. Set the 4 system switches to match the equipment application.
5. Wire optional remote temperature sensor(s).
6. Power the thermostat.
7. Set the Advanced Installer settings.
8. Test the thermostat.

INSTALLING THE THERMOSTAT

DISASSEMBLY
There are two release slots located on the bottom of the thermostat. Gently push the flat blade of a small screwdriver into one slot at a time and pry upward until the catch disengages. Carefully swing the thermostat upward and away from the subbase. (Figure 1)

THERMOSTAT LOCATION
The thermostat should be installed in a location that represents the ambient space 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 in the space.
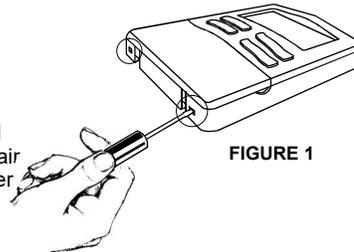
FIGURE 1

MOUNTING THE SUBBASE
When mounting the thermostat subbase, be aware that drafts may travel down wall cavities and enter the back of the thermostat through the control wire hole in the wall. It is important to seal the hole to prevent any drafts that might affect the internal temperature sensor.

INSTALLING THE THERMOSTAT

Pull the control wires through the large opening in the thermostat subbase. Next, level and mount the subbase on the wall using the supplied anchors and screws. (Figure 2)
Do not over tighten the mounting screws as the subbase may warp causing the improper seating of the thermostat connecting pins to the terminal blocks.

Use a properly sized screwdriver and back each screw terminal out (counterclockwise) before landing each wire to its dedicated terminal. Do not over tighten the terminal screws. Check to ensure that all wires are landed correctly and dressed properly to prevent any shorts. Refer to Typical System Wiring Diagrams in this manual for proper wiring.

UP

Wire Access Hole

C	R	G	W1	W2 O/B	Y1	Y2	A U X	A U X	T	T
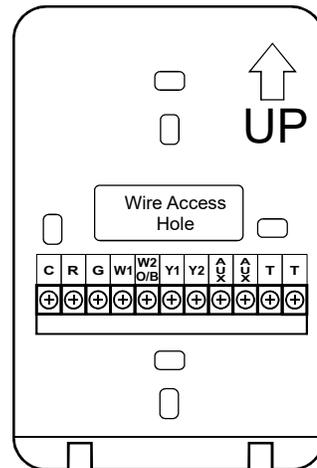
FIGURE 2

INSTALLING THE THERMOSTAT

TERMINAL	DESIGNATION
C	24 VAC Common
R	24 VAC Hot
G	Fan
W1	First Stage Heat/Auxiliary/Emergency Heat
W2/OB	Second Stage Heat or Reversing Valve
Y1	First Stage Cool or First Stage Compressor
Y2	Second Stage Cool or Second Stage Compressor
T (2)	Outdoor or Indoor Remote Sensor
AUX (2)	Relay Contacts for Fresh Air Ventilation Damper

SETTING THE SYSTEM SWITCHES

The thermostat contains a set of four system switches located on the thermostat printed circuit board. (Figure 3)

The switches are used to match the thermostat operation and relay outputs with the HVAC system requirements.

Refer to the system switch functions on the next page to properly configure the thermostat.
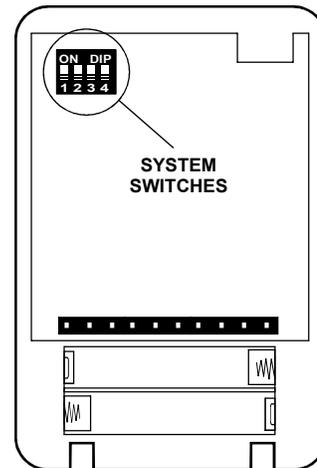
SYSTEM SWITCHES

FIGURE 3

SYSTEM SWITCH FUNCTIONS

Switch 1 - Equipment Type Switch 1 sets the equipment type. For conventional heat/cool equipment, set the switch to the OFF position (factory default). For heat pump equipment set the switch to the ON position.

Switch 2 - Fan or Reversing Valve **When Switch 1 is OFF**
For gas heat, set the switch to the OFF position (factory default). For electric heat, set the switch to the ON position.
When Switch 1 is ON
For 'O' reversing valve, set the switch to the OFF position. (factory default) For 'B' reversing valve, set the switch to the ON position.

Switch 3 - Equipment Stages Switch 3 sets the number of equipment stages.
OFF = 1 heat / 1 cool gas / electric or 2 heat / 1 cool heat pump or dual fuel.
ON = 2 heat / 2 cool gas / electric or 3 heat / 2 cool heat pump or dual fuel.

Switch 4 - Dual Fuel Mode For conventional heat pump equipment, leave switch 4 in the OFF position (factory default). For dual fuel equipment, set switch 4 to the ON position.

INSTALLING THE BATTERIES

The thermostat comes with two AA batteries. Even if the thermostat is hardwired, battery backup is recommended.

However, in the event batteries are not used and the thermostat loses primary power, all settings are non-volatile.

The battery access compartment is located on the front of the thermostat. Simply swing the hinged door down.

Install the two AA batteries matching the + and - orientation. Close the door until it clicks shut. When the batteries are properly installed, the LCD screen will be visible. (Figure 4)
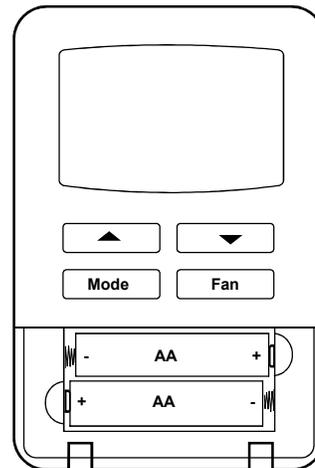
FIGURE 4

TYPICAL SYSTEM WIRING DIAGRAMS
HEAT ONLY (GAS SINGLE OR MULTI-STAGE)
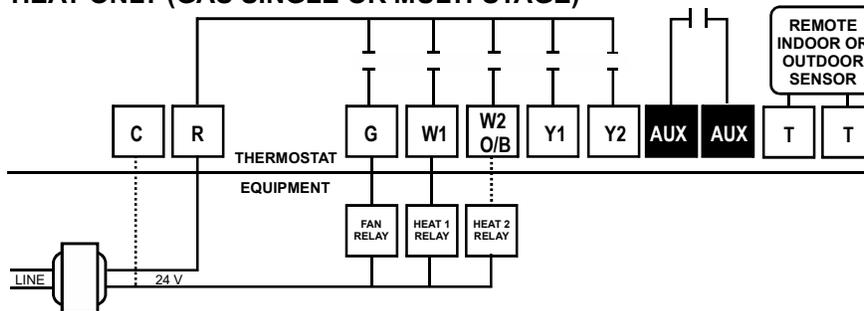
C	R		G	W1	W2 O/B	Y1	Y2	AUX	AUX	T	T

THERMOSTAT

EQUIPMENT

REMOTE INDOOR OR OUTDOOR SENSOR

FAN RELAY

HEAT 1 RELAY

HEAT 2 RELAY

LINE   24 V

Switch Settings

Switch 1 = **OFF**		Heat/Cool
Switch 2 = **OFF**		Equipment controls fan on call for heat
Switch 3 = **OFF**		Single Stage **ON** = Two Stage
Switch 4 = **OFF**		Leave OFF

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TYPICAL SYSTEM WIRING DIAGRAMS
HEAT ONLY (ELECTRIC SINGLE OR MULTI-STAGE)
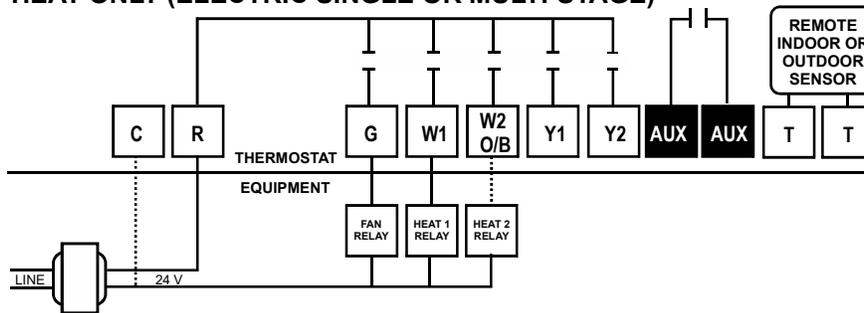
C	R		G	W1	W2 O/B	Y1	Y2	AUX	AUX	T	T

REMOTE INDOOR OR OUTDOOR SENSOR

THERMOSTAT

EQUIPMENT

FAN RELAY HEAT 1 RELAY HEAT 2 RELAY

LINE 24 V

Switch Settings

Switch 1 = **OFF**	Heat/Cool	
Switch 2 = **O**N	Thermostat controls fan on call for heat	
Switch 3 = **OFF/ON**	**OFF** = Single Stage **ON** = Two Stage	
Switch 4 = **OFF**	Leave OFF	

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TYPICAL SYSTEM WIRING DIAGRAMS
COOL ONLY (ELECTRIC SINGLE OR MULTI-STAGE)
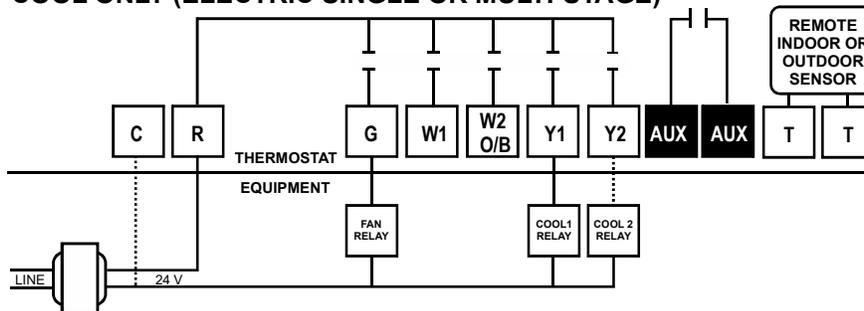
| C | R | THERMOSTAT | G | W1 | W2 O/B | Y1 | Y2 | AUX | AUX | REMOTE INDOOR OR OUTDOOR SENSOR T | T |

EQUIPMENT

FAN RELAY

COOL1 RELAY   COOL 2 RELAY

LINE   24 V

Switch Settings

Switch 1 = **OFF**	Heat/Cool
Switch 2 = **O**N	Fan energized on call for cooling
Switch 3 = **OFF/ON**	**OFF** = Single Stage **ON** = Two Stage
Switch 4 = **OFF**	Leave OFF

TYPICAL SYSTEM WIRING DIAGRAMS
HEAT/COOL (GAS SINGLE OR MULTI-STAGE)

| C | R | | G | W1 | W2 O/B | Y1 | Y2 | AUX | AUX | REMOTE INDOOR OR OUTDOOR SENSOR T | T |

THERMOSTAT

EQUIPMENT

| FAN RELAY | HEAT 1 RELAY | HEAT 2 RELAY | COOL1 RELAY | COOL 2 RELAY |

LINE   24 V

Switch Settings

Switch 1 = **OFF**	Heat/Cool
Switch 2 = **OFF**	Fan energized on call for cooling
Switch 3 = **OFF/ON**	**OFF** = Single Stage **ON** = Two Stage
Switch 4 = **OFF**	Leave OFF

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TYPICAL SYSTEM WIRING DIAGRAMS
2 HEAT/1 COOL OR 3 HEAT/2 COOL (HEAT PUMP)

C	R	G	W1	W2 O/B	Y1	Y2	AUX	AUX	T	T

REMOTE INDOOR OR OUTDOOR SENSOR

THERMOSTAT

EQUIPMENT

FAN RELAY	AUX RELAY	R VALVE RELAY	COMP 1 RELAY	COMP 2 RELAY

LINE 24 V

Switch Settings

Switch 1 = ON	Heat Pump
Switch 2 = **OFF/ON**	**OFF** - 'O' **ON** - 'B' Reversing Valve
Switch 3 = **OFF/ON**	**OFF** = 2 H/1C **ON** = 3H/2C
Switch 4 = **OFF**	Leave OFF

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TYPICAL SYSTEM WIRING DIAGRAMS
2 HEAT/1 COOL OR 3 HEAT/2 COOL (DUAL FUEL)
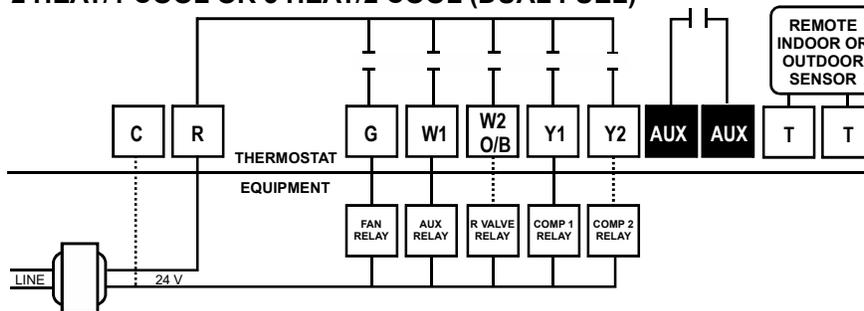
REMOTE INDOOR OR OUTDOOR SENSOR

C	R		G	W1	W2 O/B	Y1	Y2	AUX	AUX	T	T

THERMOSTAT

EQUIPMENT

FAN RELAY	AUX RELAY	R VALVE RELAY	COMP 1 RELAY	COMP 2 RELAY

LINE   24 V

Switch Settings

Switch 1 = ON	Heat Pump	
Switch 2 = **OFF**/**ON**	**OFF** - 'O' **ON** - 'B' Reversing Valve	
Switch 3 = **OFF**/**ON**	**OFF** = 2 H/1C **ON** = 3H/2C	
Switch 4 = **ON**	Locks out heat pump when furnace is energized	

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INSTALLER SETUP MENU

NOTE: Making changes in the Installer Setup Menu can seriously affect the safe operation and function of the HVAC equipment. If you are unsure about the functions of the settings it is strongly recommended that they are left at the factory default settings.

ENTERING THE MENU

Press and hold the Mode and UP arrow button simultaneously for five seconds or until the display shows 15.

Use the UP arrow button and change the number to **21** which is the factory default PIN to enter the menu.

Press the Mode button to enter the installer menu.

Press the Fan button to advance through the menu or press the Mode button to go back.

To exit the menu, hold the Mode button for 5 seconds.

If no buttons are pressed for 30 seconds the thermostat will auto exit the menu.
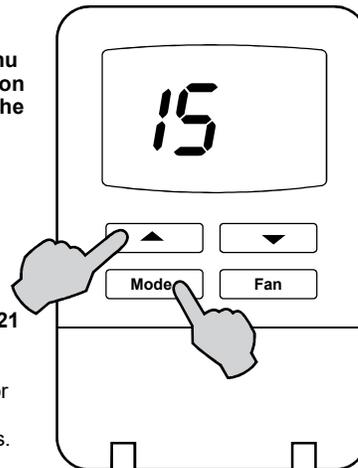
INSTALLER SETUP MENU

NOTE: The Installer Setup Menu settings are dynamic which means that non-applicable settings will not be displayed. For example, if the thermostat is configured for heat only, settings not pertaining the heat only configuration will be hidden in the menu.

MENU NUMBER	DESCRIPTION
01	**Mode Selection (Factory Default = 0)** 0 = Auto-changeover 1 = Manual Changeover 2 = Heating Only 3 = Cooling Only
02	**Cooling Setpoint Limit (Factory Default = 50° F** Cooling Limit can be adjusted from 43° F to 122° F
03	**Heating Setpoint Limit Factory Default = 90° F** Heating Limit can be adjusted from 41° F to 120° F

INSTALLER SETUP MENU

MENU NUMBER	DESCRIPTION
04	**First Stage Differential (Factory Default = 1)** 1 = 1° F 2 = 2° F 3 = 3° F
05	**Second Stage Differential (Factory Default = 2)** Adjustable from 1°F to 10°F in 1° increments
06	**Third Stage Differential (Factory Default = 2)** Adjustable from 1°F to 10°F in 1° increments
07	**Demand or Locked Staging (Factory Default = 0** 0 = Demand Staging - Thermostat will upstage and downstage based on differential settings 1 = Locked Staging - Thermostat will not downstage until call has been satisfied.

INSTALLER SETUP MENU

MENU NUMBER	DESCRIPTION
08	**Internal Sensor Calibration (Factory Default = 0)** Sensor Calibration can be adjusted from -9° F to +9° F
09	**Compressor Protection (Factory Default = ON)** ON = 4 minute delay on break time delay OFF = No delay on break
10	**Low Balance Point (Factory Default = OFF)** Low Balance Point can be used when the thermostat is configured for Heat Pump for Dual Fuel and fitted with an outdoor temperature sensor. When outdoor temperature drops below the Low Balance Point setting, the compressor is locked out and only auxiliary heat source is used for heating. Adjustable from 0° F to 77° F.

INSTALLER SETUP MENU

MENU NUMBER	DESCRIPTION
11	**High Balance Point (Factory Default = OFF)** High Balance Point can be used when the thermostat is configured for Heat Pump for Dual Fuel and fitted with an outdoor temperature sensor. When outdoor temperature rises above the High Balance Point setting, only the compressor is used and the auxiliary heat source is locked out. Adjustable from 32° F to 122° F.
12	**Temperature Display (Factory Default = 0)** 0 = Fahrenheit 1 = Celsius
13	**Audible Button Beep (Factory Default = ON)** ON = Audible Beep OFF = No Audible Beep

INSTALLER SETUP MENU

MENU NUMBER	DESCRIPTION
14	**Fresh Air Ventilation (Factory Default = OFF)** Fresh Air Ventilation is used to bring outside air into the conditioned space at a controlled CFM rate based on ASHRAE 62.2 - 2013 Ventilation and Indoor Air Quality Standard. See Ventilation Reference Chart to calculate ventilation minutes per hour. Fresh air damper is required which wires to the AUX terminals. Adjustable from 1-60 minutes in 1-minute increments.
15	**FAV Low Temp Limit (Factory Default = OFF)** FAV Low Temp is used to set an outdoor temperature when a remote outdoor sensor is installed and Fresh Air Ventilation is selected. If the outdoor temperature is equal to or lower than the selected setting, Fresh Air Ventilation will be suspended. Adjustable from 0° F to 50° F.

INSTALLER SETUP MENU

MENU NUMBER	DESCRIPTION
16	**FAV High Temp Limit (Factory Default = OFF)** FAV High Temp is used to set an outdoor temperature when a remote outdoor sensor is installed and Fresh Air Ventilation is selected. If the outdoor temperature is equal to or above the selected setting, Fresh Air Ventilation will be suspended. Adjustable from 60° F to 90° F.
17	**Changing PIN (Factory Default = 21)** PIN is used to access the Installer Menu. The range can be from 0 to 99. If PIN is changed, make sure it is documented.
18	**Remote Sensor Selection (Factory Default = 0)** 0 = Used with outdoor temperature sensor 1 = Replace internal sensor with indoor remote 2 = Use internal with indoor remote for temperature averaging

INSTALLER SETUP MENU

MENU NUMBER	DESCRIPTION
19	**Factory Reset (Factory Default = 0)** To reset the thermostat to the original factory defaults, change 0 to 1 and then exit the menu by pressing and holding down the Mode button for five seconds. **NOTE: This may change how the thermostat controls the HVAC equipment as well as any menu items that were changed from original factory defaults.**

REMOTE SENSOR INSTALLATION

This thermostat can use either a remote indoor or outdoor sensor but not both.

T-OTS REMOTE OUTDOOR TEMPERATURE SENSOR
The factory default in Installer Menu 18 = 0 which allows an outdoor remote sensor to be wired to the thermostat **T** and **T** terminals. The thermostat will display the outdoor temperature and can also be used for high and low balance point control as well as high and low temperature limit control for Fresh Air Ventilation.

T-S1 REMOTE INDOOR TEMPERATURE SENSOR
If a remote indoor temperature sensor is used, Installer Menu 18 must be changed. There are two options to choose from.
When Installer Menu is set to 1, the thermostats internal sensor is disabled and only the remote sensor will measure the space temperature.
When Installer Menu is set to 2, both the internal and remote sensor are used together for temperature averaging.
When installing an indoor remote sensor mount it in the same manner as the thermostat and not on an outside wall. Keep the sensor away from direct air flow, supply registers or near sources of heat such as lamps and appliances. It is recommended that 18-2 shielded cable be used for remote sensor wiring.

REMOTE SENSOR INSTALLATION

TEMPERATURE/RESISTANCE CHART

Temperature (°F)	Resistance (KΩ)	Temperature (ºF)	Resistance (KΩ)
30	34.6	70	11.9
40	26.1	80	9.4
50	19.9	90	7.4
60	15.3	100	5.9

Remote sensors used with this thermostat are NTC Type 2 - 10Ω @ 77° F

DISPLAY FUNCTIONS

Low battery indication
(Change batteries)

Displayed when thermostat
is in Installer Mode

Displays room
temperature

Displays heating and/or cooling
setpoint as well as outdoor
temperature when optional
outdoor remote sensor is used

Displayed when Fresh Air
Ventilation is being used
and flashes when fresh air
damper is open

Displayed when thermostat
is in off position

Displays Auto or On fan

Low Batt Room **Installer Mode** **Outside 188- °F C Heat Cool Set Set** **FAV**

88 °F C **Set Limit Reached**

OFF

EHeat.. Cool. **Auto FAN On**

Displays heating mode and
staging based on equipment
configuration

Displays cooling
mode and
staging based on
equipment
configuration

Displayed when heating
or cooling setpoint
limit is reached

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TESTING

FAN OPERATION

Press the **Mode** button until the word **OFF** is displayed. Press the **FAN** button until the word **FAN On** appears. After a moment, the internal fan relay 'G' will energize and the system fan should operate. Press the **FAN** button again until the word **OFF** appears. After a moment, the internal fan relay will de-energize and the system fan will shut off.

CONVENTIONAL HEATING

Press the **Mode** button until the word **Heat** appears. Press the **UP** arrow button and raise the setpoint above the space temperature and the first stage differential. After a moment, the internal heating relay 'W1' will energize and the heating system should operate. The word **Heat** will flash continuously. If the thermostat has been configured for two stage heating, raise the setpoint above the second stage differential and **Heat** will flash■ indicating the 'W2' heating relay is energized. Press the **Mode** button until the word **OFF** is displayed.

CONVENTIONAL COOLING

Press the **Mode** button until **Cool** appears. Press the **DOWN** arrow button and lower the setpoint below the space temperature and the first stage differential.

TESTING

Note: On a call for cooling, the thermostat activates a 4-minute time delay before the cooling relay 'Y1' is energized. The stage symbol ▪ will flash next to **Cool** to indicate the thermostat is in time delay. After the time delay, the internal fan 'G' and cooling relay 'Y1' will energize. The word **Cool** will flash. If the thermostat has been configured for two stage cooling, lower the setpoint below the second stage differential and **Cool**▪ will flash indicating the 'Y2' cooling relay is energized. Press the **Mode** button until the word **OFF** is displayed.

CONVENTIONAL HEAT PUMP

When the thermostat is configured for conventional heat pump operation, testing is the same as a heating and cooling system with the exception that a 4-minute time delay is activated before the 'Y1' compressor relay will energize on a call for heating or cooling. The stage symbol ▪ will flash to indicate the thermostat is in time delay. Depending on the mode of operation and equipment configuration**, Heat** or **Cool** will flash when the 'Y1' compressor relay is energized. **Heat** ▪ or **Cool**▪ will flash when the 'Y2' compressor relay is energized. **Heat** ▪ ▪ will flash when the auxiliary 'W1' relay is energized. **E.Heat** will flash when the mode is set to emergency heat. After testing, press the **Mode** button until the word **OFF** is displayed.

TESTING

DUAL FUEL

When the thermostat is configured for dual fuel operation, testing is the same as a heating and cooling system with the exception that a 4-minute time delay is activated before the 'Y1' compressor relay will energize on a call for heating or cooling. The stage symbol ■ will flash to indicate the thermostat is in time delay. Depending on the mode of operation and equipment configuration, **Heat** or **Cool** will flash when the 'Y1' compressor relay is energized. **Heat** ■ or **Cool** ■ will flash when the 'Y2' compressor relay is energized. **Heat** ■ ■ and third stage symbol will flash when the auxiliary 'W1' relay is energized. **E.Heat** will flash when the mode is set to emergency heat. <u>Whenever the thermostat calls for auxiliary heat, the heat pump compressor or compressors will be de-energized and the auxiliary heat will remain on until the call is satisfied</u>.

LOW BALANCE POINT (Heat Pump or Dual Fuel)

When an outdoor sensor is used with the thermostat, Installer Menu 10 allows you to select a low balance point temperature. When the outdoor temperature falls below the low balance point setting, a call for heat from the thermostat automatically energizes the 'W1' relay and bypasses the compressor relays.

TESTING

To test the low balance point setting, set Installer Menu 10 above the displayed outdoor temperature and force a call for heating. Only the auxiliary heat relay 'W1' should energize. After testing, reset the low balance point setting to a normal operating range.

HIGH BALANCE POINT (Heat Pump or Dual Fuel)
High balance point is designed to prevent the auxiliary heat 'W1' relay from energizing when the outdoor temperature is above the balance point setting. To test the high balance point setting, set Installer Menu 11 below the displayed outdoor temperature and force a call for auxiliary heat. Only the compressor 'Y1' and/or 'Y1' and 'Y2' should energize. If the thermostat is placed in the **E.Heat** (emergency heat) mode, the 'W1' relay will energize. After testing, reset the high balance point setting to a normal operating range.

FRESH AIR VENTILATION

The auxiliary dry contacts can be used with the Fresh Air Ventilation option in Installer Menu 14. Fresh Air Ventilation is designed to improve residential indoor air quality by introducing fresh, outside air through a 2-wire, power open / spring closed motorized intake damper controlled by the thermostat. The thermostat controls the amount of fresh air required each hour based on ASHRAE 62.2 - 2013 Ventilation and Indoor Air Quality Standard.

FRESH AIR VENTILATION

The reference chart on the next page provides the ventilation timer setting based on using an 8" outside air damper ducted to the return air plenum on the HVAC system. A separate 24-volt transformer should be used to power the damper. When Fresh Air Ventilation is used **FAV** will appear on the LCD. When the fresh air damper is energized through the auxiliary contacts on the thermostat, **FAV** will flash.

FRESH AIR VENTILATION DAMPER WIRING DIAGRAM

THERMOSTAT

AUX | AUX

SEPARATE 24V TRANSFORMER

PO/SC DAMPER

24V   LINE
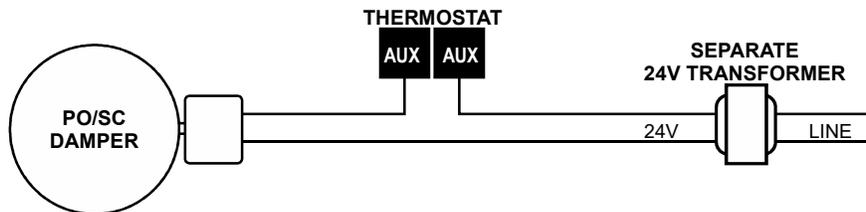
FRESH AIR VENTILATION SETUP

The reference chart below provides the ventilation timer setting (Installer Option 27) based on using 8" rigid straight duct with friction loss of 0.1" w.g. per 100 ft. This chart can be used for most applications.

VENTILATION TIMER SETTING (MINUTES PER HOUR)						
NUMBER OF BEDROOMS		ONE	TWO	THREE	FOUR	FIVE
HOME SIZE (Ft²)	<500	8	10	12	15	16
	501-1000	12	15	16	19	21
	1001-1500	16	19	21	23	25
	1501-2000	21	23	25	27	29
	2001-2500	25	27	29	31	33
	2501-3000	29	31	33	35	37
	3001-3500	33	35	37	39	41
	3501-4000	37	39	41	43	45
	4001-4500	41	43	45	47	49
	4501-5000	45	47	49	51	53

SPECIFICATIONS

Input Voltage (Hardwired)	20-30 VAC 50/60 Hz
Relay Rating	24 VAC @ 1 Amp maximum per relay
Battery Power	(2) AA 1.5 V
Operating Temperature	32° F to 150° F
Operating Relative Humidity	0-95% RH (non-condensing)
Storage Temperature	32° F to 150° F
Overall Size	3.375" W x 5.0" H x 1.0" D
LCD Display Size	2.375" W x 1.5" H
Back Light	Blue LED
Short-cycle Delay	4 minutes
Displayed Temperature Resolution	1° F
Setpoint Range	
Heating	41° F - 120° F
Cooling	43° F - 122° F
Heating and Cooling Limits	Fully adjustable
Onboard and Remote Sensors	NTC type 2
Resistance	10KΩ @ 77° F
Tolerance	+ / - 3% @ 77° F
Warranty	5 years

iO HVAC
CONTROLS