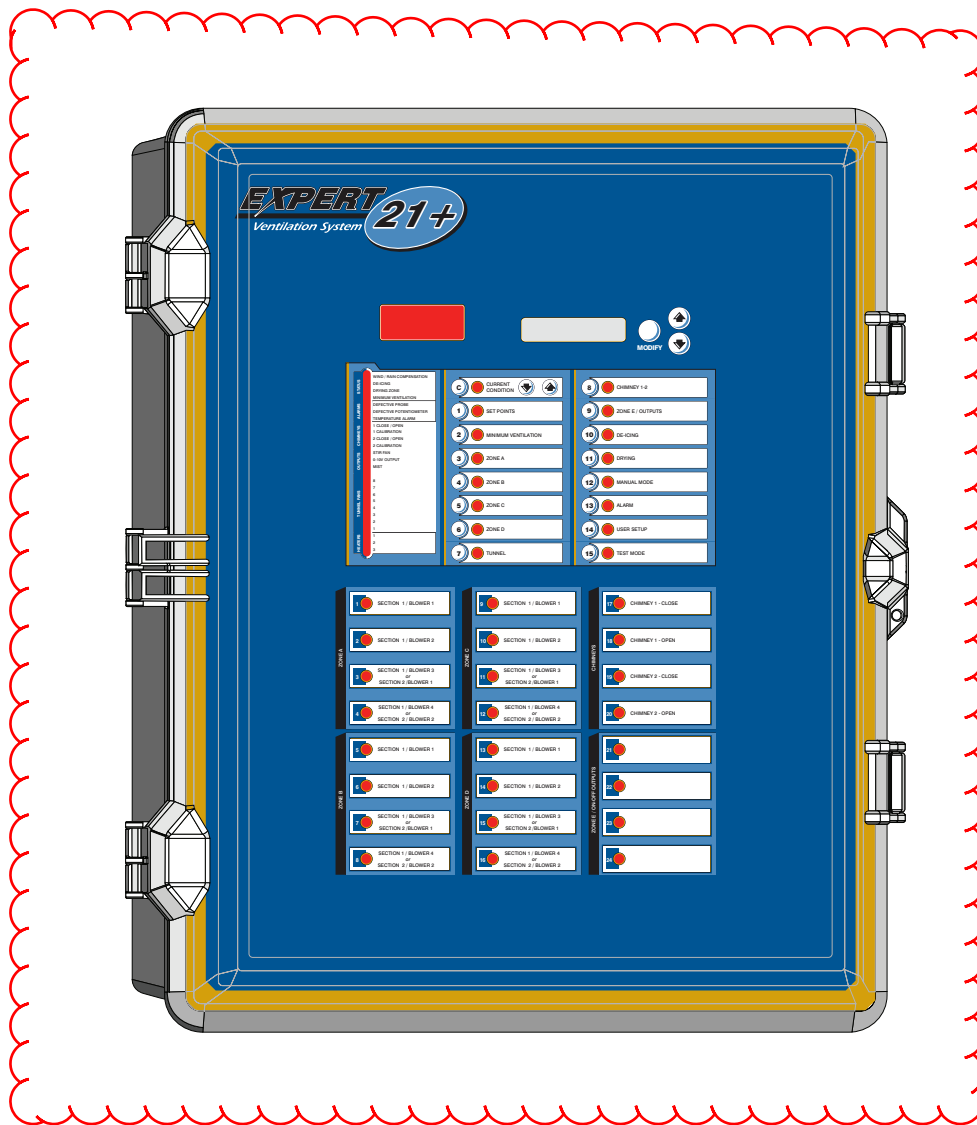


Temperature Controller

EXPERT 21+

USER'S MANUAL



NOTICE

Every effort has been made to ensure that this manual is complete, accurate and up-to-date. The information contained in it is however subject to change without notice due to further developments.

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1. INTRODUCTION

1.1. Precautions

Although fuses at the input and outputs of the controller protect its circuits in case of an overload or overvoltage, we recommend installing an additional protection device on the controller's supply circuit.

The room temperature where the controller is located must always remain between 32°F and 104°F (0°C TO 40°C). Indoor use only!

To avoid exposing the controller to harmful gases or excessive humidity, it is preferable to install it in a corridor.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not spray water on the controller!

In order to clean the control, wipe it with a damp cloth.

1.2. Symbols of the Manual



Caution. Read the following text carefully. It contains important pieces of information which, if ignored, may cause the controller to operate improperly.



Pay attention. The following text contains very useful information.

1.3. Overview of the Controller

The EXPERT 21+ is an electronic device used for environmental control in livestock buildings. It is mainly used to control the opening of multi-layer polyethylene vents in the different zones of the barn. It also combines natural ventilation and tunnel ventilation into one powerful system.

OUTPUTS:

24 built-in relays to control:

- 20 blowers;
- 2 chimneys;
- 2 tunnel fans (up to 8 tunnel fans can be used if an external Tunnel Fan Module is connected to the controller);
- 1 stir fan;
- 4 heaters;
- 1 mist;
- 1 alarm output
- 2 0-10V output to control fans or heaters

INPUTS:

- 8 inside temperature sensors;
- 1 outside temperature sensor;
- 1 wind direction sensor;
- 1 rain sensor;
- 1 wind speed sensor;
- 2 chimney potentiometers;
- 1 relative humidity sensor.



Refer to the wiring diagram enclosed at the end of this manual to connect sensors and loads.

Main Features

LCD display — A LCD screen provides an efficient interface for displaying, monitoring and adjusting the parameters.

8 Temperature sensors — Up to eight temperature sensors can be connected to the controller to obtain an accurate reading of the average room temperature and a faster reaction time.

Natural ventilation — The controller can control the opening of inflatable vents in 5 different zones (up to 4 blowers per zone). It controls the opening of these vents according to the ambient temperature their respective zone.

De-icing & drying the vents — The controller can deflate the vents on a regular basis to prevent the membrane from freezing in winter; likewise, it can inflate the vents on a regular basis to prevent the accumulation of moisture on the membrane on warm weather.

Wind compensation — If either the wind speed or wind direction are unfavorable for the current ventilation in the barn the EXPERT 21+ will reduce the vent opening to compensate. In addition, the controller can stop some fans whenever there is sufficient wind

Tunnel ventilation — When the room temperature rises, tunnel ventilation effectively reduces the actual temperature perceived by the animals.

Chimneys — The controllers can control up to 2 chimney dampers.

Assignable outputs — The controller has 4 on/off outputs that can be used to control mist units, heaters, tunnel fans or stir fans.

Histories — Histories allow monitoring the minimum and maximum reading of each sensor for the past 6 days.

Alarm management — The controller provides alarms for high-low temperatures, defective sensors and other system failures.

Password protection — A password can be enabled to restrict access to the controller setup functions.

1.4. Overview of the Vent System

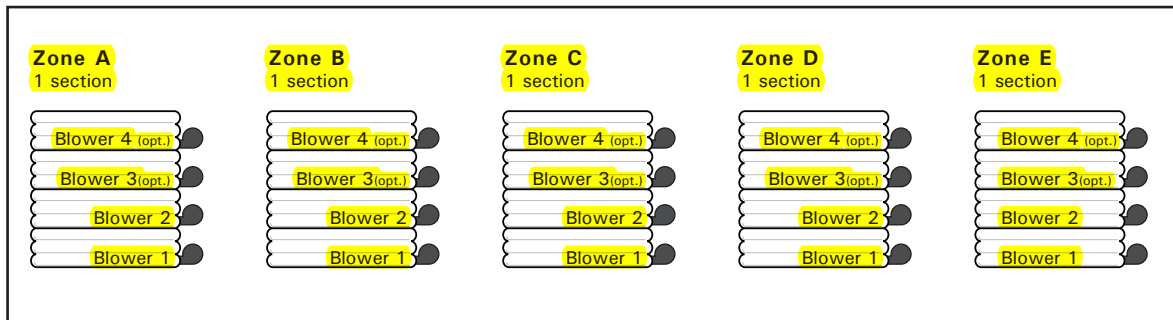
The EXPERT 21+ controls the opening of inflatable vents according to the temperature of their respective zone. In all, it can control up to 10 vent sections located in 5 different zones.

Possible vent setups: The graphs below show all possible vent setups:

- **1 Section / Zone** — When using 1 section per zone, the number of blowers per zone can be set separately for each zone. It ranges from 2 to 4 blowers.

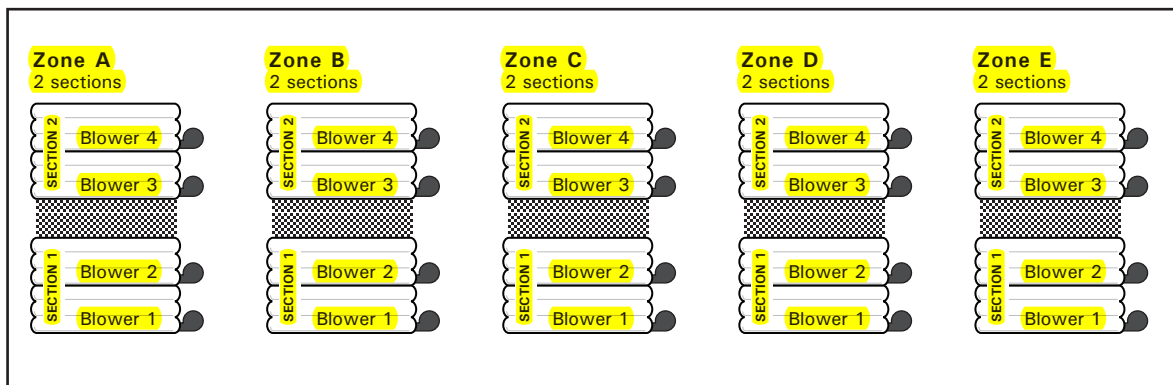
Definition of a zone: A zone is an area of the building where an inflatable panel is located. Each zone uses its own temperature settings and its own selection of probes to control the opening of the vent.

Definition of a section: A section is an inflatable vent composed of 2, 3 or 4 blowers. A maximum of 2 vent sections can be superposed in a single zone. This is useful for tall sidewalls. All zones must have the same number of sections.



Vent Setup : 1 Section / Zone

- **2 Sections / Zone** — When using 2 sections per zone, the controller automatically enables 2 blowers per section;

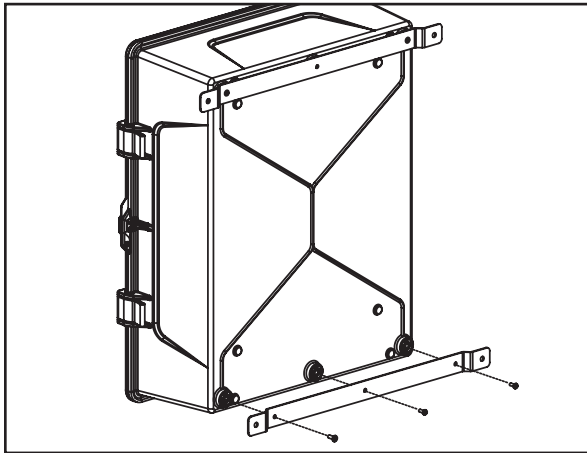


Vent Setup : 2 Sections / Zone

2. MOUNTING INSTRUCTIONS

2.1. Installing the Controller on the Wall

Fasten the two metal brackets on the mounting holes located behind the controller using six screws. Then, mount the enclosure on the wall using four other screws. Leave a clearance of at least 16" to the left of the enclosure to allow the cover to be removed for maintenance.



2.2. Connections

2.2.1. Main Wiring

Refer to the wiring diagram enclosed with this user's manual to connect the controller. Drill holes at the bottom of the enclosure to pass the wires and install watertight connectors to prevent water from entering in the enclosure. Do not make any holes at the side and top of the enclosure.



All wiring must be done by an authorized electrician and must comply with applicable codes, laws and regulations. Make sure power is off before doing any wiring to avoid electrical shocks and equipment damage.

2.2.2. Alarm Connection

There are two types of alarms on the market. One type activates when current is cut off at its input; the other type of alarm activates when current is supplied at its input. For an alarm of the first type, use the NC terminal as shown on the wiring diagram. For an alarm of the second type, use the NO terminal.

2.2.3. Sensor Inputs

Sensors operate at low voltage and are isolated from the supply. Make sure that sensor cables remain isolated from all high voltage sources. In particular, do not route the sensor cables through the same electrical knockout as other cables. Do not connect the shield from the sensor cable to a terminal or a ground.

Extending a sensor: Each sensor can be extended up to 500 feet (150 meters).

To extend a sensor: Use a shielded cable of outside diameter between 0.245 and 0.260 in (6.22 and 6.60 mm) (the cable dimensions should not be under 18 AWG) to ensure the cable entry is liquid tight. **Do not ground the shielding.**

It is preferable to solder the cable joint to ensure a proper contact between the two cables.

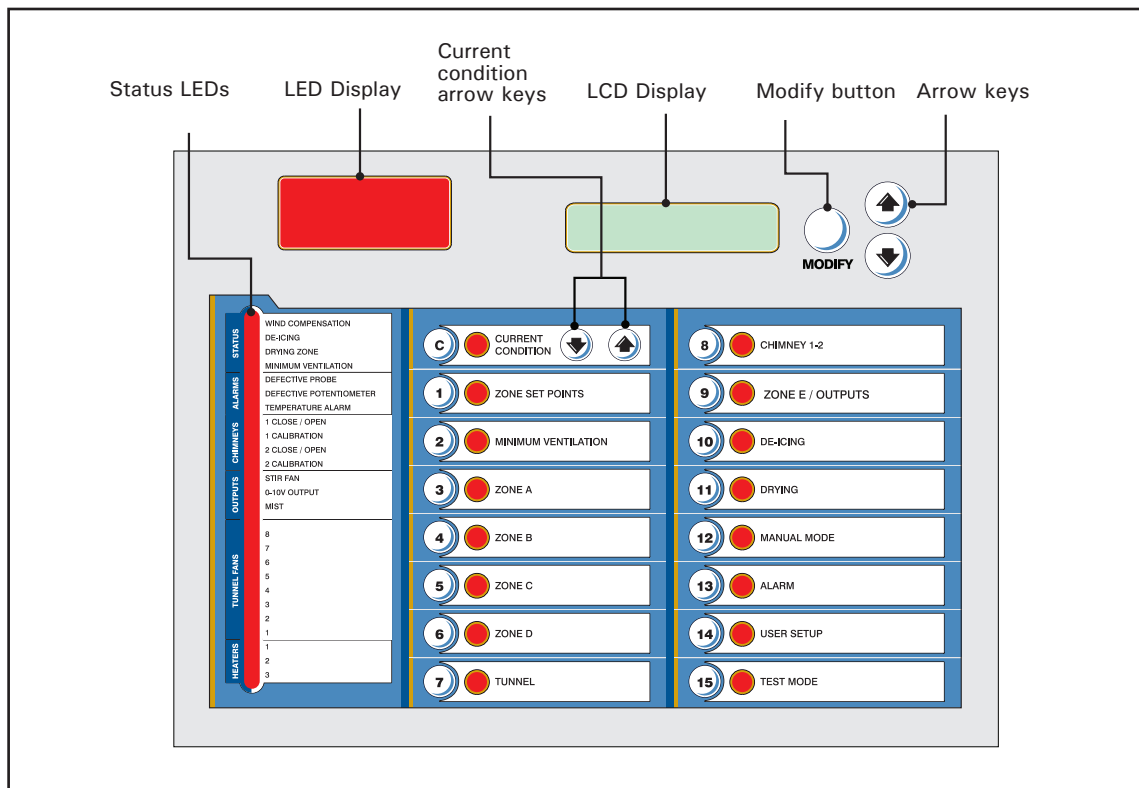


Do not run sensor cables next to other power cables. When crossing over other cables, cross at 90°.

Defective sensors: An alarm is set off when a defective probe is detected. To identify the defective probe, press the CURRENT CONDITIONS button then press on the current condition's down-arrow key. Probe readings are then displayed. Dashes are displayed instead of a reading when the probe is defective. In the case of room temperature probes, the controller will operate according to the temperature of the remaining probes.

3. USER INTERFACE

3.1. Location of the Controls



LED Display — The display on the top left corner of the faceplate shows the current room temperature averaged over all selected room temperature probes.

LCD Display — The LCD display on the right shows the current readings and parameters to be adjusted when you select a function. The three keys on the right of this display are used to edit parameters and scroll through the menus. After 15 minutes of inactivity, the display shows the current room temperature.

Adjustment & navigation arrow keys — The arrow keys located at the upper right corner are used to scroll the LCD display when all parameters cannot be presented all at once. These keys are also used to modify the value of a parameter after having pressed the MODIFY button.

MODIFY button — The editing mode allows adjusting the parameter with the adjustment buttons. To access this mode, press MODIFY once, the parameter value will flash on screen; it can now be adjusted with the adjustment buttons. Once it is adjusted, press MODIFY again to exit from the editing mode.

Current condition button — This button gives a quick access to the current conditions in the barn (temperature, wind speed, etc.).

Current condition arrow keys — These arrows give access the sub-menus that are located into the CURRENT CONDITION menu.

Status LEDs — The status pilot lights show the current status of the outputs. Refer to section 3.3 for further information about these LEDs.

3.2. Parameter Adjustment

To modify the value of a parameter, you must select the parameter then access the edit mode. To access this mode, press MODIFY once, the parameter value will flash on screen; it can now be adjusted with the adjustment buttons. Once the parameter is adjusted, press MODIFY again to exit from the edit mode.

3.3. LED Meaning

Status LED		Meaning
Status	Wind & Rain Comp.	Solid LED: A blower is running in order to close the vent due to a windy condition or because it is raining.
	De-icing	Solid LED: A vent panel deflates to de-ice the polyethylene membrane.
	Drying zone	Solid LED: A vent section inflates to dry out the polyethylene membrane.
	Minimum ventilation	Solid LED: Minimum ventilation is enabled in a vent zone.
Alarms	Defective probe	Solid LED: A defective probe is detected.
	Defective potentiometer	Solid LED: A defective potentiometer is detected.
	Temperature alarm	Solid LED: A temperature alarm is active.
Chimneys	1 Close/Open	"Solid LED: Chimney 1 is opening. Flashing LED: Chimney 1 is closing."
	1 Calibration	Solid LED: Chimney 1 is being calibrated.
	2 Close/Open	"Solid LED: Chimney 2 is opening. Flashing LED: Chimney 2 is closing."
	2 Calibration	Solid LED: Chimney 2 is being calibrated.
Outputs	Stir Fan	Solid LED: The stir fan output is running.
	0-10V Output	Solid LED: A 0-10V output is running.
	Mist	Solid LED: The mist output is running.
Tunnel	1-8	"Solid LED: Tunnel fan output #x is running. Flashing LED: A tunnel LED flashes during 1 minute at the startup of a tunnel fan stage. This minute is used to position the vents before activating tunnel fans."
Heater	1	Solid LED: Heating stage 1 is running.
	2	Solid LED: Heating stage 2 is running.
	3	Solid LED: Heating stage 3 is running. Flashing LED: Heating stages 3 & 4 are running.

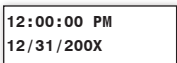
3.4. LCD Contrast

Follow these steps to modify the contrast of the LCD screen:

- Press **14** – **USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00. 
- The contrast of the LCD screen is displayed. Press MODIFY then use the adjustment buttons to set the contrast of the LCD screen to the desired intensity. It can be adjusted from 10 to 100 %.

4. CONTROLLER SETUP

4.1. Setting the Time & Date

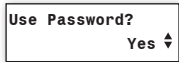
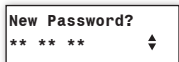
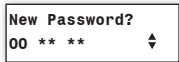
- Press **C** – **CURRENT CONDITIONS**.
- Use the current condition arrow key to select the time and date. 
- Press MODIFY. The hours start flashing. Use the arrow keys to set them to the desired value.
- Press MODIFY. The minutes start flashing. Use the arrow keys to set them to the desired value.
- Proceed in similar fashion to adjust the whole time & date.

4.2. Password

You can enable a password to restrict access to certain functions of the controller: USER SETUP & TEST MODE. When it is used, the password must be entered each time one of these functions is selected. When the correct password is entered, it does not need to be reentered until the display times out (i.e. After 15 minutes of inactivity).

The password is a sequence of three numbers from 00 to 99. By default, it is set to 00-00-00.

The following procedure shows how to enable/disable the password and how to change the code.

- Press **14** – **USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00.
- Press the down-arrow key to display the "Use Password" menu. 
- Press MODIFY then use the adjustment buttons to enable or to disable the password.
- If the password is enabled, press the down-arrow key once. The password code is displayed. 
- Press MODIFY then use the adjustment buttons to set each number of the password in turn. 



IMPORTANT

Choose an easy-to-remember password and write it down in a safe place!

4.3. Enabling the Outputs



The controller comes with 24 built-in relays. Relays 1-16 relays are reserved to control blowers, relays 17-20 are used to open/close chimneys and relays 20-24 can either be used to activate blowers or to control different types of on/off outputs. In fact, if your controller does not use relays 1-4 of Zone E, these relays become available to control different types of outputs (such as mist units, heaters, tunnel fans or stir fans).

In addition to its 24 built-in relays, the controller also comes with two 0-10V output which can be used for heating or cooling.

The following steps shows how to enable the outputs that will be used by you controller.

Before enabling the on/off outputs below, please refer to the relay assignment table in section 4.7 to see how many programmable relays are available to control them (the number of relays left depends on your particular system configuration).

- Press **(14) – USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00.
- Press the down-arrow key to select the following menus. Note that on/off output menus won't be displayed if there is no programmable relay left.
- Set the status of each output in turn:

Stir Fans — Select “Yes” if a programmable relay is used to control stir fans.

Stir Fan	Yes ▾
----------	-------

**Accessible if an assignable relay is available to control this on/off outputs. Please refer to the relay assignment table in section 4.7 to see how many assignable relays are left*

Use Tunnel — Select “Yes”

if you want to use some of configurable on/off relays of

Use Tunnel	No ▾
------------	------

the controller to control tunnel fans. Note that tunnel fans can also be connected to an external relay module instead of using the internal relays of the controller (see Tunnel Module below). **This parameter is accessible if the tunnel fan module is disabled below and if some assignable relays are available to control these on/off outputs. Please refer to the relay assignment table in section 4.7 to see how many assignable relays are left.*

#Onboard Tunnel Stages —

Specify how many tunnel fans are connected to the

#Onboard Tunnel Stages	2 ▾
------------------------	-----

controller (1 or 2). **This menu is accessible if you have answered “Yes” to the “Use Tunnel” question above.*

Tunnel Fan Module —

Select “Yes” if an external tunnel fan module is

Use Tunnel fan module?	Yes ▾
------------------------	-------

used. When this module is used, all tunnel fans must be connected into it. This module allows using up to 8 tunnel fan stages.



**If an external tunnel fan module is connected to the controller, all tunnel fans must be connected to it.*

Tunnel Stages — If the

tunnel fan module is enabled above, select the number of tunnel fan stages that will be connected to it (1 to 8).

#Tunnel Stages	8 ▾
----------------	-----

**Accessible if the “Tunnel Fan Module” is enabled above.*

Mist (On/Off output) —

Select “Yes” if one internal relay of the controller is

Use Mist	No ▾
----------	------

used to control mist units. **Accessible if assignable relays are available to control on/off outputs. Please refer to the relay assignment table in section 4.7 to see how many assignable relays are left.*

Chimneys — Select the number of chimneys that are connected to the controller (0 to 2 chimneys).

# Chimney	1	↓
-----------	---	---

Heaters — Select the number of heaters that are connected to internal relays of the controller (0 to 4 heaters).
**Accessible if assignable relays are available to control on/off outputs. Please refer to the relay assignment table in section 4.7 to see how many assignable relays are left.*

# Heaters	2	↓
-----------	---	---

0-10V Outputs 1-2 — Select "Yes" to enable 0-10V outputs 1-2.

0-10V 1	Yes
0-10V 2	Yes

0-10V Outputs 1-2 Used for — If 0-10V outputs are used, specify their particular function (ventilation or heating).

0-10V 1 used for	Ventilation	↓
------------------	-------------	---

0-10V Outputs 1-2 Mode — If 0-10V outputs are used, specify the type of signal they are using (0-10V or 10-0V).

0-10V 1 mode	0-10V	↓
--------------	-------	---

4.4. Probe Assignment

Probe Activation & Assignment

This procedure explains how to enable the probe inputs. It also shows how to assign temperature probes to the average room temperature reading. The average room temperature is used as a reference to control mist units and to detect temperature alarms.

- Press **14** — **USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00.
- Press the down-arrow key to select the following menus:

T° in the room — Press MODIFY then use the adjustment buttons to set the number of inside temperature probes that are connected to the controller (1 to 8 probes).

#T° sensors in the room:	8	↓
--------------------------	---	---

Room Probes — The sensors that are used to measure the average room temperature are flashing on screen. To change the probe selection, press MODIFY then use the arrow keys to set the status of each probe in turn.

Room probes	12345678	↓
-------------	----------	---

Room probes	1	On	↓
-------------	---	----	---

Use Out T° sensor — Press MODIFY then use the adjustment buttons to enable or disable the outside temperature probe.

Use Out T° sensor?	Yes	↓
--------------------	-----	---

Use Rain Sensor — Press MODIFY then use the adjustment buttons to enable or disable the rain sensor.

Use Rain Sensor?	Yes	↓
------------------	-----	---

- **Use Humidity Sensor** — Press MODIFY then use the adjustment buttons to enable or disable the humidity sensor.

Humidity Sensor?	Yes
------------------	-----
- Keep pressing the down-arrow key to reach the first probe assignment menu as shown below. Most outputs of the controller operate according to the average reading of chosen temperature probes. Select what probes are used to control/monitor the following outputs:

- Tunnel Fans 1-2
 - 0-10V Outputs 1-2
 - Heaters 1-4
 - Vent Zones A-E
 - Chimneys 1-2

Tunnel 1 Probes	12345678
-----------------	----------
- The temperature sensors that are used to control the output are flashing on screen.
- To change the probe selection, press MODIFY and then use the arrow keys to set the status of each probe in turn.

Tunnel 1 Probes	1	On
-----------------	---	----
- Press the down-arrow key to select the probe assignment menu of the next output.

Tunnel 2 Probes	12345678
-----------------	----------
- Proceed in similar fashion to assign probes to each output in use.

4.5. Zone Setup

- Press **14** – **USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00.
- Press the down-arrow key to display the “Use Zone” menu then set the following parameters:

Zones — Enable the proper number of vent zones in use. Up to **5 zones** can be activated (Zones A-E) (see graph in section 1.4). Press MODIFY to select the following parameter.

Use Zone	ABCDE
Min Vent?	No

Minimum ventilation — To maintain good indoor air quality, the controller can open the vents intermittently even when ventilation is not required to reduce the room temperature (i.e. when the temperature in a zone is lower than the set point). Minimum ventilation cycles allow reducing humidity levels and supplying oxygen to the room. Select “Yes” to enable this function then press the down-arrow key to select the next parameter.

Use Zone	ABCDE
Min Vent?	Yes

Number of sections per zone — Enable the desired number of inflatable vent sections per zone (1 or 2 sections). **This parameter is common to all the zones (see graph in section 1.4).*

# Sections per zone	1
---------------------	---

Zones A-E) # of blowers per section — If there is only 1 section per zone, specify the number of blowers for each zone separately (2, 3 or 4 blowers / zone). **Accessible if the zones only use 1 vent section; if they use 2 sections, the controller automatically enables 2 blowers per section (see graph in section 1.4).*

A) #Blowers per section	3
-------------------------	---

Activation Delay — This parameter represents the amount of time it takes for a blower to inflate its vent.

It can be adjusted from 15 to 300 seconds (5 minutes).

Activation delay
30 sec

Use De-ice — To prevent inflatable membranes from freezing in winter, the controller can stop some blower in turn to deflate the membranes. Enable or disable this function and then press the down-arrow key several times in order to reach the next parameter. **This menu is only available if an outside temperature probe is enabled (see “Probe Activation” in section 4.4).*

Use De-Ice
No

- Press the down-arrow key several times to reach the following parameter:

Drying the vents — The drying function is used to prevent moisture problems. With this function, the controller can activate some blowers on a regular basis to inflate the membranes and let them dry out. Press MODIFY and then use the adjustment buttons to enable or disable this function.

Use Drying
Yes

Wind Compensation — Press the down-arrow key until you reach the “Wind Comp.” menu. The wind compensation allows closing some panels and/or stopping some fans when the wind directly hits a zone. Select “Yes” to enable this compensation.

Use Wind Comp
Yes

Wind Speed Unit — Choose the desired wind speed measuring units: kilometers per hour (kmh) or miles per hour (mph). **This menu is only available if the wind speed compensation function is enabled above.*

Wind Speed Unit
kmh

Start/Stop Delays (for Wind Compensation) — The wind compensation starts when the wind blows fast enough in the direction of the specific zone. However, the wind speed and direction must be main-

Start	5:00 min
Stop	1:00 min

tained all along the “Start delay” for the wind compensation to start. Likewise, the wind condition which puts an end to the compensation (lower wind speed or change in the wind direction) has to be maintained all along the “Stop delay” for the compensation to end. Set the wind compensation start and stop delays to the desired values. **Accessible if the wind compensation is enabled above.*

Rain Compensation — The rain compensation allows closing some panels when there is wind and rain outside. Select “Yes” to enable this compensation. **Accessible if the wind compensation is enabled above and if a rain sensor is activated (see sec. 4.4).*

Use Rain Comp
Yes

Rain Compensation Delay — The rain compensation starts when it is raining outside and the wind blows fast enough in the direction of a specific zone. However, these 3 conditions (rain, wind speed & direction) must be maintained over a certain delay before the controller starts the rain compensation. Set the start delay for the rain compensation to the desired value. **Accessible if the rain compensation is enabled above.*

Compens. Delay
Rain 0:30 min

No Compensation above — If the room temperature gets higher than this temperature limit, the wind and rain compensation are disabled. **Accessible if the wind and/or rain compensation functions are enabled above.*

No Comp. Above
82.0

4.6. Measuring Units

- Press **14** – **USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00.
- Press the down-arrow key once. The time format is displayed.
- Press **MODIFY** then use the adjustment buttons to choose the desired measuring units:

Time Format — Choose the desired time format: AM-PM or 24 hours and then press the down-arrow key to select the next parameter.

Time format
AM-PM ↓

Temperature Units — Choose the desired temperature units: Celsius (°C) or Fahrenheit (°F) and then press the down-arrow key several times to reach the following parameter.

Temp. units
°F ↓

4.7. Relay Assignment

The controller has 24 built-in relays:

Relays 1-16: reserved for blowers;

Relays 17-20: reserved for chimneys;

Relays 21-24: Programmable relays: if they are not used to control blowers, these relays can be assigned to various types of On/Off outputs.

Depending on your barn setup, some preassigned relays may no be used. Do not connect any loads to these unused relays unless the relay is a programmable relay (relay 21-24). Refer to the relay assignment table to see the relation between relays and outputs.

Assigning Relays 21-24: It is possible to assign different types of outputs to relays 21-24: heaters, mist, stir fan or tunnel fan*.



***No tunnel fan can be assigned to relay 21-24 if an external fan module is enabled in the User Setup menu (see section 4.3).**

- Press **14** – **USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00.
- Press the down-arrow key to display the first relay assignment menu. Relays are displayed as follows: 1=relay 21 / 2=relay 22, 3=relay 23 / 4=relay 24. **Accessible if at least 1 on/off output is enabled in section 4.3.*
- If relays are already assigned to the selected output, they will flash on screen.
- To change the relay assignment of the chosen output, press **MODIFY** then use the adjustment buttons to set the status of each relay in turn.

Heater 1 Relay
21 On



***Make sure relays 21-24 are not assigned to more than 1 output each.**

Pre-defined Internal Relays

	1 section / Zone		2 sections / Zone	
Relay 1	Zone A	Blower 1	Zone A	Sect.1 Blower 1
Relay 2	Zone A	Blower 2	Zone A	Sect.1 Blower 2
Relay 3	Zone A	Blower 3	Zone A	Sect.2 Blower 1
Relay 4	Zone A	Blower 4	Zone A	Sect.2 Blower 2
Relay 5	Zone B	Blower 1	Zone B	Sect.1 Blower 1
Relay 6	Zone B	Blower 2	Zone B	Sect.1 Blower 2
Relay 7	Zone B	Blower 3	Zone B	Sect.2 Blower 1
Relay 8	Zone B	Blower 4	Zone B	Sect.2 Blower 2
Relay 9	Zone C	Blower 1	Zone C	Sect.1 Blower 1
Relay 10	Zone C	Blower 2	Zone C	Sect.1 Blower 2
Relay 11	Zone C	Blower 3	Zone C	Sect.2 Blower 1
Relay 12	Zone C	Blower 4	Zone C	Sect.2 Blower 2
Relay 13	Zone D	Blower 1	Zone D	Sect.1 Blower 1
Relay 14	Zone D	Blower 2	Zone D	Sect.1 Blower 2
Relay 15	Zone D	Blower 3	Zone D	Sect.2 Blower 1
Relay 16	Zone D	Blower 4	Zone D	Sect.2 Blower 2
Relay 17	Chimney 1 – Close			
Relay 18	Chimney 1 – Open			
Relay 19	Chimney 2 – Close			
Relay 20	Chimney 2 – Open			

Programmable relays (if used as blowers)

	1 section / Zone		2 sections / Zone	
Relay 21	Zone E	Blower 1	Zone E	Sect.1 Blower 1
Relay 22	Zone E	Blower 2	Zone E	Sect.1 Blower 2
Relay 23	Zone E	Blower 3	Zone E	Sect.2 Blower 1
Relay 24	Zone E	Blower 4	Zone E	Sect.2 Blower 2

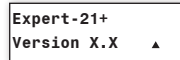
Programmable relays (if not used as blowers)

Relay 21	Mist	Heat	Stir Fan	Tun1	Tun2
Relay 22	Mist	Heat	Stir Fan	Tun1	Tun2
Relay 23	Mist	Heat	Stir Fan	Tun1	Tun2
Relay 24	Mist	Heat	Stir Fan	Tun1	Tun2

4.8. Version

The version number of the controller is used to get technical support that is adapted to your specific controller.

- Press **14** – **USER SETUP**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00.
- Press the down-arrow key to reach the “Version” display.



Expert-21+
Version X.X ▶

5. COOLING SETTINGS

5.1. Temperature Set Point

The temperature set point is the target temperature in the zones. When the temperature set point changes, the start and stop temperatures of all on/off outputs of the controller are automatically adjusted by the same amount.

- Press **1** – **SET POINT**. The temperature set point is displayed.
- Press **MODIFY** and then use the arrow keys to set the temperature set point to the desired value. Press **MODIFY** again to validate.

SetP 70.0°F
- Press the down-arrow key to display the current temperature of each zone.

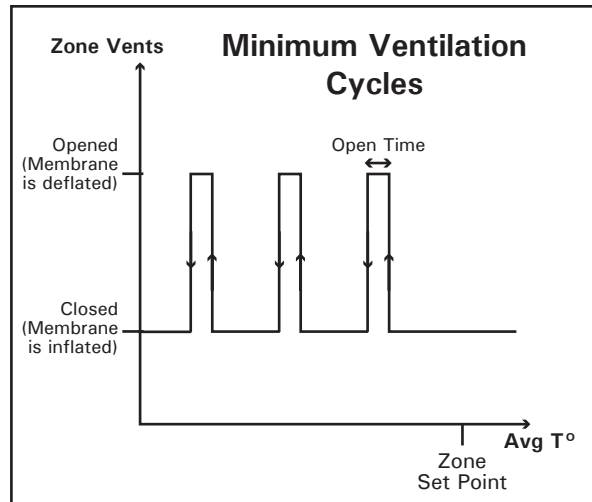
Average Temp
 Zone A: 65.8°F

5.2. Minimum Ventilation Cycles

To maintain good indoor air quality, the controller can open the vents intermittently even when ventilation is not required to reduce the room temperature. These cycles are optional and they are used to reduce humidity levels and to supply oxygen to the room.

Minimum ventilation cycles start when the ambient temperature in a zone drops below the temperature set point. At that moment, 1 blower in the zone starts running in timer mode: it stops during the “Open time” and is then reactivated until the end of the “Cycle Time”.

Minimum ventilation cycles either stop when the outside temperature gets too cold or when the ambient temperature in a zone increases and reaches the temperature set point of the zone.



Minimum Ventilation Cycle Settings

- Press **2** – **MINIMUM VENTILATION**. Minimum ventilation settings of vent zone A are displayed. **This menu is only available if the minimum ventilation feature is enabled in the User Setup menu (see Zone Setup in section 4.5).*
- Press **MODIFY** then use the adjustment buttons to set the following parameters:

Open Time (Zone A) —
 Set the amount of time the blower remains OFF during a minimum ventilation cycle in order to open a vent. Press **MODIFY** to select the next parameter.
 A)Open 30sec
 Cycle 2min
- Proceed in similar fashion to set minimum ventilation settings for each zone. Then, press the down-arrow key to select the stop temperature of minimum ventilation cycles.

Cycle (Zone A) — Select how much time separates the minimum ventilation cycles.

Stop Minimum Ventilation — Set the outside temperature below which minimum ventilation cycles stop. **This parameter is common to all zones and is only available if an outside temperature sensor is enabled (see sec. 4.4).*

Stop Min Vent.
 at: 40.0°F

5.3. Natural Ventilation

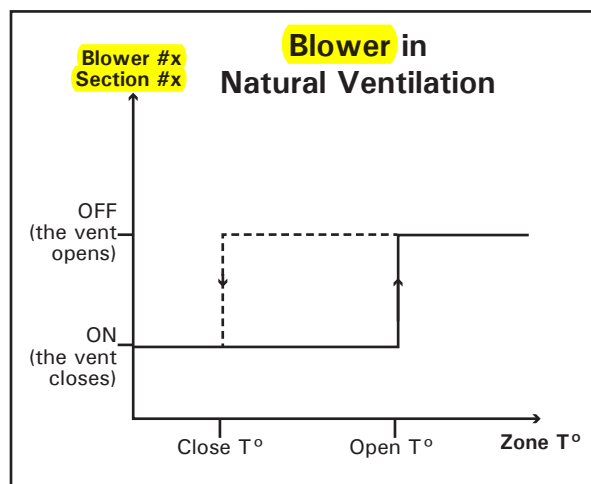
5.3.1. Vent Zone Settings

5.3.1.1. Blower's Principle of Operation

In natural ventilation, vent sections open or close according to temperature changes in their respective zones: when temperature increases in a zone, a blower stops in order to deflate the membrane; likewise, a blower starts running in order to inflate the membrane when the zone temperature decreases.

When the zone temperature increases and reaches the opening temperature of a blower, the controller stops the blower in order to deflate the membrane. Likewise, the controller activates a blower when the zone temperature decreases and reaches the blower's closing temperature (the membrane inflates). The graph on the right illustrates this.

Reference Temperature: Blowers' operating temperatures are based on the average temperature of their respective zone. Refer to the Probe Assignment section of this manual to assign probes to each vent zone (section 4.4). In addition, operating temperatures of the blowers are also related to the temperature set point. This means that if the set point changes, all opening and closing temperatures are adjusted by the same amount.



Setting the Open/Close Temperatures

- Press the desired ZONE button. The temperature at which the first blower of section 1 stops running to open the vent is displayed.

Section1 Blower1
 Open 71.0 ▼
- Press MODIFY then use the arrow keys to set the open temperature to the desired value. Press MODIFY once again to validate.
- Press the down-arrow key once. The temperature at which the first blower of section 1 starts running in order to close the vent is displayed.
- Press MODIFY then use the arrow keys to set the closing temperature to the desired value. Press MODIFY once again to validate.

Section1 Blower1
 Close 70.5 ▼
- Press the down-arrow key to select the next blower and then proceed in similar fashion to set the open / close temperatures of all consecutive blowers.

Section1 Blower2
 Open 72.0 ▼

5.3.1.2. Wind & Rain Compensation in Natural Ventilation

• Wind Compensation:

The controller can inflate some panels when strong winds are hitting a vent zone. The wind compensation function is optional and only starts when all of these conditions are met:

- The wind blows in the direction of a zone;
- The wind exceeds the speed associated with the wind compensation function;
- The wind speed and direction are maintained all along a user-defined delay.

The wind compensation function is optional and must first be enabled in the User Setup menu. Refer to section 4.5 to enable this compensation and to set the time delay that is required to launch it.

• Rain Compensation:

The controller can close some panels when there is wind and rain outside. The rain compensation starts when all of the following conditions are met:

- It is raining outside.
- The wind blows in the direction of a zone;
- The wind exceeds the speed associated with the rain compensation function;
- The rain and wind conditions are maintained all along a user-defined delay.

Refer to section 4.4 to enable the rain sensor and to section 4.5 to enable the rain compensation option and to set the time delay that is required to launch it

Settings

- Press the desired ZONE button.
- Press the down-arrow key until you reach the wind direction menu. **Accessible if the wind compensation function is enabled (see Zone Setup in section 4.5).*

- Press adjust then use the arrow keys to set the following parameters:

Wind Direction — Select what wind direction hits the selected zone. Note

Direction: North
Wind speed 10

that the wind compensation will also take place if the wind comes from the direction that immediately follows and precedes the chosen direction: i.e, if the direction is set to North-East (NE), a wind coming from North or from East would also enable the wind compensation. Once the wind direction is chosen, press MODIFY to select the next parameter. **Accessible if the wind compensation function is enabled in section 4.5.*

Wind Speed — Select the wind speed over which the wind compensation must be launched. This parameter is either expressed in kilometers per hour (km/h) or in miles per hour (mph) depending on the chosen measuring units (section 4.5). **Accessible if the wind compensation function is enabled in section 4.5.*

Close how many panels?

— Select how many panels must close when a strong wind hits the zone.

Close how many
Panels? 3

Wind speed if it rains

— Select the wind speed at which the rain compensation must be launched. **This menu is accessible if the rain compensation function is enabled (see Zone Setup in section 4.5).*

Wind speed if it
rains 30



The wind speed at which rain compensation starts has priority over the speed at which wind compensation starts.

Close how many panels?

— Select how many panels must close in the zone when it is raining outside and the wind speed exceeds the "Wind Speed if it rains" parameter value. **This menu is accessible if the rain compensation function is enabled (see Zone Setup in section 4.5).*

Close how many
Panels? 3

5.3.2. De-icing the Vents

During the cold season, the vents remain closed and motionless all the time. For this reason, the controller provides a de-icing function to prevent the formation of ice on the polyethylene membrane. To de-ice a membrane, the controller **stops the blower of a vent section in order to make the membrane move**; this movement prevents the formation of ice.

The de-icing process starts when all vents of a zone are closed and when the outside temperature is sufficiently low.

When a de-icing cycle starts in a zone, the controller stops the 1st blower of a section and then waits for the "Wait Time" delay before restarting the blower. The controller then starts de-icing the 1st blower of the next section. This process is repeated up until all sections are de-iced. At that moment, the controller waits for the end of the De-icing Cycle Time before de-icing the vents once again.

Settings

- Press **10** – **DE-ICING**. **Accessible if the de-icing function is enabled (see Zone Setup in section 4.5).*
- Press MODIFY then use the arrow keys to set the following parameters:

Start — Set the outside temperature below which the de-icing function starts. Press MODIFY to select the next parameter.

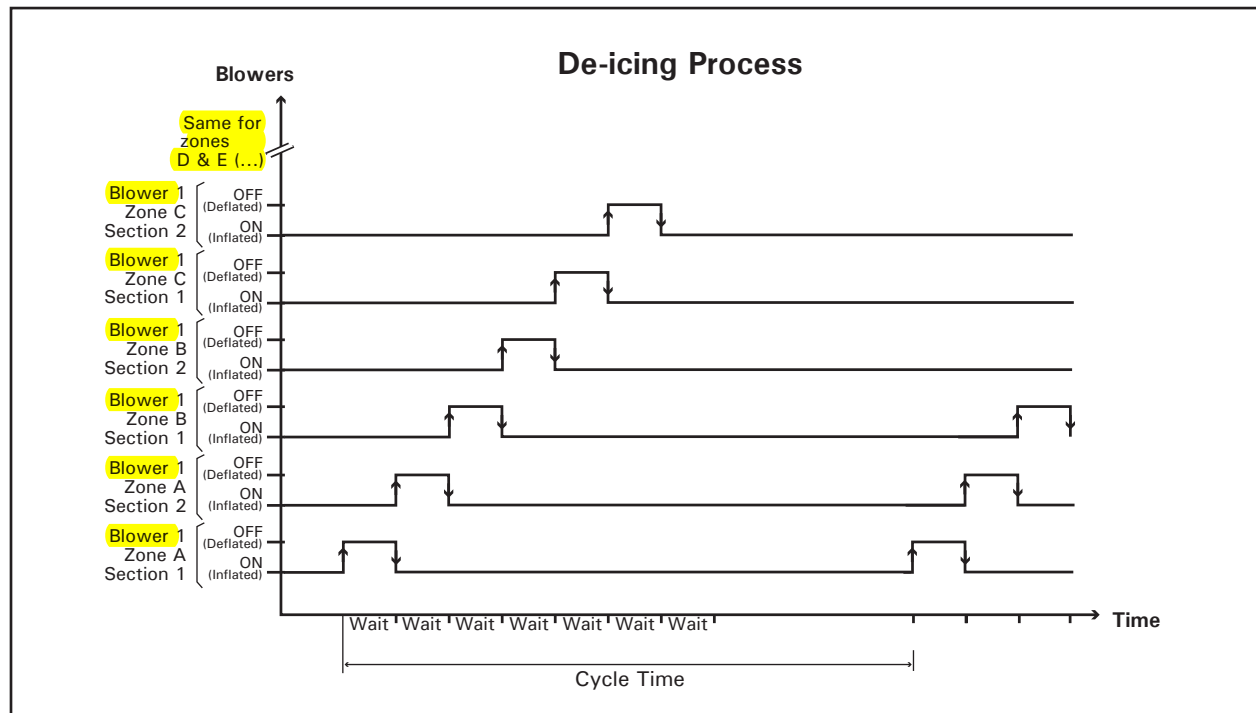
Start	32.0°F
Stop	34.0°F ↕

Stop — Set the outside temperature above which the de-icing function stops.

Cycle — Select the interval of time that separates two de-icing cycles. Press MODIFY to select the next parameter.

Cycle	300min
Wait	60sec ↕

Wait — Specify how much time it takes for the membrane to deflate when a blower stops.

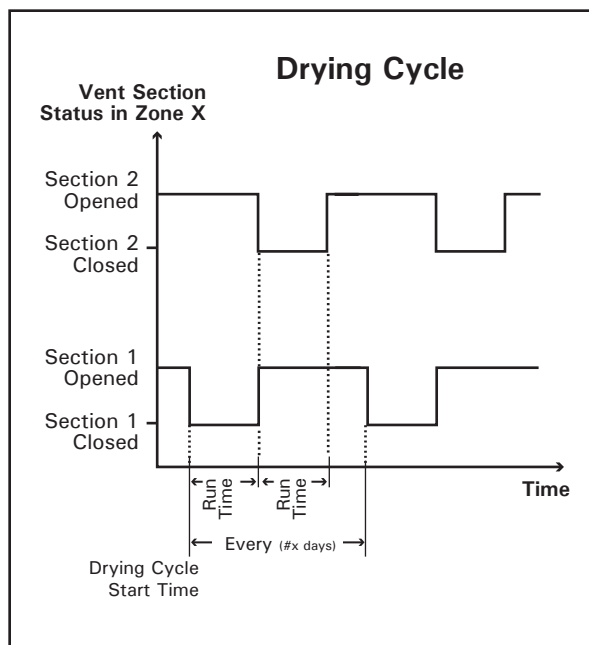


5.3.3. Drying the Vents

During the warm season, inflatable vents remain opened all the time. For this reason, the controller provides a drying function to prevent moisture problems that are likely to appear when the membrane remains fold. This drying function can only be used when the controller operates in natural ventilation (i.e., when no tunnel fan stage is active).

To dry out the membranes, the controller activates all blowers of the 1st vent section of the zone in order to inflate the membrane. The blowers keep on running during the Drying Run Time and then stop. If the zone has 2 vent sections, the controller repeats the same process right after having stopped the blowers of the 1st section.

Contrarily to de-icing cycles, drying cycles are independent for each zone. You must specify time at which the drying cycle starts for each zone and must then specify the frequency at which these cycles are performed.



Settings

- Press **11** – **DRYING**. **Accessible if the drying function is enabled (see Zone Setup in section 4.5).*
- Press MODIFY then use the arrow keys to set the following parameters:

A) Enable Drying — Select “Yes” to enable the drying function in zone A.

A)Enable Drying
Yes↑

A) Dry at — Set the time of day at which the drying cycle is performed in zone A.

A)Dry at	8:00A
	↓

- Enable Drying & Set Dry Times for Zones B, C, D & E** — Press the down-arrow key. The same settings are displayed for zones B, C, D and E. Proceed in similar fashion to enable or disable drying cycles for all zones in use and to set their start times.

Run Time — Specify how much time it takes for a blower to deflate the membrane (this parameter is common to all zones). Press MODIFY to select the next parameter.

Run Time	30min
Every	1day ↓

Periodicity (Every X days) — Set the day frequency at which drying cycles are performed (this parameter is common to all zones).



No drying cycle is performed when the controller is in tunnel ventilation !

5.4. Tunnel Ventilation

5.4.1. Principle of Operation

The controller can activate up to 8 On/Off tunnel fan stages. These stages operate in a sequence to increase the level of ventilation as the room temperature increases. The user must define the temperature at which each fan stage is enabled and the temperature at which each stage stops as the temperature decreases.

Start temperatures of tunnel fan stages are defined with respect to each other. This means that when the start temperature of a stage changes, all the consecutive values are adjusted by the same amount. For example, if the start temperature of stage 4 is increased by 1°F, start temperatures of all consecutive fan stages will be increased by 1°F.

Startup of a Tunnel Stage: When the start temperature of a tunnel stage is reached, the controller waits 1 minute before starting the fans of that stage. This delay allows vents to close at the

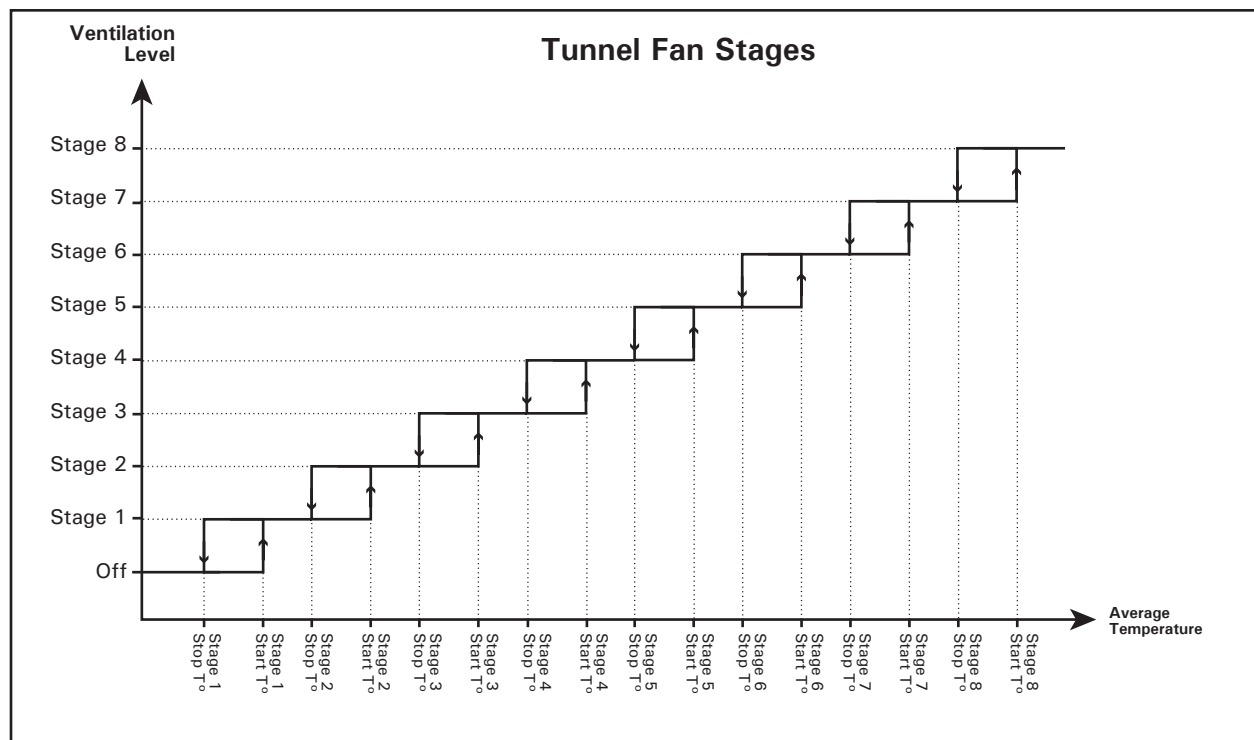
beginning of a stage. The pilot light associated with the stage flashes during this delay.

Reference Temperature: Operating temperatures of tunnel fan stages are based on the average temperature reading of chosen probes. Refer to the Probe Assignment section of this manual to assign probes to the tunnel ventilation mode (section 4.4).

Tunnel Fan Module: 2 tunnel fans can be connected to the internal relays of the controller. It is also possible to connect these fans to an external module to use more of them. The tunnel module allows using up to 8 tunnel fan stages.

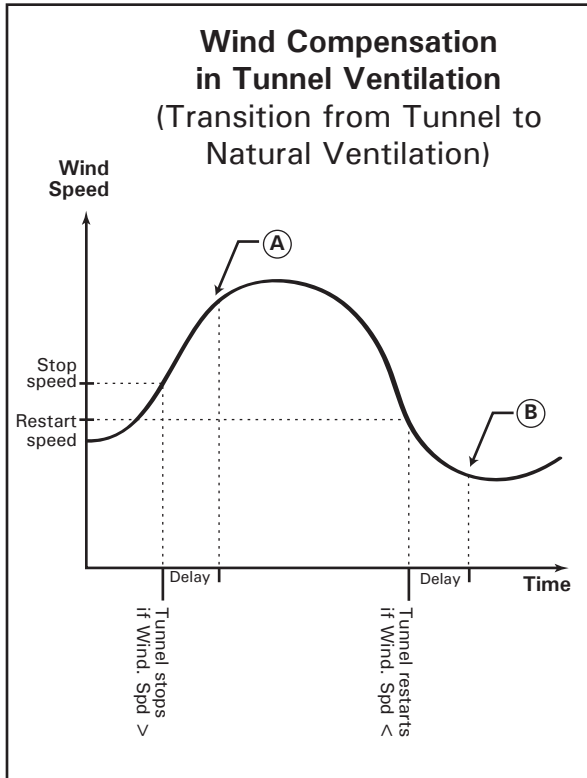
Inflatable Vents in Tunnel Ventilation: The controller allows specifying the number of panels that must close at the start-up of each tunnel fan stage.

Wind Compensation in Tunnel Ventilation: In order to save energy, the EXPERT-21+ can switch back to natural ventilation when the wind blows fast enough. Refer to the following section for further information about this option.



5.4.2. Wind Compensation in Tunnel Ventilation

In order to save energy, the EXPERT-21+ can switch back to natural ventilation when the wind blows in fast enough in the proper direction. The graph below shows how this compensation works when tunnel ventilation is on:



A

Beginning of the Wind Compensation in Tunnel Mode :

When the controller is in tunnel ventilation, that the wind direction is appropriate and the wind speed reaches a certain speed ("Tunnel stops if wind speed>"), the controller automatically switches back to natural ventilation: it first opens all inflatable panels and then stops the tunnel fans. Note that the wind speed & direction must be maintained all along a user-defined delay for this compensation to take place ("Tunnel Stop Delay").

B

End of the Wind Compensation in Tunnel Mode:

If the wind speed falls to a certain point ("Tunnel restarts if wind speed <") or if the wind direction changes while the compensation is on, the controller automatically goes back to tunnel ventilation: it restarts the proper tunnel fan stage and closes the inflatable panels. Note that the change in the wind direction or the reduction in the wind speed must be maintained all along the "Restart Delay" for the wind compensation to stop.

5.4.3. Tunnel Ventilation Settings

a) Operating T° & Wind Compensation Settings

- Press **7** – **TUNNEL**. **This menu is only available if at least 1 tunnel stage is used (see section 4.3).*
- Press **MODIFY** then use the arrow keys to set the following parameters:

Stage 1) Start Temperature — Set the temperature above which the first tunnel fan stage starts. Then, press **MODIFY** to select the following parameter

1)Start	71.6°F
Stop	70.7°F ▾

Stage 1) Stop Temperature — Set the temperature below which the first tunnel stage stops. Note that the stop temperature of a stage must be at least 0.5°F (0.3°C) lower than its start temperature.

Start/Stop Temperatures for other Tunnel Stages — Set the start and stop temperature for all tunnel fan stages in use.

2)Start	72.6°F
Stop	72.1°F ▴

Stop Tunnel if Wind Spd is > — If the wind compensation is used, select the wind speed over which the controller must switch back to natural ventilation. This value is either expressed in miles or kilometers per hour depending on the chosen units (sec. 4.5). You can also decrease the value until the word “None” is displayed if to disable this function. **Accessible if the wind compensation function is enabled in section 4.5.*

Stop Tunnel if Wind Spd is >	30 ▴
------------------------------	------

Wind Direction — If the wind compensation is used, select the wind direction that activates the compensation (go back in natural ventilation). Note that the wind compensation will also take place if the wind comes from the direction that immediately

Wind Direction	North ▴
----------------	---------

follows and precedes the chosen direction: i.e, if the direction is set to North-East (NE), a wind coming from North or from East would also enable the wind compensation. **Accessible if the wind compensation function is enabled in section 4.5.*

Delay before stop — If the wind compensation is used, select during how much time the windy condition must be maintained for the controller to switch back to natural ventilation. **Accessible if “Stop Tunnel if Wind Spd is>” parameter is not set to “None”.*

Delay before Stop	15:00min ▾
-------------------	------------

Restart Tunnel Fans if Wind Speed is < — If the wind compensation is used, select the wind speed below which the controller must switch back to tunnel ventilation when the compensation is active (refer to previous graph). This parameter must be at least 3 kmh (or mph) lower than the speed at which the compensation starts (“Stop Tunnel if Wind spd is >”).

Restart Tun if Wind Spd is <	15 ▴
------------------------------	------

Delay before restart — If the wind compensation is used, select during how much time the low wind condition must be maintained for the controller to go back in tunnel mode.

Delay before restart	15:00min ▾
----------------------	------------

b) Closing the Panels in Tunnel Ventilation:

1. If using 1 section per zone:

- Press the desired ZONE button.
- Press the down-arrow key to select the "#Stop at tunnel at tunnel Stage 1" parameter. This parameter represents the number of panels that must close (# of blowers to activate) at the start-up of tunnel stage 1. **This menu is only available if at least 1 tunnel stage is used (see section 4.3).*

#Stop at tunnel
Stage1: 1
- Press MODIFY then use the adjustment buttons to specify how many panels must close, in the chosen zone, at the start-up of the first tunnel stage.
- Press MODIFY to validate and then press the down-arrow key to select the following parameter. If your controller uses more than 1 tunnel stage, specify the number of panels to close at the start-up of each tunnel stage.

#Stop at tunnel
Stage2: 3

2. If using 2 sections per zone:

- Press the desired ZONE button.
- Press the down-arrow key to select the "Section 1 Closes at Tunnel 1" parameter. This parameter represents the number of panels that must close in section 1 at the start-up of the 1st tunnel stage. **This menu is only available if at least 1 tunnel stage is used (see section 4.3).*

Section 1 Closes
at Tunnel1 1
- Press MODIFY then use the adjustment buttons to specify the number of panels that must close at the start-up of tunnel stage 1.
- If the controller uses 2 tunnel stages and the tunnels fans are connected directly into the unit (i.e., they are not connected to an external tunnel module), you must specify how many panels must close in section 1 at the start-up of tunnel stage 2.

Section 1 Closes
at Tunnel2 1



NB. If tunnel fans are connected to an external tunnel module, the controller allows selecting the number of panels to close at the start-up of the first tunnel stage only.

- Press MODIFY to validate then press the down-arrow key to select the following vent section.

Section 2 Closes
at Tunnel1 2
- Proceed in similar fashion to set the number of panels to close in section 2 at the start-up of tunnel stages 1 & 2 (if applicable).

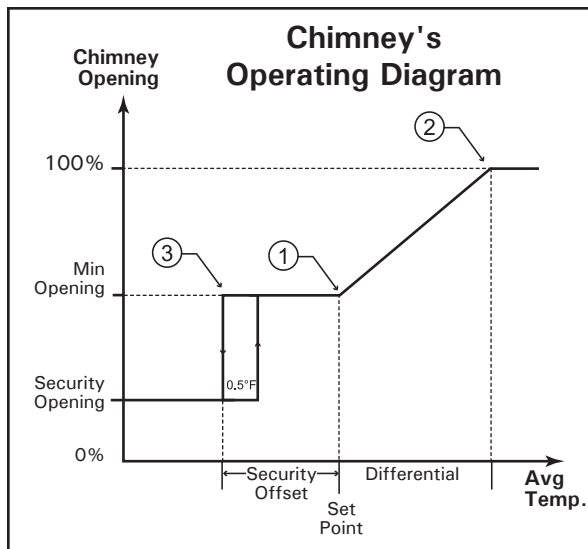
5.5. Chimneys

The controller can adjust the position of 2 chimney dampers. The damper position is defined as a function of temperature: at the chimney set point, the damper is at its minimum opening position (#1 on the graph). At the set point + differential, the damper is open at 100% (#2 on the graph). The opening of the chimney damper is automatically adjusted in linear fashion between these 2 temperature limits.

In addition, if temperature falls below the set point and reaches the security offset value (#3 on the graph), the damper closes further to its security opening. A fix hysteresis of 0.5°F is used to reopen the chimney when the temperature rises again.

Reference Temperature: Operating temperatures of chimneys are based on the average temperature reading of chosen probes. Refer to the Probe Assignment section of this manual to assign probes to each chimney output (section 4.4).

Chimneys in Tunnel Ventilation: In tunnel ventilation, both chimneys position themselves to their respective tunnel ventilation position. This position is defined by the user.



Chimney Calibration

Before setting chimney parameters, you must calibrate each one of them. This calibration tells the controller where the actuators' limit switches are located.

- Press **8** – **CHIMNEY 1-2**. **Accessible if a chimney is enabled (see section 4.3).*
- Press the down-arrow key to select the calibration display of chimney 1 or chimney 2.

1)Calib Chimney	No ↕
2)Calib Chimney	No ↕
- To start the calibration, press MODIFY then press the up-arrow key. Press MODIFY once more to validate. The controller will fully close the actuator of the selected chimney; once it reaches the minimum limit switch, the controller opens the actuator until the actuator reaches the maximum limit switch.
- The message "done" is displayed when the calibration is over.

Chimney Settings

- Press **8** – **CHIMNEY 1-2**. **Accessible if a chimney is enabled (see section 4.3).*
- Press MODIFY then use the arrow keys to set the following parameters:

Minimum — This is the minimum opening of the chimney; the chimney is at this minimum position when the temperature is at the chimney's set point.

1)Pos.	0%
Min0%	↕

Chimney Set Point — The set point is the temperature over which the chimney starts opening as a function of temperature. Adjust the set point then press MODIFY to select the next parameter.

1)SetP	70.0°F
Diff	2.0°F ↕

Differential — The differential is the normal operating interval of the chimney. The value ranges from 0.5 to 20°F (0.3 to 11.1°C).

Security Offset — The security offset is the number of degrees below the set point at which the chimney goes into security mode and closes to the security position. The value ranges from 0.5 to 20°F (0.3 to 11.1°C).

1) Secur. Offset
2.0°F ↕

Security Opening — The security opening is the position of the chimney when the security mode is enabled. The value ranges from 0 to 100%.

1) Secur. Opening
0% ↕

Open in Tunnel Mode — The chimney can reach a user-defined position when tunnel ventilation starts. Specify what is the position of the chimney in tunnel mode. The value ranges from 0 to 100%.

1) Open in tunnel
Mode: 0% ↕

- Proceed in similar fashion to adjust these parameter for chimney 2 (if applicable).

5.6. Stir Fans

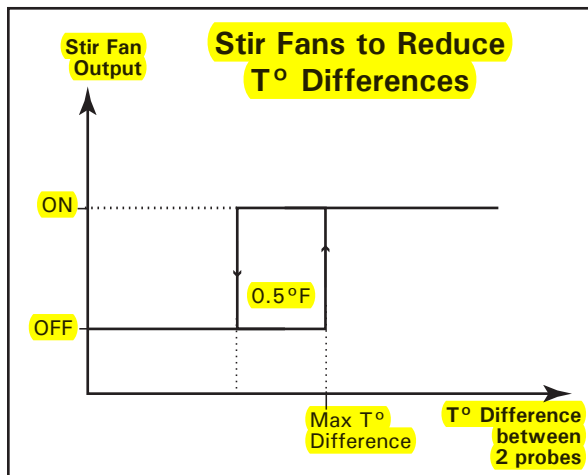
The controller can operate 1 stir fans output in 3 different ways: the output can be used on cold and/or hot temperature conditions and/or can be used to reduce temperature differences between temperature sensors. Each operating mode is explained below. Refer to section 4.3 to enable the stir fan output.

Wind Compensation on Stir Fans:

In order to save energy, the EXPERT-21+ can stop all stir fans whenever there is sufficient wind.

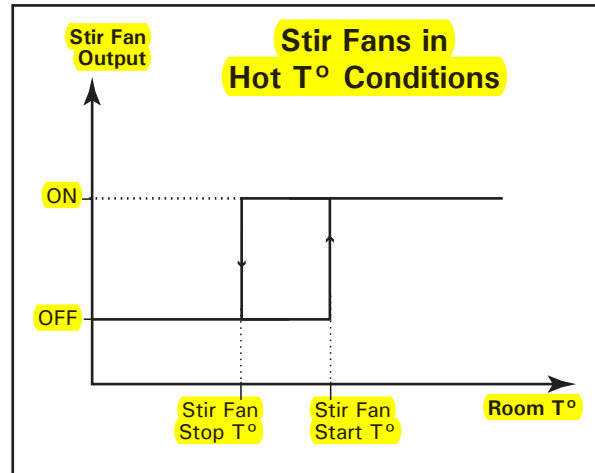
1) Stir Fans to Reduce T° Differences Between Sensors

Stir fans can be used to standardize the room temperature. In order to this, the stir fans start running in timer mode when the temperature difference between two sensors exceeds a user-defined value; a fix hysteresis of 0.5°F (0.3°C) is used to stop them when the temperature difference between the sensors gets lower.



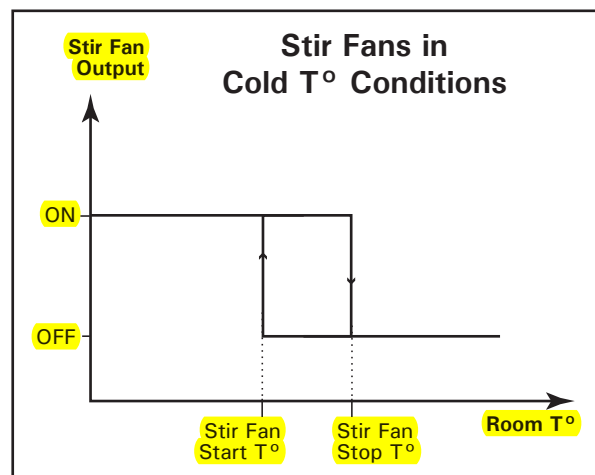
2) Stir Fans In Hot Temperature Conditions

Stir fans can be used to create a wind chill sensation when the room temperature is warm. When they are used in HOT temperature conditions, stir fans start running in timer mode when the room temperature rises and reaches the output's start temperature; they stop when the room temperature falls to the stop temperature.



3) Stir Fans in Cold Temperature Conditions

Stir fans can be used to stir the warm air of the heaters when the room temperature is cold. When they are used in COLD temperature conditions, stir fans start running in timer mode when the room temperature falls to the output's start temperature; they stop when the room temperature rises to the output's stop temperature.



Settings

- Press **9** – **OUTPUTS.**

- Press the down-arrow key to select the Stir Fan Probe Diff menu. **Accessible if the stir fan output is enabled (see section 4.3).*

- Press MODIFY then use the arrow keys to set the following parameters:

Stir Fan Probe Diff. — Select the maximum allowable temperature difference between two sensors. Whenever the temperature difference between two sensors exceeds this value, the stir fan output starts running in timer mode.

Stir Fan Probe	
Diff	5.0°F

Start Stir Fan if HOT? — Select “Yes” to use the stir fan output in hot temperature conditions (see previous page for further information on this function).

Start S.Fan if	
HOT ?	Yes

Start T° — If the stir fan output is used in hot temperature conditions, select the temperature over which it must start running in timer mode. **Accessible if the “HOT T° condition” is enabled above.*

Start	80.0°F
Stop	79.5°F

Stop T° — If the stir fan output is used in hot temperature conditions, select the temperature below which it must stop running. **Accessible if the “HOT T° condition” is enabled above.*

Start Stir Fan if COLD? — Select “Yes” to use the stir fan output in cold temperature conditions (see previous page for further information on this function).

Start S.Fan if	
COLD?	Yes

Start T° — If the stir fan output is used in cold temperature conditions, select the temperature below which it must start running in timer mode. **Accessible if the “COLD T° condition” is enabled above.*

Start	60.0°F
Stop	60.5°F

Stop T° — If the stir fan output is used in cold temperature conditions, select the temperature over which it must stop running. **Accessible if the “HOT T° condition” is enabled above.*

Stir Fan Timer (On/Off) — Set the on time and the off time of the stir fan timer.

On	0:30min
Off	1:00min

No Stir Fans if Wind Speed > — If the wind compensation is used, select the wind speed at which the controller must stop the stir fan output. This value is either expressed in miles or kilometers per hour depending on the chosen units (sec. 4.5). You can also decrease the value until the word “None” is displayed if to disable this function. **Accessible if the wind compensation function is enabled in section 4.5..*

No S.F. if wind	
Speed is >	30

Restart stir fans if Wind Speed is < — If the wind compensation is used, select the wind speed below which the controller must restart the stir fans. This parameter must be at least 3 kmh (or mph) lower than the speed at which the compensation starts (“Stop stir fans if Wind spd is >”). **Accessible if the wind speed at which the output stops is not set to “None” above.*

Rest.StirFan if	
Wind Spd <	15

Direction — If wind compensation is used, select what wind direction causes the stir fan output to stop when the wind speed is sufficient. Note that the wind compensation will also take place if the wind comes from the direction that immediately follows and precedes the chosen direction: i.e, if the direction is set to North-East (NE), a wind coming from North or from East would also requires the stir fan output to stop.

Direction: North	
------------------	--

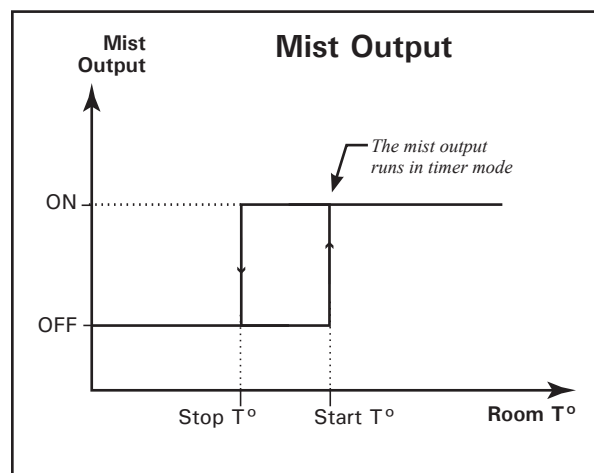
Delay before Stop — If the wind compensation is used, select during how much time the high wind condition must be maintained for the controller to stop the stir fans.

Delay before	
Stop	15:00min

5.7. Mist

The controller can control one misting output. Misters are used to cool down the temperature in the room. They are activated in timer mode when the room temperature is too high and are stopped when the average room temperature drops to their stop temperature.

Reference temperature: Operating temperatures of the mist output are based on the average temperature in the room. Refer to the Probe Assignment section of this manual to assign room temperature probes (section 4.4).



Settings

- Press **9** - OUTPUTS.
- Press the down-arrow key to select Mist Start menu. **Accessible if the mist output is enabled (see section 4.3).*
- Press MODIFY then use the arrow keys to set the following parameters:

Mist Start Temperature

— Set the room temperature above which the mist output starts running in timer mode.

Mist	
Start	88.0°F ↕

Mist Stop Temperature

— Set the room temperature below which the mist output stops.

Mist	
Stop	87.0°F ↕

Mist Timer (On Time) —

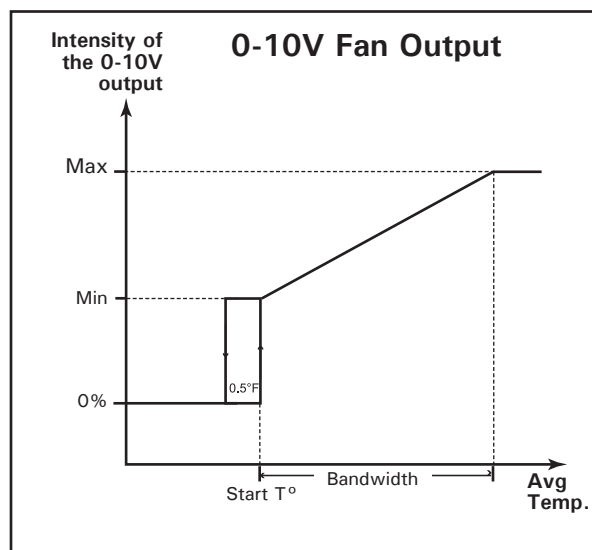
Set the on time and the off time of the misting timer.

On	0:00min
Off	0:00min ↕

5.8. 0-10V Ventilation Output

The controller can control two 0-10V outputs. This type of outputs can either be used as a supplementary and independent ventilation stages or as an heating stages. Refer to the Outputs Activation section of this manual to enable 0-10V outputs and to specify their respective function (section 4.3).

When a 0-10V output is used for ventilation, the output is enabled at its minimum intensity when the temperature reaches the output's start temperature. The intensity of the output gradually increases in a linear fashion as the temperature increases; the maximum intensity is reached when the temperature reaches the Start T° + Bandwidth (the bandwidth defines the temperature interval over which the output goes from minimum to maximum intensity). The output stops when the temperature decreases of 0.5°F (0.3°C) below the start temperature.



Reference temperature: Operating temperatures of the 0-10V outputs are based on the average temperature reading of chosen probes. Refer to the Probe Assignment section of this manual to assign probes to these outputs (section 4.4).

Wind Compensation on 0-10V Fans: In order to save energy, the EXPERT-21+ can stop the 0-10V fans whenever there is sufficient wind.

Settings

- Press ⑨ – **OUTPUTS**. The temperature at which the first 0-10V starts is displayed.
*Accessible if a 0-10V output is enabled (sec. 4.3).

- Select the start temperature menu of a 0-10V output that is used for ventilation and then press MODIFY to set the following parameters:

Start Temperature — Set the temperature at which the 0-10V starts running at minimum speed.

Output1 0-10V
Start 70.0°F

Bandwidth — Set the temperature interval over which the output goes from minimum to full speed.

Output1 0-10V
BandW 2.0°F

Min Intensity — Set the minimum intensity of the output.

Output1 0-10V
Min 15%

Max Intensity — Set the maximum intensity of the output.

Output1 0-10V
Max 100%

Stop 0-10V if wind speed

> — If the wind compensation is used, select the wind speed at which the controller must stop the 0-10V fan. This value is either expressed in miles or kilometers per hour depending on the chosen units (sec. 4.5). You can also decrease the value until the word “None” is displayed if to disable this function. *Accessible if the wind compensation function is enabled in section 4.5..

Stop 0-10V 1 if
Wind. Spd > 30

Restart 0-10V if Wind

Speed is < — If the wind compensation is used, select the wind speed below which the controller must restart the 0-10V fan. This parameter must be at least 3 kmh (or mph) lower than the speed at which the compensation starts (“Stop 0-10V if Wind spd is >”). *Accessible if the wind speed at which the output stops is not set to “None” above.)

Rest. 0-10V 1 if
Wind Spd < 15

Direction — If wind compensation is used, select what wind direction causes the 0-10V output to stop when the wind speed is sufficient. Note that the wind compensation will also take place if the wind comes from the direction that immediately follows and precedes the chosen direction: i.e, if the direction is set to North-East (NE), a wind coming from North or from East would also require the 0-10V output to stop.

Direction: North

⬆

Delay before Stop — If the wind compensation is used, select during how much time the high wind condition must be maintained for the controller to stop the 0-10V fan.

Delay before

Stop 15:00min

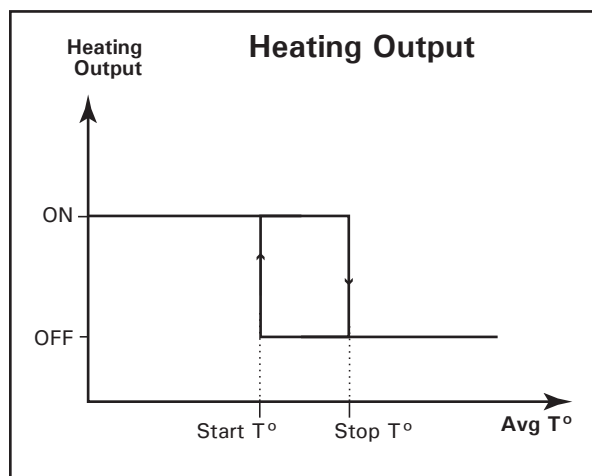
⬆

- If the second 0-10V output is used for ventilation, proceed in similar fashion to set its parameters.

6. HEATING SETTINGS

6.1. On/Off Heating Outputs

The controller can control up to 4 on/off heating outputs. These outputs are independent from one another and each start when their respective start temperature is reached; they stop operating when the temperature increases to their stop temperature.

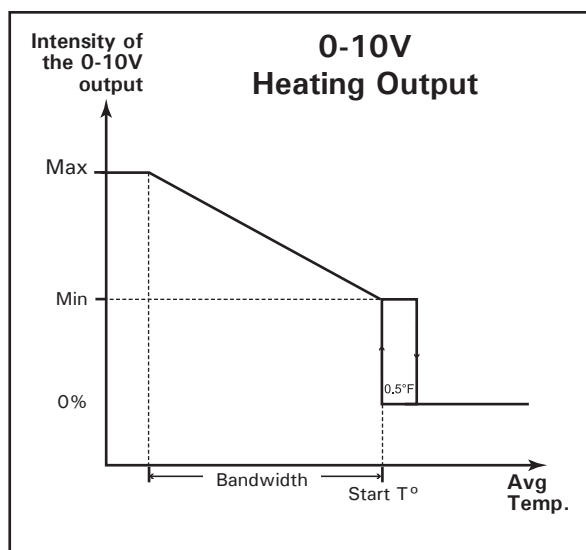


Reference Temperature: Operating temperatures of heating outputs are based on the average temperature reading of chosen probes. Refer to the Probe Assignment chapter of this manual to assign probes to each heating output.

6.2. 0-10V Heating Output

The controller can control two 0-10V outputs. This type of outputs can either be used as a supplementary and independent ventilation stages or as an heating stages. Refer to the Outputs Activation section of this manual to enable 0-10V outputs and to specify their respective function (section 4.3).

When a 0-10V output is used for heating, the output is enabled at its minimum intensity when the temperature reaches the output's start temperature. The intensity of the output gradually increases in a linear fashion as the temperature decreases; the maximum intensity is reached when the temperature reaches the Start T° – Bandwidth (the bandwidth defines the temperature interval over which the output goes from minimum to maximum intensity). The output stops when the temperature increases of 0.5°F (0.3°C) above the start temperature.



Reference temperature: Operating temperatures of the 0-10V outputs are based on the average temperature reading of chosen probes. Refer to the Probe Assignment section of this manual to assign probes to these outputs (section 4.4).

6.3. Heating Output Settings

On/Off Output Settings

- Press **9** – **OUTPUTS**.
- Press the down-arrow key to select Heater 1 Start Temperature menu. **Accessible if an heating output is enabled (see section 4.3).*
- Press MODIFY then use the arrow keys to set the following parameters:

Heater 1 Start Temperature — Set the temperature below which heater 1 starts running.

Heater 1	Start	70.0°F	↕
----------	-------	--------	---

Heater 1 Stop Temperature — Set the temperature above which heater 1 stops. Note that the stop temperature of an heating output must be at least 0.5 °F (0.3°C) greater than its start temperature.

Heater 1	Stop	70.5°F	↕
----------	------	--------	---

Heater 2-4 Start/Stop Temperatures — Proceed in similar fashion to set the start and stop temperatures of all on/off heating outputs in use.

0-10V Heating Output Settings

- Press **9** – **OUTPUTS**. The temperature at which **the first** 0-10V starts is displayed. **Accessible if a 0-10V output is enabled (sec. 4.3).*

- Select the start temperature menu of a 0-10V output that is used for heating and then press MODIFY to set the following parameters:



Before adjusting the following parameters, make sure the 0-10V function is set to "Heating" in the User Setup menu (sec. 4.3).

Start Temperature — Set the temperature at which the 0-10V starts running at minimum speed.

Output1	0-10V	Start	70.0°F	↕
---------	-------	-------	--------	---

Bandwidth — Set the temperature interval over which the output goes from minimum to full speed.

Output1	0-10V	BandW	2.0°F	↕
---------	-------	-------	-------	---

Minimum Intensity — Set the minimum intensity of the output.

Output1	0-10V	Min	15%	↕
---------	-------	-----	-----	---

Maximum Intensity — Set the maximum intensity of the output.

Output1	0-10V	Max	100%	↕
---------	-------	-----	------	---

- If the second 0-10V output is used for heating, proceed in similar fashion to set its parameters.

7. ALARMS

The alarm output is set off when an alarm condition is detected: when the room temperature is too high or too low, for instance. When an alarm is active, the pilot light (LED) corresponding to the alarm condition is lit on the faceplate of the controller.

The table on the right gives all possible alarm conditions. Another alarm situation occurs in case of a power failure. In this case, the alarm relay is activated. When the alarm relay is activated, the normally open contact (—●—●—) closes.

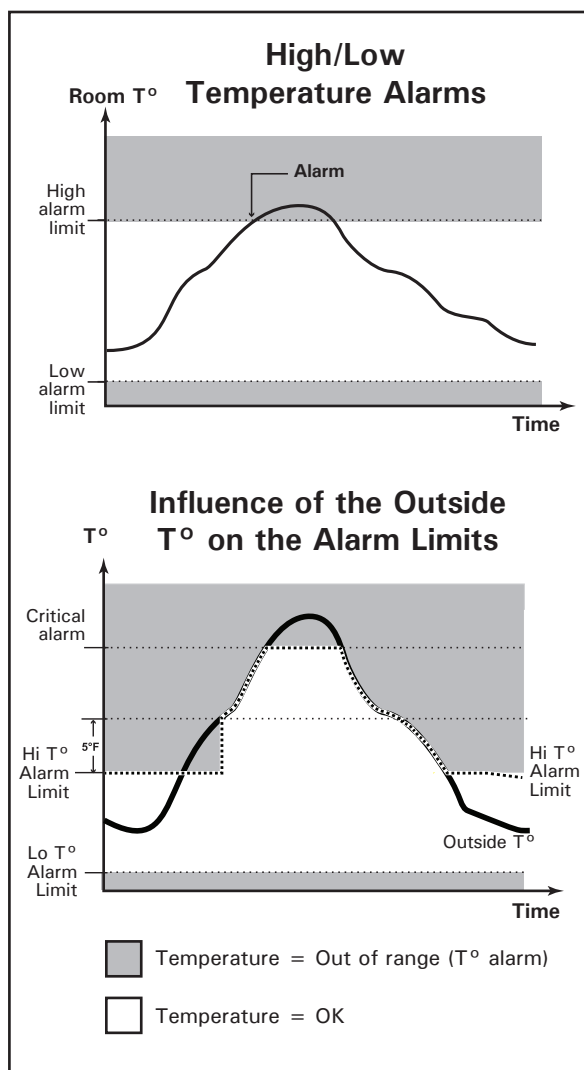
Alarm Conditions
High / Low Temperature Alarm
Sensor #x is defective
Outside T° sensor is defective
Potentiometer is defective/

7.1. Temperature Alarms

High / Low Temperature Alarms: A high temperature alarm is set off when the average room temperature exceeds the high temperature alarm limit; likewise, a low temperature alarm is set off when the room temperature decreases below the low temperature alarm limit.

Influence of the Outside Temperature on the Alarm Limits: The influence of the outside temperature avoids false alarms due to warm weather. When the outside temperature is greater than the high alarm limit + 5°F (2.8°C), the outside temperature becomes the high alarm limit. This means an alarm is set off when the room temperature is higher than the outside temperature. The graphic on the right illustrates this situation.

Critical Temperature: The critical temperature is the absolute maximum temperature allowed in the room. An alarm is set off if the room temperature reaches the critical temperature limit, without considering the outside temperature.



Setting the Alarm Limits

- Press **13** – **ALARM**. The high and low temperature limits are displayed.
- Press **MODIFY** then use the arrow keys to set the following parameters:

Low Alarm Limit — Set the room temperature below which the low temperature alarm is set off. Press **MODIFY** to select the following parameter.

Low:	60.0°F
High:	80.0°F

High Alarm Limit — Set the room temperature above which the high temperature alarm is set off.

Critical Alarm Limit — Set the absolute room temperature above which a critical temperature alarm is set off.

Critical high:	95.0°F
----------------	--------

7.2. Defective Probe Alarm

To identify the defective temperature probe, press the **C** – **CURRENT CONDITIONS** button then press the current condition's down-arrow key. Probe readings are then displayed. Dashes are displayed instead of a reading when the probe is defective. In the case of room temperature probes, the controller will operate according to the temperature of the remaining probes.

7.3. Defective Potentiometer

If a chimney potentiometer is defective, the controller will enable the security mode:

When the temperature is 2°F (1.1°C) above the set point of the defective chimney, the actuator opens according to the following cycle:

- 8 seconds ON
- 60 seconds OFF.

When the room temperature is 2°F (1.1°C) below the set point of the defective chimney, the actuator closes according to the same cycle.

8. MONITORING FUNCTIONS

8.1. Room Temperature

The room temperature is the average temperature reading of chosen probes. Refer to the Probe Assignment section of this manual to assign these probes (section 4.4).

The controller displays the room temperature in the current condition menu. This menu also gives the minimum and maximum room temperature readings that were recorded everyday for the past 6 days (temperature histories are updated at midnight everyday).

Current Reading

- Press **C** – **CURRENT CONDITIONS**. The current room temperature is displayed. Probes that are used to calculate the average room temperature are flashing on screen.

Room T°	78.2°F
Pr.Act:	12345678

Min / Max Values

- Press the navigation down-arrow key once. The controller displays today's minimum room temperature along with the time and date.
- Press the navigation down-arrow key once again. The controller displays today's maximum room temperature along with the time and date.



Room T°12/31/XX
Min 76.7 4:29A



Room T°12/31/XX
Max 79.2 3:57P

History

- Keep pressing the navigation down-arrow to scroll down through the room temperature history. The controller will display minimum and maximum room temperature readings of the past 6 days.



Room T°12/30/XX
Min 75.9 3:51A

8.2. Probe Temperature

The controller displays the current temperature reading of each sensor in the current condition menu. This menu also gives the minimum and maximum temperature readings that were recorded everyday by each sensor for the past 6 days (temperature histories are updated at midnight everyday).

Current Reading

- Press **C** – **CURRENT CONDITIONS**.
- Press the current condition down-arrow key once  . Current temperature readings of probes 1-4 are displayed.

1:78.2	1:78.0
3:78.3	4:78.1
- Press the navigation down-arrow key once. Current temperature readings of probes 5-8 are displayed. **Available if more than 4 probes are enabled (see Probe Activation in sec. 4.4).*

5:78.5	6:78.1
7:78.0	8:78.2

Min / Max Values

- Press the navigation down-arrow key once again. The minimum temperature reading of probe 1 is displayed along with the time and date.

Probe1 12/31/XX
Min 77.4 3:27A
- Press the navigation down-arrow key once again. The maximum temperature reading of probe 1 is displayed along with the time and date.

Probe1 12/31/XX
Max 79.3 4:16P

History

- Keep pressing the navigation down-arrow to scroll down through probe temperature histories. The controller will display minimum and maximum temperature readings of each probe of the past 6 days.

Probe1 12/30/XX
Min78.7 5:47P

8.3. Outside Temperature

The controller displays the outside temperature in the current condition menu. This menu also gives the minimum and maximum readings that were recorded everyday by the outside temperature sensor for the past 6 days (temperature histories are updated at midnight everyday).

Current Reading

- Press **C** – **CURRENT CONDITIONS**.
- Press the current condition down-arrow key twice  . The current outside temperature is displayed. **Accessible if the outside temperature sensor is enabled (see Probe Activation in section 4.4).*

Out T° 64.2°F

Min / Max Values

- Press the navigation down-arrow key once. The controller displays today's minimum outside temperature along with the time and date.

Out T° 12/31/XX
Min 53.4 3:02A
- Press the navigation down-arrow key once again. The controller displays today's maximum outside temperature along with the time and date.

Out T° 12/31/XX
Max 69.5 4:29P

History

- Keep pressing the navigation down-arrow to scroll down through the outside temperature history. The controller will display minimum and maximum outside temperature readings of the past 6 days.

Out T° 12/30/XX
Min 58.9 3:45A

8.4. Wind Speed

The controller displays the wind speed in the current condition menu. This menu also gives the minimum and maximum speeds that were recorded everyday for the past 6 days (this wind speed history is updated at midnight everyday).

Current Reading

- Press **C** – **CURRENT CONDITIONS**.

- Press the current condition down-arrow key to display the wind speed menu  .

WindSpd Omph
↓

Min / Max Values

- Press the navigation down-arrow key once.   The controller displays today's minimum wind speed along with the time and date. .
- Press the navigation down-arrow key once.   The controller displays today's maximum wind speed along with the time and date.

WindSpd12/31/XX
Min 0 12:00A ↓

WindSpd12/31/XX
Max 32 6:30A ↓

8.5. Wind Direction

The controller displays the current wind direction in the current condition menu.

Current Reading

- Press **C** – **CURRENT CONDITIONS**.
- Press the current condition down-arrow key to display the wind direction menu  .

Direction: North
↓

8.6. Rain Sensor Status

Select the following menu to see if the rain sensor currently detects rain or not.

Current Reading

- Press **C** – **CURRENT CONDITIONS**.
- Press the current condition down-arrow key to display the rain sensor menu  .

Rain: Yes
↓

8.7. Relative Humidity

If a humidity sensor is connected to the unit, the EXPERT 21+ displays the current humidity level in the Current Condition menu.

Current Reading

- Press **C** – **CURRENT CONDITIONS**.
- Press the current condition down-arrow key to display the humidity level  .

Humidity: 50%
↓

9. TEST MODE

The test mode is used to simulate temperature changes and to verify the controller's performances. When the test is enabled, all outputs of the controller operate according to the simulated temperature.

- Press **15** –**TEST MODE**. If a password is enabled, enter the current password using the adjustment buttons. By default, it is set to 00-00-00. The test mode status will then be displayed.
- Press MODIFY then use the arrow keys to change the test mode status.

Test mode On ↕
- If the test mode is enabled, press the down-arrow key once. The simulated room temperature is displayed.

Room T° bypass: -40.0°F ↕
- Press MODIFY then use the arrow keys to select the desired simulated room temperature.



The test automatically ends after 15 minutes of inactivity. It can also end sooner by switching the test mode status back to "Off".

10. MANUAL MODE

The controller allows you to set the status of **each blower** or the position of each chimney damper manually. **In order to activate or deactivate a blower**, please refer to the relay assignment table to see on which relay the blower is connected (section 13.1).

The manual mode pilot light flashes while an output is controlled manually.

- Press **12** –**MANUAL MODE**.

- Use the navigation buttons to select the proper vent section or the proper chimney.

Relay 10 On ↕
Relay 11 Auto ↕

- Press MODIFY then use the adjustment buttons to select the desired status for the selected output:

Chimney 1 OFF ↕

Status of blower relays (relays 1-16) & programmable relays (relays 21-24):

Auto : the blower is controlled by the controller;
On : the blower is on;
Off : the blower is off.

Status of chimney dampers (relays 17-20):

Auto : the chimney is controlled by the controller;
Close: the chimney closes;
Open : the chimney opens;
Off : the chimney stays still.

11. TECHNICAL SPECIFICATIONS

Type.....	EXPERT 21 +
Mains supply fuse F1	 4A, slow-blow
Mains supply/frequency	85-250V, 50/60Hz
0-10V output 1-2.....	0-10Vdc, 30mA source max.
Precision on the 0-10V outputs	±1 %
14Vdc output	14 Vdc ±10%, regulated, 250mA max.
Alarm contact	10mA to 2A, 24 Vac or dc max.
Pot + output.....	3.0V, 20mA max.
Potentiometer inputs	1-20K pot., linear
Wind direction sensor.....	10K Potentiometer
Rain Sensor.....	Dry contact
Relative Humidity Sensor	4-20mA
Wind speed sensor.....	Square wave from open collector transistor
Temperature inputs	1K @ 77°F (25°C), NTC
Relays 1-24	Dry contact, 10A resistive, 120VAC (1/4HP) / 240VAC (1/2HP) Tungsten (Light Bulb): 8.3A max at 120VAC
Housing	ABS, moisture and dust-tight.
Operating temperature.....	32 to 104°F (0 to 40°C)
Storage temperature	5 to 122 °F (-15 to 50°C)
Ambient relative humidity	max. 95%

12. MEMORY CARD

The memory card is used to create a backup copy of your controller's configuration. The card is also useful to transfer the configuration of one controller to another controller of the same type.

The switch at the bottom of the card is used to lock or to unlock the card ( = locked,  = unlocked).



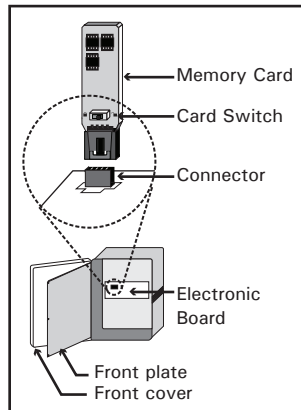
Turn off power each time you open the controller's enclosure. This prevents accidental exposure to areas of high voltage.

TO TRANSFER A CONFIGURATION:

1. Turn off power to the controller.

2. Unscrew the screws located on the controller's front panel then open the panel.

3. If you are about to copy the controller's configuration on the memory card, make sure the card's switch is at the unlocked position.



4. Insert the card in the J10 connector located on the electronic board inside the controller. Components of the memory card must face down as illustrated.

5. Close the cover then reapply power to the controller. The transfer menu should be shown on screen (if this is not the case, simultaneously press the CURRENT CONDITION'S up and down-arrow keys for 3 seconds to display this menu).

6. Use the up- and down-arrow keys to select the proper type of transfer:

MEMORY CARD to CONTROLLER:

Mem.Card → Ctrl
+/- to start

To transfer the memory card's content into the controller, select the "Mem.Card → Ctrl" with the ADJUSTMENT buttons. Once it is selected, simultaneously press the ADJUSTMENT buttons' up- and down-arrow keys to start the transfer.

CONTROLLER to MEMORY CARD:

Ctrl > Mem. Card
+/- to start

To save the controller's configuration into the memory card, select the "Ctrl → Mem. Card" menu with the ADJUSTMENT buttons. Once this menu is selected, simultaneously press the ADJUSTMENT buttons' up- and down-arrow keys to start the transfer.

7. Once the transfer is over, simultaneously press and hold the up- and down-arrow keys for 5 seconds to exit the transfer menu, then remove the memory card from the connector as follows:

- Turn off power to the controller;
- Open the controller's cover;
- Remove the card from the connector;
- Close the cover then reapply power to the controller.

8. Lock the card's switch  if required.

TRANSFER ERROR



The controller will not warn you if the transfer is incorrect. Respect the following rules to make sure the transfer works properly:

- Make sure the card switch is at the unlocked position before transferring a configuration on the card.
- Do not move or hold the card while a transfer is ongoing.

13. WORKSHEET

CLIENT

Name: _____

Address: _____

City: _____

Tel.: _____

Fax: _____

E-mail: _____

INSTALLER

Name: _____

Address: _____

City: _____

Tel.: _____

Fax: _____

E-mail: _____

13.1. Relay Assignment Template

Pre-defined Internal Relays

	1 section / Zone		2 sections / Zone		
Relay 1	Zone A	Blower 1	Zone A	Sect. 1	Blower 1
Relay 2	Zone A	Blower 2	Zone A	Sect. 1	Blower 2
Relay 3	Zone A	Blower 3	Zone A	Sect. 2	Blower 1
Relay 4	Zone A	Blower 4	Zone A	Sect. 2	Blower 2
Relay 5	Zone B	Blower 1	Zone B	Sect. 1	Blower 1
Relay 6	Zone B	Blower 2	Zone B	Sect. 1	Blower 2
Relay 7	Zone B	Blower 3	Zone B	Sect. 2	Blower 1
Relay 8	Zone B	Blower 4	Zone B	Sect. 2	Blower 2
Relay 9	Zone C	Blower 1	Zone C	Sect. 1	Blower 1
Relay 10	Zone C	Blower 2	Zone C	Sect. 1	Blower 2
Relay 11	Zone C	Blower 3	Zone C	Sect. 2	Blower 1
Relay 12	Zone C	Blower 4	Zone C	Sect. 2	Blower 2
Relay 13	Zone D	Blower 1	Zone D	Sect. 1	Blower 1
Relay 14	Zone D	Blower 2	Zone D	Sect. 1	Blower 2
Relay 15	Zone D	Blower 3	Zone D	Sect. 2	Blower 1
Relay 16	Zone D	Blower 4	Zone D	Sect. 2	Blower 2
Relay 17	Chimney 1 — Close				
Relay 18	Chimney 1 — Open				
Relay 19	Chimney 2 — Close				
Relay 20	Chimney 2 — Open				

Programmable relays (if used as blowers)

	1 section / Zone		2 sections / Zone		
Relay 21	Zone E	Blower 1	Zone E	Sect. 1	Blower 1
Relay 22	Zone E	Blower 2	Zone E	Sect. 1	Blower 2
Relay 23	Zone E	Blower 3	Zone E	Sect. 2	Blower 1
Relay 24	Zone E	Blower 4	Zone E	Sect. 2	Blower 2

Programmable relays (if not used as blowers)

Relay 21	Mist	Heat	Stir Fan	Tun1	Tun2
Relay 22	Mist	Heat	Stir Fan	Tun1	Tun2
Relay 23	Mist	Heat	Stir Fan	Tun1	Tun2
Relay 24	Mist	Heat	Stir Fan	Tun1	Tun2

13.2. Probe Assignment Template

	Selection of Sensors							
OUTPUTS	1	2	3	4	5	6	7	8
Tunnel Fan 1								
Tunnel Fan 2								
0-10V Output 1								
0-10V Output 2								
Heater 1								
Heater 2								
Heater 3								
Heater 4								
Vent Zone A								
Vent Zone B								
Vent Zone C								
Vent Zone D								
Vent Zone E								
Chimney 1								
Chimney 2								
Average Room T°								

13.3. User Setup Menu

Parameter	Range	Your setting
Contrast	10-100%	
Time format	AM/PM / 24h	
Temperature units	°F / °C	
# of T° sensors in the room	1-8	
Room probes	1-6	
Outside Temperature sensor	Yes / No	
Rain sensor	Yes / No	
Humidity sensor	Yes / No	
Zones	A; A-B; A-B-C; A-B-C-D; A-B-C-D-E	
Minimum ventilation	Yes / No	
# Sections per zone	1-2	
Zone A) # Blowers per section	2-4	
Zone B) # Blowers per section	2-4	
Zone C) # Blowers per section	2-4	
Zone D) # Blowers per section	2-4	
Zone E) # Blowers per section	2-4	
Activation delay	15-300 seconds	
De-icing	Yes / No	
Drying	Yes / No	
Stir Fans	Yes / No	
Use Tunnel (internal relays)	Yes / No	
# Onboard tunnel stages	1-2	
Use tunnel module	Yes / No	
# Tunnel stages (on T.Module)	1-8	
Mist	Yes / No	
Chimneys	Yes / No	
Heaters	1-4	
# 0-10V Output	1-2	
0-10V Output 1 used for	Heat / Ventil.	
0-10V Output 1 mode	0-10V / 10-0V	
0-10V Output 2 used for	Heat / Ventil.	
0-10V Output 2 mode	0-10V / 10-0V	
Wind compensation	Yes / No	
Wind speed units	mph / kmh	
Rain compensation	Yes / No	
No compensation above	_____°	
Use Password	Yes / No	
Password	_____	

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