

# DEH 2000 DIGITAL VENTILATION TIMER/HUMIDITY/FAN CONTROL

 **Therma-Stor**  
PO Box 8050, Madison, WI 53708  
1-800-533-7533  
[www.thermastor.com](http://www.thermastor.com)

## DEH 2000 Digital Ventilation Timer/Humidity/Fan Control

### Installation & Operation Instructions



## 1 Specifications

Model:	DEH2000 Digital Control
Electrical:	24 VAC
Humidity Range:	20 – 90% RH
Humidity Accuracy:	+/- 4%
Output:	3 Amps 24 VAC

## 2 Installation

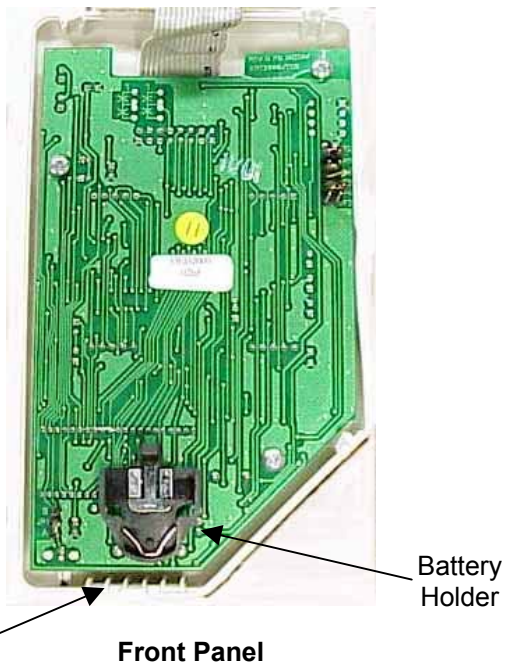
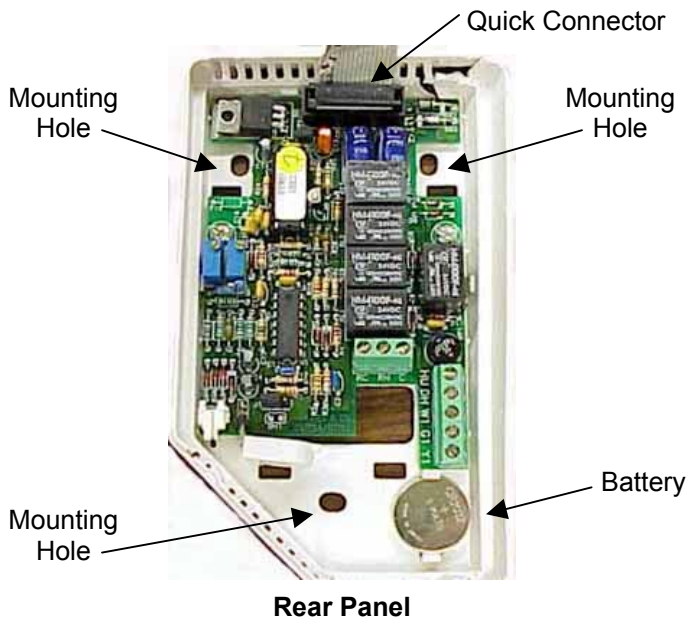
This control panel must be installed in the conditioned space and in accordance with all applicable codes and standards. Follow the instructions below when installing and setting this control.

### 2.1 Install Instructions

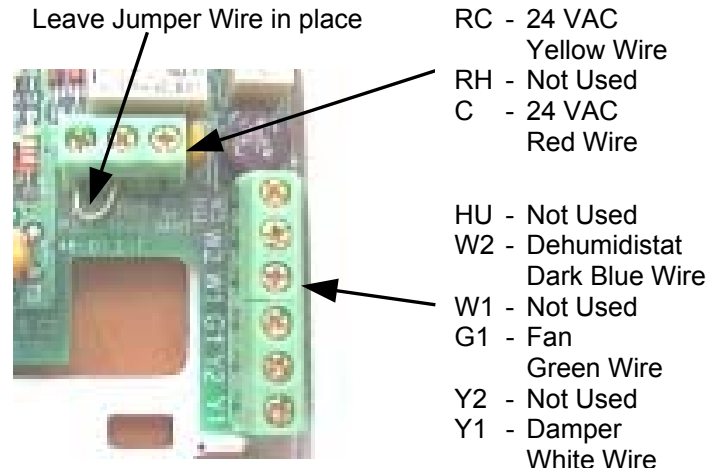
1. Separate the front panel from the back panel by depressing the tongue located in the bottom of the control.
2. Gently disconnect the quick connector on the back panel
3. Remove the battery from the back panel by sliding it to the left and out from its retaining clip. To mount in the black battery holder on the front panel, insert it from the top, gently pressing downward until it snaps into place and is held under the top clip of the holder. The + engraved on the battery should be visible.
4. Line the back panel up against the wall or flat surface onto which it is to be mounted and drill in the appropriate mounting holes
5. Insert the screws so they extend approximately 1/8" from the wall or flat surface.
6. Align the back panel against these screws, pushing it forward, allowing it to slide downwards to lock into position.
7. Make the electrical connections to the terminals on the back panel as shown in the wiring diagram.
8. Reconnect the quick connector onto the back panel.
9. Reassemble the front to the back panel. Connect at the top first, then at the bottom.

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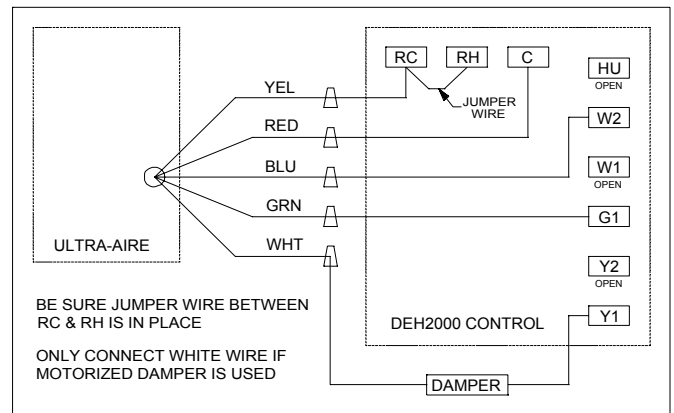
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contact or be connected to a high voltage circuit. Some of the control wires leaving the Ultra-Aire APD may not be used with certain control panels and should be left safely disconnected with wire nuts taped onto the stripped ends. Be sure to consult the electrical schematic in this manual or on the front panel of the Ultra-Aire APD before making the control connections.



**DEH2000 Control Wiring**



**Wiring Diagram**

## 2.2 Wiring

**WARNING:** DO NOT ALLOW THE YELLOW LEAD FROM THE ULTRA-AIRE TO CONTACT THE RED LEAD OR ORANGE LEAD FROM THE ULTRA-AIRE OR DAMAGE TO THE TRANSFORMER WILL RESULT.

The installer must supply the wiring between the Ultra-Aire APD and the control panel. Be sure to safely route the control wires to prevent damage during installation. Be careful not to cross the wires when connecting the Ultra-Aire APD and the remote control panel or damage to the transformer may result.

The remote controls of the Ultra-Aire APD are powered by a low voltage circuit (24 VAC) and must **NEVER**

**WARNING:** CONNECTING THE WHITE WIRE TO THE CONTROL TERMINAL WITHOUT USE OF A MOTORIZED DAMPER COULD CREATE A SHORT RESULTING IN DAMAGE TO THE TRANSFORMER.

The white wire controls the motorized damper that can be installed into a fresh air duct. This provides the ability to control when fresh air is introduced into the building by using the ventilation timer function labeled "damper" on the control (See Section 3.7). If the motorized damper is not used, **DO NOT CONNECT THE WHITE WIRE TO THE CONTROL OR DAMAGE TO THE TRANSFORMER MAY RESULT.** Simply leave the white wire terminal (Y1) unused if the damper is not used.

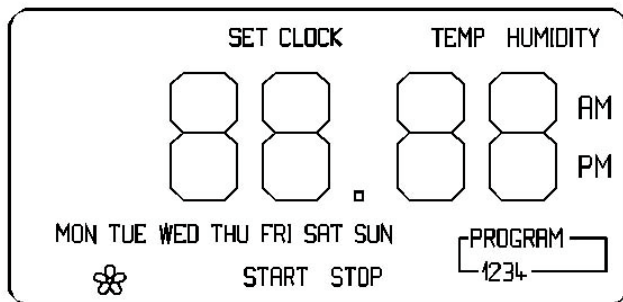
## 2.3 Location

Install the remote control panel in a central area of the structure where it will sense the relative humidity of the structure accurately. Do not install the control panel where it may not accurately sense the relative humidity such as near HVAC supply registers, near exterior doors and windows, or near a pool or spa.

# 3 Operation

## 3.1 Display

When there is power to the control, the control display sequence will alternately show the clock, humidity, temperature, fan status, and fresh air damper status. The display sequence repeats continually, and can be referred to as “home state”.



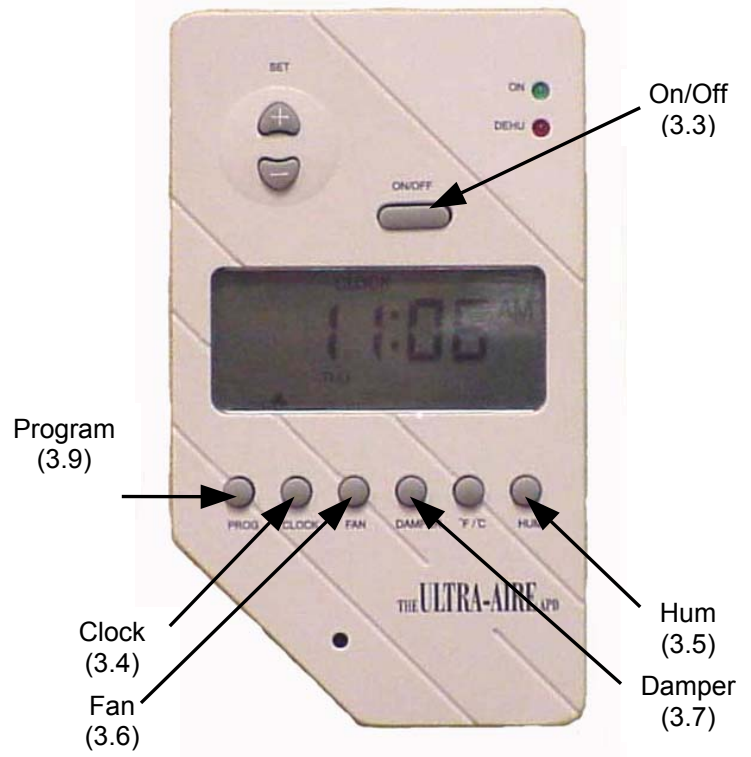
- The word “CLOCK” appears at the top of the display during the clock display, along with the day and time.
- The word “HUMIDITY” appears during the humidity display, with the current setpoint on the left, and the ambient RH on the right.
- The word “TEMP” appears as the unit displays the current temperature.
- The fan status display is indicated by a capitol “F”. “OF” indicates fan off status, “on” indicates fan on status.
- The damper display is indicated by a “d” with the same on/off status indicators as the temperature.
- The ventilation program is displayed along the bottom of the display during the clock, humidity, and temperature displays only when the damper operation is set to the programmed setting “Pr”.

## 3.2 Setting

During the set-up process, if you make a mistake, simply continue. You can always go back to adjust the settings. If you leave the control alone and don't touch any buttons for about 10 seconds, the control will remember any changes made and return to “home state”.

## 3.3 On/Off Setting

Press the “ON/OFF” button to turn the system on or off. When the system is on, the green indicator will be lit. In the off mode, the controller continues the regular display sequence and indicates current time, temperature, and relative humidity. It also displays the status of the fan and damper as if the control were on, but the fan and damper will not operate unless the control is on and the green indicator is lit. With the power off, there will be no operation of the system whatsoever, but the display sequence will continue to be lit. Setup can be done with the control either on or off.



## 3.4 Setting Clock Time

1. Push “CLOCK” button. The hour display will flash, use the “SET” + or – button to adjust hour. Notice the a.m./p.m. display.



2. Push “CLOCK” button again. The minute display will flash. Use the “SET” buttons to adjust to proper time.
3. Push “CLOCK” button again. The day display will flash. Use the “SET” buttons to adjust to proper day.
4. Push “CLOCK” button again. The AM/PM display will flash. Verify AM/PM setting is correct.



5. Push “CLOCK” button again, or wait a few seconds to make all the displays stop flashing. The time is now set. To readjust, begin again at step one.

### 3.5 Setting Relative Humidity Setpoint

The relative humidity setpoint operates the dehumidifier function of the Ultra-Aire. It has no effect on any other function of the unit. The control senses the ambient relative humidity of the space in which it is located. The ambient condition is displayed on the right in the relative humidity display sequence, under the word “HUMIDITY”. The current setpoint is displayed on the left, under the word “SET”.



If the setpoint is equal to or greater than the current ambient condition, the space does not need to be dried, so the dehumidifier will be off.

Example: Setpoint: 50% RH  
Current condition 45% RH = Dehumidifier off, red “DEHU” indicator not lit.

If the setpoint is less than the ambient condition, the dehumidifier will be on, and the red “DEHU” indicator will be lit. The space is more humid than the setpoint, so the controller operates the dehumidifier to dry the space.

Example: Setpoint: 50% RH  
Current condition: 55% RH = Dehumidifier on, red “DEHU” indicator lit.

To set the relative humidity setpoint, press the “HUM” button. The display will show the “HUMIDITY” display, and the word “SET” will flash. Use the “SET” + or – buttons to adjust the relative humidity setpoint as desired. Therma-Stor Products recommends relative humidity levels of around 45% in the summer, and lower levels in the winter if you live in a cold climate. It is not recommended that the humidity setpoint be set below 35%. In order to dry the home in the winter in a cold climate, use the ventilation function of the system rather than the dehumidifier function. Call the factory or refer to the owner’s manual for more information.

### 3.6 Fan Setting and Operation

Use the “FAN” button to adjust the fan operation. There are 3 choices for fan operation: “on”, “off” (denoted by “OF”), or program (denoted by “Pr”). To set operation,

1. Press the “FAN” button. The display will indicate the current fan setting.

2. Use the “SET” + or – buttons to adjust fan operation (“on”, “OF” or “Pr”). Press the “FAN” button again or leave the unit alone for 10 seconds to return to home state.



The fan display reading in the normal display sequence does not indicate the current fan setting, it indicates the current fan status, and will always read either on or off.

With the fan in the “on” mode, the fan will run continuously. This does not effect either the dehumidification or ventilation functions of the system. In other words, the system may or may not be ventilating or dehumidifying while the fan is running. Common reasons for operating the fan continuously are continuous filtration and air recirculation.

With the fan in the “off” or “program” mode, the fan will operate only when needed by other functions of the system. The fan will remain off unless the system is dehumidifying and/or ventilating. The fan always runs during dehumidification, and it also always runs during ventilation. To completely turn the system off, use the “ON/OFF” button as described earlier. To adjust the ventilation mode, see the “damper operation and setting (ventilation)” section.

### 3.7 Damper Operation and Setting (Ventilation)

The damper setting controls the ventilation function of the system. It has no control over the dehumidification function, although the ventilation function can and should be used to dry the space depending on the climate and the outside air conditions. See “programming notes” section and call the factory or dealer for more details.

In order to provide ventilation, the damper must be open (“on”) and the fan must be running. The controller takes care of these two functions automatically, so that whenever the damper is open (“on”), the fan is running. This is true even if the fan has been set to the “off” mode.

The ventilation indicator “☼” will be lit whenever the unit is ventilating

There are three damper operation modes, “on”, “off” (denoted by “OF”), and program (denoted by “Pr”). With the damper in the “on” mode, the damper will be open and the fan of the system will be operating in order to introduce fresh air into the space. Use this mode for continuous fresh air ventilation. The fan is always on when the damper is open. When in “off” mode, the damper will not open and the system will not ventilate.

When in the “program” mode, the control will operate the damper and fan (ventilate) according to the programmed ventilation schedule (see the section referring to programming the ventilation schedule).

To set the damper operation:

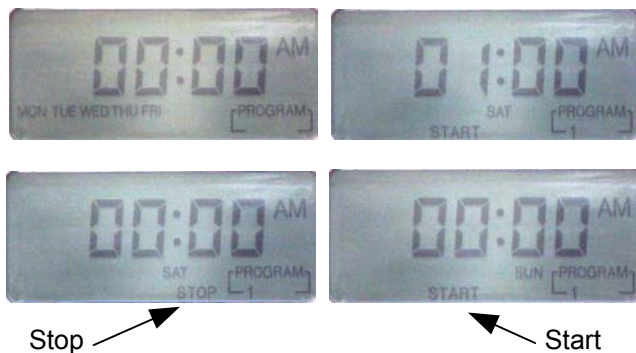
1. Press the “DAMPER” button. The letter “d” will appear on the display, along with the current mode setting.
2. Use the “SET” + or – buttons to adjust the fan setting to the desired mode (“on”, “OF”, or “Pr”).
3. Press the “DAMPER” button again or leave the control alone for 10 seconds to select the indicated damper mode and return to the home state.



### 3.8 Intermittent or Programmed Ventilation

With the damper in program mode (denoted by “Pr” when setting the damper operation) the system will operate the ventilation function according to the current ventilation program. The control needs to be programmed to turn the ventilation function on and off at the desired times. This is done by programming the ventilation timer.

There are 4 programs available for ventilation Monday through Friday. There are also 4 programs for Saturday and 4 programs for Sunday. No other choice of days is available. Each program to be used has an “on event” called “START” which brings the ventilation function on, and an “off event” called “STOP” which turns the function off. Each START and STOP must be entered in to the controller.



To set or adjust the ventilation program:

1. Press the “PROG” button **two times**. The display will indicate “Program 1/start” at the bottom, and the hour display will flash.
2. Use the “SET” + or – button to adjust the hour for the Program 1 start time. Be sure to pay attention to the am/pm setting.

3. Press the “PROG” button again. The display will indicate “Program 1/start” at the bottom, and now the minute display will flash.
4. Use the “SET” + or – buttons to adjust to the desired minute setting.
5. Press the “PROG” button again to move on to the “Program 1/stop” event. The display will indicate “Program 1/stop” at the bottom, and the hour display will flash.
6. Use the “SET” + or – button to adjust the hour for the Program 1 stop time. Be sure to pay attention to the am/pm setting.
7. Press the “PROG” button again. The display will indicate “Program 1/stop” at the bottom, and now the minute display will flash.
8. Use the “SET” + or – buttons to adjust to the desired minute setting.
9. Pressing the “PROG” button again to move onto “program 2/stop” and begin the process again if setting the other programs. Follow the same procedure for each program.
10. To end the program process simply leave the control alone (don’t push any buttons) for about 10 seconds. The unit will remember any changes and return to “home state”.

### 3.9 Programming Notes

To run the ventilation program, the damper mode must be in the “program” mode (“Pr”).

The timer can be operated manually without changing the program by adjusting the damper mode from “program” to either “on” or “off”.

To delete a program after it has been entered, adjust the program so that the “START” and “STOP” times are identical.

The occupants should determine ventilation times and rates. Therma-Stor Products makes no firm recommendations concerning when to ventilate. Common ventilation schedules include constant ventilation, ventilation based on occupancy times, intermittent operation, and seasonal ventilation.

Remember the control must be on for the unit to be functioning - make sure the green power indicator “ON” is lit.

Ventilating or Dehumidifying to control indoor relative humidity levels

Fresh air ventilation may have a drying effect or a wetting effect on the indoor space, depending on the amount of moisture present in the outdoor air. Relative humidity is not a good indicator of outside humidity levels: use dew point measurements instead. Consider outside humidity levels when using the ventilation function of the dehumidifier.

During summer in hot, humid climates ventilation will increase the moisture load in the home. Consider reducing the amount or frequency of fresh air ventilation if indoor humidity continues to be high.

During winter in a cold climate, the outside air is very dry (dew points below 3° F). Ventilation will have a drying effect on the space. In fact, ventilation during these conditions will have a greater drying effect than the Ultra-Aire's dehumidification system. It is less expensive and more effective to introduce cool, dry air into the space and warm it up in order to reduce indoor humidity levels when it is dry outside. In order to combat condensation on window in the wintertime, increase the amount of fresh air ventilation rather than attempting to operate the dehumidification function of the Ultra-Aire. Call the factory for more information.