Ventra XT™

VXT-016-001, VXT-016-201, VXT-016-401
VXT-024-001, VXT-024-201, VXT-024-401
VXT-032-001, VXT-032-401

Installation & Operation Manual

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VAL PRODUCTS, INC. WARRANTIES

For Warranty claims information, please see the "Manufactured Products Standard Warranty" form QMS101 available from Val Products, Inc. by:

- Phone: 1-800-998-2526
- Email: marcom@val-co.com
- Online: https://www.val-co.com/doc/382/warranty/16368/qms101-warranty.pdf

Conditions and Limitations:

- Products and Systems involved in a warranty claim under the "Manufactured Products Standard Warranty" shall have been properly installed, maintained and operated under competent supervision, according to the instructions provided by Val Products, Inc.

- Malfunction or failure resulting from misuse, abuse, negligence, alteration, accident or lack of proper installation or maintenance shall not be considered a defect under the Warranty.

Introduction

General Information on the Control

The Ventra™ XT's advanced microprocessor-based design has made it possible to regulate the environments of livestock facilities with greater precision than conventional thermostats and timers. It provides a consistent climate for your animals, resulting in better feed efficiency, better growth, and lower mortality. This is achieved by careful monitoring of temperature, air speed, humidity, static pressure, feed use and water use. These "inputs" are used to determine when to turn equipment on and off, when to open and close air inlets, when to turn on tunnel ventilation, and much more. Using the controller's keypad or touch screen, you will input operating parameters for each device group, desired building temperature (which can be adjusted automatically over time), and conditional decisions such as at what humidity level should fogging/misting be disabled.

⚠️ Warning! ⚠️

AS WITH ANY SOPHISTICATED CONTROL SYSTEM, THIS CONTROLLER CANNOT BE GUARANTEED TO PERFORM WITHOUT INCIDENT FOREVER. THERE ARE MANY CONDITIONS SUCH AS LIGHTNING STRIKES, PROGRAMMING ERRORS, AND EQUIPMENT FAILURE THAT COULD RESULT IN THIS CONTROLLER FAILING TO PERFORM ITS INTENDED FUNCTION. YOU MUST BE AWARE OF THIS AND BE WILLING TO TAKE THE NECESSARY PRECAUTIONS TO PREVENT FINANCIAL LOSS.

TO PROTECT AGAINST LOSS RELATED TO THE FAILURE OR MALFUNCTION OF THIS CONTROLLER, THE FOLLOWING SAFEGUARDS ARE REQUIRED:

1. A MANUAL BACKUP SYSTEM MUST BE INSTALLED. THIS SYSTEM MUST TAKE OVER IN THE EVENT OF A CONTROL SYSTEM MALFUNCTION.
2. AN ALARM SYSTEM MUST BE INSTALLED. THIS SYSTEM MUST PROVIDE A VISUAL INDICATION AND AUDIBLE WARNING OF ABNORMAL CONDITIONS.
3. A WEEKLY TEST OF THE MANUAL BACKUP SYSTEM AND ALARM SYSTEM MUST BE PERFORMED. THIS TEST CONFIRMS THAT THESE SYSTEMS ARE FUNCTIONING PROPERLY.
4. A DAILY CHECK OF THE CONTROL SYSTEM MUST BE PERFORMED. THIS CHECK CONFIRMS THAT THE SYSTEM IS OPERATING PROPERLY.
5. NON-FUNCTIONAL ALARM OR BACKUP SYSTEM COMPONENTS MUST BE REPAIRED IMMEDIATELY.

Symbols

Our concern is for your safety. The safety warnings are included in this manual as a guide to help and encourage the safe operation of your equipment. It is your responsibility to evaluate the hazards of each operation and implement the safest method of protecting yourself as owner and/or operator.

= NOTE - take notice this may help you!

= IMPORTANT INFORMATION - be sure to read!

= WARNING - The safety alert symbol is always used on warning signs that involve your safety or has extra significance since it is describing the importance of a feature or explaining a step to which you should pay close attention to avoid problems.

STOP = STOP - before you go further check the details of all requirements, processes or procedures of instructions listed.

= CHECK - the details of all requirements, processes or procedures of instructions listed.

= USER

DANGER

Imminent hazard, if ignored serious injury or death WILL occur.

WARNING

Hazard is very possible and care should be given as injury or product function could be compromised.

CAUTION

Potential hazard, if ignored minor or moderate injury MAY occur.

HOT-KEY SYMBOLS

Hot-Key technology™ are keys that provides direct access to the Home screen, Channel Hot Keys, Current Status, Control Settings, History, Summary, as well as change the Zone being viewed. *These Hot-Keys are located to the right of the Display Screen.*

	HOME		ZONE

| CHANNEL HOT KEYS | CURRENT STATUS | CONTROL SETTINGS | HISTORY | SUMMARY |
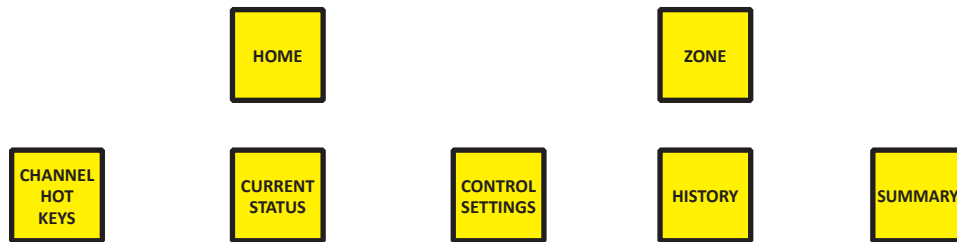
TOGGLE SWITCHES SYMBOLS

The Toggle Switch decals shown below will be included with your control (for up to 9 groups) and can be used on the front panel to show which devices are configured to which channels.

Tunnel Fan Group 1   Sidewall Fan Group 1   Stir Fan Group 1   Pit Fan Group 1

Ceiling Inlet Open Group 1   Ceiling Inlet Close Group 1   Sidewall Inlet Open Group 1   Curtain Open Group 1   Ridge Fan Group 1   Ridge Vent Open Group 1   Tunnel Inlet Open Group 1   Tunnel Inlet Close Group 1

Heater Group 1   Forced Air Furnace Group 1   Brooder Group 1

Silo Group 1   Feed Group 1

Mister Group 1   In House Fog Group 1   Cool Pad Low Pressure Group 1   Cool Pad High Pressure Group 1

Feed Group 1   Light Group 1

Before You Start

WARNING

1. A *QUALIFIED ELECTRICIAN* should perform all wiring to ensure local and national codes are followed.
2. Disconnect all power and use LOCK OUT TAG OUT PROCEDURES before inspecting or servicing equipment.
3. Protect yourself and others against electronic static discharge. In addition to shutting down the power remember to GROUND yourself before working with this equipment.
4. Always use the proper wire size for wiring systems.
5. Always use proper tools and wire connectors whenever working on this electronic equipment. Splicing and taping wires is not adequate and may cause your control to operate incorrectly.

Planning

In order to set up a building to be operated by the controller you must:

- List the devices (fans, curtains, heaters, lights, misters, etc.) that are in the facility.
- Plan how each type of device will be grouped (turned on and off together).
- Determine optimum sensor locations.
- Determine which sensors will control each equipment group.
- Determine which controller output channel each equipment group will be connected to.
- Determine which controller input channel each sensor will be connected to.
- Determine the desired operational settings such as on/off temperature settings for each heating and cooling group, etc.
- After you have documented, and thoroughly understand the set up information, you can begin programming the controller. The System & Control Device Setup section of this manual describes the process of programming the controller.

Component Description

Controller

The Ventra XT™ is available in a 16, 24 or 32 channel controller. Variable speed stations can be added to provide control for variable speed devices. It is important that you understand the control's (VS) configuration if you are using varible speed devices, and the control specifications for each device requirement.

Variable Speed (VS) Configurations

1. 16 total channels, 2 of which are VS channels. The variable speed channels can be on channels 7 and 8 or on channels 15 and 16. Relay boards occupy banks 1 and 2 from the left in the enclosure.
2. 16 total channels, 4 of which are VS on channels 7, 8, 15 and 16. Relay boards occupy banks 1 and 2 from the left in the enclosure.
3. 24 total channels, 2 of which are VS channels. The variable speed channels can be on channels 7 and 8 or on channels 15 and 16. Relay boards occupy banks 1, 2 and 3 from the left in the enclosure.
4. 24 total channels, 4 of which are VS on channels 7, 8, 15 and 16. Relay boards occupy banks 1, 2 and 3 from the left in the enclosure.
5. 32 total channels, 2 of which are VS channels. The variable speed channels can be on channels 15 and 16 or on channels 31 and 32. Relay boards occupy all four banks in the enclosure.
6. 32 total channels, 4 of which are VS on channels 15, 16, 31 and 32. Relay boards occupy all four banks in the enclosure.

> **The DIP switches in the top left corner of the Switches board on the front cover need to be set according to the variable speed combination used. See the DIP setting section later in the manual for more information.**

Control Specifications

Fuses: Power Supply Input: 2.5 Amp 250VAC (5 x 20 mm) fast-acting interrupting type (Littelfuse 216 02.5 or equivalent)

Output Channel: 20 Amp 3AB ceramic body slow-acting type (Bussmann MDA-20 or equivalent 0.25 x 1.25")

Power Input: 120VAC / 240VAC 2.0A Maximum

Maximum torque on power input terminal screws is 8 inch-pounds.

Output:

Depending on the model, up to 32 Normally Open relay output channels and up to 4 variable speed channels.

120VAC, 1 HP / 240VAC, 1.5 HP maximum per circuit.

Alarm Output: 120VAC / 240VAC, 10A general purpose, NO/NC connection.

Sensor Inputs: 14 analog and 6 digital

Environmental: NEMA Enclosure type 4X

Dimensions: Width is approximately 16.75 inches (42.54 cm)

       Depth is approximately 10.25 inches (26.03 cm)

       Height is approximately 18.75 inches (47.62 cm)

Circuit Protection

Circuit Breakers

The controller should be wired to an independent circuit breaker. Ideally, each equipment output channel should have its own breaker to insure that tripping one breaker will not affect other devices in the ventilation system. Motors must have a thermal overload protection device or impedance protection. The overload should auto-reset for any essential equipment.

Power Surges

The Ventra XT™ is protected against normal voltage surges, but lightning induced surges could damage the equipment. We recommend use of a Deadbolt™ surge suppressor to reduce damage from lightning and other types of power surges. ***Lightning damage is not covered by the warranty.***

Conduit and Connections

High voltage wires should enter the control enclosure from the bottom so they can be easily connected to the relay terminals. Low voltage sensor wiring can be brought in from the bottom or side and connected to the input terminals near the top. Make sure there are no frayed wires because the control board may press against the wires when the controller's cover is closed.

To avoid electrical shorts or damage due to moisture, you should never run conduit openings through the top of the box. Conduit and hubs should be corrosion resistant plastic or fiberglass. Use only UL approved NEMA 4X rated conduit hubs. Connect hubs to conduit before connecting to the control enclosure. Use only liquid-tight strain-relief connectors to bring cables into the box.

Clearance Holes for Standard Conduit

Trade Size (inches)	Hole Size (inches)
1/2	0.875
3/4	1.125
1	1.375
1 1/4	1.750
1 1/2	2.000
2	2.500
2 1/2	3.000
3	3.625

WARNING

1. A *QUALIFIED ELECTRICIAN* should perform all wiring to ensure local and national codes are followed.
2. Disconnect all power before inspecting or servicing equipment.
3. Always use the proper wire size for wiring systems.

Essential Background Information

The following sections on Zones, Effective Environmental Temperature (EET) and Ventilation Modes are necessary for you to understand in order to set up the control and run your barn effectively.

Zones

This controller has a ZONE key and has multiple zone capability. This lets you specify different environmental conditions in individual rooms or areas. When two or more zones are set up, the controller can act like two or more separate controllers.

Zone Example
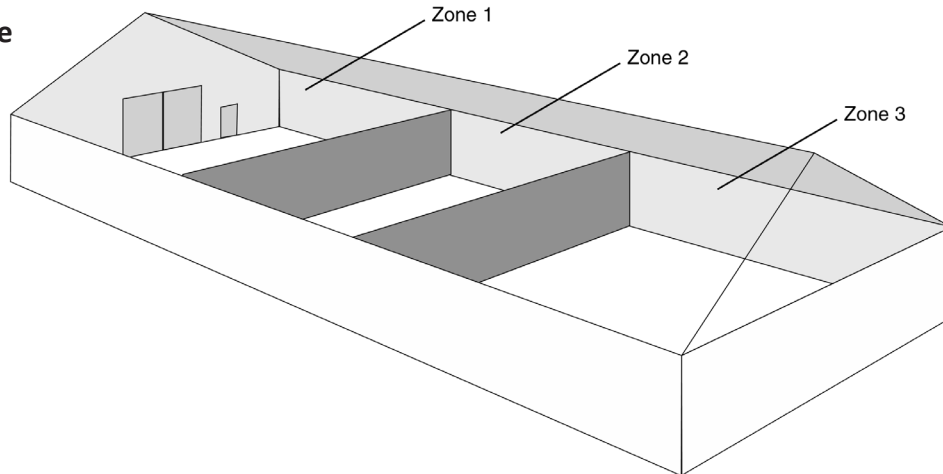
There are a few rules that pertain to multiple zones:

• Output channels cannot be assigned to more than one zone.
• Sensors cannot be assigned to more than one zone. Zoning isolates sensors in each zone. For example: zone 1 can not read or average sensor readings from an inside temperature sensor in zone 2.

> **The exception here is the "Air Sensor Shared" device. This device is not assigned to a separate air probe but is assigned to a module/channel that has another "Air Sensor" assigned to it. The "shared" sensor can be assigned to a different zone than the one the actual air probe is installed in. This allows two zones to share the same physical air probe.**

Effective Environmental Temperature (EET)

EET takes into account the effect that air movement has on **HOW** comfortable an animal feels *(requires an air temp/speed sensor such as Air Sensor Model 935)*. This feature is based on the understanding that the higher the air movement is through a building, the cooler the animals feel. Since the animals feel cooler than what the actual temperature is, the fans and inlets are operated based on a lower temperature, than if the wind speed weren't present. This method keeps the animals from getting too chilled.

The controller uses three temperature settings to determine what temperature is used to operate the devices.

These are:

• **Actual Temperature** - the actual temperature readings from the Air Sensors with no wind speed adjustments.
• **Effective Temperature** - The temperature from the air sensors with the maximum cooling effect of the air movement taken into account. This will be lower than the actual temperature.
• **Working Temperature** - This is the temperature used to control the devices. This will be somewhere between the Actual Temperature and the Effective Temperature, depending on the "Temp Control" setting.

(EET continued)

The degree of effect the air movement has on the Actual Temperature, when figuring the Working Temperature, is controlled by the "Temp Control" setting under the Temperature Control Setting menus. If "Temp Control" is set to "Actual", air movement has no effect on the Working Temperature used to control the devices. The devices will operate based on the Actual Temperature. If "Temp Control" is set to **"EET"**, the air movement will have the highest effect on the Working Temperature and the devices will operate based on the lower Effective Temperature. If "Temp Control" is set somewhere between "Actual" and "**EET**", the Working Temperature of the devices will be a percentage of the Effective and Actual Temperature.

The difference between the Actual temperature and the Effective Temperature will never be greater than 6 degrees Fahrenheit. This prevents a building from getting too hot due to high wind speeds.

Humidity also plays a part in determining the Effective Temperature. The higher the Actual Temperature and/or humidity, the higher the air movement has to be to get the same cooling effect as lower temperature and/or humidity readings.

Ventilation Modes

You'll need to be familiar with several ventilation terms used in this manual.

Natural

Natural ventilation is simply opening a building to allow outside breezes to flow through. This is usually accomplished by lowering curtains. Natural ventilation is ideal when the temperature outside is close to the temperature the animals need. The air exchange rate depends greatly on outside winds.

Power

Power ventilation uses sidewall fans in conjunction with curtains or other inlets for cooling. *This will increase the air exchange and bring more fresh outside air into the building.*

> **The controller menus combine natural and power ventilation into one mode called "natural" to differentiate this mode from tunnel mode.**

(Ventilation Modes continue on the next page.)

Minimum

Minimum ventilation is the process of bringing outside air into a building even when the indoor temperature and humidity do not require it. This helps keep ammonia, dust and carbon dioxide from accumulating.

Purge

Purging is the process of evacuating stale contaminated air and replacing it with fresh air. This is necessary when a building is closed up for a long time, as during cold weather. Purging is initiated when humidity reaches the level and length of time you set. Purging will not occur if curtains are open. Any combination of fans and air inlets can be set up to purge.

Tunnel

Tunnel mode uses air inlets or curtains located at one end of the building and tunnel fans at the other end to transform the building into a wind tunnel. This creates a wind chill effect for the animals. Tunnel mode is often used in warm climates where natural/power ventilation cannot adequately cool the animals.

Entering & Exiting Tunnel Mode

While entering and exiting tunnel mode, the tunnel curtains are moving to or from their tunnel positions. During this time, if all the tunnel fans are turned on, the curtains may not be able to move because of the suction generated by these fans. It is recommended that a limited number of fan groups be designated as ENTRY/EXIT fans to reduce this effect.

More detail on setting up ventilation modes will follow in the Temperature Control and Sidewall, Tunnel and Ceiling Inlet Setting menus.

> **If you experience problems, refer to *Appendix 4: Troubleshooting*.**

Sensors

Sensors throughout the building provide data on air temperature, humidity, feeder run times, static pressure, whisker switch, and water usage and will be wired to either the analog or digital terminal inputs, as listed below.

Attach the following sensors to these inputs. Record the connection on the **Sensor Data Sheet, Appendix 6**, at the end of this manual.

ANALOG SENSORS   *(main Analog Terminal inputs 1 to 14, or the Analog Input board)*
• Air/Temp sensors
• Outside temperature sensor
• Humidity sensor (needs a 12-volt connection)
• Feed sensor
• Static pressure sensor (Analog Input Board only, requires a 24-Volt connection)
• Position sensor

DIGITAL SENSORS   *(Digital Terminal Inputs 1 to 6)*
• Digital alarms
• Whisker switch
• Water Flow Meter

Devices

Devices throughout the building can be controlled by the Ventra XT™ and will be wired to either Output Relays, a Variable Speed Relay or the Analog Output Board 0 - 10V outputs.

DEVICES   *(Output Relays or Variable Speed Relays)*
• All Fans (fixed or variable speed fans, or the optional On/Off relays for variable frequency drives (VFD)
• All Heaters/Furnaces (On/Off relay for variable output heating devices)
• Side Curtains
• Feeders
• Chimneys
• Ridge Vents
• Ceiling, Sidewall and Tunnel Inlets
• Lights
• Cool Pads, Misters and Foggers

ANALOG OUTPUT BOARD   *(0-to10 volt outputs)*
• VFD fans (0-to-10 or 10-to-0 volt outputs)
• Variable Heaters (gas valve relays)
• Variable Lights

Control Hardware and Installation

It is important that you **verify the parts listed** in *Appendix 5*.

Location

Begin by selecting a sheltered, vertical surface and effective location for wiring and access. The control should be mounted in an area where there is at least **2** inches of space surrounding it, clear from electrical items, with the wire routing holes facing down. ⚠️ *(This protects the control from water or debris.)* ⚠️

Mounting the control

Mount the controller indoors where the temperature remains between 30 degrees Fahrenheit (- 1 degree Celsius) and 110 degrees Fahrenheit (43 degrees Celsius). DO NOT mount the controller in direct sunlight. Place the controller away from motors and relays/contactors that switch high current. It is **NOT RECOMMENDED** that you install the control in the same room where the animals live since the air tends to be corrosive to electronic circuits. A separate room or control office is a preferred location.

Mounting brackets for the Ventra XT™ are enclosed with the unit.

Before you drill holes into the enclosure, mark their locations and make sure that you DO NOT drill into circuit boards and cables.

1. Attach the mounting clips with the 1/4-10 x 0.5" screws, included in the hardware kit shipped with the control.

2. Draw a level line on the wall where the control should be mounted.

3. Hold the control enclosure backside to the wall and align the top or bottom of the enclosure to the line drawn and use the mounting bracket holes to mark the wall where the holes should be drilled.

4. Drill pilot holes and use appropriate TEK screws to mount the control.
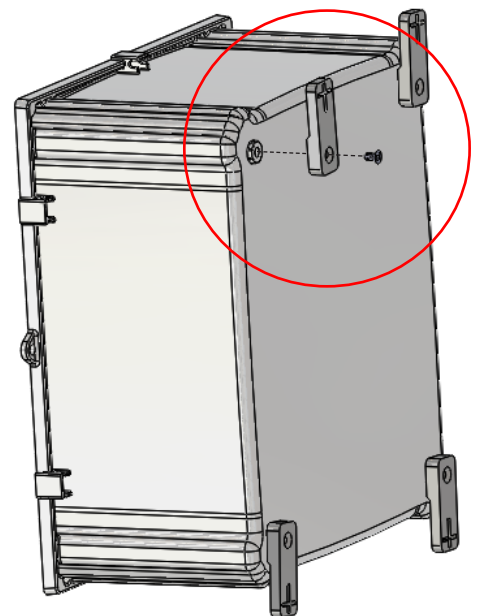
⚠️ **Warning:**
Do not overtighten screws. ⚠️

Unless absolutely necessary, do not remove the circuit boards. They are static sensitive and should always be handled with appropriate grounding and electrostatic precautions.

⚠️ **High Voltage Inside Enclosure!**

The controllers come with a clear outer door, to keep the screen and front panel clean, and an inner panel to seal the inside of the enclosure from gases and dust. When finished wiring up the controller, make sure to retighten the thumb screws on the inner panel to reseal the box, then use the Quick Release latches to close the clear outer door to keep things clean.

Thumb Screw | **Quick Release Latch**

Thumb Screw | **Quick Release Latch**
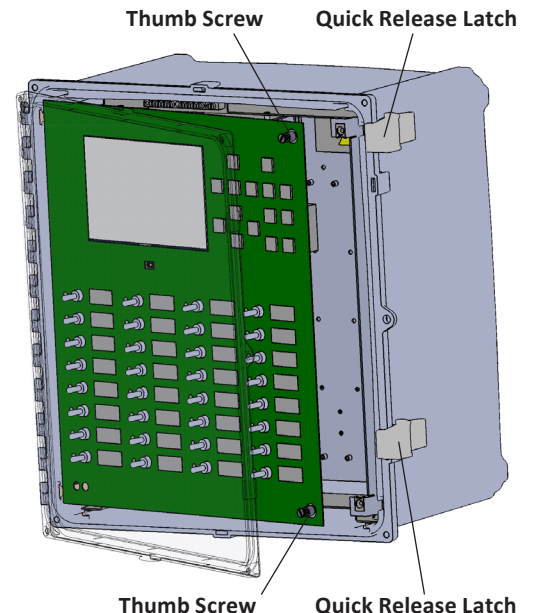
Memory Card Location

The SD card stores the controller software, alarm detail and recorded history, as well as the operating parameters the user inputs for the controller. The SD card is located in a socket on the upper right corner of the inside cover.

Your controller is shipped with the SD card **installed**. *You should NOT remove the SD card unless you are updating the controller with a different version of software, such as a customer specific pre-loaded set of parameters which may not have come installed on your new control. The information on updating your control software can be found in the section **Updating the controller w/ New Version of Software**.*

Handling the SD Card

SD Card & Socket - Inside Cover

> **Always touch a ground before you touch the circuit boards. Never install or remove SD cards without turning off the power to the controller.**

To install the SD card, match the key in the card base to the slot in the socket on the control board, *as shown to the right.* Gently push the SD card into the slot until it snaps into place.

If you ever need to remove the SD card, push down gently, it will snap up and then you can remove it from the socket.

Note: SD cards larger than 32GB of storage capacity cannot currently be used with this controller.

Prepare Enclosure for Wiring

The holes for wiring are NOT pre-drilled.

1. Determine and mark the location for each hole, *(the number and size of hole/holes needed will be determined by the number of devices and inputs to install).* It is recommended that you place the hole/holes to the bottom side of the enclosure, as pictured to the right. It is also recommended that the hole used for the power supply be located in line with the power supply relay, located to the right corner of the enclosure, *(circled in picture to right).*

2. Use a hole saw to drill hole/holes at the bottom of the enclosure for conduit or strain reliefs, taking care that you do not drill into any of the control's components.

3. Insert the conduit or strain reliefs from the outside bottom of the enclosure (through the hole/holes) and be sure to use glue/caulking to seal against moisture or debris. Sealing the wiring is critical to protect against the harsh corrosive environment.

Power Relay

4.50" Drill Hole Access Area

4.50"

5.50"

Keep Out Area 5.50" from top of Enclosure

Drill Holes for Sensors & Devices   **Drill Hole for Power Cord**
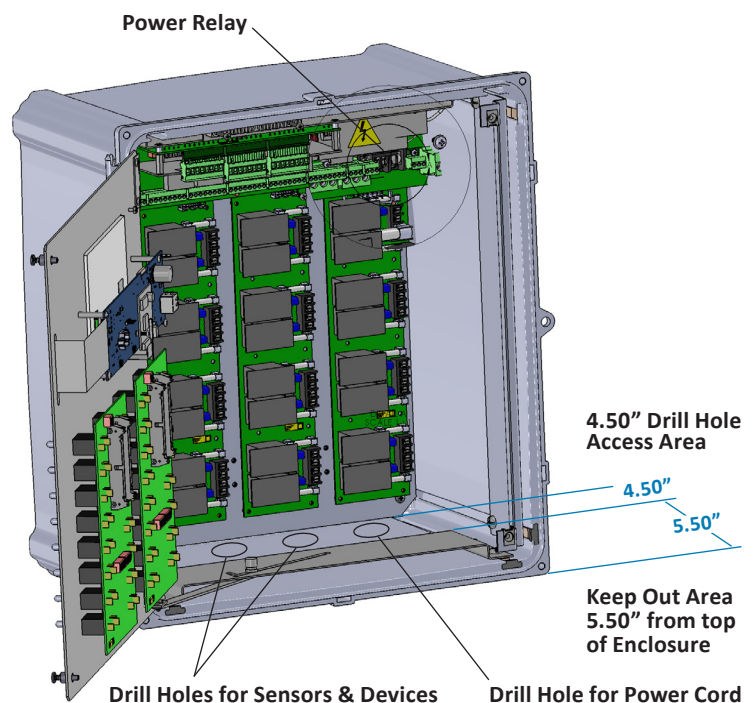
Powering the control

1. Locate the power supply at the top right corner inside the base of the enclosure *as shown below*.

STOP

> ⚠️ **Be sure that ALL POWER IS DISCONNECTED BEFORE INSTALLING or Servicing the control.** ⚠️

Power Supply Wiring   **Input Power Connections**

L
N
GND
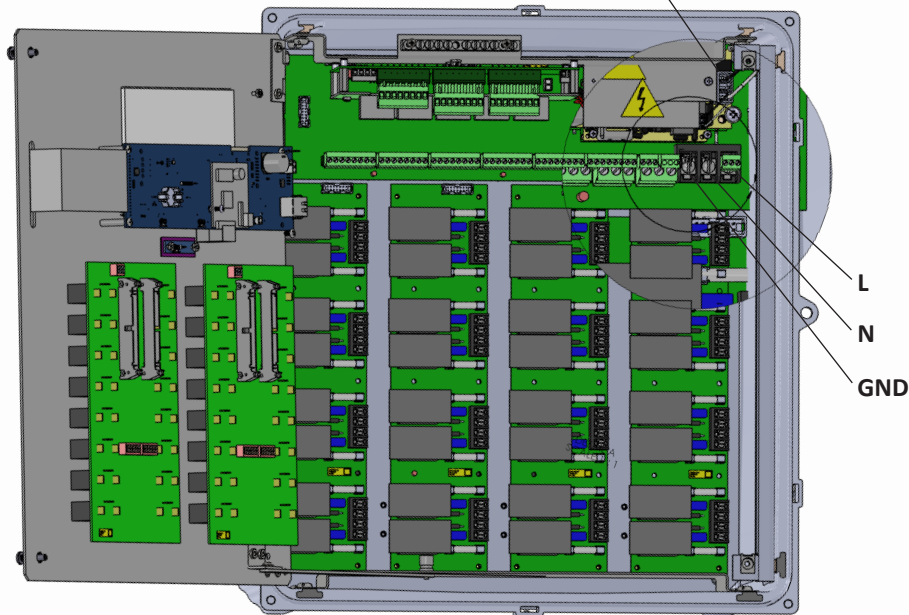
⏚ **Ground**

N **Neutral** - spelled out on actual input board

L **Line** - spelled out on actual input board

120 VAC Connections		240 VAC Connections	
Hot	L	Hot	L
Neutral	N	Hot	N
Ground	G	Ground	G

> 📝 It is beneficial to install an isolating switch to allow the power supply to be switched off during installation and service. The isolating switch must be bipolar.

> ℹ️
> - To ensure the Ventra XT™ alarms on loss of power in either leg of 220V at your electrical service panel, we recommend wiring the control for 220V when it is available.
> - A main power disconnect must be provided by the installer to allow the controller to be shut off.
> - The maximum torque for the power input terminals is 8 inch-pounds.
> - Use 18 to 14 gauge wire.

> ⚠️ Do not tap power from the power supply for other devices. The extra power draw may cause the controller to malfunction.

Sensor Installation - Input Terminals

Sensor Wire *(Recommendations)*

Use **shielded 16 to 24 gauge** (or .5mm to 1.2mm for metric users) stranded wire, such as Carol® AWM style 2426, to connect sensors to input channels. Wire can be twisted pair or straight type. The shielding should be grounded to GND at the controller's terminal block.

Only 22 to 24 gauge wire will fit the Scotchlok® connectors supplied with the sensors.

Sensor Wire Spacing

If a sensor or communication cable runs parallel to power cables, allow a separation of at least 12" (30cm) to avoid interference.

ℹ️ **Do not run sensor or communication cables through conduit with power wires.**
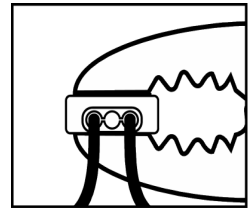
3M Scotchlok® connectors are recommended for splicing (22-24 gauge wire only). Apply firm, even pressure to a button to ensure good contact. The button will be flush when properly sealed.

Sensor Placement

Suspend sensors from the ceiling to ensure free airflow. Sensors should hang close to the animals, but should be out of their reach. Leave enough wire so you can tie up several loops of slack to keep the sensor at the right height. If you must replace a bad sensor in the future, the extra length allows you enough wire to cut off the old sensor and still have plenty to splice to the new sensor.

As you install sensors, record wire length and gauge on the **Sensor Data Sheet, Appendix 6**. The person programming the controller will need these values.

Splices

The splice between the wire and the sensor lead should be protected from the corrosive air in the building. The best splices can be made using the gel-filled 3M Scotchlok connectors enclosed with the sensors. These create low-resistance, corrosion-resistant connections. Wrap your splice well in electrical tape.

Replacement sensors can be connected by cutting the old sensor lead and making a new connection with a Scotchlok connector. It is not necessary to strip the insulation from the individual wires when using Scotchlok connectors.

Terminal Connectors

Make all sensor connections to the sensor terminals on the controller's input/output Interconnect board or the Analog Input board. There are 14 analog inputs (temperature, humidity, feed sensors and static pressure) and 6 digital inputs (water meter, whisker switch and digital alarm) on the main interconnect board and 14 inputs on the Analog Input board. Any sensor that requires a 24-volt power supply needs to be configured to the Analog Input board.

Note: the Analog Input board is factory set as Module address #3. See "Setting The DIP Switches for Expansion Stations" in the next section for information on how to change this.

Input Terminals Inside Control

Analog Output Terminals
Analog Input Terminals
Analog Input Terminals
Digital Input Terminals
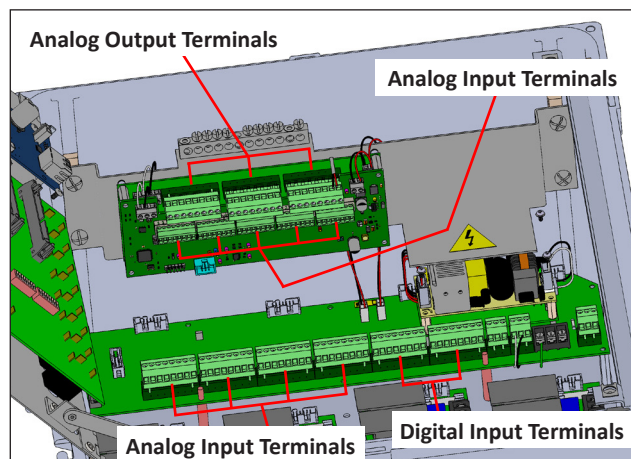
Input Terminals - continued

The main interconnect board has six terminal blocks for inputs. Four (4) blocks are for analog inputs (1 through 14) and the other two (2) are for digital inputs (1 through 6). The Analog Input board provides 5 terminal blocks for additional analog inputs.

Input numbers are labeled on the input boards with 1 on the left for both analog and digital terminals.

On the main Interconnect board, some analog input terminals, (1 to 6) have a 12V output that is required by certain sensors. All digital inputs have the 12V output available. The Analog Input board provides 12 and 24 volt connections on the right end of each terminal block to provide power to any sensors that need them.

> **WARNING!**
> 1. **A QUALIFIED ELECTRICIAN should perform all wiring to ensure local & national codes are followed.**
> 2. **Disconnect all power before inspecting or servicing equipment.**
> 3. **Always use the proper wire size for wiring systems.**

Interconnect Board with Analog and Digital Input Terminals
(Board shown NOT mounted in Control)
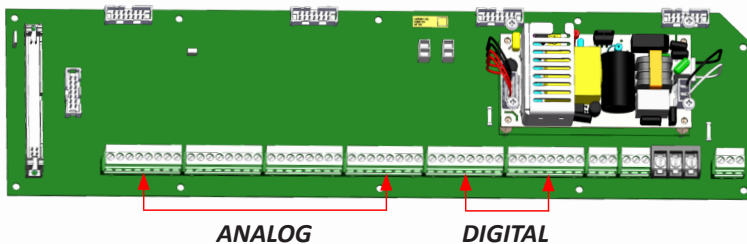
(Board shown mounted in Control)

ANALOG   DIGITAL

12 Analog Output terminals

14 Analog Input terminals
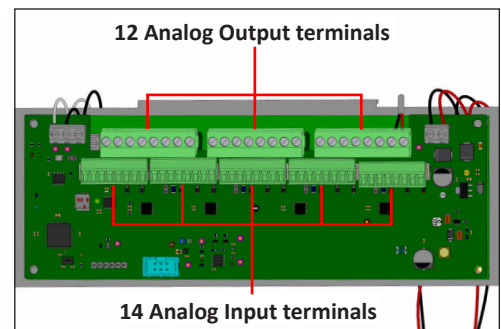
Insert the wires into the underneath side of the terminals. The Analog Input board is wired up the same way.

> **Note: the terminal blocks can be removed from the board sockets to make wiring the terminals easier. Removing the Analog Output terminal blocks will make seeing the labeling of the Analog Input terminal connections easier.**

4-to-20 Milli-amp connections

On the Analog Input board, input connections 3, 6, 9 and 12 can be set to act as normal input connections or as 4-to-20 milli-amp connections for sensors that require it. Put a jumper on the two pins behind the terminal block to enable the 4-to-20 milli-amp setting for the connection. Remove the jumper to have the connection work as a normal input.
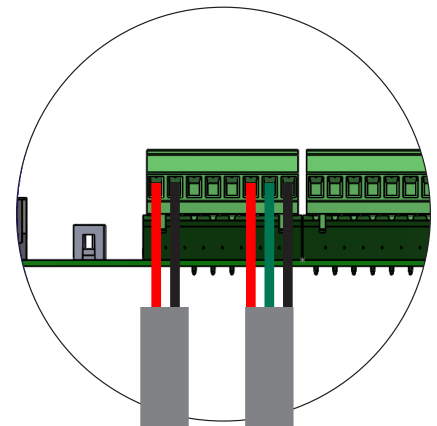
Jumper
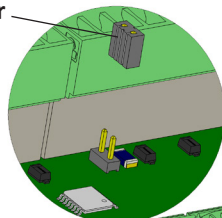
Optional 4-20 milli-amp input connections using jumpers or normal input connections without jumpers
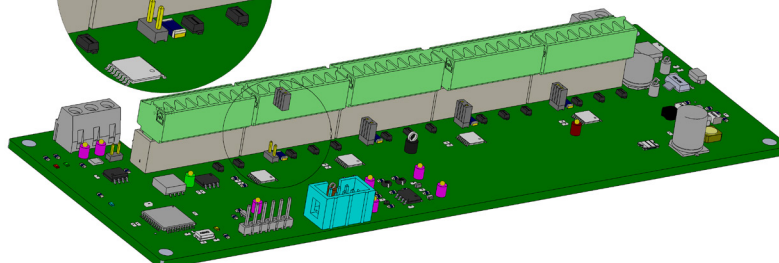
Analog Inputs

Temperature Sensors

Suspend sensors from the ceiling to ensure free airflow. Sensors should hang close to the animals, but should be out of their reach.

For best results, keep the sensors out of sunlight, away from moving machinery, heaters, power wiring, sprinklers, or lights. Center sensors between heating devices.

Connect sensors to the input/output board as shown below making sure to ground the shielding as well as the black wire.

Note: Any temperature sensors that can measure wind speed have to be attached to an analog input connection on the Interconnect board, not the Analog Input board.

Temperature Sensor for measuring only the actual temperature.

Air Speed / Temp Sensor for measuring Effective Environmental Temperature.

Controller Analog Input Block

AIN5 GND AIN6 GND AIN7 GND AIN8 GND AIN9 GND AIN10 GND

Ground Cable Shield at terminal block end ONLY. Run shield to earth ground terminals located on analog output board bracket that is attached to interconnect board. Failure to terminate shields correctly could result in equipment failure.

TEMPERATURE SENSOR

Button

SHIELDED CABLE
May be any length

RED wire to input

BLACK wire to GND

3M Scotchlok® connectors are recommended for splicing (22-24 gauge wire only). Apply firm, even pressure to a button to ensure good contact. The button will be flush when properly sealed.

Humidity Sensor

Follow the same procedure as the temperature sensors. Position the humidity sensor in the center of the building. The humidity sensor is a three-wire device and must be connected to one of the three-connection inputs, labeled 1 through 6 on the input board .

Controller Analog Input Block

+12V | AIN 1 | GND | +12V | AIN 2 | GND | +12 | AIN 3 | GD | +12 | AIN 4 | GND

Humidity Sensor

← Scotchlok Button

SHIELDED CABLE
May be any length

RED wire to +12V

GREEN wire to IN

BLACK wire to GND

3M Scotchlok® connectors are recommended for splicing (22-24 gauge wire only). Apply firm, even pressure to a button to ensure good contact. The button will be flush when properly sealed.

Feed Sensor

Feed sensors should be mounted inside the controller enclosure with the feeder power wire running through the sensor loop. If a single sensor monitors multiple feeder circuits, run the wires from all feeder groups the same direction through the sensor loop.

BLACK wire to GND

Controller Analog Input Block

AIN 5 GND AIN 6 GND AIN 7 GND AIN 8 GND AIN 9 GND AIN 10 GND

RED wire to input

Connect sensor to analog input terminals.

Attach sensor to the side of the control enclosure with double-faced tape.

Power to feeder

Power from breaker
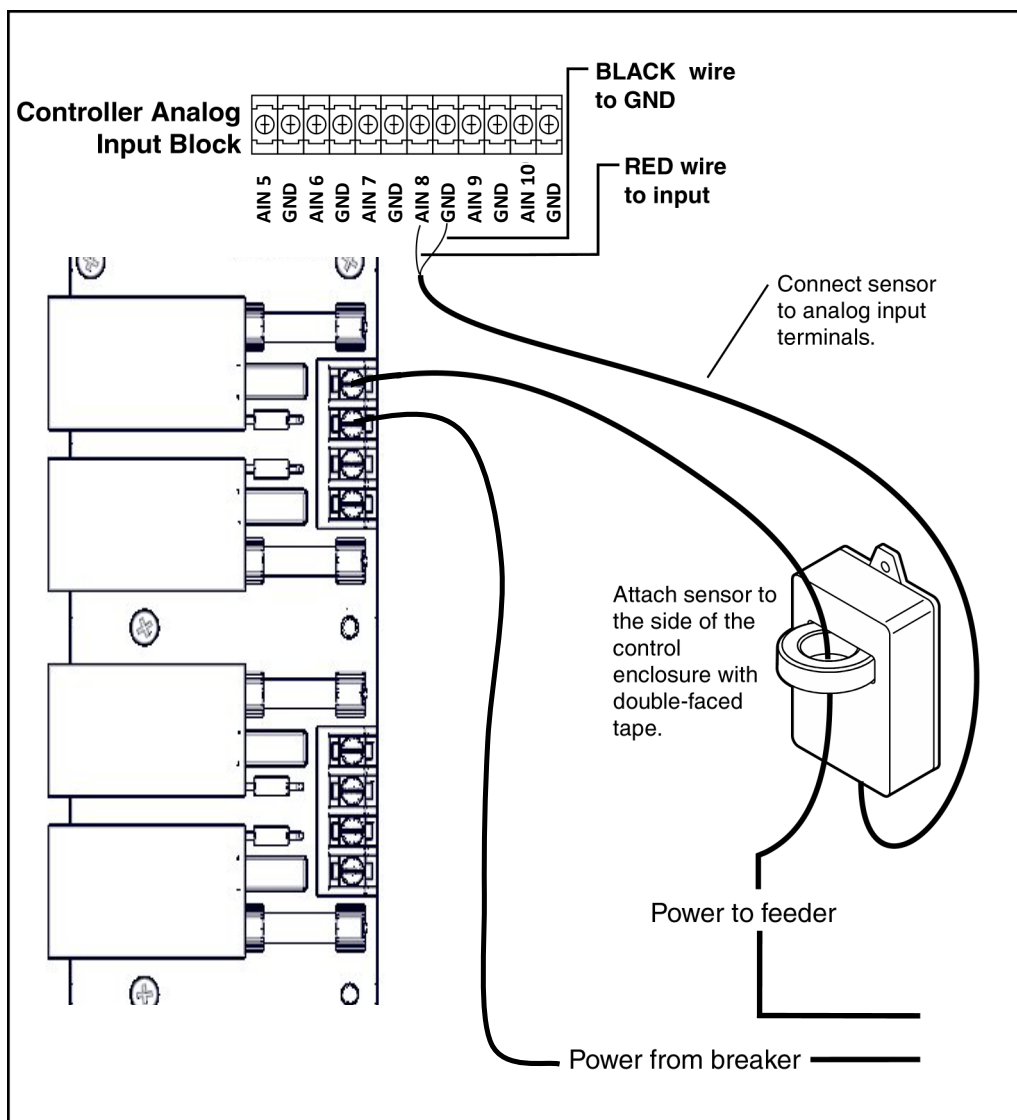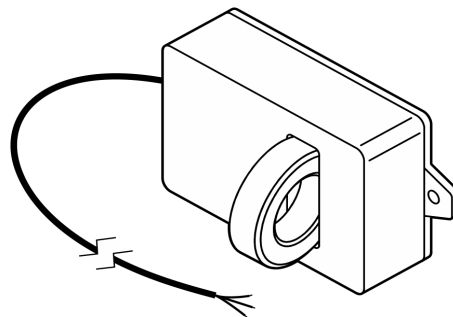
The best use for a single feed sensor is monitoring your silo auger motor. This provides a clear indication of all feed entering the building and it provides an alarm when the feed silo is empty.

Static Pressure Sensor

Connect the static pressure sensor to the +12, AIN and GND input terminals on the Analog Input board.

CONTROLLER

CONTROLLER ANALOG INPUT BLOCK

+12V | AIN 2 | GND | +12V | AIN 3 | GND | +12 | AIN 4 | GND | +12 | AIN 5 | GND

STATIC PRESSURE SENSOR

HIGH

LOW

-- COM | OUT | + EXC

BUILDING

ROOM BEING MONITORED / CONTROLLED

OUTSIDE
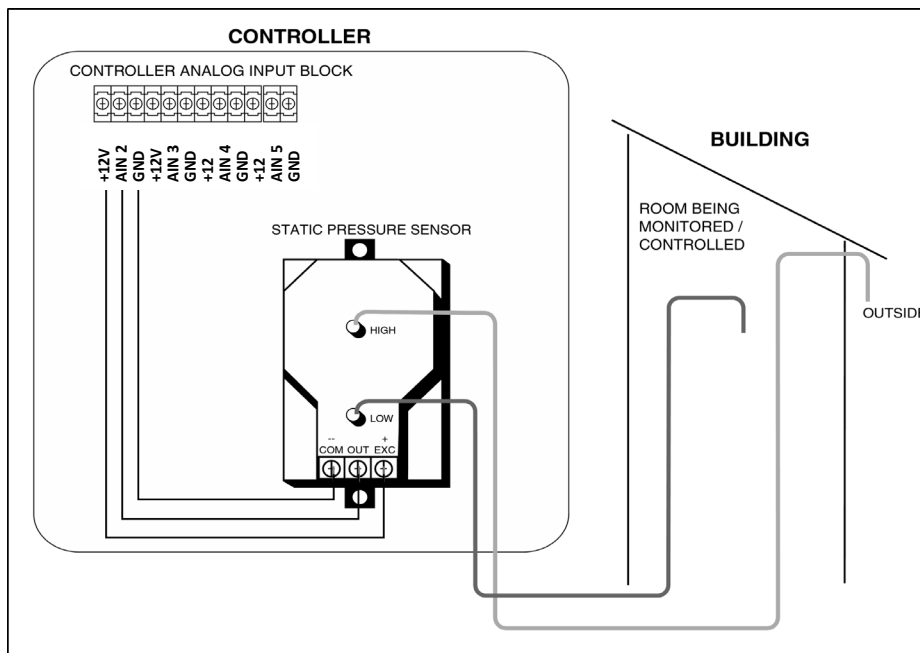
Position Sensor

A position sensor allows the controller to determine the current opening size of a curtain, ridge vent, chimney damper or inlet. If the position sensor has more than two leads, find two that provide a smooth change in resistance as the sensor is turned. You may need an Ohmmeter to measure this.

NOTE: If using any of the following Valco Position Sensor P/Ns: 970128, 970139, 970140, 970160, 970370, or 970371, please connect the green wire to the analog input terminal and the red wire to the GND terminal, and cap off the black wire if it is present.

Controller Analog Input Block

AIN 7 | GND | AIN 8 | GND | AIN 9 | GND | AIN 10 | GND | AIN 11 | GND | AIN 12 | GND

Terminate the shield wire into the earth ground terminals located on the bracket the analog output board is mounted on.

POSITION SENSOR

SHIELDED CABLE May be any length

SHIELD wire to ground

Two of the position sensor wires provide a change in resistance as the gear moves. Connect these wires to AIN and GND.

Digital Inputs

Digital Alarm

Digital alarms provide warnings of almost any emergency condition you need to be informed about. Any no-voltage circuit that can be switched will provide an alarm to the controller.

The controller has (6) six digital inputs (numbered DIN1 through DIN6 on the input board) which can be connected to digital alarms, whisker switch or water meters.

The term "digital" refers to two possible states for a circuit: open and closed. You can set up each digital alarm input to sense for an open or a closed circuit. The circuit must be a simple switch with no voltage applied.

> ## WARNING!
> **Attaching circuits with voltage to the controller's digital inputs will damage the controller.**

- Attach a low water pressure switch to detect water line breaks or empty water tanks. This can be especially important where evaporative cooling or fogging is used.
- Attach a gas pressure switch to detect an interruption in gas.
- If you are running three-phase power, you can set up a switch to detect the loss of a phase.
- Attach a level switch to indicate when your feeder bin is empty.
- If your curtain drop has an output switch or the capability to have a switch/relay added, you can alarm when the curtain drops.
- You can hook up a door switch to alarm when people enter your building, or when the door remains open.

Controller Digital Input Block

+12V DIN 1 GND +12V DIN 2 GND +12 DIN 3 GND +12 DIN 4 GND

Low Water Pressure Switch
(Closes when pressure drops too low)

Water Supply
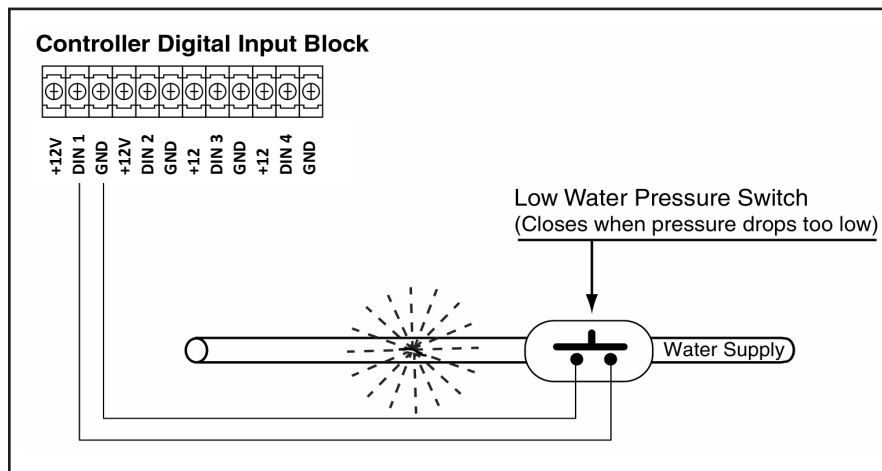
The controller allows you to set up the digital alarm in several ways. For example, you can alarm when the circuit becomes open or becomes closed and you can delay an alarm to avoid false alarms.

Water Flow Meter

This manual has included several different water meter products. Be sure to choose the correct set of instructions for installing your specific water meter. Your water meter should be shipped with instructions from the manuafacturer. We have included instructions for a few products for your convenience. VAL-CO® is not responsible for meter damage or incorrect readings occuring from improper installation.

> **Several types of electronic water meters are available. IT IS RECOMMENDED THAT YOU USE THE DIRECTIONS SHIPPED WITH YOUR SPECIFIC WATER METER FOR INSTALLATION AND WIRING, IMPROPER WIRING WILL RESULT IN PRODUCT DAMAGE.**

PA-69 (Digital) WATER METER

> ⚠️ The electronic water meter sensor is made to fit on the Badger™ flow meter RCDL 25 (or a compatible unit) as shown below. Any other orientation may cause inaccurate readings and early FAILURE. The water meter hooks up to a three-connection input. If you use another meter with two electrical connections, wire through IN and GND and verify that the control is reading the signal. Improper connections or incompatible sensors may ground out the input/output board and cause noticeable controller malfunction until the wiring is corrected OR DAMAGE TO THE OTHER WATER METER MAY OCCUR.

PA-69, WATER SENSOR

Digital Meter Wiring Example

PA-69

Shielded wire MUST go to EARTH GROUND

RED

GREEN

BLACK

AIN7
GND
AIN8
GND
AIN9
GND
AIN10
GND
AIN11
GND
AIN12
GND
AIN13
GND
AIN14
GND
DIN1
GND
DIN2
GND
+12V
DIN3
GND
+12V
DIN4
GND
+12V
DIN5
GND
+12V
DIN6
GND
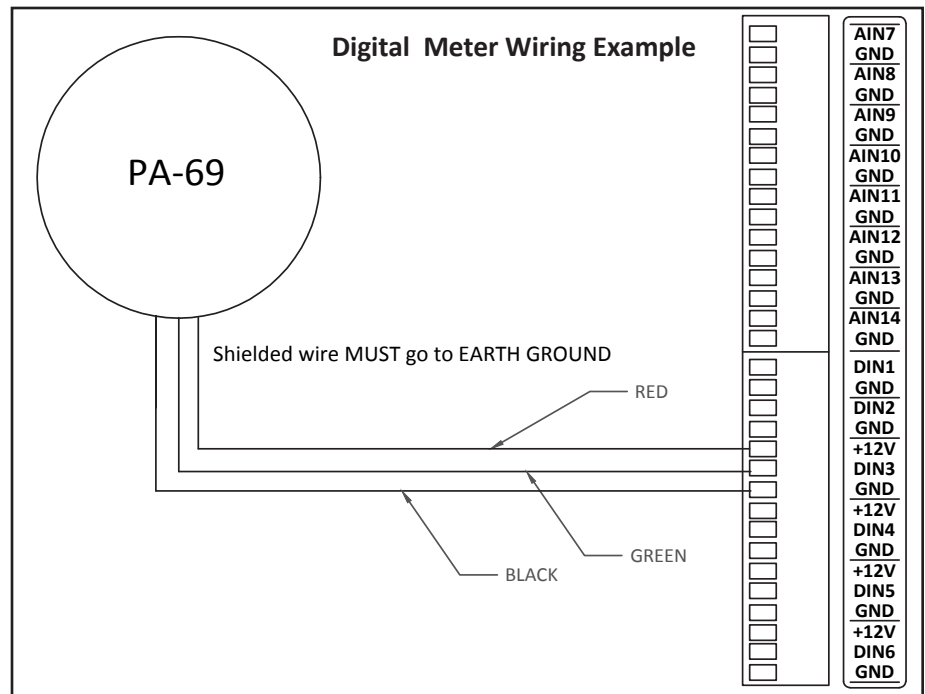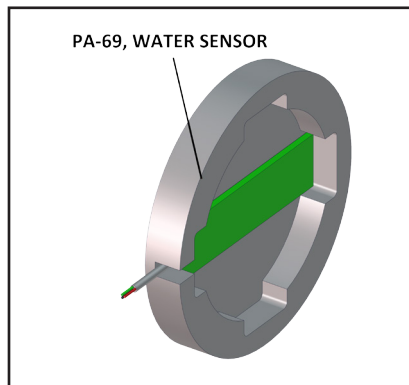
Water Flow (Counter) Meters

BADGER COUNTER METER

Wire as shown in the diagram to the right. **THIS IS A DRY CONTACT, DO NOT ATTACH ANY OF ITS WIRES TO +12V.**

BOTH Counter Meter Wiring Examples

Shielded wire MUST go to EARTH GROUND

RED

BLACK

AIN7
GND
AIN8
GND
AIN9
GND
AIN10
GND
AIN11
GND
AIN12
GND
AIN13
GND
AIN14
GND
DIN1
GND
DIN2
GND
+12V
DIN3
GND
+12V
DIN4
GND
+12V
DIN5
GND
+12V
DIN6
GND

DWYER COUNTER METER

Wire as shown in the diagram to the right. **THIS IS A DRY CONTACT, DO NOT ATTACH ANY OF ITS WIRES TO +12V.**
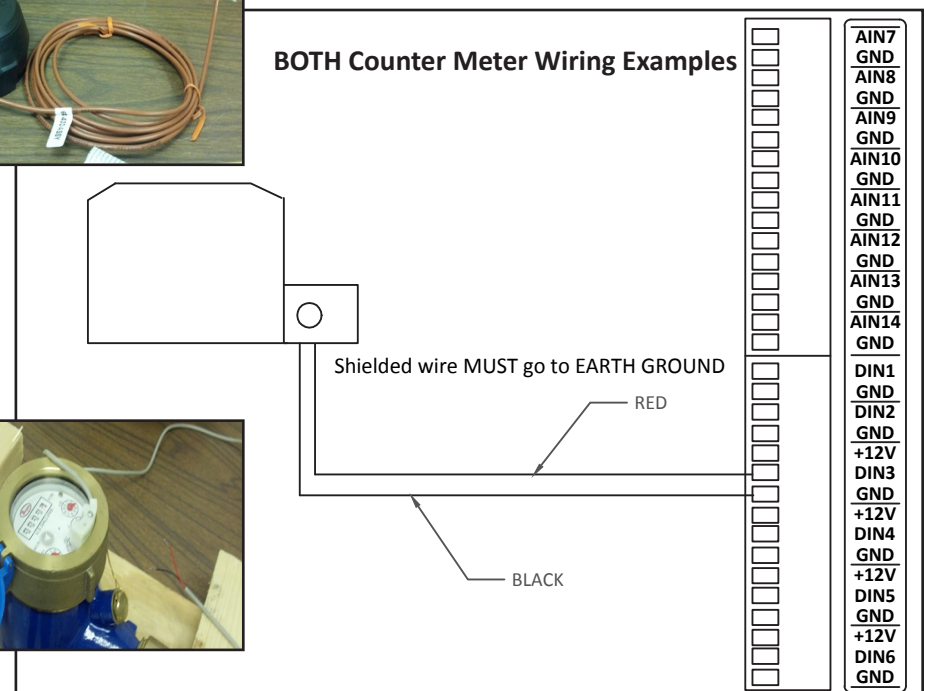
Output Relays - What you NEED to know

Variable Speed Output DIP switch settings

If there are four DIP switches at the top left corner of the Switches boards, these need to be set to the right positions in order for the variable speed relays to work correctly. There are two possible combinations for these switches for the right hand Switches board (channels 1 to 16):

1 and 2 OFF (down)
3 and 4 ON (up)

1 and 2 ON (up)
3 and 4 OFF (down)
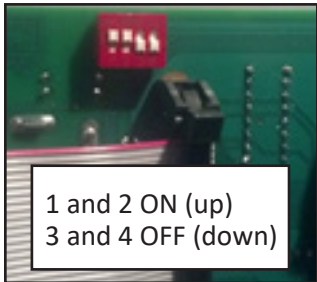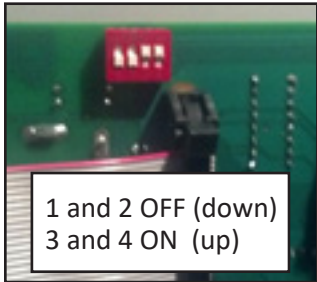
The table explains the DIP switch combinations used on right hand Switches board:

CHANNELS	VARIABLE RELAY CHANNELS	#1 rack type	#2 rack type	#3 rack type	#4 rack type	DIP switch settings on right hand Switches board
16	7,8	Variable	Fixed	N/A	N/A	1/2 OFF, 3/4 ON
16	15,16	Fixed	Variable	N/A	N/A	1/2 ON, 3/4 OFF
16	7,8,15,16	Variable	Variable	N/A	N/A	1/2 OFF, 3/4 ON
24	7,8	Variable	Fixed	Fixed	N/A	1/2 OFF, 3/4 ON
24	15,16	Fixed	Variable	Fixed	N/A	1/2 ON, 3/4 OFF
24	7,8,15,16	Variable	Variable	Fixed	N/A	1/2 OFF, 3/4 ON
32	15,16	Fixed	Variable	Fixed	Fixed	1/2 ON, 3/4 OFF
32	31,32	Fixed	Fixed	Fixed	Variable	1/2 ON, 3/4 OFF
32	15,16,31,32	Fixed	Variable	Fixed	Variable	1/2 ON, 3/4 OFF

NOTE: If channels 7 and 8 are variable relays, DIP switches 1 and 2 are off and 3 and 4 are on. All other combinations will have DIP switches 1 and 2 on and 3 and 4 off.

If there are two Switches boards installed in the controller and the left hand Switches board (channels 17 to 32) has these DIP switches, the DIP switches for the left hand board should always be set with 1 and 2 off (down) and 3 and 4 on (up). Note: Channel 7 and 8 can only be used as variable relays in the 16 and 24 channel controllers. There cannot be any relays installed on the far right column in the enclosure if channels 7 and 8 are variable relays.

Output Channel Load Specifications

Check the load on each channel. Light groups and tunnel fan groups will likely be your highest amperage circuits. The relays are rated at 1HP at 120VAC and 1½ HP at 240VAC. They will sustain a 200 percent startup surge for up to three seconds.

Use a contactor or divide equipment into several groups as necessary to avoid overloading a relay.

Output Relays - Inside Base of enclosure

Fuse Replacement

The fuse on the power supply is a 2.0 Amp 250VAC (5 x 20mm) fast-acting interrupting type (Littelfuse 0216002 or equivalent).
Each output relay has a 20 Amp 3AB ceramic body slow-acting fuse (Bussmann MDA-20 or equivalent 0.25 x 1.25").
Electrical load should be no more than 1HP at 120VAC and 1½HP at 240V.
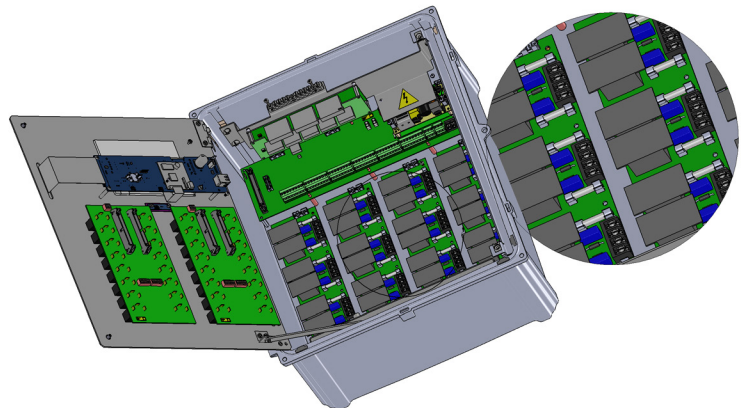
> **WARNING!**
> **When replacing Relays, they must be carefully ALIGNED and FULLY SEATED!**

> **The VAL-CO® Ventra XT™ Controller has "Plug-in" RE-LAYS for easy and cost effective replacement.**

Channel Interlocking

Devices that require an open and close channel such as curtain machines, inlets and chimney dampers, should be interlocked. This prevents sending open and close signals simultaneously to curtain or inlet machines, which could damage equipment.

In the event two interlocked channels are switched on, the first channel on has priority.

For inlet devices installed on these channels, set the appropriate switches OFF. For example, if Curtain Group #1 is on channels 1 and 2, then interlock (move to OFF) switches 1 and 2.

An odd-numbered channel can be interlocked with the next even-numbered channel (1 & 2, 3 & 4, and so on). Interlocking must always be done in pairs.
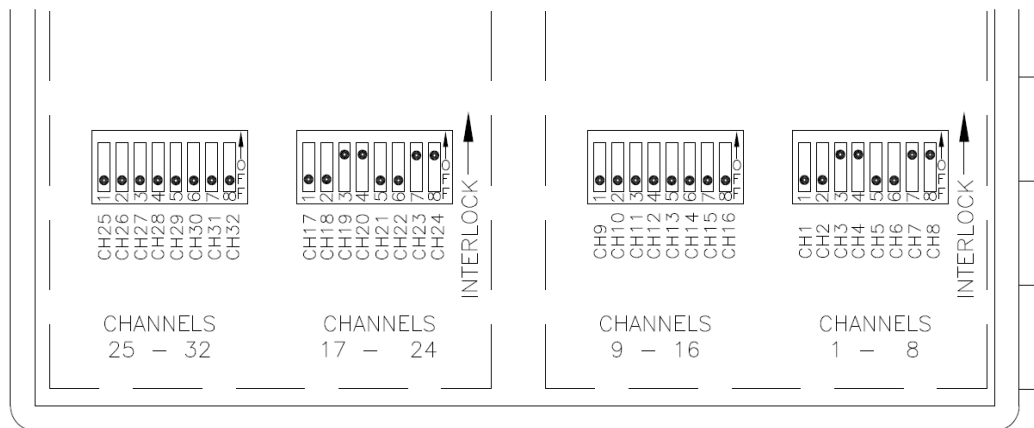
Testing Interlocks

Equipment Groups

Verify that all interlocks are properly set for open/close devices.

Manually switch each equipment group ON and OFF with the front panel toggle switches. Verify the connection of the proper devices to each channel. Run each device long enough to confirm that it is fully functional and properly adjusted.

Backup Systems

Test the backup equipment override thermostats and curtain drops. Make sure these devices operate the way they are expected to before depending on them to protect animals.

Alarms

Turn off the electricity to the controller. This will cause an alarm and allow you to verify that each alarm device is operational.

Clear any ACTIVE ALARM by pushing **ENTER** while the alarm is on the screen.

Failure to clear an alarm will prevent the alarm relay from resetting.

Output Relay Wiring

Bring the wire from an output channel through a strain relief or conduit on the bottom of the of the controller and up between the banks of relays to the proper relay. The control wire should run from the circuit breaker to the Ventra XT™ relay and then out to the device or device contactor.

We recommend dedicating a separate circuit breaker for each channel. That way, if there is a problem with one of the device groups, it won't disable your entire ventilation system.

High Voltage Wire must be brought up thru bottom of Controller and secured to Enclosure using adhesive mounting pad and cable ties.

Fan Group

L1 (Hot)
L2 (Neutral)
Ground

DANGER

Disconnect all POWER while servicing this control!

High Voltage Wire must be brought up thru bottom of Controller and secured with adhesive mounting pad and cable tie.

Curtain Machine

Open
Common
Close

Ground

L1 (Hot)

L2 (Neutral)

Ground

DANGER

Disconnect all POWER while servicing this control!
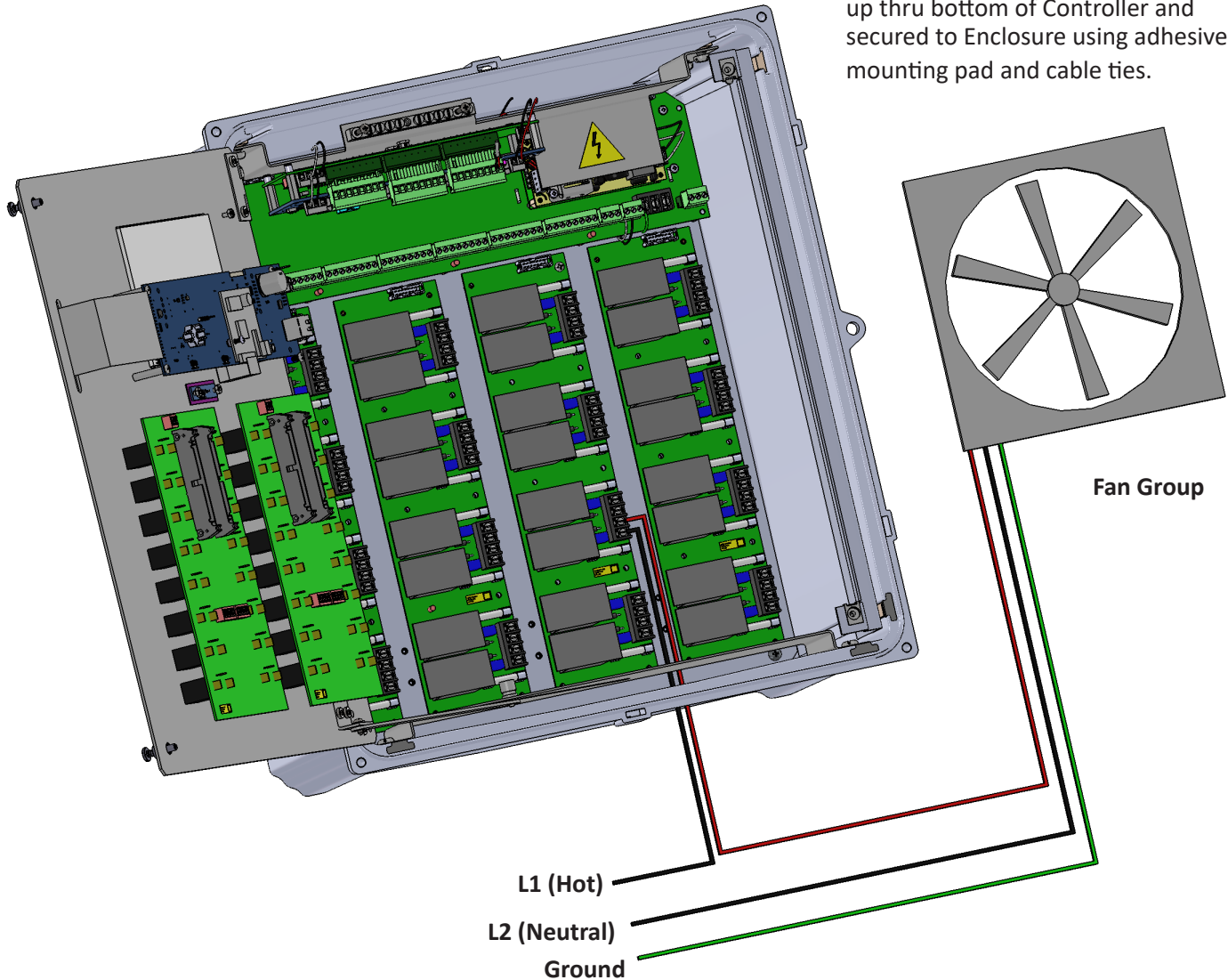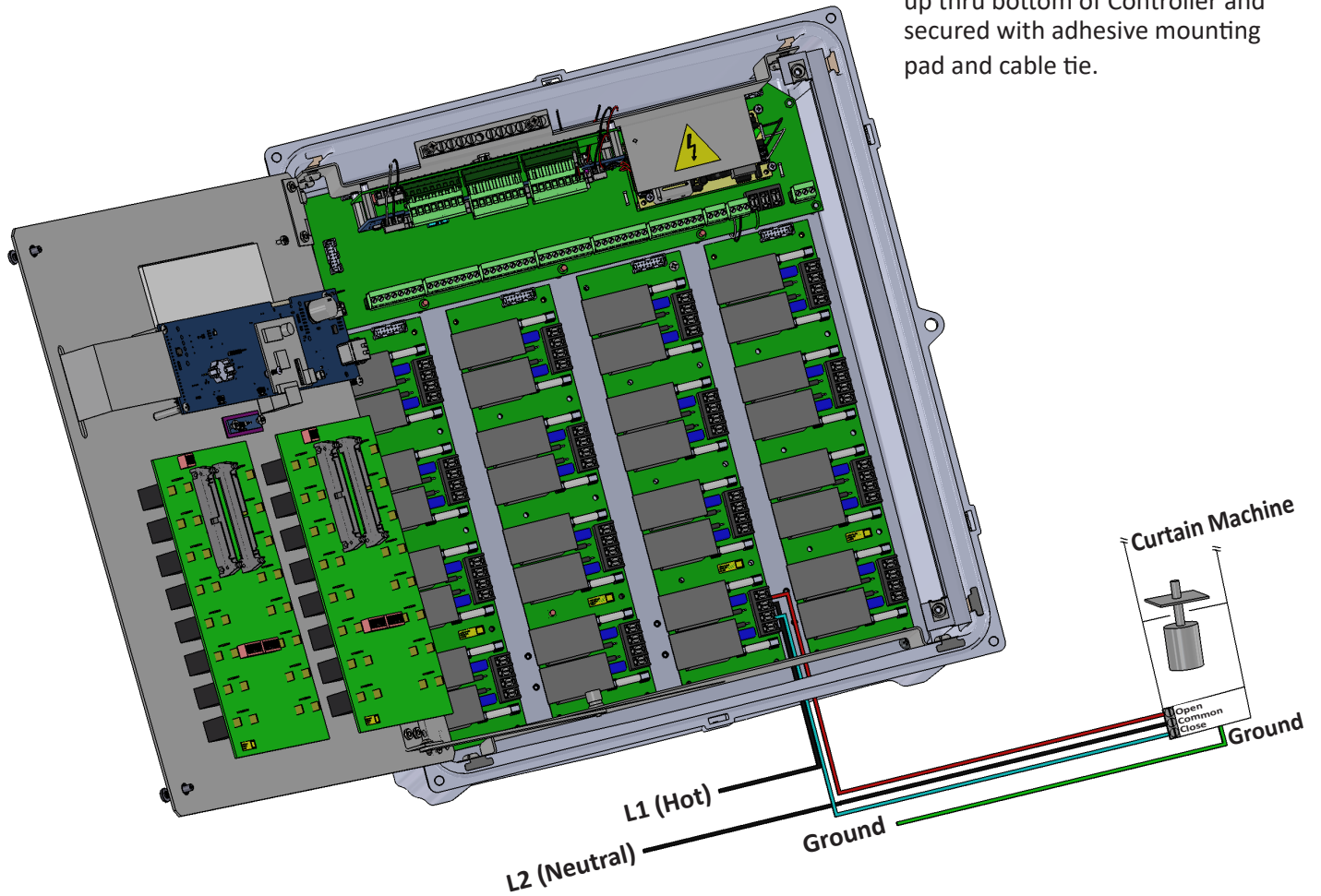
Output Relay Wiring - continued

Backup Systems

Setting backup devices that allow heat and ventilation in case of a power failure or other type of failure is essential for the safety of the animals.
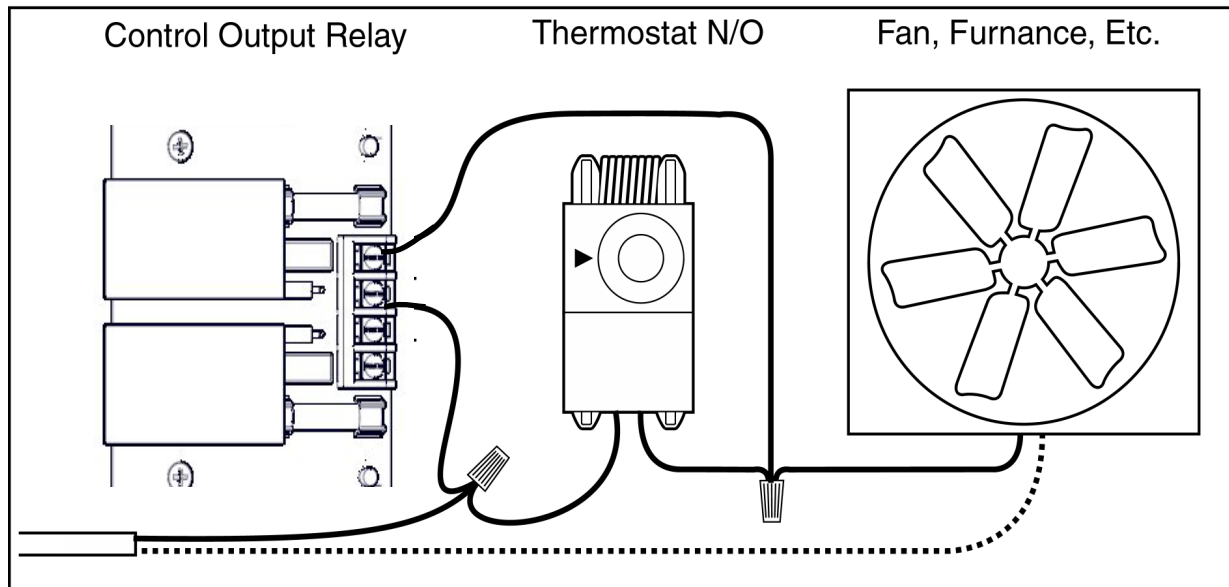
Alarm Information

Note: Always test alarm operation.
The Ventra XT™ will alarm on:
- High/low temperature
- Power outage
- Feeder over/under run time (with optional feed motor sensor)
- Over/under consumption of water (with optional water meter sensor)
- Static pressure (with optional static pressure sensor)
- Digital alarm input
- Communication errors and certain memory errors

The alarm connection may be wired to whatever device is necessary to provide a warning of alarm conditions, usually an auto dialer or siren.
Backup alarm devices must be installed in case of controller failure.

Alarm Relay Output Wiring

The alarm relay is on the input board. Located toward the top right corner of the enclosure.

Alarm Relay

The (NC) dry-contact (no voltage) connection has continuity during an alarm condition and could be used to turn on a device such as a siren, strobe light or auto dialer. The (NO) connection will have continuity when there is no alarm. Specifications: The alarm relay is SPDT rated 120/240VAC 10A. Alarm devices should be fused externally.
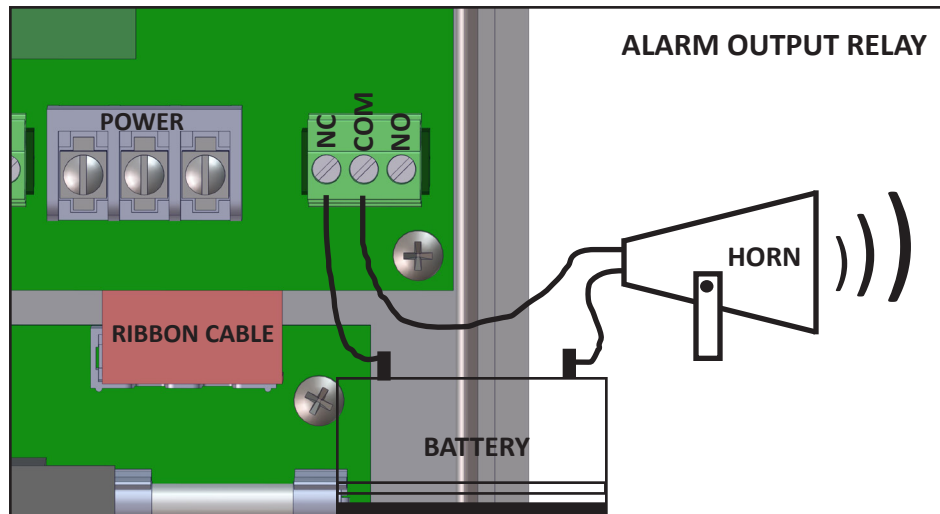
Communications Station

You can attach a communications station to the Ventra XT™ to enable remote access from a computer. This access gives you many of the same capabilities as using the controller's keypad. Refer to the manual that came with your communications station for wiring instructions. In addition, remote access to the controller can be achieved by direct access, using a RS485 serial port adapter from a Windows computer, or by using an optional VLink-Node box, which uploads controller information to the Cloud for later retrieval by the VLink program. Note: the VLink-Node connection requires Internet access on site.

Up to 16 Ventra XT™ controllers can be wired to the same communications station.

Expansion Stations

You can attach a variable speed expansion station (2VS) or a 12-channel expansion station to Ventra XT™ 16, 24 and 32 Channel models. Refer to the installation manual that came with your expansion station for wiring instructions.

Analog Output Board (0-to-10 volt outputs)

The purpose of the Analog Output board is to provide 0 to 10 volt output capability to the Ventra XT™ whole house controller to allow the use of variable output gas heaters and brooders, variable lighting control, and variable frequency drive motor devices (VFD Fans) .

Note: the Analog Output board is factory set as Module address #2. See "Setting The DIP Switches for Expansion Stations" in the next section for information on how to change this.

To wire the devices, insert the wiring into the Analog Output terminal block and tighten the screws.

12 Analog Output terminals

14 Analog Input terminals

Analog Board
Red to +12
Black to Ground
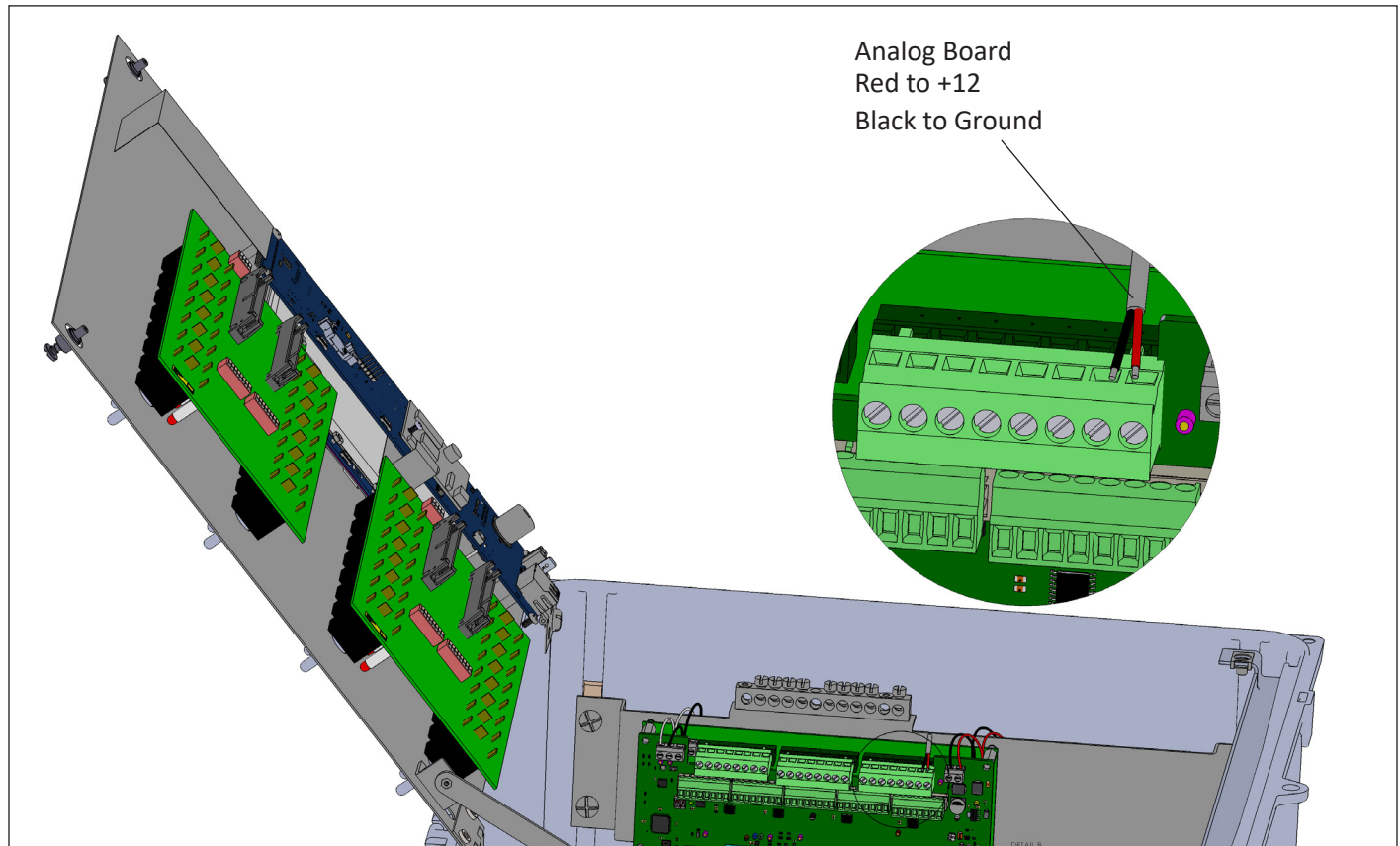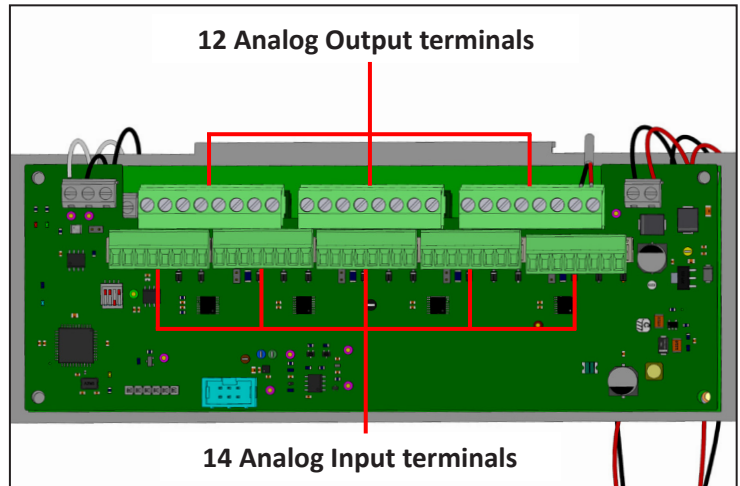
⚠ **Ensure Bracket 921445 is GROUNDED to the EARTH GROUND TERMINAL on the Interconnect Board.** ⚠

📝 **Use Zip ties to secure cables to the spacers.**

Variable Heaters and Brooders

When installing variable output heaters, wire the main power lines to a Digital output relay. Wire the gas value regulator to one of the 0-to-10 volt Analog Output board relays. When configuring the device in the controller software, use the module and channel number of the digital output relay when first setting up the device. Once configured, go to the variable heater's Parameter settings to enter the module and channel number of the gas valve.

Variable Lights

When installing variable lights, wire the lights to one of the 0-to-10 volt Analog Output board relays.

Variable Frequency Drive motors (VFD Fans)

When installing VFD fans, wire the fans to one of the 0-to-10 volt Analog Output board relays. If the fan requires a relay to be activated before a voltage is applied, wire that relay to one of the digital output relays. When configuring the device in the controller software, use the module and channel number of the 0-to-10 analog output relay when first setting up the device. Once configured, go to the VFD's Parameter settings to enter the module and channel number of power relay needed to activate the fan.

Setting the DIP SWITCH of Expansion Stations   LSB = LEAST SIGNIFICANT BIT

There are four (4) DIP Switches provided on Expansion Stations, such as the Analog Output and Analog Input boards that must be set to the correct position either ON or OFF to make the expansion station a slave to the Ventra XT™ control. The number entered via the switch is binary with 1 representing the LSB as shown with the switches in the OFF/ON positions. No two expansion boards can have the same slave number (DIP switch settings).

By default, the Analog Output board is set to Module #2 and the Analog Input board is set to Module #3. The internal Interconnect board is always module #1 and cannot be changed.

Analog Output board
DIP switches
(default address #2)
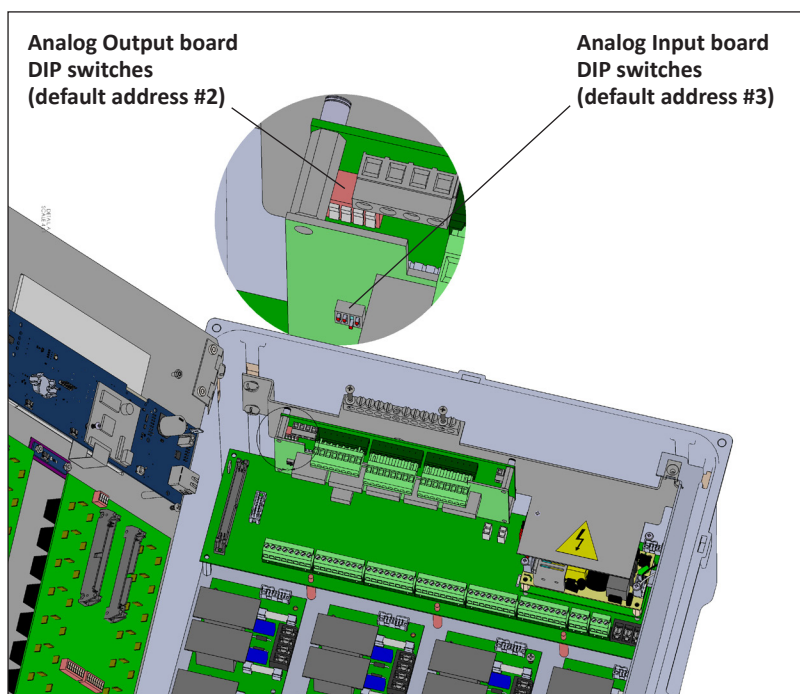
Analog Input board
DIP switches
(default address #3)

Setting DIP Switches for Expansion Stations, including the Analog Output and Input board.

The controller assigns devices (input sensors or output channels) by station and channel number. The host controller (Interconnect Board) is always station 1. The Analog Output board has a factory default address of station #2, and the Analog Input board has a factory default address of station #3.

1. Begin numbering your expansion stations from the next available number.
2. The station number is set with DIP switches on the control circuit board.

If the switch positions are changed, remove and re-apply power to the board to reset it.

Setting the Address Switches

If there are more than 4 switches on the DIP block, the first four switches are used to select an address number for the station. Each station must be given a unique number. The controller uses these address numbers to communicate with specific stations. It is this number which is used in the controller software when entering the module number a device is being added to.

The table shows the switch settings for each possible address number. EXAMPLE: To assign an address number of 4, the switches would be set as follows: SEL 1 - on, SEL 2 -on, SEL 3 -off, SEL 4 - off

Actual DIP Switch block orientation and labeling may vary from the example shown.

Station #	1 host	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SEL 1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SEL 2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
SEL 4	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
SEL 8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON

The Control's Display, Keys, and Navigation

The Display Area
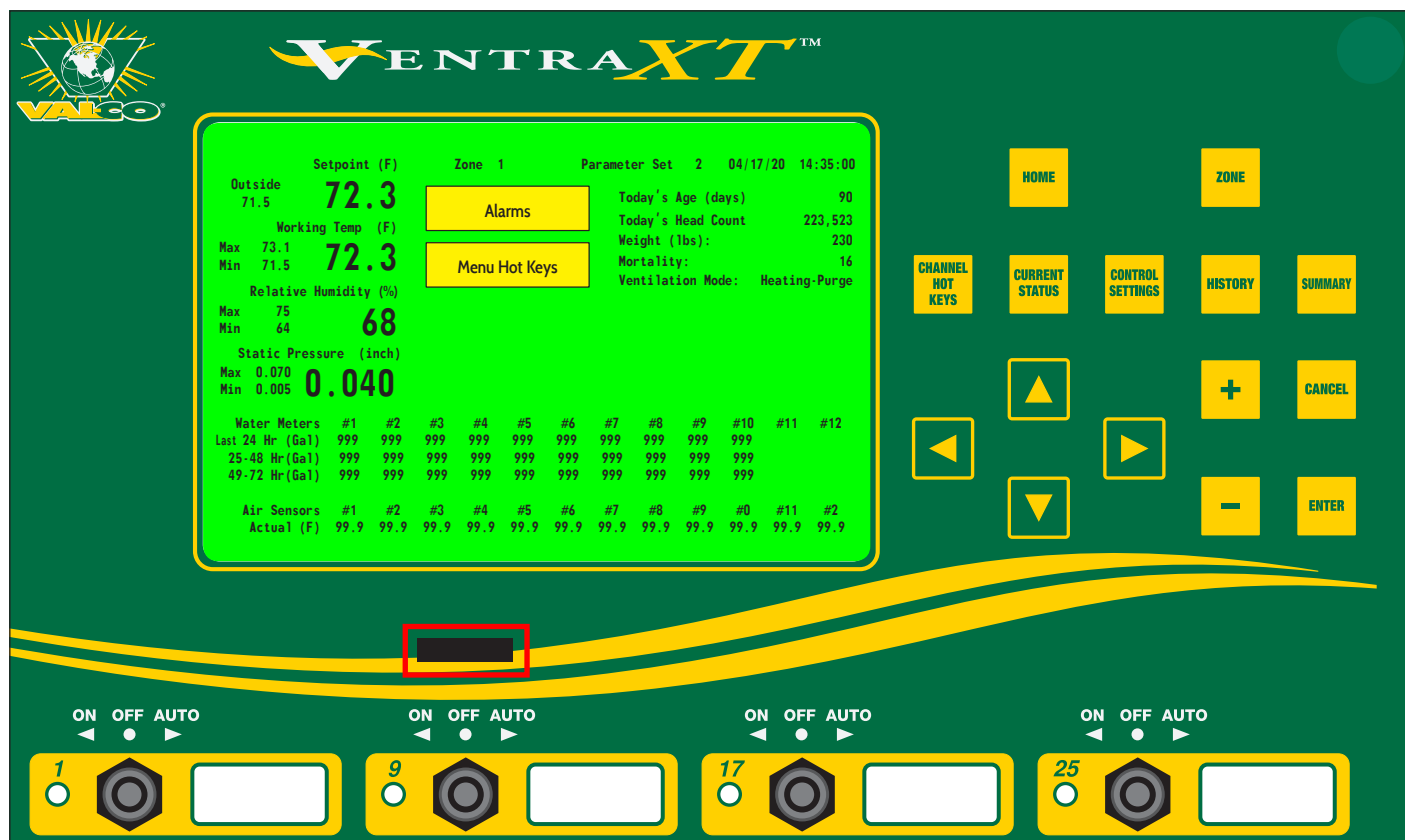
Touch Screen

The display is a 7" touch screen. Using finger swipes up, down, left, and right will change the view on the screen as needed. The yellow buttons on the screen can be pressed to navigate to different screens in the system. Any blue highlighted lines indicate the currently selected line which will be acted upon when the PLUS, MINUS, or ENTER keys are pressed.

After 5 minutes of no user activity, the screen will become dim. If 2 additional minutes of inactivity pass, the system will return to the Home screen, (pictured above). When the screen is dimmed, there are multiple ways to brighten it again.

1. Hold your hand in front of the Proximity Switch for a few seconds (small black rectangle just below the screen, outlined in red above).

2. Open the clear door.

3. Touch anywhere on the screen, if the clear door is already open.

Controller Switches and Hot-Keys

Channel Output Toggle Switches

- Each equipment group is assigned to an output channel. Some devices with independent open and close circuits, such as curtains, require two output channels. In those cases, the two output channels should be interlocked. *Refer to the **Channel Interlocking** section under **Output Relays** for more information.*
- The three-position toggle switches allow you to manually control devices connected to each output channel. The status light next to a channel illuminates when that channel is on.

ON/OFF

Set the switch to ON or OFF to override the controller. You can use this switch to test an equipment group, turn off equipment, or override the controller for any reason. The controller will not let you turn on a channel if it is interlocked to a channel that is already on.

AUTO

Set the toggle switch to AUTO to allow the controller to manage the environment. Before selecting AUTO, input your settings in the Device/Equipment Settings menu. Make certain the settings in this menu are properly configured.
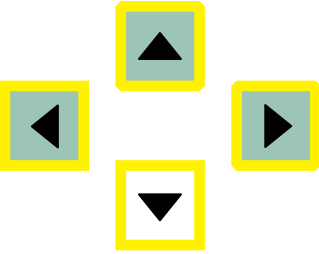
HOT-KEYS

HotKey technology™ provides direct access to current temperatures, history, control settings, and the Channel Hot Keys screen. Pressing a Hotkey provides a quick way to get to the most commonly used menus. The Channel Hot Keys screen provides easy access to the individual device settings.

> Navigation to all menus can be done using the arrow keys on the keypad, or swiping left or right on the screen, if you chose not to use Hot-Keys.

Hardware Key Pad Descriptions

CONTROL SETTINGS		Hot Key for accessing control parameter setup such as the temperature setpoint. You can edit these values.
CURRENT STATUS		Hot Key for accessing the current environmental conditions including temperature and humidity. These values can be viewed.
HOME		Hot Key for returning to the Home screen.
HISTORY		Hot Key for accessing hourly historical data of equipment run times and environmental conditions such as average temperature.
CHANNEL HOT KEYS		Hot Key for viewing the output devices and which channels they are configured to. Use this screen to get quick access to the device settings.
▲ ◄ ► ▼		Used for navigation. Press the **UP** or **DOWN** arrow to move vertically through menu screens. Press the **LEFT** or **RIGHT** arrow to move to the top screen of an adjacent menu category. This same navigation can be achieved by swiping the touch screen up, down, right-to-left (move right) or left-to-right (move left).
+ -		When you need to change a value or group number in a menu item, press the **PLUS** and/or **MINUS** keys.
CANCEL ENTER		Press **CANCEL** to cancel a current menu and move back to the current main menu. Pressing **CANCEL** multiple times will return to the previously viewed menu groups, eventually returning to the Home screen. Press **ENTER** to edit a menu item's value and to confirm changes.
ZONE		Selects the zone to be viewed or modified. Pressing **ZONE** cycles between all zones. Note: The numbers shown in the top right corner of a screen's Header line indicates the Zone being viewed, as well as the currently loaded parameter set. For example, Z1-S02 means Zone 1 is being displayed and the system is currently running Parameter Set #2. Note: The Alarm screens and Device Channel Hot Key screen are not zone related. Pressing the **ZONE** key on these screens will change the zone number but will not affect what is shown on these screens.
SUMMARY		Press **SUMMARY** to view the summary of history records for that day.

Menus and Navigation

There are multiple ways to navigate between menus and to move around the different screens. You can use the touch screen for almost all navigation, use just the hardware Hot Keys to move around, or use any combination of the two. The section below explains the different ways to accomplish this.

Hardware Hot Keys

Except for the **ZONE** key, these keys provide quick access to the most used menus on the system. Pressing the **ZONE** key will change the current zone being displayed.
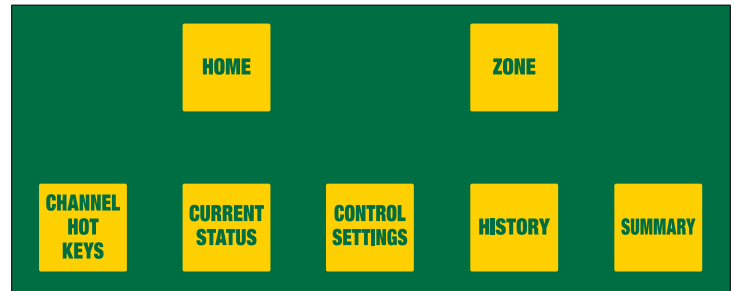
Cancel Key

Pressing the hardware **CANCEL** key or the **CANCEL** button in the upper left corner of the screen will return to the previous screen.
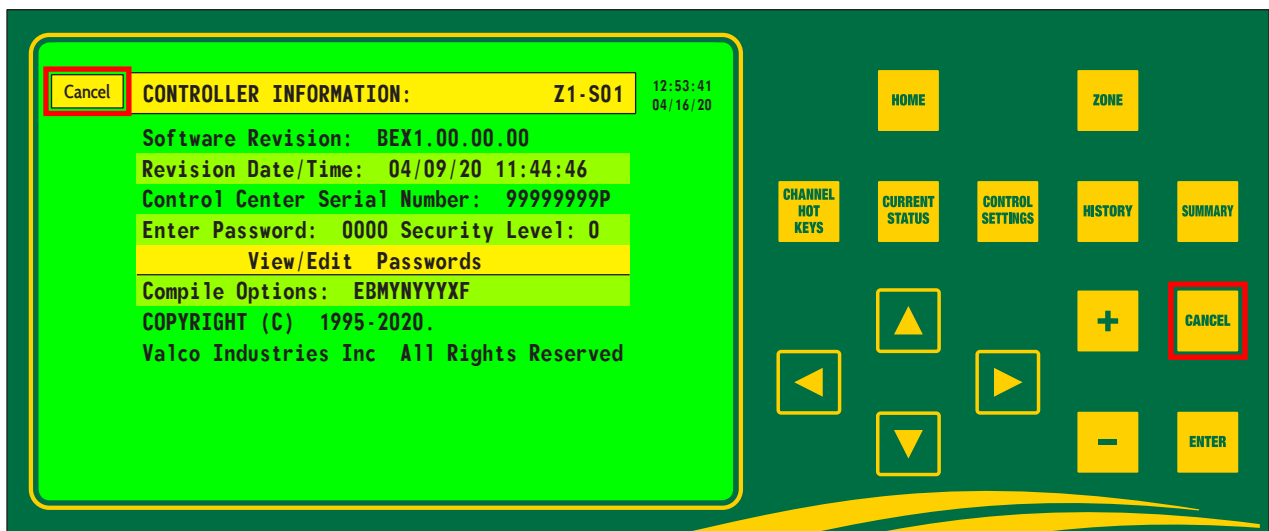
Moving between Menu Groups and Menu Rows

The **RIGHT ARROW** hardware key or **swiping a finger from right to left** will scroll the screen to the right to display the next menu group in the list. **LEFT ARROW** hardware key or **swiping a finger from left to right** will scroll the screen to the left to display the previous menu group in the list.
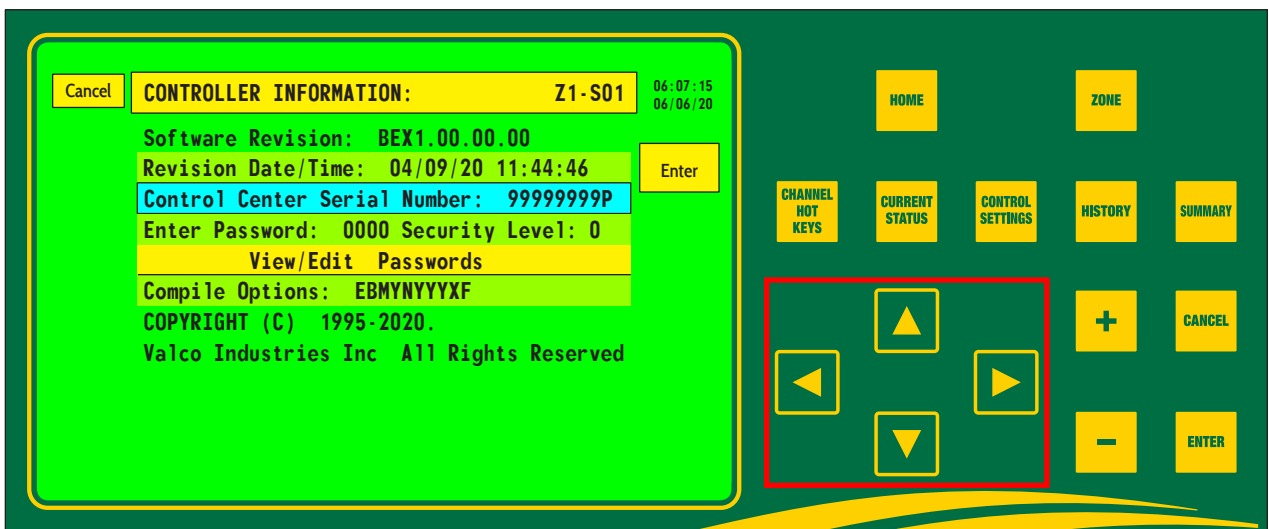
Moving between Menu Groups and Menu Rows - continued

The **DOWN ARROW** and **UP ARROW** hardware keys will scroll up and down between editable menu rows. As you scroll the rows, a row will change to a blue background, as shown in the image below, to indicate the selected row. When the topmost editable row or bottom most editable row is reached, pressing the arrow again will remove the highlight. However, if there are additional pages in this menu group, the screen will change to display the next or previous page for the menu group also.

Touch to select a row – In addition to using the **DOWN** and **UP ARROW** keys to select a row, simply touch a line on a text screen to select the row. The touched line will turn blue to indicate it is selected. If the line does not turn blue, it indicates the line is not editable and is informational only.

Yellow lines – Yellow text lines, as shown to the right, indicates the line is a button. Selecting this line will turn it blue. While the button is highlighted in blue, pressing the **ENTER** hardware key, or the **ENTER** button on the screen, will open another window to display settings or info pertaining to that button. When viewing this type of screen, pressing **CANCEL** on the screen or pressing the **CANCEL** hardware key is needed to exit the screen and return to the previous menu group.
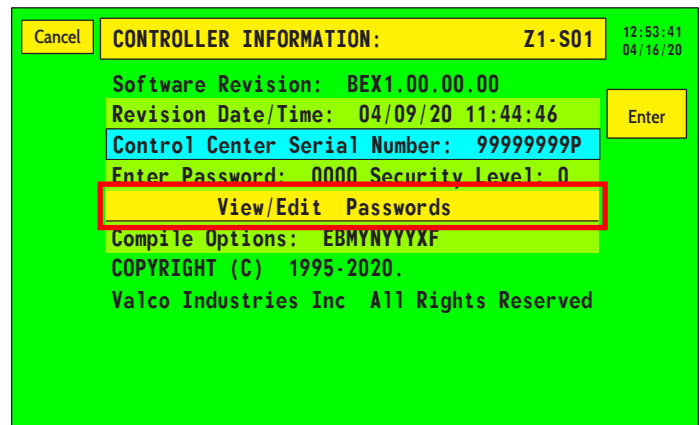
Dimmed lines – Any lines with gray wording indicates those lines are dimmed out and are not allowed to be changed. A dimmed line indicates the controller is not using the setting due to the way the controller is currently set up but can be made available if some other setting is changed first.

In the screen example to the right, the On/Off Timer line, as well as the last three lines are dimmed. These lines cannot be selected at this time. In order to enable the On/Off Timer line, the fan's Run Mode needs to be changed to include one of the Timed run modes. To enable the bottom three lines, a Position Sensor or Whisker Switch needs to be configured and calibrated.

See the specific device settings section to see what it takes to enable a dimmed line.

Changing Pages

For menu groups which have more rows than will fit on one screen, **PAGE UP** and **PAGE DOWN** buttons are provided on the screen for easy scrolling to those additional pages. These buttons will only appear on the screen if there are additional pages to view.

The **UP ARROW** and **DOWN ARROW** hardware keys can also be used to scroll between pages. When using the hardware keys, if the screen only displays informational data, such as the History screen, pressing the **UP ARROW** or **DOWN ARROW** key will immediately change the page. If some of the rows can be edited, the page will change once the first or last line is selected, and the key is pressed again.

You can also use your finger to change the pages. Swiping from the top to the bottom has the same effect as pressing the **PAGE UP** button. Swiping bottom to top has the same effect as pressing the **PAGE DOWN** button.
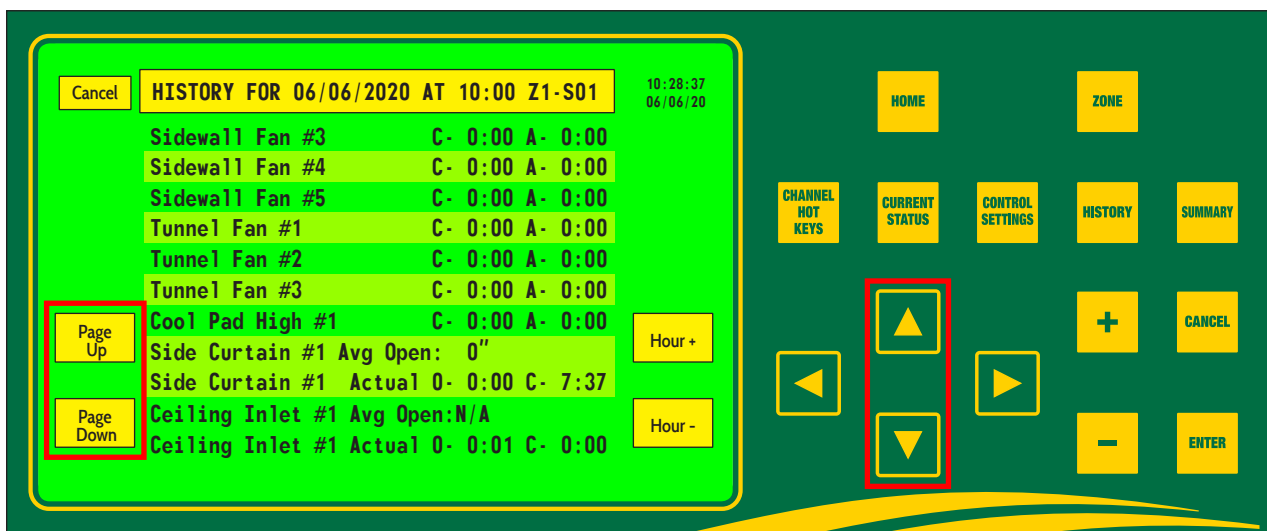
Changing Device Groups

When viewing the device settings and more than one device type in configured, use the **Group +** and **Group –** buttons on the screen, or use the **+ (PLUS)** and **– (MINUS)** hardware keys to change which group number is being displayed.

Note: Depending on the screen being displayed, the **Group +** and **Group –** buttons on the screen may show different wording, such as **Hour +** and **Hour –** for the History screen. Regardless of the wording of these two buttons, the **+ (PLUS)** and **– (MINUS)** hardware keys will always perform the same functions as these two buttons.
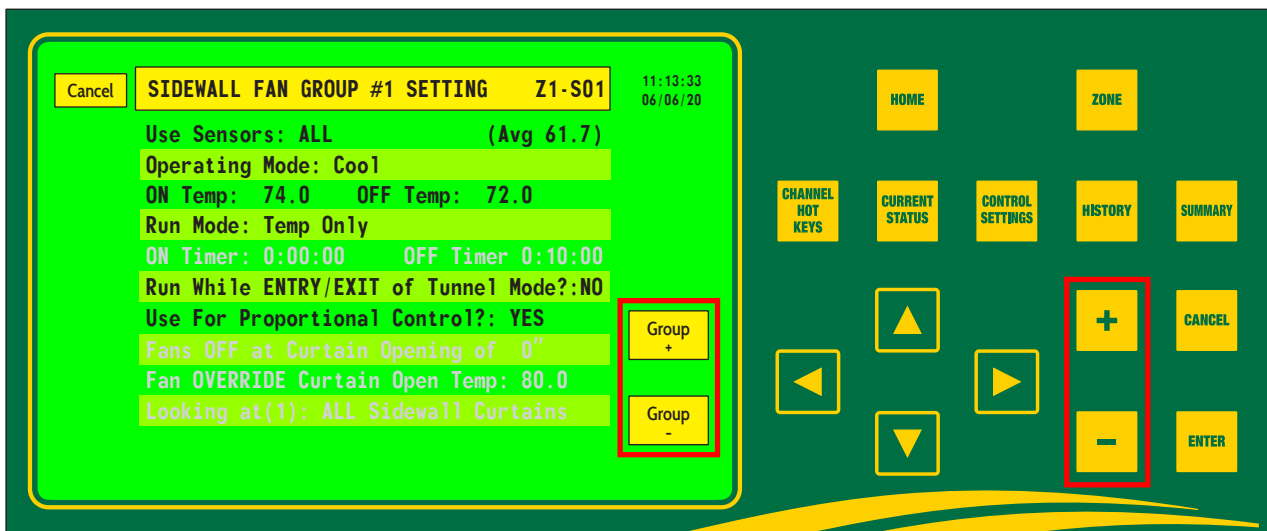
Menus and Navigation - continued

Navigating Button Screens

For screens, such as the Home screen, Channel Hot Keys, Menu Hot Keys, and Input Hot Keys, simply **touch the desired button** to go to the appropriate menu group. The **Up Arrow** and **Down Arrow** keys can also be used to scroll through the available buttons. The selected button will be displayed with a blue background. Once the desired button is highlighted, press the **Enter** hardware key to go to the selected menu group. The image below shows the History button was scrolled to using the **Up** and **Down** hardware keys. Pressing **Enter** will open the History screen.
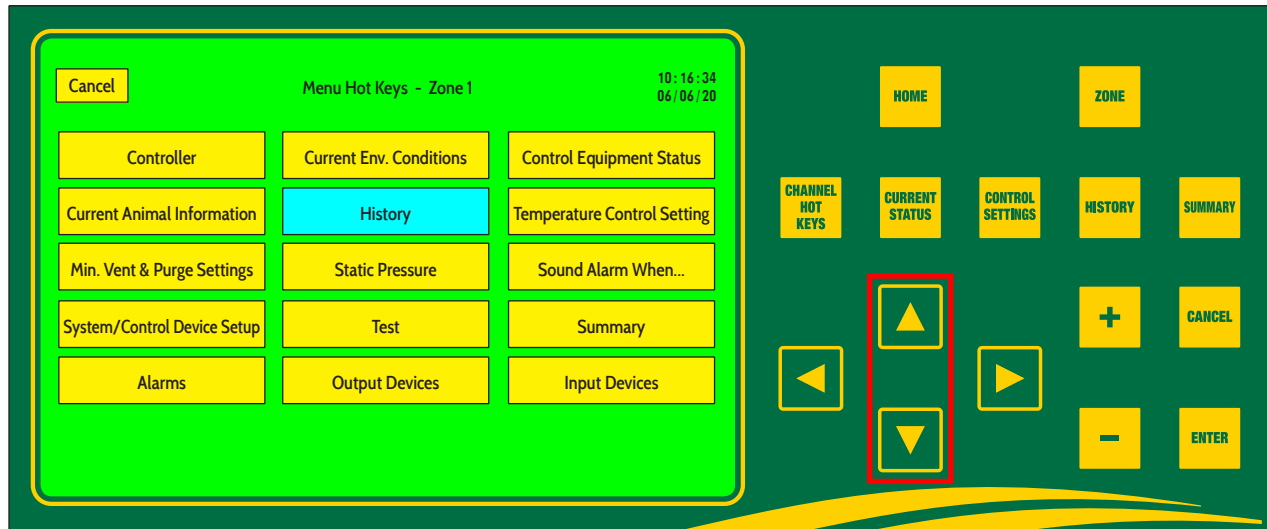
Changing Values

Once you have navigated to the menu group and have selected the setting you wish to change, you need to put the system into edit mode to change the value. The section below explains the different ways this is done.

Basic editing steps

Basically, changing all values take the same three steps:

STEP #1 - press **ENTER** to go into Edit mode:
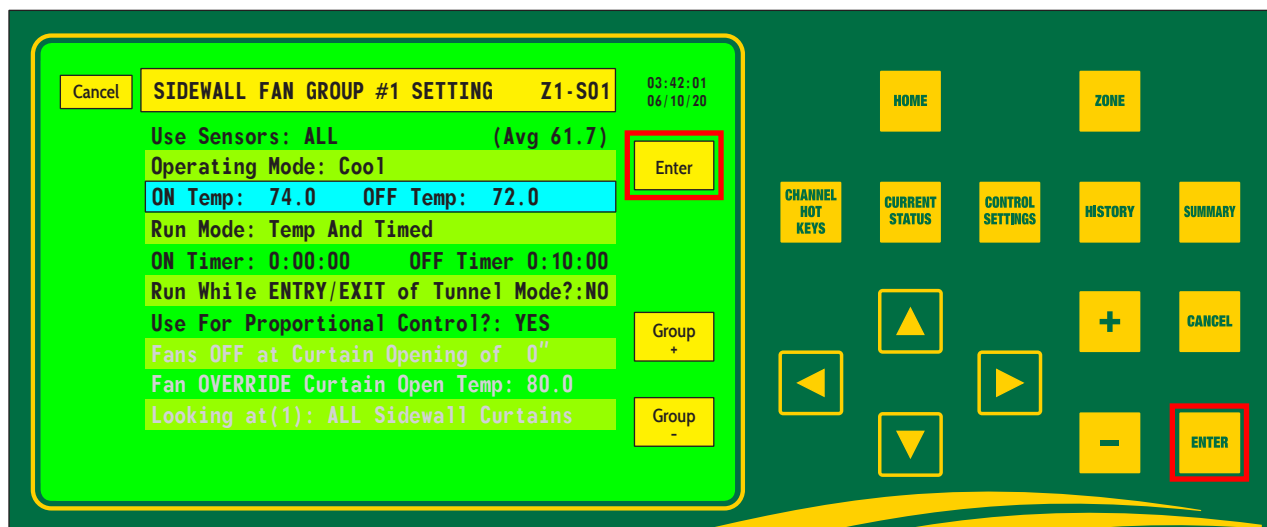
Changing Values - continued

STEP #2 - This will place a cursor under the value that will change. Use the **+ (PLUS)** and **– (MINUS)** buttons or hardware keys to raise or lower the value until the desired value is reached.

Note: the longer the **+ (PLUS)** and **– (MINUS)** button/key is held down the faster the value will change.
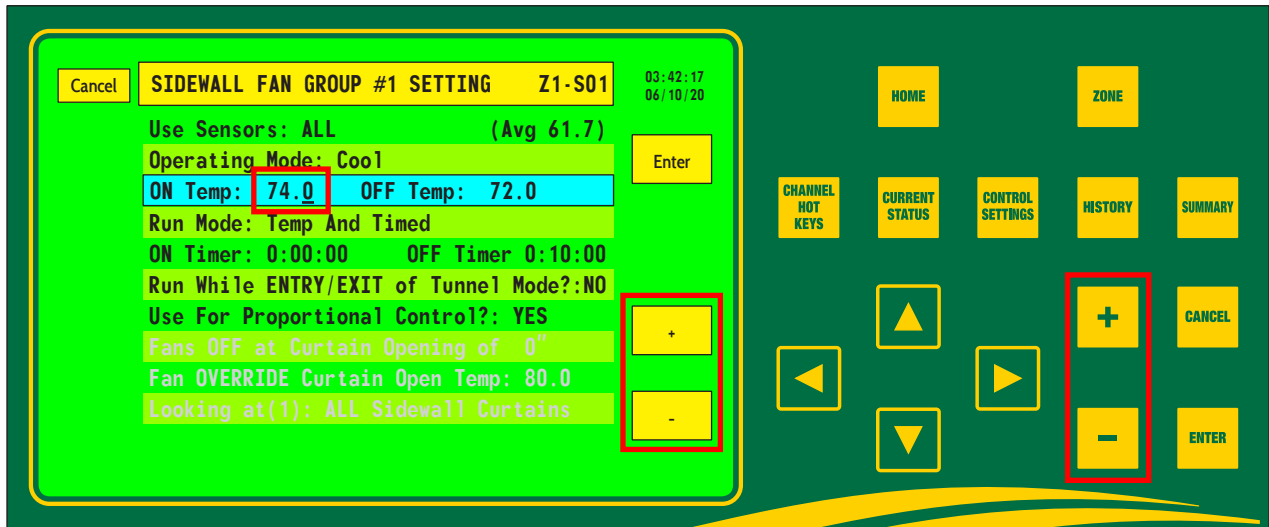
STEP #3 - Press **ENTER** to save the change.

Note: If the line has additional settings which can be edited, pressing **ENTER** will move the cursor to the next value to be edited. Repeat the steps above to change the new value as desired. Once all values that been edited, the cursor will disappear when **ENTER** is pressed to indicate editing mode has been exited.
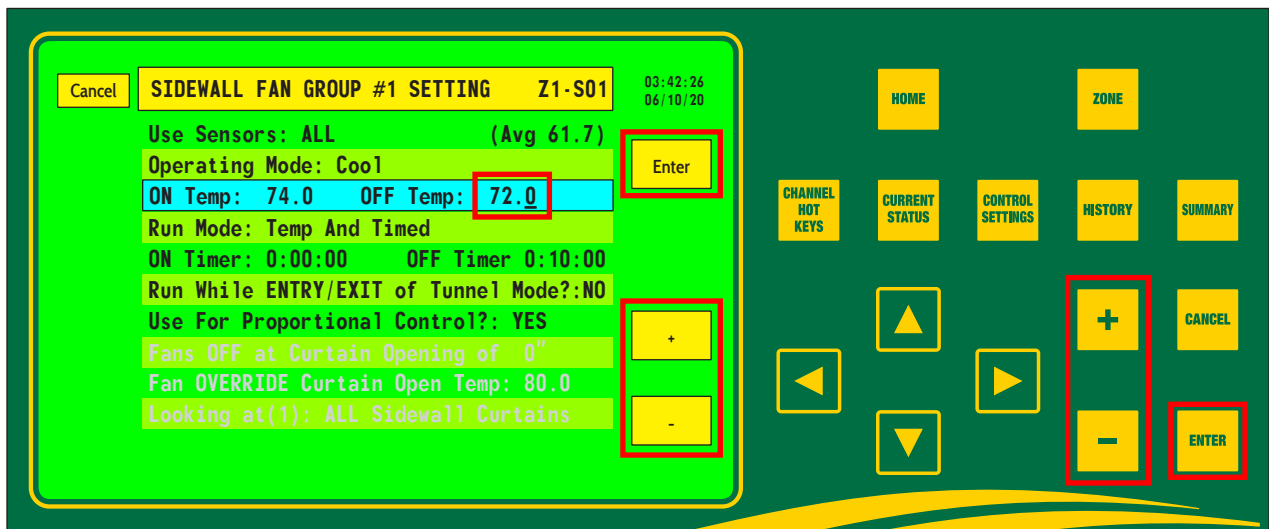
Changing Values - continued

Note: While in edit mode, if you wish to discard any changes made, press the **CANCEL** button or hardware key to return to the original value and exit edit mode immediately.
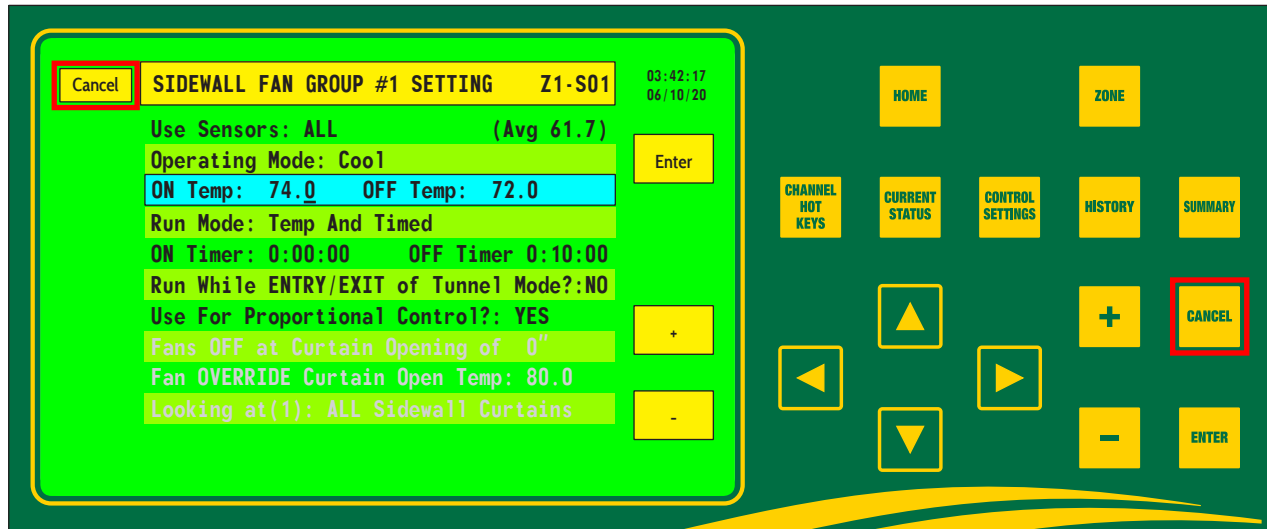
Editing Time Values

Editing time and timer values take the same steps as explained above with the following additions.

When **ENTER** is first pressed, the cursor is placed in the right-most time section, as shown below. Using the **+ (PLUS)** and **– (MINUS)** buttons or hardware keys will change the time value, incrementing/decrementing the hours, minutes and/or seconds as needed.
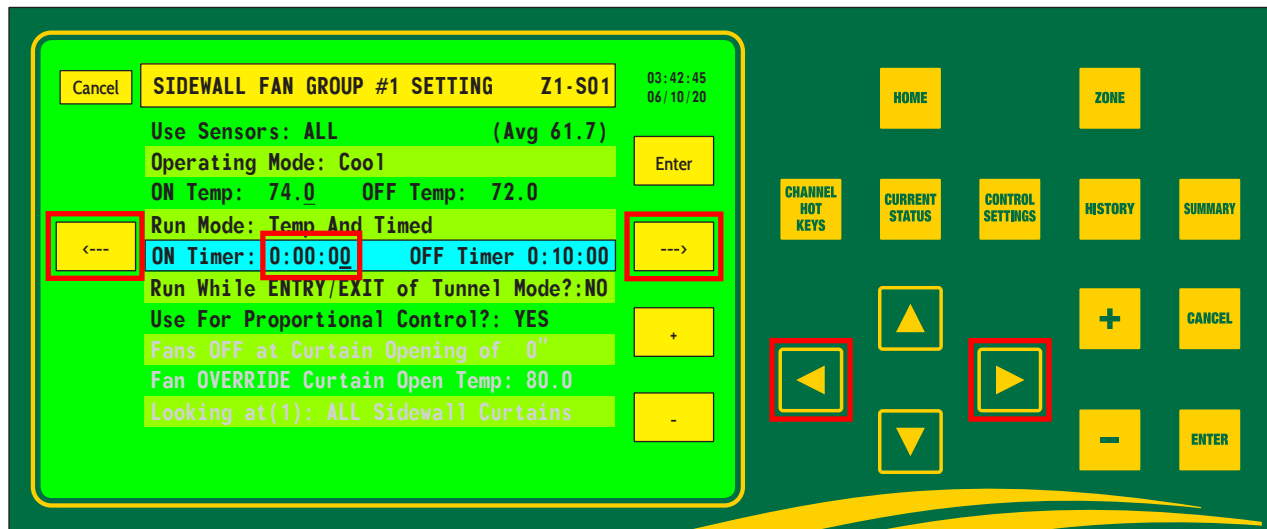
However, you can use the **LEFT** and **RIGHT Arrow** buttons or hardware keys to change the time section being edited to allow faster changes.

Pressing the **RIGHT ARROW** will move the cursor from the Seconds section, to the Hours section, to the Minutes Section and back to the Seconds section.

```
ON Timer: 0:00:00      OFF Timer 0:10:00
```

Pressing the **LEFT ARROW** will move the cursor in reverse order.

```
ON Timer: 0:00:00      OFF Timer 0:10:00
```

Once a section is selected, use the **+ (PLUS)** and **– (MINUS)** buttons or hardware keys to increase/decrease that section of the time value, incrementing/decrementing the higher time sections as needed.

Note: when the cursor is in a time section other than the right-most section, pressing **ENTER** will also move the cursor to the next section to the right. When the cursor is in the right most time section, pressing **ENTER** will cause the cursor to jump to the next editable value, or exit edit mode.

Editing Word Settings

Editing word settings, such a Fan's **Run Mode** as shown below, is done the same way as explained in the **Basic Editing Steps** section above.

Press **ENTER** to go to edit mode, which places the cursor under the current selection.

Use the **+ (PLUS)** and **– (MINUS)** buttons or hardware keys to change the value.

Press **ENTER** again to save the change or use the **CANCEL** button/key to discard any changes and exit edit mode..
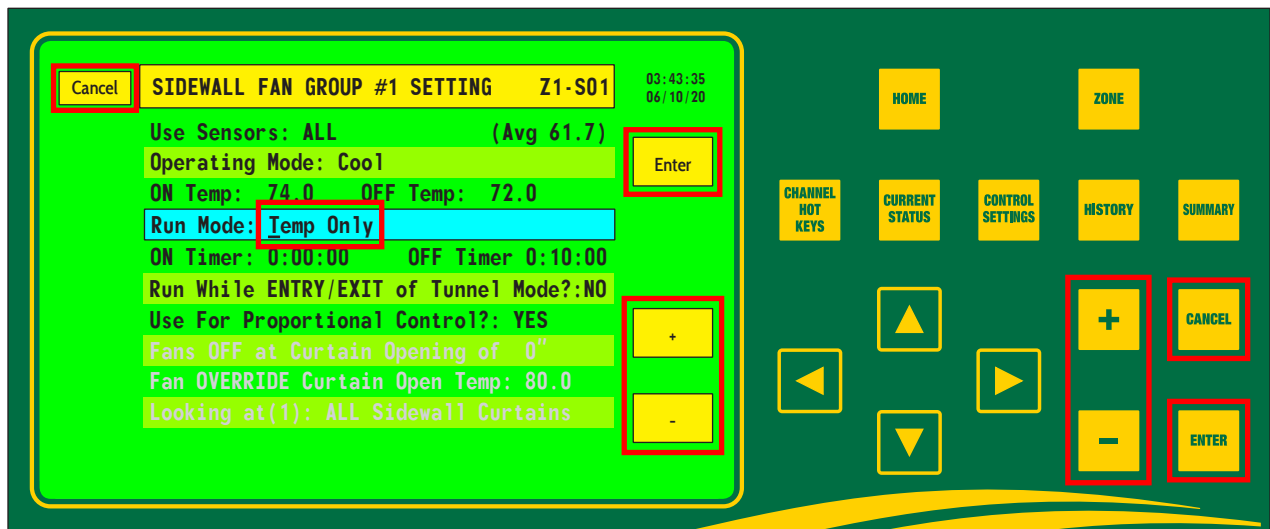
Power Up Sequence

Check all connections before switching on your controller.

When the controller is powered on, you will see the following sequence of operations. These operations are automatic and you should not press any keys at this time. This will take approximately 45 seconds.

```
Ventra  XT Bootloader          v 01.01.23
**************************
```

```
Ventra  XT Bootloader          v 01.01.23
Application  loaded  on 05/06/2020  @ 06:13

Starting  application:
Vers:  XT X0.00.00.20  Beta
ID:    XT X0.00.00.20  Beta 04-03-20
Reset:  0x9D036000
```


Ventra XT

```
Cancel | Controller Power-Up Self Testing      05:28:05
                                               06/01/20
        COPYRIGHT (C) 1995-2020.
        Valco Industries Inc All Rights Reserved   Enter
        Checking Real Time Clock.....
         StartUp Procedure Options:
         Press ENTER to change!
```

```
Cancel | Controller Power-Up Self Testing      05:28:52
                                               06/01/20
        COPYRIGHT (C) 1995-2020.
        Valco Industries Inc All Rights Reserved
        Checking Real Time Clock.....
          Start-Up Procedure 032        5:28
        Power Reset Slave Modules. (5 Seconds)
```


Press ENTER when the blue box appears if you want to load and use a different parameter set than what you will be setting up as you continue through the "Setting Up the Control" instructions. *More detailed information on parameter sets can be found in the* **Parameter Sets** *section.*

Control Power Up Sequence Completed
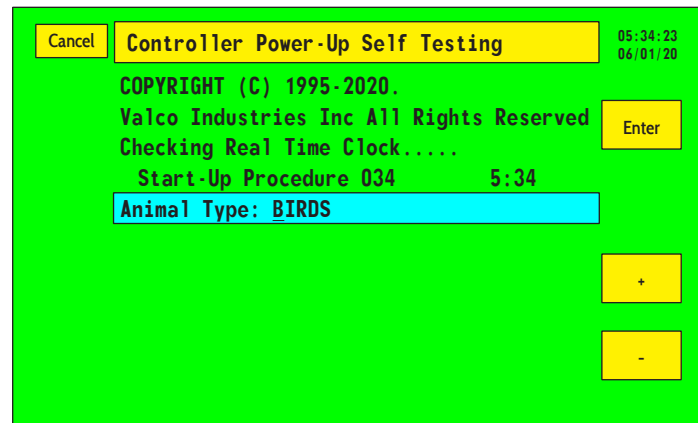
When the controller has finished going through the sequence of operations *shown above* the **Home** screen will appear. The exception to this is if this is a new parameter set, addition input is required to set the **Global** parameters. Instructions for setting up the GLOBAL parameters is shown below.

Global Parameters - (Initial Setup)

The controller software is designed for hog or bird applications, Metric or American measurement units and Fahrenheit or Celsius temperatures. When setting up the controller, or a new parameter set for the first time and the start up procedure is complete, the display screen will display a blue box requesting the Animal Type (Hog or Bird applications), Units of Measure (Metric or American measurement units), Temperature Measure (Fahrenheit or Celsius temperatures), Display Language (English or Spanish), and the number of channels on the main unit.

To set these, use the **+** and **–** buttons/keys to make the selection, then press **ENTER** to display the next choice. Once the other 4 options, shown to the right, are set, the system will complete the startup procedure and display the Home Screen. From there, use the buttons and/or hardware keys to proceed to **System/Control Device Setup** to add new input and output devices.

```
Cancel  Controller Power-Up Self Testing    05:34:23
                                            06/01/20
        COPYRIGHT (C) 1995-2020.
        Valco Industries Inc All Rights Reserved   Enter
        Checking Real Time Clock.....
          Start-Up Procedure 034        5:34
        Animal Type: BIRDS

                                                  +

                                                  -
```
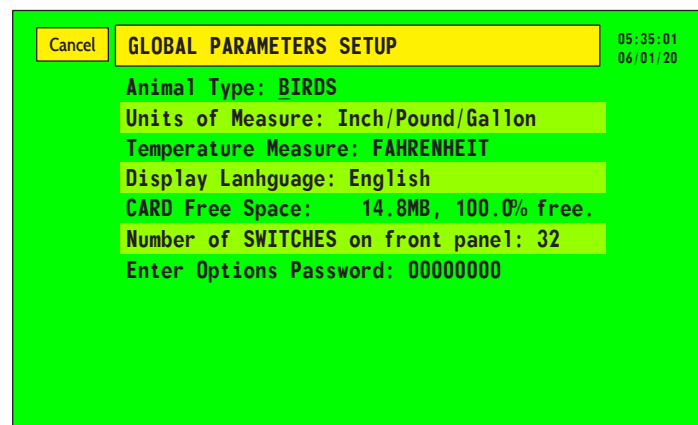
```
Units of Measure: Inch/Pound/Gallon

Temperature Measure: FAHRENHEIT

Display Language: English

Number of SWITCHES on front panel: 32
```

If a mistake was made setting the global parameters, before any input or output devices are added to the system, navigate to the **System/Control Device Setup** and use the **Right Arrow** key or use a finger to swipe the screen from right to left to display the **Global Parameter Setup** screen. Use this screen to make any changes to the Global Parameters by selecting one of the lines, pressing ENTER, and use the + and – buttons/keys to change the value before pressing ENTER again to save the change.

```
Cancel  GLOBAL PARAMETERS SETUP             05:35:01
                                            06/01/20
        Animal Type: BIRDS
        Units of Measure: Inch/Pound/Gallon
        Temperature Measure: FAHRENHEIT
        Display Lanhguage: English
        CARD Free Space:    14.8MB, 100.0% free.
        Number of SWITCHES on front panel: 32
        Enter Options Password: 00000000
```

> The Global parameter preferences cannot be changed once you start installing devices (fans, inlets, etc.) and the Animal Type, Units of Measure, and Temperature Measure lines will not appear. To change the preferences, uninstall all of the devices to display these lines and change them, or follow the steps in the *Resetting the Control to a "New State"* section to reset your controller to a "New - Factory Fresh State" which will remove the devices, alarms, and history. The exception to this rule is the "Display Language" and "Number Of Switches On front Panel" submenus. You can change these at any time.

Critical User Information

> If this is your first time setting up the Ventra XT™ control, you should review the information on the following pages before you start the setup of the devices and parameters, so that you will have a clear understanding on the function of the controller and its menus. This knowledge will help you with establishing the settings; Go to "Setting up the Control Software" section.

Daily Usage

You should review a few parameters on a daily basis.

- Alarms - Check the controller display to make sure there are no active alarms. If there are active alarms, you must clear them (press the ENTER key) to turn off the alarm relay. Go to the Alarm History menu to find information on alarms and errors. As the animals grow, adjust the water usage and feeder run time ON/OFF alarm settings as necessary.
- Current Environmental Conditions - Observe that the animals appear comfortable. Check the temperature and humidity. You should also check these in the History menu to see what the conditions were during the previous night/day.
- Setpoint - Verify the temperature setpoint (Temperature Control Setting menu) is correct. If you are not using the temperature setpoint ramping feature, adjust the setpoint manually as the animals grow and their temperature requirements change.
- Equipment Status - Check the water use and feeder run times. You should also check the status of equipment.
- Backup Thermostats - Adjust and test backup thermostats regularly to match changes in the setpoint temperature. Improperly adjusted thermostats may start devices when you don't want them to or they will not provide effective backup when needed.

> If an active alarm condition is detected, the Home screen will display the Alarm button in red. Press the button to see the active alarms. Select the alarm and press ENTER to clear it.

Survival Mode

> In the rare event that all temperature sensors in a zone fail, or an entire input/output board fails, the controller follows a set of operating rules and activates attached alarm devices.
>
> - The last valid temperature reading continues to be used.
> - Curtains and inlets stay in their current position.
> - If the current ventilation mode is Entering Tunnel, the controller will continue into Tunnel mode.
> - Purge cycles will continue.
> - Furnaces and Heaters are turned off.
> - Brooders continue to run based on the last valid temperature reading.
> - Other devices run based on timed settings and/or last valid temperature.

Home Screen

The **Home** screen is the first screen that will appear once the controller is running. The system will return to this screen shortly after the system notices no user activity with the screens. You can also return to this screen quickly by pressing the **Home** button on the front of the unit.

The screen displays some of the current conditions of a zone in one convenient place. This same information can be found on other screens as well. If more than one zone is configured, use the **Zone** button to see the current conditions of the other zones.

```
              Setpoint (F)        Zone  1          Parameter Set   2    04/17/20  14:35:00
     Outside
       71.5        72.3                                Today's Age (days)              90
                                      Alarms           Today's Head Count        223,523
          Working Temp  (F)                            Weight (lbs):                 230
 Max    73.1                                           Mortality:                     16
 Min    71.5        72.3            Menu Hot Keys       Ventilation Mode:    Heating-Purge
        Relative Humidity (%)
 Max      75
 Min      64          68

     Static Pressure  (inch)
 Max  0.070
 Min  0.005   0.040

     Water Meters    #1    #2    #3    #4    #5    #6    #7    #8    #9   #10   #11   #12
 Last 24 Hr(Gal)    999   999   999   999   999   999   999   999   999   999
   25-48 Hr(Gal)    999   999   999   999   999   999   999   999   999   999
   49-72 Hr(Gal)    999   999   999   999   999   999   999   999   999   999

     Air Sensors     #1    #2    #3    #4    #5    #6    #7    #8    #9    #0   #11    #2
      Actual (F)    99.9  99.9  99.9  99.9  99.9  99.9  99.9  99.9  99.9  99.9  99.9  99.9
```

The screen displays the following information for a zone:

Setpoint – The current temperature setpoint.

Outside – The current outside temperature. If no Outside sensor is configured, this will show "---".

Working Temp – The current average working temperature of all the configured Air Probe sensors of the zone, as well as the highest and lowest average readings since midnight.

Relative Humidity – The current average humidity of all the configured Humidity sensors of the zone, as well as the highest and lowest average readings since midnight. If no Humidity sensors are configured, these readings will show "---".

Static Pressure – The current static pressure reading for the zone, as well as the highest and lowest readings since midnight. If no Static Pressure sensor is configured, these values will show "---".

Water Meters – Displays the water usage over the last three 24-hour periods. Each configured meter will be displayed in its own column with the number above it indicating which group number the readings are from.

Air Sensors – These columns show the current actual readings of the individual temperature sensors. Only the columns for the configured Air Probe sensors will be displayed.

Animal Information – This section provided a quick overview of the current animal information. Displayed is the current animal age and weight, as well as current head count and mortality count.

Ventilation Mode – This displays the operational mode the system is currently running. These modes can be "Natural Temp", "Heating - Purge", "Entering Purge", "Purging", "Exiting Purge", "Entering Tunnel", "Tunnel", and "Exiting Tunnel".

The **Alarm** button can be used to navigate to the **Alarm** screen. The alarm screen can also be viewed by swiping your finger across the screen from left to right.

> ℹ️ Note: a red alarm button indicates there is one or more active alarms that need attention.

Use the **Menu Hot Keys** button to navigate to the **Menu Hot Keys** screen, which provides additional navigation buttons to access other screens on the system. You can also swipe your figure from right to left to change the screen to the **Menu Hot Keys** screen.

Menu Hot Keys

The Menu Hot Keys screen provides easy access to the other screens on the system. Pressing one of these buttons will open the associated screen which include:

Controller – Displays the general controller information, including where the serial number of the controller and the security passwords can be viewed, entered, and edited.

Current Env. Conditions – Displays the current status of the input sensors, as well as the current operating mode in text format. This same info is displayed on the Home screen.

Cancel	Menu Hot Keys - Zone 1	12:53:14 04/16/20
Controller	Current Env. Conditions	Control Equipment Status
Current Animal Information	History	Temperature Control Setting
Min. Vent & Purge Settings	Static Pressure	Sound Alarm When...
System/Control Device Setup	Test	Summary
Alarms	Output Devices	Input Devices

Control Equipment Status – Displays the current ON/Off state of the output relays, current opening sizes of the curtains/inlets, accumulated water meter usage and accumulated feeder runtimes.

Current Animal Info – Displays and allows editing of the animal information including the animal age.

History – Displays the hourly history of the system and devices.

Temperature Control Settings – Displays and allows editing of the temperature related general settings, such as temperature setpoint and ramping, tunnel enter and exit temperatures and others.

Min. Vent & Purge Settings – Displays and allows editing of the settings for minimum ventilation, as well as timed and humidity purges.

Static Pressure – Displays and allows editing of the static pressure Natural and Tunnel setpoints, as well as set up ramping of the static pressure based on the outside temperature.

Sound alarm When – Displays and allows editing of all the alarm options of the system.

System/Control Device Setup – Provides selections for adding, listing, changing and deleting devices, adding and deleting zones, setting the power delay for fans, as well as change the controller's time and date. Note: swiping right to left from this screen will take you to the Global Setup screen, which allows you to change languages, the number of channels on the unit, add/change the Startup Options Password, as well as change the animal type, unit of measure and temperature designation if no devices have been configured.

Test – Displays selections that allow testing certain aspects of the controller and its hardware.

Summary – Displays a daily summary of the history information.

Alarms – Opens the alarm screen.

Output Devices – Opens the Device Channels screen, which displays buttons for the channels of the configured devices and allows easy access to a specific device's settings.

Input Devices – Opens the Menu Input Hot Keys screen, which displays buttons for any input device types which are configured, allowing easy access to specific input device settings.
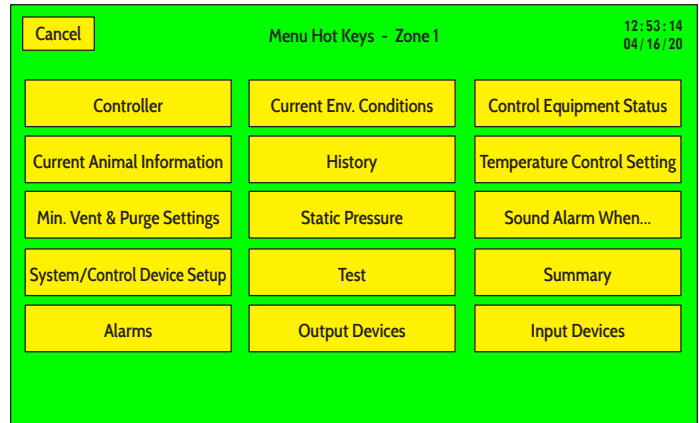
Output Devices

The **Device Channels** screen displays buttons with device names which correspond to how the devices are configured to the output relays. Note: Pressing the **Channel Hot Keys** hardware key provides quick access to the same screen.

These button positions correspond to the toggle switches on the front panel of the unit. The devices shown on this screen are not zone-specific. All devices are shown that are configured to the module

The buttons with names indicate that device is configured to that output relay and can be manually overridden by flipping the corresponding toggle switch. The blank buttons indicate no device is configured to that relay and is available.

For inlets and curtains, two buttons will have the same name, such as buttons 1/2, 3/4, 5/6, 7/8, and 9/10 in the above image. In these instances, the odd numbered button is the Open channel, the even numbered button is the Close channel.

Pressing one of the buttons with a device name will open the settings screen for that device, which displays and allows the editing of that device's settings.

Use the "Previous Module" and "Next Module" buttons to switch the screen to display the other Expansion Station modules with output relays configured.

Input Devices

The **Menu Input Hot Keys** screen displays buttons for the different types of input devices that are configured for a Zone. Only the buttons with at least one input device configured for the Zone will be displayed. To see the available buttons for other zones, press the **Zone** button on the front cover of the unit.

Pressing a button will open that input device type's settings screen. For the Humidity Sensor, Static Pressure, Feed Sensor and Water Meter Sensor buttons, the Settings screen that opens will display the settings for all the available device groups of that type on the same screen. For the Air Sensor, Digital Alarm, Whisker Switch, and Position Sensor buttons, the Settings screen will open to the first available device group number of that input type. The **Group +** and **Group −** buttons on those screens are used to change the device group number being displayed.
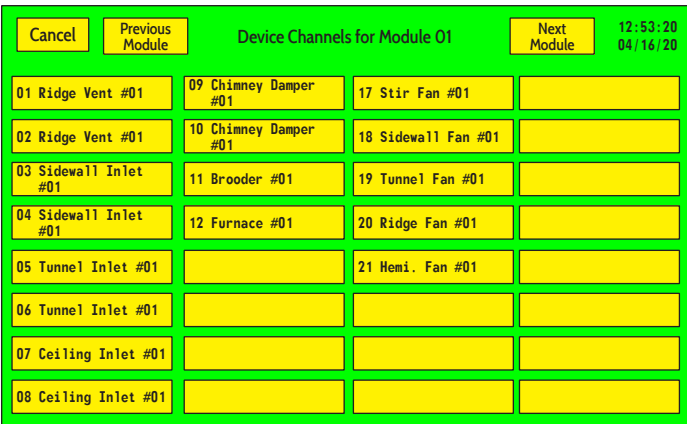
The image above displays buttons for a 32-channel controller.*
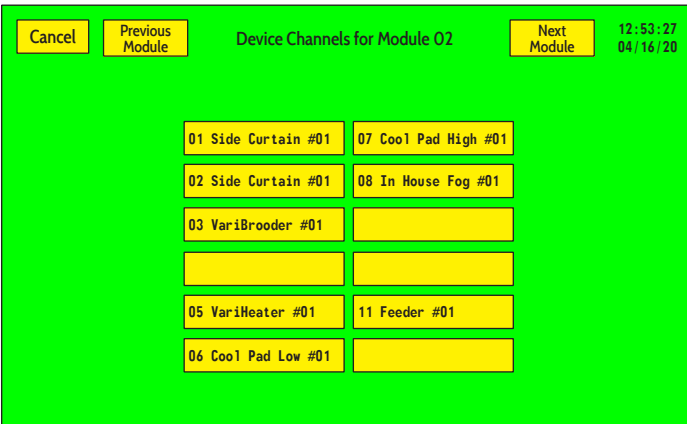
The image above displays buttons for a 12-channel Expansion Station.
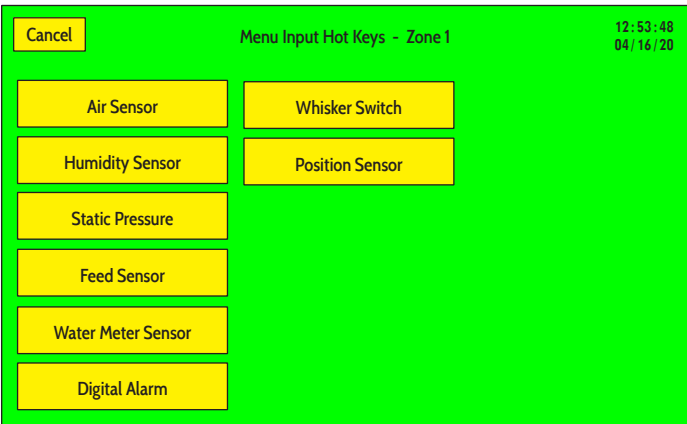
Controller Information

This screen displays the general information about the controller software, displays, and allows the editing of the controller Serial Number, which needs to be unique if using VLink for remote access, as well as enter, view, and edit the Security passwords.

Software Revision Number

```
Software Revision:  BEX1.00.00.00
```

This displays the software version information which is running on the controller currently. Have this information available when calling Val-co tech support.

Revision – Date/Time

```
Revision Date/Time:  04/09/20 11:44:46
```

```
┌──────┬─────────────────────────────────────────┬─────────┐
│Cancel│ CONTROLLER INFORMATION:          Z1-S01 │12:53:41 │
│      │                                         │04/16/20 │
│      │ Software Revision:  BEX1.00.00.00       │         │
│      │ Revision Date/Time:  04/09/20 11:44:46  │         │
│      │ Control Center Serial Number:  99999999P│         │
│      │ Enter Password:  0000 Security Level: 0 │         │
│      │        View/Edit  Passwords             │         │
│      │ Compile Options:  EBMYNYYYXF            │         │
│      │ COPYRIGHT (C)  1995-2020.               │         │
│      │ Valco Industries Inc  All Rights Reserved│        │
└──────┴─────────────────────────────────────────┴─────────┘
```

This screen displays the software's revision date and time. Note: Pressing Enter when this line is selected will do a manual save of the current parameter set. This can be used to make sure the device and zone settings are saved before removing power from the controller.

Control Center Serial Number

```
Control Center Serial Number:  99999999P
```

This is a unique identifier which the user will enter in order to use VLink, allowing access to the controller from a remote PC. It is recommended that you change this number and record the new number for future reference. The procedure is the same as entering a password.

Entering the Password

```
Enter Password:  0000 Security Level: 0
```

Using security passwords help restrict access to certain menus and restricts who can make changes to the different settings. Once the security passwords are set up, a password needs to be entered before those restrictions are lifted. These restrictions includes the viewing and editing of these security passwords.

Ventra XT controllers are shipped without a password, so there are few restrictions on what can be viewed or edited. You can use the EDIT PASSWORD menu (described later) to create a password.

1. Press ENTER.
2. Press the PLUS (+) or MINUS (-) key to change the first digit to match your password.
3. Press the RIGHT arrow key to move to the next digit.
4. Repeat steps 2 and 3 until the password is correct.
5. When the cursor is under the last digit, press ENTER and your security level will appear. Wait for a few seconds for the controller to accept the password.

Security remains at the level entered for one hour after the last key is pressed. To reset the security level to 0 after you are finished, enter a password of 0000 and press ENTER.

Editing the Passwords

```
        View/Edit  Passwords
```

View/Edit Passwords will only appear if no passwords have been set or a password above level 5 has been entered on the previous line. To view and edit the security passwords, select this line and press **ENTER**. This will open a new screen listing the passwords already entered.

⚠️ **You must have level 5 or higher security access to edit passwords.** ⚠️

As a new password and level are set, a new slot will be added to add another password. Up to 10 different passwords can be set up. Password codes and security levels may be changed or deleted at any time.

Note: the first entered password will default to a level 7 password. Once the first password is entered, the screen will return to the Controller screen and you will be required to enter the new password to return to this screen to add more password entries.

```
Cancel    Controller Passwords - 10 Max.      10:28:10
                                              04/29/20
        Edit Password#01: 1234 Security Level: 7
        Edit Password#02: 1000 Security Level: 1    Enter
        Edit Password#03: 2000 Security Level: 2
        Edit Password#04: 3000 Security Level: 3
        Edit Password#05: 4000 Security Level: 4
        Edit Password#06: 0000 Security Level: 0
```

1. To enter or change a password, choose the password you want to edit using the PLUS or MINUS keys or touching the line.
2. Press ENTER.
3. Change the password digits using the PLUS or MINUS keys. Use the LEFT and RIGHT arrow keys to move between digits.

⚠️ To DELETE a password, change it to 0000. Be sure there is a level 5 or higher password left, or all passwords have been removed, before exiting this screen, or you will be locked out of the controller.

4. Repeat step 3 until the password is correct.
5. When the cursor is under the last digit, press ENTER to confirm the password.
6. Use the PLUS and MINUS keys to select a security level for this password.
7. Press ENTER to confirm the password and security level.
8. Repeat the above steps to enter or change another password.
9. When done, press CANCEL to return to the Controller Information screen.

Security Levels

0	This is the most secure level. Level 0 users cannot change parameters or settings.
1	User can change the Animal Information.
2	User can change the Setpoint Temperature and the Ramping Offset (if the zone is ramping) and Time and Date.
3	User can change the feeder timers, light timers, temperature alarms and variable speed power settings.
4	User can change all parameters except for adding, deleting and changing control devices and passwords.
5 – 7	User is allowed to make any changes. Level 5 is required to view Error Detail menus.
9	Service code for technician or a user single-day code available from manufacturer.

Compile Options

```
Compile Options:  EBMYNYYYXF
```

This menu item provides a quick look at the controller's configuration. It is useful for troubleshooting over the phone with a service technician. It is not important to know what the code shown after Compile Options signifies. This menu item will only appear for users with a password security level of 5 or when no passwords and security levels have been set up.

Current Environmental Conditions Menu

Average Actual Temperature

`Avg Actual Temperature:    72.3`

This is an average of all indoor air sensors. If the controller detects erroneous sensor readings it does not use them to calculate the average temperature. Sensor readings outside the temperature range of -60 degrees to 160 degrees Fahrenheit or -51.1 to 71.1 degrees Celsius are ignored.

Average Actual - Effective Temp

`Avg Actual-*-Effective Temp:    70.5`

```
Cancel   CURRENT ENVIRONMENT CONDITIONS      Z1-S01    05:35:43
                                                       04/16/20
         Avg Actual Temperature:    72.3
         Avg Actual-*-Effective Temp:    70.5
         Sensor Temps: #1  72.0  72.6  ----  ----
         Outside Temp:    65.8
         Avg Air MPH: #1    1.2    1.5    ----  ----
         Relative Humidity: 55 --- ---    avg: 55
         Static Press: 0.050  water (Ramping OFF)
         Ventilation Mode: Natural Temp
         Animal Stress Index: DANGER
```

This reading is based on the actual/effective mix set in the Temperature Control Settings menu. Effective temperature takes into account the effect that air speed has on how comfortable an animal feels. If there is no air sensor, *"Avg Actual - * Effective Temp: N/A"* is displayed. *(requires an air temp/speed sensor such as Air Sensor Model 935).*

> **If you use the Effective Environmental Temperature feature, YOU MUST:**
> - **Enter Animal Age**
> - **Enter Animal Weight**
> - **Enter Projected Age**
> - **Enter Projected Weight**
> - **Use Air Speed/Temp Sensors**
> - **Clean Sensors WEEKLY**

Sensor Temperatures

`Sensor Temps: #1  72.0  72.6  ----  ----`

The controller displays current temperatures for 1-12 indoor sensors (this may require up to (3) lines to display). The sensor number shown on the screen is the first sensor in the listing *(if the number is #1, the temperatures are for sensors one, two, three and four)*. A series of dashes indicates a sensor is not installed. N/A indicates a sensor with an invalid reading *(the reading is too high, too low, or there is no reading).*

> **If there is an "*" in front of the sensor reading, there is a problem with the reading and the sensor is not being used to control devices or to calculate the avg. temperature. If the sensor is not being used (has a * next to it), there should be an active alarm associated with it.**

Outside Temperature

`Outside Temp:    65.8`

This is the reading from the outside temperature sensor. Outside temperatures from -60 degrees to 160 degrees Fahrenheit or -51.1 to 71.1 degrees Celsius are considered valid.

Air Speed

`Avg Air MPH: #1    1.2    1.5    ----  ----`

6.9 MPH is the fastest air speed reported.

Because air speed is measured using a resistive thermal sensor, high accuracy should not be expected. The objective is to determine the overall effect air speed has on the animal's comfort level. The air speed shown is averaged over several minutes. Multiple readings are listed the same as the sensor temperatures. OFF indicates the air speed capability for a sensor has been turned off (refer to the Air Sensor Settings section later in this document) and a series of dashes indicates the sensor is not installed. N/A is displayed for any sensor with an invalid reading. This menu item requires an air temp/speed sensor such as Air Sensor Model 935 and an EET-capable controller.

Relative Humidity

`Relative Humidity: 55 --- ---    avg: 55`

This menu item is displayed only if there is at least one relative humidity sensor installed. A total of 3 humidity sensors per zone can be installed. The average reading of the installed sensors will be used during the operation of the controller. Humidity can be difficult to accurately measure, especially in a confinement building environment where the air is generally contaminated. Factory fresh sensors are typically accurate to plus or minus 5 percent. Long-term accuracy depends greatly on the level of impurities in the air.

Static Pressure

`Static Press: 0.050  water (Ramping OFF)`

This menu item is displayed only if there is a static pressure sensor installed. The Ramping OFF status indicates the temperature is beyond the low or high end of the ramp table or that you have not set a ramp table. ON indicates the static pressure setpoint is adjusted based on the ramp table. Refer to the Static Pressure Setting section for static pressure ramping information.

Ventilation Mode

`Ventilation Mode: Natural Temp`

Devices operate differently in different modes, so knowing the ventilation mode helps you understand what the controller is doing. Seven possible modes can be displayed:

- **Natural Temp** – The building is currently using devices designated as natural (natural, power, or minimum ventilation). All tunnel-only and purge-only devices should be off or closed.
- **Entering Purge** – The building is transitioning into purge mode. Non-purge curtains, inlets and fans are closing or turning off. Purge curtains and inlets are opening to the specified purge opening size.
- **Purging** – All non-purge devices are off or closed and purge devices are running or open to the specified purge opening size. The building remains in this mode for the duration specified under the Building Purge Setting menu.
- **Exiting Purge** – The building is transitioning out of purge mode. All devices designated as purge are closing or turned off.
- **Entering Tunnel** – The building is transitioning into tunnel mode. All inlets and curtains are opening to their "Tunnel Entry Size' setting and fans are either on or off, depending on their "Run While ENTRY/EXIT of Tunnel Mode" setting.
- **Tunnel** – The building is in tunnel cooling mode. All devices designated as natural only are off or closed. Only devices designated as tunnel are enabled.
- **Exiting Tunnel** – The building is transitioning from tunnel mode back to natural. All inlets and curtains are opening to their "Tunnel Exit Size' setting and fans are either on or off, depending on their "Run While ENTRY/EXIT of Tunnel Mode" setting.

Animal Stress Index

`Animal Stress Index: DANGER`

The Animal Stress Index provides an indication of your animals' comfort level. It takes into account the combined effects of air temperature, air speed, floor type, animal weight and animal age. The four responses are:

- Not Stressed
- Alert
- Danger
- Emergency

> **If "Today's Age", "Today's Weight", "Finish Age" and "Finish Weight" are set to zero/zero's, the stress index will not be displayed. This is only available for hogs.**

Control Equipment Status Menu

The Control Equipment Status menu shows the status of the ventilation equipment in the building. The screens are automatically updated as the status changes.

> There will be a line shown for each device group (images below only show Group #1 of each device). No line will be shown for any group number which is not configured.

Any device that has an **ON/OFF** status menu, may also have (SW ON) or (SW OFF) on the menu when the output channel's toggle switch is in a position that contradicts the expected on/off status.

```
Cancel   CONTROL EQUIPMENT STATUS      Z1-S01    12:53:46
                                                 04/16/20
         Brooder Group #1: OFF
         Furnace Group #1: OFF
         VariHeater #1: OFF
         VariBrooder #1: OFF
         VariLights #1: OFF
         Stir Fan Group #1: OFF
         Sidewall Fan Group #1: OFF
         Tunnel Fan Group #1: OFF
         Ridge Fan Group #1: OFF
Page     Hemi Fan Group #1: OFF
Down     Vari-Stir Fan #1: OFF
```

```
Cancel   CONTROL EQUIPMENT STATUS      Z1-S01    12:53:50
                                                 04/16/20
         Vari-Side Fan #1: OFF
         Vari-Tunnel Fan #1: OFF
         Vari-Ridge Fan #1: OFF
         Vari-Hemi #1: OFF
         VFD-Stir Fan #1: OFF
         VFD-Sidewall #1: OFF
Page     VFD-Tunnel #1: OFF
Up       VFD-Ridge #1: OFF
         VFD-Hemi #1: OFF
Page     Cool Pad Low Group #1: OFF
Down     Cool Pad High Group #1: OFF
```

```
Cancel   CONTROL EQUIPMENT STATUS      Z1-S01    15:40:35
                                                 04/16/20
         In House Fog Group #1: OFF
         Side Curtain #1 Open:    0.0"
         Sidewall Inlet #1 Open:   0.0"
         Tunnel Inlet #1 Open:    0.0"
         Ceiling Inlet #1 Open:    0.0"
         Ridge Vent #1 Open:    0.0"
Page     Chimney Damper #1 Open:    0.0"
Up       Feeder Group #1: OFF
         24Hr Feed Sensor #8:  0:00, 0:00, 0:00
Page     Feed Sensor #8 Total Run:  0  0:00:00
Down     Lights Group #1: OFF
```

```
Cancel   CONTROL EQUIPMENT STATUS      Z1-S01    15:40:41
                                                 04/16/20
         Digital Alarm Group #1: ON
         Whisker Switch Group #1: OFF
         24Hr Water #1 Used:      0,   0,    0
         Water #1 Total Gallons Used:     0


Page
Up
```

Brooders / Furnaces / Heaters

```
Brooder Group #1: OFF
```

The current ON/OFF status of an individual furnace group is shown (brooder and heater are similar).

Vari-Brooders and Vari-Heaters

```
VariHeater #1: OFF
```

The current ON/OFF status of an individual heater group is shown. If the heater is on, the current BTU output of the heater is shown.

Vari-Lights

```
VariLights #1: OFF
```

The current ON/OFF status, as well as the current power level, of an individual light group is shown.

Fans

`Stir Fan Group #1: OFF`

Fixed speed fan groups can only be **OFF** or **ON**. Variable speed fan groups can be **OFF** or **ON** at power settings that range from 1 (minimum) to 60 (full on), VFD fan groups can be **OFF** or **ON** at power levels between 1% and 100%.

> **Variable speed fans require a controller model with variable speed channels or the ability to communicate with a variable speed expansion station. VFD fans require a 0-to-10 volt Analog Output board installed in the unit.**

In House Fog, Cool Pads and Misters

`Cool Pad Low Group #1: Duty Cycle 3: ON`

In house fog, cool pad and mister operation is controlled using temperature and one of four variable duty cycle timers. The example above shows Cool Pad Low Group number 1 (#1) is currently controlled by Duty Cycle timer three.

Curtains, Ridge Vents, Chimneys, and Inlets

`Side Curtain #1 Open:    0.0"`

Device motor run times (or position sensors if installed) are used to calculate the current opening size of curtains and inlets. "**Sync**" or "**Exercise**" will appear at the end of the second line if the airway device is currently performing one of those features.

Equipment Timers

`Lights Group #1: OFF`

The ON/OFF status for the various timers used to control lights and feeders.

`24Hr Feed Sensor #8:  0:00, 0:00, 0:00`

The 24-hour feed sensor run times are in hrs:min format. The times are taken from the three most recent 24-hour periods in the historical data (excluding the current hour). The most recent 24-hour total is displayed as the left-most data.

> **The 24Hr. Feed Sensor run times show how long a device was actually running during the previous three 24-hour periods. The feed sensors are monitored at all times. The feed sensor group number does not have to match a feeder's group number to work. But if you want to activate an alarm whenever a feeder is off longer than it should, a feed sensor needs to be assigned the same group number as the feeder.**

`Feed Sensor #8 Total Run:  0  0:00:00`

Run time is totaled for each feed sensor (days, hours, minutes and seconds). Press ENTER after selecting/highlighting the total to reset it to zero. Press ENTER again when the pop-up appears to confirm the reset. Press CANCEL to leave as is.

Digital Alarm Group

`Digital Alarm Group #1: ON`

Displays the current status of the digital alarm sensors. ON indicates the device in currently in the Active state, and will trigger an alarm if left in this state for the set time limit. How you have the digital alarm set will determine if the Active state is ON when the input indicates the device is open or when it is closed.

Whisker Switch Group

`Whisker Switch Group #1: OFF`

Displays the current status of the whisker switch sensors. OFF indicates that the sensor circuit is open and the inlet/curtain is closing. ON indicates a closed circuit and the inlet/curtain is opening.

Water Use

`24Hr Water #1 Used:     0,    0,    0`

The amount of water used in the three most recent 24-hour periods, with the left most total being the most recent.

`Water #1 Total Gallons Used:     0`

The Total Gallons Used for each water meter is displayed. Press ENTER while viewing the total to reset it to zero. Press ENTER again when the pop-up appears to confirm the reset. Press CANCEL to leave as is.

Current Animal (Hog/Bird) Information Menu

Weight Gain Progress

`Today's Age:   0 Days   Weight:   0.0LB`

`Finish Age:    0 Days   Weight:   0.0LB`

```
┌────────┬───────────────────────────────┬──────────┐
│ Cancel │ CURRENT ANIMAL INFORMATION  Z1-S01 │ 12:54:05 │
│        │                                    │ 04/16/20 │
│        Today's Age:   0 Days   Weight:   0.0LB      │
│        Finish Age:    0 Days   Weight:   0.0LB      │
│        Beginning Head Count:     1                   │
│        Mortality Head Count:     0                   │
│        Total Sold Head Count:    0                   │
└─────────────────────────────────────────────────────┘
```

The controller tracks animal age and weight. However, you must input the initial age and weight at the start of a production cycle. Each day at midnight, the age is incremented by one and a new weight is calculated. You must input the projected finishing age and weight for this calculation to work properly. The temperature ramping feature uses the animal age value. Some stress index calculations (if the controller supports stress index) use the age and weight values.

Head Count Information

`Beginning Head Count:     1`

`Mortality Head Count:     0`

`Total Sold Head Count:     0`

The head count numbers are for your record keeping.

⚠️ **Setting the Beginning Head Count to 0 or the Temp control to Off, in effect, shuts down the controller. It also disables most alarms.**

Changing Current Animal Information

To change the Head Count information, you enter the increase or decrease in the count and the controller will update the actual count. Only the hourly change in the Mortality Head count is saved in the history record for each hour.

History Menu

```
Cancel    HISTORY FOR 06/20/2020 AT 15:00 Z1-S01      15:19:24
                                                      06/02/20
          Temperature Control: *----------
          House Control Mode: Growout2
          Setpoint Temperature:  70.0
          Zone Avg Temperature:  70.0
          High/Low Temps (actual):  70.0/ 70.0
          Low   70.0 @ 14:00   High  70.0 @ 14:00
          Avg Air Speed (MPH):    0.0
          Avg Outside Temp:  70.0                     Hour +
          Avg Humidity:  50%
Page      Static Pressue Setpoint:  0.040             Hour -
Down      High/Low Static Pressure: 0.040/ 0.040
```

```
Cancel    HISTORY FOR 06/20/2020 AT 15:00 Z1-S01      15:19:35
                                                      06/02/20
          Purge Cycles (Humidity/Timed):  0/  0
          Mortality Changed this hour by:    +0
          Minutes at "ALERT" Stress Index: 5
          Minutes at "DANGER" Stress Index: 10
          Minutes at "EMERGENCY" Stress Index: 5
          Brooder #1                 C- 0:00 A- 0:00
Page      Furnace #1                 C- 0:00 A- 0:00
Up        Heater #1                  C- 0:00 A- 0:00   Hour +
          VariHeater #1         OK C- 0:00 A- 0:00
Page      Stir Fan #1                C- 0:00 A- 0:00   Hour -
Down      Sidewall Fan #1            C- 0:00 A- 0:00
```

```
Cancel    HISTORY FOR 06/20/2020 AT 15:00 Z1-S01      15:19:35
                                                      06/02/20
          Tunnel Fan #1              C- 0:00 A- 0:00
          Pit Fan #1                 C- 0:00 A- 0:00
          Ridge Fan #1               C- 0:00 A- 0:00
          Hemi Fan #1                C- 0:00 A- 0:00
          Vari-Stir Fan #1           C- 0:00 A- 0:00
          Vari-Side Fan #1           C- 0:00 A- 0:00
Page      Vari-Tunnel Fan #1         C- 0:00 A- 0:00
Up        Vari-Pit Fan #1            C- 0:00 A- 0:00   Hour +
          Vari-Ridge Fan #1          C- 0:00 A- 0:00
Page      Vari-Hemi Fan #1           C- 0:00 A- 0:00   Hour -
Down      VFD-Stir Fan #1            C- 0:00 A- 0:00
```

```
Cancel    HISTORY FOR 06/20/2020 AT 15:00 Z1-S01      15:19:35
                                                      06/02/20
          VFD-Sidewall #1            C- 0:00 A- 0:00
          VFD-Tunnel #1              C- 0:00 A- 0:00
          VFD-Pit #1                 C- 0:00 A- 0:00
          VFD-Ridge #1               C- 0:00 A- 0:00
          VFD-Hemi #1                C- 0:00 A- 0:00
          Cool Pad Low #1            C- 0:00 A- 0:00
Page      Cool Pad High #1           C- 0:00 A- 0:00
Up        Mister #1                  C- 0:00 A- 0:00   Hour +
          In-House Fogger #1         C- 0:00 A- 0:00
Page      Feeder #1                  C- 0:00 A- 0:00   Hour -
Down
```

```
Cancel    HISTORY FOR 06/20/2020 AT 15:00 Z1-S01      15:19:35
                                                      06/02/20
          Side Curtain #1 Avg Open:    0"
          Side Curtain #1    Actual O- 0:00 C- 0:00
          Sidewall Inlet #1 Avg Open:   11"
          Sidewall Inlet #1 Actual O- 2:07 C- 0:00
          Tunnel Inlet #1 Avg Open:    1"
          Tunnel Inlet #1    Actual O- 2:07 C-16:48
Page      Ceiling Inlet #1 Avg Open:    1"
Up        Ceiling Inlet #1   Actual O- 2:07 C-16:52   Hour +
          Ridge Vent #1 Avg Open:   13"
Page      Ridge Vent #1      Actual O- 1:35 C- 0:00   Hour -
Down
```

```
Cancel    HISTORY FOR 06/20/2020 AT 15:00 Z1-S01      15:19:47
                                                      06/02/20
          Chimney Damper #1 Avg Open:   1"
          Chimney Damper #1 Actual O- 2:07 C-16:52
          Feed Sensor Grp #1 ON Time: 19:11
          Water Meter #1 Gallons Used:    8
          System Restart Incidents:  1


Page                                                  Hour +
Up

                                                      Hour -
```

The controller tracks operating conditions and equipment status. This information is totaled or averaged for each one-hour period and then saved to memory and can be retrieved. The "**Searching History Record for Data**" message will display each time the four keys are pressed. This message may appear for a split second or for many seconds (10, 20, or more) depending on what screen and/or date/time is being changed.

> **Each zone has its own history record. The user has to press the ZONE key to view the history of a different zone. When the Zone key is pressed, the "Z1" in the "Z1-S02" right upper corner of the display will change to show which zone is being viewed. The zone numbers will scroll in order as you press the Zone key.**

Scroll to History by Date

• Press the **HISTORY HOT-KEY** to open the "**HISTORY FOR**" screen.
• Then press the **Hour +** or **Hour -** button, or the **Plus** or **Minus** hardware key to scroll the hour and date displayed.
• The date and hour in the header will change as you press the **Hour +** and **Hour -** buttons or **Plus** and **Minus** hardware keys.
• Holding a button or hardware key down will cause the displayed hour to change faster.

Scroll pages within a Date

• Press **HISTORY HOT-KEY** to open the "**HISTORY FOR**" screen.
• Use the **Page Up** or **Page Down** buttons, or the **Down Arrow** or **Up Arrow** hardware keys to view additional pages of history.

> **History storage capacity is influenced by the number of devices that are installed. This history record fills quicker when more devices are being read. When the memory storage is almost full, the history and alarm records are deleted by oldest dates to make room for the new history. The SD card can hold many years of history records, but the Ventra XT™ will only display the history records for the current year and the previous year (12 to 24 months, depending on the time of year).**

The optional Link Software package is a great way to download history data from the controller and display it on a PC in table or chart format.

Historical Environmental Conditions Stored

`Temperature Control: *----------`

`House Control Mode: Growout2`

`Setpoint Temperature:  70.0`

`Zone Avg Temperature:  70.0`

`High/Low Temps (actual):  70.0/ 70.0`

`Avg Air Speed (MPH):    0.0`

`Avg Outside Temp:  70.0`

These menu items display the measured environmental conditions including temperature, air speed and humidity. The setpoint temperature is recorded once per hour. The average temperature calculation uses actual, effective, or a percentage of effective temperature depending on the Temperature Control Mode. With the Temperature Control Mode set to OFF, actual temperature is used.

Daily High and Low Temperatures

`Low    70.0 @ 14:00   High  70.0 @ 14:00`

The daily high and low temperature (for a 24-hour period - full day) is displayed with the hour of the day that each temperature was recorded. The high and low temperatures displayed are shown for the date shown in the top line of the display. To change to a different day, press the **Hour +** or **Hour -** button, or the **Plus** or **Minus** hardware key until the date desired is displayed on the top line.

Static Pressure

`Static Pressue Setpoint:  0.040`

`High/Low Static Pressure: 0.040/ 0.040`

When a static pressure sensor is installed, static pressure information is stored. Refer to the Static Pressure Setting section, for more information.

Purge Cycles

`Purge Cycles (Humidity Timed):   0/  0`

The controller records the number of purge cycles each hour.

Mortality Change

`Mortality Changed this hour by:     +0`

The controller records the mortality change each hour. Say you add 5 dead and then subtract 2 the hourly total will display 3.

Stress Index

`Minutes at "ALERT" Stress Index: 5`

`Minutes at "DANGER" Stress Index: 10`

`Minutes at "EMERGENCY" Stress Index: 5`

The animal stress index provides an indication of your animals' comfort level. It takes into account the combined effects of air temperature, air speed, floor type, animal age and animal weight. These menu items are displayed only when there is information to report (stress minutes is greater than zero).

On Times - all fans, all heaters, cool pads/misters/foggers, feeders

`Sidewall Fan #1          C- 0:00 A- 0:00`

The controller saves historical information for all devices except lights. The Times listed are in minutes and seconds for a given hour and the controller has the ability to record actual on time as well as the time a device should have been on.

The time listed next to C is the time a device should have operated according to the controller's settings. The time listed next to A is the actual time a device operated. If the C and A times are different, the channel switch was probably not on Auto during the time period.

Opening Sizes - all inlets, curtains, ridge vents and chimney dampers

`Sidewall Inlet #1  Avg Open:  11"`

The controller saves historical opening size information for curtains, inlets, ridge vents and chimney dampers. The number of inches open is a running average for the hour.

`Sidewall Inlet #1 Actual O- 2:07 C- 0:00`

The time listed next to O is the time spent opening and the time listed next to C is the time spent closing. These are actual times rather than the times expected according to the controller's settings.

Water Use

`Water Meter #1 Gallons Used:     8`

The amount of water consumed is often used as an indicator of animal health.

System Restart

`System Restart Incidents:    1`

Every time the controller performs a power-up restart, the System Restart incident counter for that hour is incremented by one. A restart may occur as a result of a power loss, system reset, or watchdog reset. This is a troubleshooting aid.

Runtimes and Average BTU Output

`VariHeater #1        OK C- 0:00 A- 0:00`

For the Vari-Brooders and Vari-Heaters, the average BTU output for the hour of the heater is shown before the runtimes. This average BTU value is calculated only while the heater was running.

Temperature Control Settings Menu

The controller makes many decisions based on temperature. The Temperature Control Settings menu allows you to input preferences for temperature-related decisions. Be sure to complete these menu items before setting up specific devices (fans, heaters, etc.). The information entered here, especially temperature setpoint, impacts most installed devices.

```
Cancel   TEMPERATURE CONTROL SETTING      Z1-S01    12:54:31
                                                    04/16/20
         Temp Setpoint:  70.0         (Ramping Off)
         Temp Control: Actual *---------- Eff.
         House Control Mode: Growout2
         Ridge to Curtains: NO INTERLOCK
         Heater to Curtains: NO INTERLOCK
         ENTER Tunnel Temperature:  85.0
         EXIT Tunnel Temperature:  80.0
         Remain in Tunnel Time:  1:00:00
         Enable Tunnel Entry. Outside Temp:   0.0
 Page    Today's Age:   0 Days
 Down    Floor Type: CONCRETE
```

```
Cancel   TEMPERATURE CONTROL SETTING      Z1-S01    15:16:14
                                                    04/16/20
         Close Curtains Below Outside Temp: -60.0
         Temperature Ramp Offset:  +0.0
         Ramp Point # 1 Age:   0    Temp:  70.0
         Ramp Point # 2 Age:   0    Temp:  70.0
         Ramp Point # 3 Age:   0    Temp:  70.0
         Ramp Point # 4 Age:   0    Temp:  70.0
 Page    Ramp Point # 5 Age:   0    Temp:  70.0
 Up      Ramp Point # 6 Age:   0    Temp:  70.0
         Ramp Point # 7 Age:   0    Temp:  70.0
 Page    Ramp Point # 8 Age:   0    Temp:  70.0
 Down    Ramp Point # 9 Age:   0    Temp:  70.0
```

```
Cancel   TEMPERATURE CONTROL SETTING      Z1-S01    15:16:44
                                                    04/16/20
         Ramp Point #10 Age:   0    Temp:  70.0
         Ramp Point #11 Age:   0    Temp:  70.0
         Ramp Point #12 Age:   0    Temp:  70.0




 Page
 Up
```

Temperature Setpoint

```
Temp Setpoint:  70.0         (Ramping Off)
```

This is your target building temperature. The controller calculates the on and off temperatures for devices based on the current temperature setpoint.

Changing the Setpoint will cause the following temperature settings to change:

- ***Temperature Control Settings***
- ***Purge and Minimum Vent Settings***
- ***Sound Alarm When settings***
- ***Fixed Fans; Stir, Sidewall, Tunnel, Ridge, Pit, Hemi***
- ***Variable Fans; Stir, Side, Tunnel, Ridge, Pit, Hemi***
- ***VFD Fans; Stir, Side, Tunnel, Ridge, Pit, Hemi***
- ***Heater Settings; Brooder, Furnace, Heater***
- ***Variable Heaters: Brooder, Heater***
- ***Mister Settings; In House Fogger, Cool Pad Low/High, Mister***
- ***Curtains***
- ***Inlets: Side, Tunnel, Ceiling***
- ***Ridge Vents***

Set the Temp Setpoint manually or have the temperature ramping feature automatically adjust it every day at midnight. If the animal age is within the age settings in the temperature setpoint ramp table (explained later), ramping is ON. When ramping is ON, the setpoint may NOT be manually adjusted. Temperature settings for control devices (fans, heaters, etc.) automatically track along with temperature setpoint changes.

> ℹ️ **You should determine what your temperature setpoint will be before inputting or editing individual temperature settings for control devices.**

Controlling Building Temperature: Actual or Effective

`Temp Control: Actual *---------- Eff.`

Actual or effective temperature, or a blend of the two, can be used to control the building environment. This is called the working temperature. The controller uses the ***working*** temperature to determine when to turn devices on and off. The Temp Control can also be set to OFF. ***See NOTE below on what happens when "Temp Control" is set to* OFF.** ***Effective*** takes into account the effect that air speed has on how comfortable the animal feels. ***Actual*** uses the actual air temperature only.

When setting the temperature control, use the **PLUS** or **MINUS** keys to move the asterisk (*) right or left, or to select the OFF mode (the asterisk is replaced by the word OFF). Moving the asterisk to the right increases the amount of effective temperature used to calculate the working temperature. If you are not using an air speed/temp sensor such as Air Sensor Model 935, move the asterisk fully toward Actual.

> 📝 **The OFF mode causes the controller to turn off all temperature controlled output devices and disable the normal alarms. Changing Temp Control to OFF also sets the Beginning Head Count (Current Animal Information menu) to zero and turns off all output channels, so no fans, inlets, etc. will work. The controller still continues to read inputs and store history. This mode is designed to conserve energy costs when the building is empty.**

House Control Mode

`House Control Mode: Growout2`

This determines which sensors are used for calculating the working temperature. The working temperature is used to determine when devices should be turned on or off. Most producers designate a section of their building for Brood. All of the air sensors in that area of the building are then Brood sensors. Refer to the Air Sensor Settings section for information about specifying the location of an air sensor. The rest of the building can be one or two more sections: Growout 1 and Growout 2.

Growout2 Area

Growout1 Area

Brood Area

In this example, the birds initially occupy the brooding area in the center of the building. As the birds grow and require more space, the Growout1 and Growout2 areas are opened up.
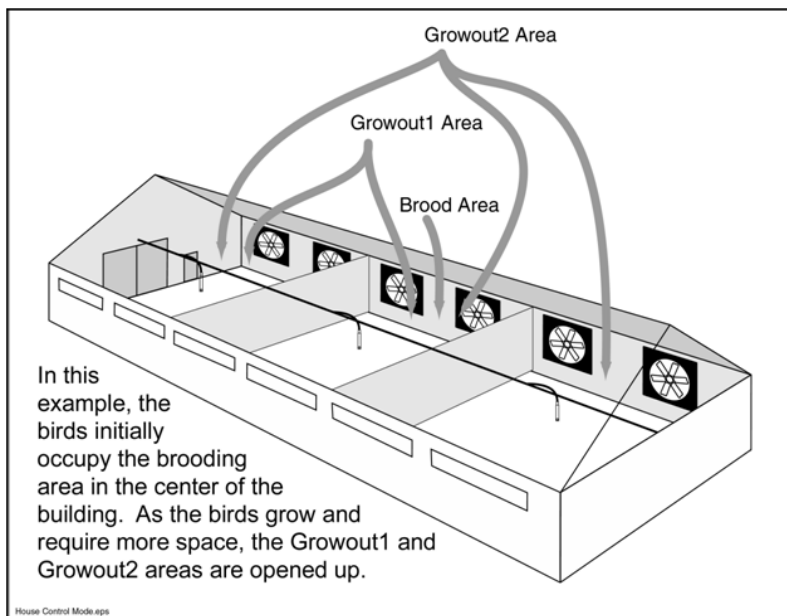
House Control Mode.eps

> When the House Control Mode is Brood, only sensors in the Brood area are used by the controller. When you move from Brood to Growout 1, or from Growout 1 to Growout 2, remember to change the House Control Mode menu item.

Interlocking

`Ridge to Curtains: NO INTERLOCK`

`Heater to Curtains: NO INTERLOCK`

You can interlock devices together so that the operation of one device affects the operation of another device. These menu items only appear when the related devices are installed.

To enable interlocking, set Ridge to Curtains and/or Heater to Curtains to one of the **INTERLOCK** modes.

When interlocking is enabled, a menu is added to the Ridge and Heater/Brooder/Furnace menus that allow you to specify the curtain groups to interlock with the device. This includes the variable heater and brooder devices.

Interlocking ridge vents to curtains can enhance air quality in the building while maintaining good temperature control. When ridge vents are interlocked, their open or close settings are ignored. All ridge vents open the same number of inches as the interlocked curtain having the largest opening size. For example, the maximum curtain opening size is 48 inches and the maximum ridge opening size is 10 inches. As the curtains open the ridge will also open, tracking the curtain in that zone that is open the most. As soon as any curtain in the group is 10 inches open, all ridges in that zone will be fully open (this example assumes that ALL curtain groups are interlocked).

When interlocking is enabled for a heater (or furnace or brooder), and the controller detects that the heater's ON temperature has been reached, the heater will not turn on if the interlocked curtains are open more than about one inch or 2.54 centimeter. Set the Heater to Curtain interlock to **Zone Interlock** to use curtains/ridge vents in the current zone only or to **All Zone Interlock** to keep the heater from turning on if any curtain in any zone is open. The word "Curtains" in the Interlock menu items also includes ridge vents. Only the word Curtain appears due to the limited display size.

Refer to the *Ridge Vent Settings* and the *Furnace, Heater and Brooder Settings* sections for more information.

Tunnel Settings

`ENTER Tunnel Temperature:  85.0`

`EXIT Tunnel Temperature:  80.0`

You can set up the temperatures for entering and exiting tunnel mode. Tunnel mode takes over when the working temperature reaches the tunnel entry temperature. For example, you may be running sidewall fans to keep the building temperature below 80 degrees. But on a hot day, this might not be enough to keep the temperature below 80 degrees, so tunnel mode begins at 83 degrees to create a wind chill effect for the animals.

The controller follows these steps when tunnel mode starts:
- Fans designated to run during Tunnel entry and exit will turn on. Other fans will turn off, regardless of their run modes.
- Purge and minimum ventilation times are overridden and cease to function until the building returns to natural mode.
- All inlets and curtains, regardless of their operating mode, will begin to move to their set Tunnel Enter size. Tunnel mode will start once all the inlets and curtains are opened to at least their Tunnel Enter size.
- If you stage the tunnel fans on at different temperatures (set each fan's ON Temp setting), inlets will open wider proportionally to the number of fan groups running.

> During Tunnel Exiting, all inlets and curtains, regardless of their operating mode, will begin to move to their set Tunnel Exit size. Natural mode will start, and the inlets/curtains will return to their normal operations, once all the inlets and curtains are opened to at least their Tunnel Exit size.

`Remain in Tunnel Time:  1:00:00`

Input the minimum time the building must remain in tunnel mode. This prevents the ventilation system from going out of tunnel mode too quickly. However, the controller overrides the minimum time if the working temperature drops to the setpoint. Don't set the minimum time too long since it is possible the temperature could fall to the EXIT Tunnel Temperature and turn off the fans before the minimum time expires leaving you with no ventilation.

`Enable Tunnel Entry. Outside Temp:    0.0`

You can prevent the controller from entering Tunnel mode if the outside temperature is too low. Set the Enable Tunnel Entry, Outside Temp value to the temperature where the outside temperature has to be above to allow tunnel mode. An Outside Temperature Sensor has to be installed for this menu to appear.

> Refer to the *Progressive Heating and Cooling Example* section, for more information on staging tunnel groups.

Temperature Ramping

`Today's Age:    0 Days`

`Ramp Point # 1 Age:    0   Temp:  70.0`

You can automatically adjust the building temperature to the animals' needs by creating a ramp table with appropriate temperature values and ages. The animal age used here is the same animal age used within the Current Animal Information menu.

A ramp point is an age at which you want the building (or zone) to be at a specific temperature. Set a series of ramp points, up to 12, to adjust temperature over a growing cycle. The Age settings in the ramp table should be in ascending order. A decrease in age from one Ramp point to the next will cause the ramping to stop at that age.

Each day at midnight, the controller scans the ramp table and a new temperature setpoint is determined and substituted for yesterday's setpoint. The controller selects the setpoint temperature based on the ramp point ages and temperatures. For in-between ages and temperatures, the controller calculates an appropriate setpoint temperature (see graph below). This allows subtle temperature changes from day to day.

`Temperature Ramp Offset:  +0.0`

If you enter a Temperature Ramp Offset, it is added (or subtracted) from the temperature determined by the ramp table. This allows you to temporarily adjust a ramp table without re-entering all the values.

> You can also adjust all ramp point temperature values by editing the Temperature Ramp Offset value, and then holding the ENTER key for several seconds. After the values have been updated, the Temperature Ramp Offset value will be 0. You must manually readjust temperatures to return the ramp table to the previous values.

The graph below illustrates how up to 12 ramp points might be configured.

Notice in the graph how the temperature ramps smoothly between ramp point ages. Also note how the temperature stays constant at 65 degrees beyond the age of 100. The reason is the age for Ramp Point 11 is a descending value (100 days down to 90 days) which disables further ramping.
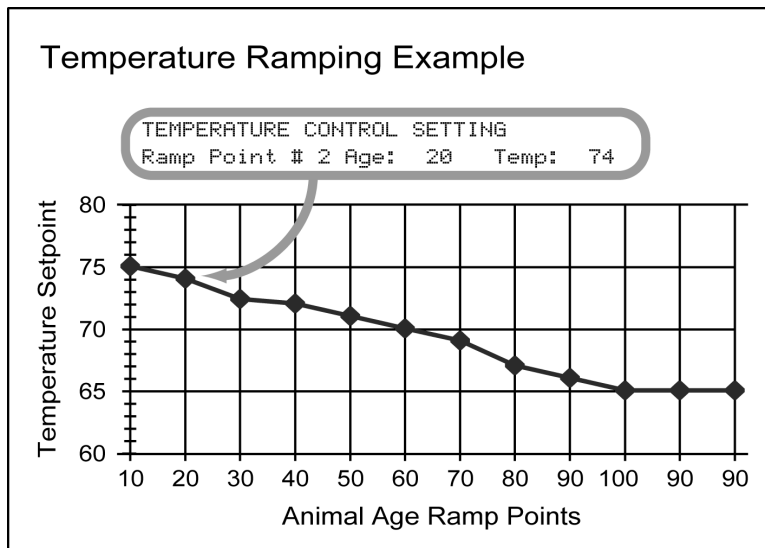
Floor Type

`Floor Type: CONCRETE`

The floor type of the building (or zone) contributes to the calculated effective temperature. It should be set to CONCRETE for all concrete slab surfaces and OTHER for all other floor types.

Curtain Temperature Inhibit

`Close Curtains Below Outside Temp: -60.0`

Set an outside temperature at which all natural curtains in the building (or zone for multi-zone controllers) are not allowed to open. This menu only appears if at least one fan capable of providing minimum ventilation and an outside temperature sensor are installed. The curtain inhibit does not affect purge cycles, static pressure controlled curtains, or tunnel mode curtains. When the temperature rises to at least one degree higher than this setting, normal operation resumes. Enter -60 to have the controller ignore this setting.

This setting does not change when the setpoint temperature changes.

Minimum Venting and Purging

Introduction

Purging is the process of evacuating stale contaminated air and replacing it with fresh outside air. Any combination of fans and inlets can be set up to purge.

Minimum ventilation is the process of bringing outside air into a building even when the indoor temperature and humidity do not require it. This helps keep ammonia, dust and carbon dioxide from accumulating. When outside temperatures are cold, minimum ventilation may be necessary even though you are also heating the building.
You will see one of two menus depending on how the building is set up:

- Building Purge Setting menu - If no fans, or only stir fans are installed, the controller assumes you are running a simple **natural-ventilated building** and displays the Building Purge Setting menu.
- Minimum Ventilation and Purge Settings menu - If fans (other than stir fans) are installed, then the controller assumes you are running a **power-ventilated building** and displays the Minimum Ventilation and Purge Settings menu.

> **The humidity-related menu items shown below appear only when at least one humidity sensor is installed. If more than one Humidity sensor is installed, the average reading of all sensors is used to determine if the purge should be performed.**

Building Purge Setting Menu

Natural Ventilation

If you are running a natural-ventilated building, the Building Purge Setting menu is displayed.

| Cancel | BUILDING PURGE SETTING | Z1-S04 | 13:39:38 06/03/20 |

Purge Time ON: 0:00:01 Delay: 3:00:00
Humidity Purge Setpoint: 100%
Humidity Purge ON 0:00:00 Delay 1:00:00
Purge Inhibit Temp LOW: 60.0 HIGH: 74.0
Before purge raise Temperature to: 70.0
Time to Abort Heat before Purge: 0:00

Conditions for Purging

A purge cycle can be triggered by the Purge Delay timer or by the Humidity Delay timer. The purge cycle runs for the time specified by either the Purge Time ON or the Humidity Purge ON depending on which delay timer triggered the purge cycle. The two possible purge conditions are:

- All curtains and ridge vents have been fully closed for the duration specified by the Purge Delay timer. Air inlets are not considered to be curtains when checking for all curtain devices closed. Or,
- All curtains and ridge vents have been fully closed and the humidity level has been continuously at or above the Humidity Purge Setpoint for the duration specified by the Humidity Delay timer.

Normally the Humidity Delay timer would be set for less time than the Purge Delay timer so that under high humidity conditions a purge cycle would take place more frequently. The default Humidity Setpoint of 100% disables the humidity purge.

> **When a purge occurs in a natural-ventilated building, the curtains and inlets open to the Purge Opening Size that you entered for each device group.**

Purge Time On and Delay Time

`Purge Time ON:  0:00:01  Delay:  3:00:00`

The Purge Time ON determines how long the building will purge when triggered by the Purge Delay timer. The Purge Delay timer is the length of time the building must be continuously closed before starting a purge.

> The rule that having pit fans means a building is "power ventilated" may cause a problem for growers who use only pit fans and curtains. The Purge Time ON menu item is not available for power ventilated buildings. The solution is to install the Pit Fans as Stir Fans so that the Purge Time ON menu item is available.

Humidity Purge Setpoint

`Humidity Purge Setpoint:  96%`

If the building is closed and the humidity rises above this setting for the length of the Humidity Delay timer, a purge is initiated. If the humidity sensor gives a bad reading, humidity purges will not occur, but timed purges will occur.

Humidity Purge On Time and Delay Time

`Humidity Purge ON 0:00:01 Delay 1:00:00`

The Humidity Purge ON time determines how long the building will purge when triggered by the Humidity Purge Setpoint and Humidity Delay timer. The Humidity Delay timer is the length of time the building must be continuously closed and humidity at or above the Humidity Purge Setpoint before starting a purge based on humidity.

High and Low Temperature Inhibit

`Purge Inhibit Temp LOW: 60.0 HIGH: 74.0`

If the working temperature falls below the Purge Inhibit Temp LOW setting, purging is inhibited. If the temperature falls below the Purge Inhibit Temp LOW setting while a purge is in progress, the purge is stopped. If the temperature rises above the Purge Inhibit Temp HIGH setting, purging is inhibited. If the temperature rises above the Purge Inhibit Temp HIGH setting while a purge is in progress, the purge is stopped.

Heat zone before purging

`Before purge raise Temperature to:  70.0`

It is possible to heat the zone before purging. Heated air holds more moisture, causing more moisture to be removed during purging. You can heat the zone to a maximum of 5 degrees above the Temperature Setpoint. This value will change with the Temperature Setpoint.

`Time to Abort Heat before Purge:  0:00`

Set the Abort time to prevent the heater from running constantly because the Heat Temperature can't be reached. If the Heat Temperature is not reached in this amount of time, the heating will be aborted and the purge will commence.
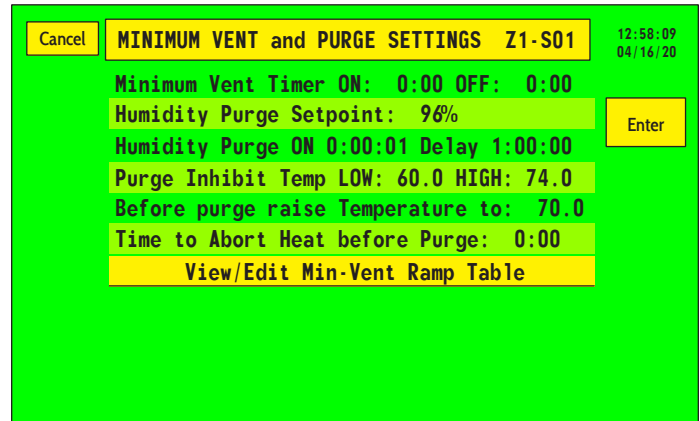
> A Heater MUST be installed and in use during Heat Purge. It MUST also be set to Yes before these two menus will appear.

Minimum Vent and Purge Settings Menu

Power Ventilation

If you are running a power-ventilated building, the Minimum Ventilation and Purge Settings menu is displayed.

Only a humidity purge is available in a power-ventilated building. When a purge occurs in a power-ventilated building, the curtains and inlets open to the Purge Opening Size for each device group. Fans that have Purge as a part of their operating mode are turned on.

```
Cancel   MINIMUM VENT and PURGE SETTINGS  Z1-S01    12:58:09
                                                    04/16/20
         Minimum Vent Timer ON:  0:00 OFF:  0:00
         Humidity Purge Setpoint:  96%           Enter
         Humidity Purge ON 0:00:01 Delay 1:00:00
         Purge Inhibit Temp LOW: 60.0 HIGH: 74.0
         Before purge raise Temperature to:  70.0
         Time to Abort Heat before Purge:  0:00
              View/Edit Min-Vent Ramp Table
```

Minimum Ventilation Timer

`Minimum Vent Timer ON:  0:00 OFF:  0:00`

This is the ON and OFF times (minutes and seconds) used for fans designated as Temp or Minimum Vent when those fans are not running based on temperature. Minimum ventilation is important when a building purge is not triggered frequently enough to keep inside air fresh. Minimum ventilation runs inlets using their proportional settings or by static pressure control depending on how you've set up the inlet or curtain.

Humidity Purge Setpoint

`Humidity Purge Setpoint:  96%`

If the humidity remains at or above this setting for the length of the Humidity Delay Timer, a purge is initiated.

> **If you do not have any fans designated as Purge fans, the Humidity Purge Setpoint menu item does not appear.**

Humidity Purge On Time and Delay Time

`Humidity Purge ON 0:00:01 Delay 1:00:00`

The Humidity Purge ON time determines how long the building will purge when triggered by the Humidity Purge Setpoint and Humidity Delay timer. The Humidity Delay timer is the length of time humidity must be at or above the Humidity Purge Setpoint before starting a purge based on humidity.

Humidity Purge and Minimum Ventilation

> Minimum Vent Timer ON: 5:00 OFF: 5:00
>
> Humidity Purge Setpoint: 70%
>
> Humidity Purge On: 0:05:00 Delay: 0:06:00

Humidity

DELAY | ON | DELAY | ON | **Humidity Purge**

ON | OFF | ON | OFF | ON | OFF | ON | OFF | ON | **Minimum Vent**

Time

During the first 30 minutes, the building receives 15 minutes of regular timed ventilation.

During the next 30 minutes, the building receives 20 minutes of ventilation. The increase helps to combat the rising humidity.

Note: The minimum ventilation and the humidity purge will not occur simultaneously. When a purge cycle completes, the controller resets the minimum ventilation OFF timer so that it needs to cycle completely before a new purge can start.

Humdity Purge and Min Vent Chart.eps

VAL-CO® recommends setting the Humidity Purge Delay slightly longer than the minimum ventilation cycle. The Humidity Purge ON time should be similar to the Minimum Vent Timer ON. This approach increases the amount of ventilation the building receives as humidity increases.

If you do not have any fans designated as Purge fans, the "Humidity Purge" line will display "No Purge Fans Installed" and be dimmed out.

`Humidity Purge: No Purge Fans Installed`

High and Low Temperature Inhibit

`Purge Inhibit Temp LOW: 60.0 HIGH: 74.0`

If the working temperature falls below the Purge Inhibit Temp LOW setting, purging is inhibited (or stopped if a purge is in progress). If the temperature rises above the Purge Inhibit Temp HIGH setting, purging is inhibited (or stopped if a purge is in progress).

> ⚠️ **The minimum ventilation and the humidity purge cannot occur simultaneously. When a purge cycle completes, the controller resets the minimum ventilation OFF timer so that it needs to cycle completely before a new purge can start.**

> **We recommend you set your HIGH Purge Inhibit Temp at the point you begin turning on fans based on temperature.**

Heat zone before purging

`Before purge raise Temperature to:  70.0`

It is possible to heat the zone before purging. Heated air holds more moisture, causing more moisture to be removed during purging. You can heat the zone to a maximum of 5 degrees above the Temperature Setpoint. This value will change with the Temperature Setpoint.

`Time to Abort Heat before Purge:  0:00`

Set the Abort time to prevent the heater from running constantly because the Heat Temperature can't be reached. If the Heat Temperature is not reached in this amount of time, the heating will be aborted and the purge will commence.

> **A Heater MUST be installed and in use during Heat Purge. It also MUST be set to Yes before these two menus will appear.**

Min Vent Ramping

`View/Edit Min-Vent Ramp Table`

Select the "View/Edit Min-Vent Ramp Table" line and press ENTER to open the Minimum Vent Ramp table settings.

Min Vent Ramp Table

You can automatically adjust the Minimum Vent timers by creating a ramp table with appropriate On/Off times for different ages. The animal age used here is the same animal age used within the Current Animal Information menu. A ramp point is an age at which you want the building's (or zone's) minimum ventilation times to be. Set a series of ramp points, up to 9, to adjust the minimum vent times over a growing cycle.

```
Cancel   Min-Vent Ramp Table        Z1-S01   15:56:05
                                              04/16/20
         Min Vent # 1 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 2 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 3 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 4 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 5 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 6 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 7 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 8 Age:  0 ON: 0:00 OFF: 0:00
         Min Vent # 9 Age:  0 ON: 0:00 OFF: 0:00
```

`Min Vent # 1 Age:  0 ON: 0:00 OFF: 0:00`

Age - animal age to start using this slot's cycle times for minimum ventilation.
On – The number of minutes and seconds the fans should run during the Min-Vent cycle
Off – The number of minutes and seconds the fans should be off during the Min-Vent cycle.

> **Each day at midnight, the controller scans the ramp table and new Minimum Vent On and Off times are determined and substituted for yesterday's times. The controller selects the On and Off times based on the ramp point settings. For in-between ages, the controller calculates appropriate times based on the ages and times between the nearest Ramp point ages. This allows subtle changes from day to day. A decrease in age from one Ramp point to the next will cause the ramping to stop at that age.**

Static Pressure Setting Menu

Using an optional static pressure sensor, the controller monitors the difference in air pressure between air outside the building and inside the building. Static pressure can be used to control inlet devices. As more fans turn on or off, the controller adjusts the inlet size to compensate for changes in static pressure. There is two different Static Setpoints, Natural ventilation mode and Tunnel mode.

```
Cancel    STATIC PRESSURE SETTING        Z1-S01    12:54:55
                                                   04/16/20
          STATIC PRESSURE - NATURAL
          Setpoint: 0.040 Close: 0.030 Open: 0.050
          STATIC PRESSURE - TUNNEL
          Setpoint: 0.040 Close: 0.030 Open: 0.050
          Ramp #1 Temp: -60.0  Static Press: 0.000
          Ramp #2 Temp: -60.0  Static Press: 0.000
          Ramp #3 Temp: -60.0  Static Press: 0.000
          Ramp #4 Temp: -60.0  Static Press: 0.000
          Ramp #5 Temp: -60.0  Static Press: 0.000
```

Natural Setpoint, Open and Close

```
STATIC PRESSURE - NATURAL
Setpoint: 0.040 Close: 0.030 Open: 0.050
```

Input the target static pressure while the controller is in Natural Ventilation mode, then, input the pressure at which static-pressure-controlled inlets should close to increase the static pressure. The Close static pressure must be lower than the Setpoint static pressure. Finally, input the pressure at which inlets should open more. Open static pressure must be higher than the Setpoint static pressure.

> The static pressure sensor delivers a maximum reading of 0.250.

Tunnel Setpoint

```
STATIC PRESSURE - TUNNEL
Setpoint: 0.040 Close: 0.030 Open: 0.050
```

Input the target static pressure while the controller is in Tunnel mode. The Tunnel Close and Open settings are calculated based on the offsets of the Natural Setpoint's Close and Open settings and cannot be changed.

Static Pressure Ramping

```
Ramp #1 Temp: -60.0  Static Press: 0.000
```

You can create a static pressure ramp table to automatically change the Natural static pressure settings (setpoint, close and open) based on outside temperatures.
An outside air sensor must be installed to use ramping.

Input up to five ramp points by selecting one of the ramp point lines, then pressing **ENTER**. Change the temperature to the desired setting using the **PLUS** or **MINUS** keys. Press **ENTER** again to move the cursor to the Static Pressure field. Change the static pressure to the desired setting using the **PLUS** or **MINUS** keys. The Temp should be in ascending order. If the Temp reading is less than the previous ramp point, ramping will stop and use the last valid ramp point's static pressure until the outside temperature drops back into the ramp's Temp settings.

> ⚠ **Consult your county extension agent or other specialist for the best use of static pressure control in your region.** ⚠

Sound Alarm When. . . . Menu

> ⚠️ **The alarm system should be tested periodically to ensure proper operation.**

Alarm Relay Operation

During normal operation the relay terminals labeled C-NC (in the controller) do not have continuity, and the terminals labeled C-NO have continuity. In the event of an alarm condition, the C-NC terminals make contact (complete a circuit), and the C-NO contacts open. The alarm relay is momentarily in an alarm state during controller power up and always in an alarm state during a power interruption.

There are user-adjustable alarm settings plus a number of factory-preset errors and alarms. To minimize nuisance alarms, all alarm conditions include a built-in time delay or the requirement for a repeat occurrence.

```
Cancel   SOUND ALARM WHEN....          Z1-S01    15:07:29
                                                 04/16/20
         Fixed High Temp Exceeds:   90.0
         Temperature Above:  80.0  Below:  60.0
         Outside Temp Influence HI Alarm Temp:NO
         Stat Press Stays Above:  0.250 for  0.00
         High Pressure Alarm Open ALL Inlets: YES
         Stat Press Stays Below:  0.000 for  0:00
         Fan ON Stat Press Below: 0.000 for  0:00
         Highest/Lowest Air Probes differ by: 99
         Feed Sensor #8 ON Time Exceeds:   0:00:00
Page     Feed Sensor #8 OFF Time Exceed:   0:00:00
Down
```

```
Cancel   SOUND ALARM WHEN....          Z1-S01    15:07:38
                                                 04/16/20
         Feed Sensor #9 ON Time Exceeds:   0:00:00
         Feed Sensor #9 OFF Time Exceed:   0:00:00
         Water #1 GPH Flow Exceeds:      0
         Water #1 24-Hr. Drop:  0%
         Water #3 GPH Flow Exceeds:      0
         Water #3 24-Hr. Drop:  0%
Page     Humidity Sensor #01 Reading is Bad: NO
Up       Humidity Sensor #02 Reading is Bad: NO
```

Fixed High Temperature Alarm

```
Fixed High Temp Exceeds:  90.0
```

Input a fixed high temperature at which an alarm state should occur. Fixed means the setting doesn't change even when temperature ramping is set up or the outside temperature is influencing the High Temperature Alarm setting. This setting is always compared to actual average temperature. This is the highest possible temperature allowed before a high temperature alarm is activated.

High/Low Temperature Alarm

```
Temperature Above:  80.0  Below:  60.0
```

Input the high and low temperatures at which an alarm state should occur. These settings change when temperature ramping is set up. These temperature settings are always compared to actual average temperature.

```
Current HI Alarm (Influenced):   90.0
```

The High Temperature Alarm can change automatically based on the outside temperature (see below). If the outside temperature is influencing the High Temperature Alarm setting, a new line will appear below the "Temperature Above/Below" line to show the High value is currently based on the outside temperature and not the Temperature setpoint.

Outside Temp Influence HI Alarm Temp

`Outside Temp Influence HI Alarm Temp:NO`

It is possible to increase the High Temperature Alarm setting automatically when the Outside temperature is higher than the Temperature Setpoint. If this is set to YES, the High Temperature Alarm setting will ramp with the Outside temperature, as long as the Outside temperature is above the Setpoint. If the Outside temperature is below the Setpoint, the High Temperature Alarm setting will not change. The Fixed High Temperature Alarm is the highest possible temperature allowed before a high temperature alarm is activated regardless of this setting.

Feed Sensor Alarms

A feed sensor can be used to monitor the motor current of any device. The Feed Sensor is monitored at all times. Typically, the feed sensor is used to monitor the runtimes of feeders. The "Feed Sensor On Time Exceeds" and "Feed Sensor Off Time Exceeds" alarms are provided to allow for the activation of an alarm if the sensor detects the motor ran too long or was off for too long.

`Feed Sensor #8 ON Time Exceeds:   0:00:00`

The On time will be tracked regardless of whether the controller turned on the device or the toggle switch was manually set to On. If the Feed Sensor detects the device has ran longer than the "On Time Exceeds" value without shutting off, the alarm will be activated.

`Feed Sensor #8 OFF Time Exceed:   0:00:00`

The Off time is tracked in two ways. If a feeder and feed sensor have the same group number, the Off time of the feed sensor is only tracked when the controller says the feeder should be on. If the Feed Sensor detects the device is Off longer than the "Off Time Exceeds" value when the controller says the feeder should be on, the alarm will be activated. If there is no feeder with the same group number as the feed sensor, the Off time is tracked continuously. If the Feed Sensor detects the device is Off longer than the "Off Time Exceeds" value without turning on, the alarm will be activated. Each feed sensor will have its' own alarm settings.

> **If a Feed Sensor On Time alarm is generated, and there is a Feeder with the same group number as the sensor, the feeder will be turned off until the alarm is cleared or the controller is reset. The Feed Sensor Off Time alarm will automatically be cleared if the feeder is later determined to be running.**

Water Use Exceeds Alarm

`Water #1 GPH Flow Exceeds:      0`

This setting determines the flow rate in gallons per hour that, if exceeded for more than one minute, triggers an alarm. Setting the value to zero disables the flow check. Each water meter will have its' own alarm setting.

Water Flow Drop Alarm

`Water #1 24-Hr. Drop:  0%`

Each hour, the number of gallons used for each water meter is totaled. The most recent 24-hour total for the water meter is compared to the previous 24-hour total. If the total has dropped by a percentage larger than your setting, an alarm is triggered. Setting the value to zero disables the flow check. The check is also disabled if both of the totals being compared are less than 10 gallons. Each water meter will have its' own alarm setting.

Static Pressure Alarms

Static pressure settings are in inches of water. Times are in minutes and seconds. Low static pressure may indicate malfunctioning fans, not operating or not pushing air (bad belt or obstruction). High static pressure may indicate malfunctioning inlets or curtains.

`Stat Press Stays Above:  0.250 for  0.00`

Static pressure high limit is usually set to a level representing danger to the building. Static pressure needs to stay above the level you set for the time period you set before the controller alarms.

`High Pressure Alarm Open ALL Inlets: YES`

Set the High Pressure Alarm Open All Inlets to YES, to prevent the static pressure from rising too high and causing damage to the building. On active alarm, all the inlets and curtains will open fully until alarm is cleared.

`Stat Press Stays Below:  0.000 for  0:00`

There are two types of static pressure low limit settings. The first type is constantly monitored. If this low limit is exceeded (falls below) for the time period you enter, the alarm is triggered. This is useful during minimum ventilation to ensure fans are being turned on, and during tunnel operation when a drop in static pressure is intolerable.

`Fan ON Stat Press Below: 0.000 for  0:00`

The second type is checked only while one or more fans set as proportional are running. Set the static pressure alarms for a level that might indicate problems with fans or inlets. Also, enter a time that the condition must exist. *However, be sure the time is less than the time the proportional fans run since the controller only checks for this static pressure alarm condition while proportional fans are running.*

POSSIBLE STATIC PRESSURE ALARM SETTINGS

When fans are running, negative static pressure (vacuum) increases inside the building.

STATIC PRESSURE SENSOR

Static Pressure Stays Above 0.14 for 0:30

Fan ON Static Pressure Below 0.03 for 0:30

Static Pressure Stays Below 0.01 for 10:00

Fan Off Time

60 Second Fan On Time

High Negative Static Pressure

Negative Static Pressure

Low Negative Static Pressure

Proportional Fan Cycle Time

Legend
— Alarm Condition is being checked.
- - - Alarm Condition is not being checked.
Actual static pressure inside the building

Static Pressure Explained.eps

Humidity Sensor Reading is Invalid Alarm

`Humidity Sensor #01 Reading is Bad: NO`

When this menu item is set to YES for each humidity sensor, the controller alarms if the humidity sensor fails. The alarm requires the humidity sensor to give 10 invalid readings during a single hour to avoid false alarms. The humidity sensors are checked every 15 seconds, so a complete failure would cause an active alarm state in as little as 150 seconds. All invalid readings are recorded in the Alarm History. Each humidity sensor will have its' own alarm setting. This alarm setting is especially useful if you rely on the humidity sensor to trigger humidity-based purges or to enable and disable evaporative cooling devices.

Temperature Range Alarm

`Highest/Lowest Air Probes differ by: 99`

Setting this menu item will activate the alarm relay, with a "Temp Range" alarm, if the difference of the temperature readings of any two temperature sensors is greater than the value you set. The alarm will display the two sensors that caused the alarm, and the readings of those two sensors at the time the alarm activated. This alarm can notify you when the temperature changes drastically from one end of the barn to the other. It also can indicate when a temperature sensor is going bad and starts sending lower or higher readings than it should. When the alarm is active, the controller continues to use the readings from the temperature sensors to control devices. To prevent nuisance alarms when the temperature only changes momentarily, as when a door is opened and closed, the alarm will not activate until it has taken ten readings that were off by the set value. The "Range Alarm" is not self-clearing, so the alarm could activate within a few minutes (10 continuous out-of-range readings) or a few hours/days/months (intermittent out-of-range readings).

⚠ **The alarm system should be tested periodically to ensure proper operation.**

Setting up the Control Software
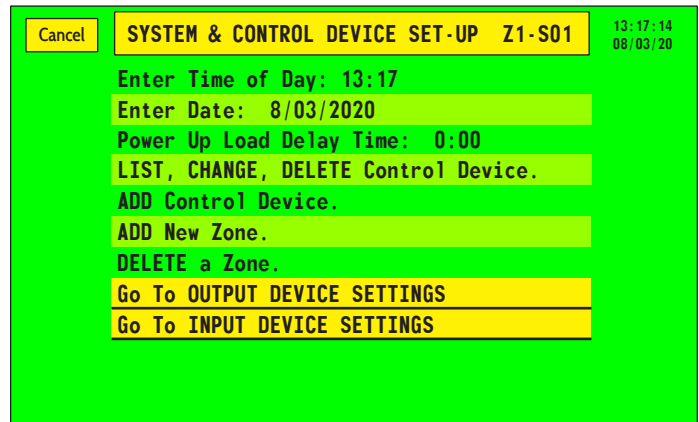
System & Control Device Set-up Menu

The System and Control Device Setup screen allows the following:
- Change the date and time used by the controller.
- Set the Power Up Delay Time.
- Add, list, change, and delete devices.
- Add and delete zones.
- Go to the output and input device screens for devices already configured.

To get to this screen:
1. Press the **Home** key.
2. Press the **Menu Hot Keys** button.
3. Press the **System/Control Device** Setup button.

```
┌──────────────────────────────────────────────┐
│ Cancel │ SYSTEM & CONTROL DEVICE SET-UP  Z1-S01 │ 13:17:14
│                                                │ 08/03/20
│      Enter Time of Day: 13:17                  │
│      Enter Date:  8/03/2020                    │
│      Power Up Load Delay Time:  0:00           │
│      LIST, CHANGE, DELETE Control Device.      │
│      ADD Control Device.                       │
│      ADD New Zone.                             │
│      DELETE a Zone.                            │
│      Go To OUTPUT DEVICE SETTINGS              │
│      Go To INPUT DEVICE SETTINGS               │
│                                                │
└──────────────────────────────────────────────┘
```

Enter Time of Day

`Enter Time of Day: 13:17`

Once selected, press **ENTER** to edit the current time (24-hour, HH:MM format). Use the **PLUS +** and **MINUS -** buttons/keys to change the values. Use the **LEFT** and **RIGHT Arrow** buttons/keys to switch between editing the hour value and the minutes value.

Enter Date

`Enter Date:  8/03/2020`

Once selected, press **ENTER** to edit the current date (month/ day/year format for American and day/month/year for Metric). Use the **PLUS +** and **MINUS -** buttons/keys to change the values. Use the **LEFT** and **RIGHT Arrow** buttons/keys to switch between editing the month, day, and year values.

> The controller does not update the clock for Daylight Savings Time because not all global areas recognize this adjustment.

Power Up Load Delay Time

`Power Up Load Delay Time:  0:00`

Press **ENTER** to edit the power up load delay time in Minutes and Seconds. Use the **PLUS +** and **MINUS -** buttons/keys to change the values. Use the **LEFT** and **RIGHT Arrow** buttons/keys to switch between editing the minutes value and the seconds value.

This setting prevents groups of fans and heaters from all starting at the same moment. Load delay time is designed to reduce the peak demand power requirements for your buildings and reduce the electrical load capacity for backup generators. The load delay time should be set just long enough to get a motor up to speed, about 2 to 5 seconds. The load delay time is only used for the first five minutes after a controller is powered on.

LIST, CHANGE, DELETE Control Devices

`LIST, CHANGE, DELETE Control Device.`

Note: this line will be disabled (dimmed) until at least one device has been configured (see **Add a Device** below).

Press **ENTER** when **LIST, CHANGE, DELETE Control Devices** is selected to open a window which displays all the devices configured for the controller. The list displays the device name and group number, the zone the device is set up in (Z1 stands for Zone 1), and the module and channel number the device is configured to. Note: The "S01" in the image indicates parameter set #1 is currently loaded in the controller.

If more than 5 devices are configured, use the **Page Down** and **Page Up** buttons to see additional devices.

```
Cancel    Current Controller Devices            13:37:22
                                                08/03/20
          Air Sensor                # 1 Z1-S01
          to  Module 02  Channel 01.
          Side Curtain              # 1 Z1-S01
          to  Module 02  Channel 01.
          Position Sensor           # 1 Z1-S01
          to  Module 02  Channel 10.
          Sidewall Fan              # 1 Z1-S01
          to  Module 01  Channel 01.
          Vari-Side Fan             # 1 Z1-S01
Page      to  Module 02  Channel 03.
Down
```
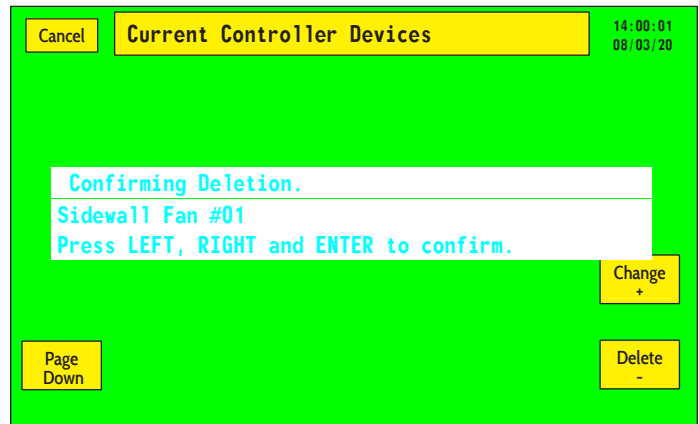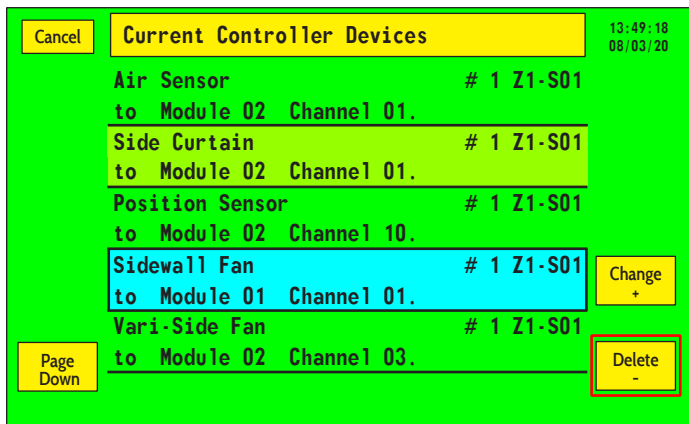
To change a device's Module and Channel numbers, select the device by touching the line on the screen, or use the **UP** and **DOWN Arrow** keys to scroll up through the device list until the device is highlighted. Once highlighted, press the **Change +** button or the **PLUS+** hardware key to display the Change screen. Use the **PLUS +** and **MINUS -** buttons keys to change the module number, then press **ENTER** to change the channel number. Pressing **ENTER** while the cursor is on the Channel setting will save the changes and return you to the List screen. Use the **LEFT** and **RIGHT Arrow** buttons/keys to switch between the module and Channel settings. Note: the configured zone can not be changed. To change a device's zone the device needs to be deleted, then added back with the correct zone set.

```
Cancel    Current Controller Devices            13:49:18
                                                08/03/20
          Air Sensor                # 1 Z1-S01
          to  Module 02  Channel 01.
          Side Curtain              # 1 Z1-S01
          to  Module 02  Channel 01.
          Position Sensor           # 1 Z1-S01
          to  Module 02  Channel 10.
          Sidewall Fan              # 1 Z1-S01  Change
          to  Module 01  Channel 01.            +
          Vari-Side Fan             # 1 Z1-S01
Page      to  Module 02  Channel 03.            Delete
Down                                            -
```

```
Cancel    Add a Control Device                  13:51:56
                                                08/03/20

                                                Enter

          CHANGE Sidewall Fan       # 1 Z1-S01
          to  Module  1  Channel 01.
<---                                             --->


                                                +


                                                -
```

System & Control Device Set-up Menu - continued

To delete a device, select the device as explained above and press the **Delete** button or the **MINUS –** key. A popup window will appear asking for confirmation. To confirm the deletion, press and hold the **LEFT Arrow** key, **RIGHT Arrow** key and **ENTER** key at the same time.

Cancel	Current Controller Devices	13:49:18 08/03/20
	Air Sensor	# 1 Z1-S01
	to Module 02 Channel 01.	
	Side Curtain	# 1 Z1-S01
	to Module 02 Channel 01.	
	Position Sensor	# 1 Z1-S01
	to Module 02 Channel 10.	
	Sidewall Fan	# 1 Z1-S01	Change +
	to Module 01 Channel 01.	
	Vari-Side Fan	# 1 Z1-S01	
Page Down	to Module 02 Channel 03.	Delete -

Cancel	Current Controller Devices	14:00:01 08/03/20
	Confirming Deletion.	
	Sidewall Fan #01	
	Press LEFT, RIGHT and ENTER to confirm.	Change +
Page Down		Delete -

Add Control Device

ADD Control Device.

> ⓘ Before adding any devices to the controller, verify the correct global parameters are set. Once a device is configured, the animal type, unit of measure, and temperature type cannot be changed without deleting all the devices again. Use the **Right Arrow** key or **swipe a finger across the screen from right to left** to view the Global Parameters screen (see next section for more info).

Press **ENTER** when **ADD Control Device** is selected to open a window to allow selected and setting up a new device.

You are prompted for a control device name to add. Use the **Next Device** and Previous Device buttons, or the **PLUS +** and **MINUS -** keys to scroll through the list of possible devices. When the correct device is shown, press **ENTER** to move to the next field. The cursor will move to indicate which field can be changed. Repeat this procedure, using the **PLUS +** and **MINUS –** buttons/keys to change values for the Group Number (# 1), Zone (Z1), Module and Channel. Pressing **ENTER** while the cursor is under the Channel number will save the

Cancel	SYSTEM & CONTROL DEVICE SET-UP Z1-S01	14:14:46 08/03/20
		Enter
	ADD:Air Sensor # 1 Z1-S01	
<---	to Module 01 Channel 01.	--->
		Next Device
		Previous Device

changes and return to the System/Control Device screen. Note: the **LEFT** or **RIGHT Arrow** buttons/keys can be used to move between fields also. Use the **PLUS** or **MINUS** keys to change values in fields.

> 📝 **When adding devices to an expansion station, refer to the expansion station's instructions to set DIP switches so the controller can communicate with those devices.**

> ⓘ • **When adding a control device you must specify a group/device number. This is simply the number of the device you are adding. For example, if four air sensors are installed, they would be numbered 1 through 4.**
> • **Every input/output device type must be assigned a unique group/device number. For example, there can be only one #1 air sensor.**

When a device that has open/close capability is added, the controller allows only odd channel numbers and automatically allocates the specified channel as open and the next output channel as the close channel (for example, channel 1 is open and channel 2 is closed).

The Air Sensor Shared device is an exception to the rule where a device must be assigned a unique module/channel number. See the Air Sensor Shared Device section for complete details on installing, changing, and deleting Air Sensor Shared devices and their associated air sensor.

Each Output device needs to be installed to its own channel number. Input devices will be installed to the channel number based on where they are wired into the input connections. The analog input channels will be 1 to 14, and the digital inputs channels (Water Sensor, Digital Alarm, Whisker Switch) will be 1 to 6. It is possible to have an Air Sensor installed on "Module 01 Channel 01" and a Water Sensor installed on "Module 01 Channel 01". On Expansion Station modules, the digital inputs are channels 11 to 14.

When adding a Vari-Heater and Vari-Brooder to the controller's device list, the Module and Channel numbers entered needs to be the module and channel number of the output relay where the heater's power supply is attached. The Analog Output Module/channel for the Gas Regulator connection is entered later within the Vari-Heater/Vari-Brooder settings.

For VFD fans, the assigned output channel needs to be the module and channel number of the 0-to-voltage analog output relay. The VFD Fan Settings screen provides a setting for assigning an optional On/Off digital relay for enabling the VFD fan before a voltage is applied if needed.

The outside air sensor is always #13 and the static pressure sensor is always #0. The channel number is the input terminal number in the case of sensors, or the output channel (relay) number for controlled devices.

Possible Errors When Adding Devices

When adding devices, there are (4) four errors that may occur:

1. An attempt has been made to install a duplicate device with the same group number.
2. An attempt has been made to install a device to a duplicate station/channel number.
3. An attempt has been made to add too many devices.
4. An attempt has been made to install a "Air Sensor Shared" device to a module/channel that doesn't have an "Air Sensor" device installed on it.

If one of these errors occurs, a pop-up window will be displayed explaining which error occurred. Remember, some devices with open/close capability use two consecutive channels and the first channel must be odd.

Cancel	SYSTEM & CONTROL DEVICE SET-UP Z1-SO1	14:39:37 08/03/20

Enter

ADD:Air Sensor   # 1 Z1-SO1

Device Setup.
Set-Up Error: Duplicate Device Found!
Press CANCEL to Continue.

+

-
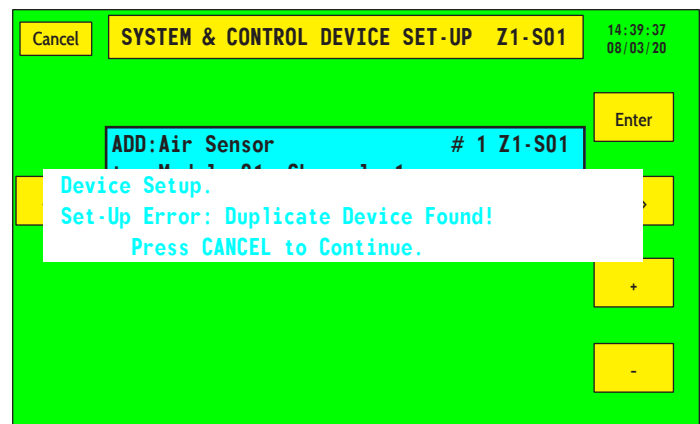
Add Zone

```
ADD New Zone.
```

Press **ENTER** when **Add New Zone** is selected to add a zone. You are prompted with the next available zone number and asked to press **ENTER** again to accept it.

Only 9 zones can be added. Attempting to add zone 10 will result in an error message.

```
Cancel   SYSTEM & CONTROL DEVICE SET-UP   Z1-S01    14:44:12
                                                    08/03/20
         Enter Time of Day: 14:44
         Enter Date:  8/03/2020                      Enter
         Power Up Load Delay Time:   0:00
         LIST  CHANGE  DELETE Control Device
      Adding Zone...
      Next available unused Zone number is 2
      Press ENTER to accept this Zone number.
         DELETE a Zone.
         Go To OUTPUT DEVICE SETTINGS
         Go To INPUT DEVICE SETTINGS
```

Delete a Zone

```
DELETE a Zone.
```

Note: To delete a zone, all devices assigned to that zone have to be deleted first.

Press **ENTER** when **Delete a Zone** is selected to remove a zone. You are prompted to confirm you want to delete the selected zone.

Confirm the deletion by pressing the **LEFT Arrow**, **RIGHT Arrow** and **ENTER** *keys all at the same time*. Zone 1 cannot be deleted.

```
Cancel   SYSTEM & CONTROL DEVICE SET-UP   Z1-S01    14:46:39
                                                    08/03/20
         Enter Time of Day: 14:46
         Enter Date:  8/03/2020                      Enter
         Power Up Load Delay Time:   0:00
         LIST  CHANGE  DELETE Control Device
      Deleting a ZONE Parameter.
       DELETING current Zone.   ARE YOU SURE?
      Press LEFT, RIGHT and ENTER to confirm
         DELETE a Zone.
         Go To OUTPUT DEVICE SETTINGS
         Go To INPUT DEVICE SETTINGS
```

Changing Zones

When multiple zones have be set up, press the **ZONE** key to move the controller to the next available zone. The currently displayed zone number is shown in the upper right corner of most screens. Some screens are not zone related and will not display this number but pressing the **ZONE** key will still change the zone number used for zone specific screens.

```
Cancel   SYSTEM & CONTROL DEVICE SET-UP   Z1-S01    13:17:14
                                                    08/03/20
         Enter Time of Day: 13:17
         Enter Date:  8/03/2020
```

Global Parameter Set-up Menu

GLOBAL PARAMETERS SETUP `15:01:09 08/04/20` Cancel Animal Type: BIRDS Units of Measure: Inch/Pound/Gallon Temperature Measure: FAHRENHEIT Display Language: English CARD Free Space: 14.8MB, 99.9% free. Number of SWITCHES on front panel: 32 Enter Options Password: 00000000	**GLOBAL PARAMETERS SETUP** `14:59:49 08/03/20` Cancel Display Language: English CARD Free Space: 14.8MB, 99.9% free. Number of SWITCHES on front panel: 32 Enter Options Password: 00000000
Screen with no devices configured.	Screen when devices configured.
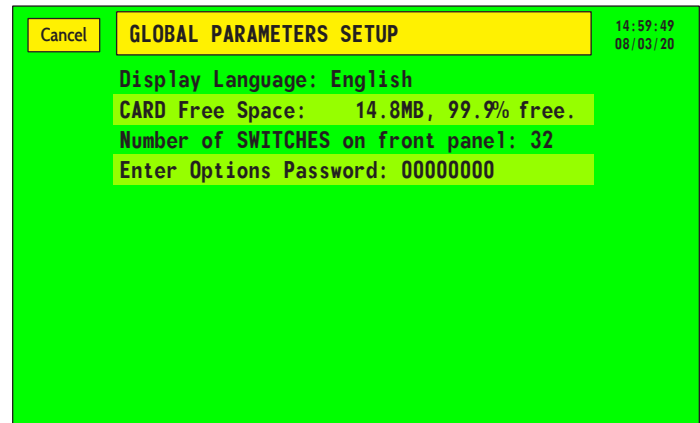
The **Global Parameters Setup** menus allow you to change the global settings used by the controller. These include the animal type (bird or hog), unit of measure (English or metric), temperature style (Fahrenheit or Celsius), display language (English or Spanish), how many channels on the controller (16, 24 or 32), and the Startup Options password. It also shows how much free space is left on the SD card.

To get to this screen:

1. Press the **Home** key.
2. Press the **Menu Hot Keys** button.
3. Press the **System/Control Device** Setup button.
4. Use the **Right Arrow** key or swipe a finger across the screen from right to left to display the screen.

> The first three menus below are only visible when there are no devices installed on the controller. To change these three settings, you need to delete all the installed devices, or create a new Parameter Set.

Setup Animal Type

`Animal Type: HOGS`   `Animal Type: BIRDS`

Select whether the controller will be used in a hog or bird application by pressing the **PLUS +** or **MINUS –** button/key, then the **ENTER** button/key.

Setup Units of Measure

`Units of Measure: Inch/Pound/Gallon`   `Units of Measure: Centimeter/Gram/Liter`

Select the preferred unit of measurement by pressing the **PLUS +** or **MINUS –** button/key, then the **ENTER** button/key.

Setup Temperature Measure

`Temperature Measure: FAHRENHEIT`   `Temperature Measure: CELCIUS`

Select the preferred temperature measurement by pressing the **PLUS +** or **MINUS –** button/key, then the **ENTER** button/key.

Global Parameter Set-up Menu - continued

The following 4 menus can be viewed at any time:

Setup Language

```
Display Language: English
```
```
Display Language: Spanish
```

Select the English or Spanish language by pressing the **PLUS +** or **MINUS –** button/key, then the **ENTER** button/key.

SD Card Free Space

```
CARD Free Space:    14.8MB, 99.9% free.
```

This line shows how much free space is remaining on the SD card. If the free percentage gets to low, replace the SD card or use a PC to delete some of the history and/or alarm records.

Number of Switches on Front Panel

```
Number of SWITCHES on front panel: 32
```
```
Number of SWITCHES on front panel: 24
```
```
Number of SWITCHES on front panel: 16
```

Set this to the number of toggle switches mounted on the front cover. Setting this value incorrectly can cause the Channel hotkeys not to work right or cause additional problems.

Start Up Options Password

To prevent unauthorized user from accessing the startup options, enter an eight-digit password here. If a password is entered here, the user will have to enter the password to gain access to the Startup Options.

To enter or change the password, press **ENTER** when the line is selected. The cursor will be placed under the first digit of the password. Use the **PLUS +** and **MINUS –** buttons/keys to change the digit (0 to 9). Use the **RIGHT** and **LEFT Arrow** buttons/keys to move to a different digit. Once the full password is set, press **ENTER** to save

```
┌──────────────────────────────────────────────────────┐
│ Cancel   GLOBAL PARAMETERS SETUP            15:02:59   │
│                                             08/03/20   │
│          Animal Type: HOGS                            │
│          Units of Measure: Centimeter/Gram/Liter  Enter│
│          Temperature Measure: CELCIUS                 │
│          Display Language: English                    │
│  <---    CARD Free Space:    14.8MB, 99.9% free.  --->│
│          Number of SWITCHES on front panel: 32        │
│          Enter Options Password: 12300000             │
│                                                    +   │
│                                                        │
│                                                    -   │
└──────────────────────────────────────────────────────┘
```

the changes. Use the **CANCEL** button/key to exit without saving. To reset or remove the password, set all the digits to 0 before saving.

*See the **Start Up Options** section for more information.*

Viewing, Entering or Changing Equipment Operating Parameters

There are multiple ways to reach the screens to allow inputting the operating parameters for the devices you have installed.

Use "Device Channels" screen for Output Devices

To get to the **Device Channels** screen:

- Press the **Channel Hot Keys** key.
- Or, from the **Home** screen, press the **Menu Hot Keys** button, then press the **Output Devices** button.
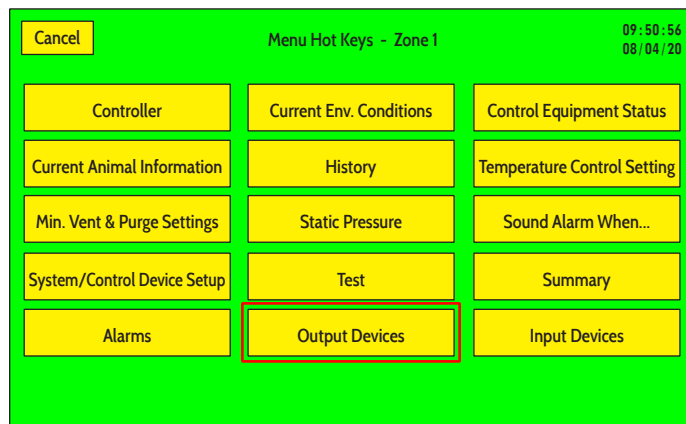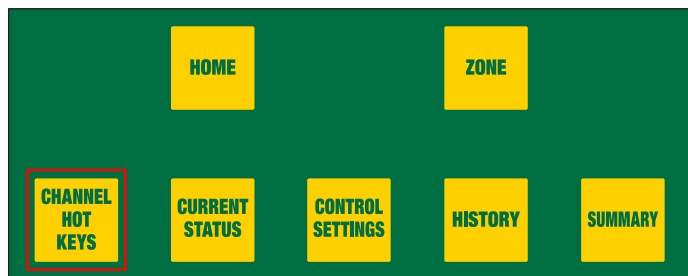
This will open the Device Channels screen (examples shown below). The screen includes a button for each output relay available on the module. There will be a screen for Module #1, as well as one for each expansion station attached to the main controller. Each screen will display buttons that correspond to the same channels/toggle switches on the front of the controller. Use the **Next Module** and **Previous Module** buttons on the screen to switch modules.
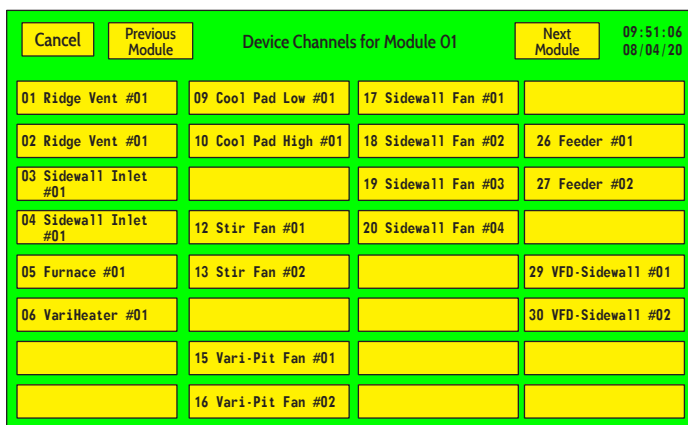
Example of a 32-channel XT
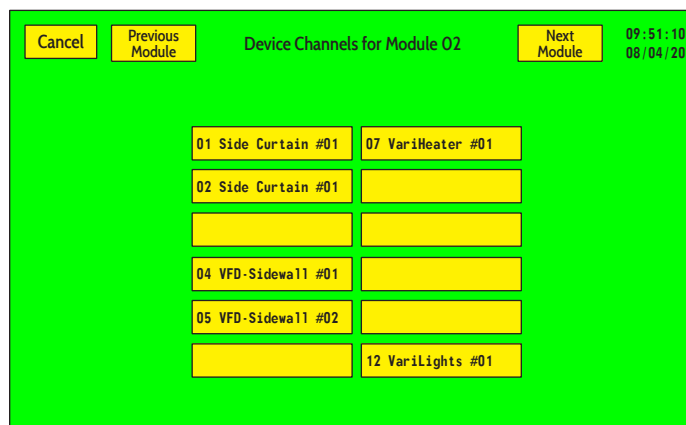
Example of a 12-channel expansion station

Press one of the buttons to go to that device's settings screen. The **Up** and **Down Arrow** keys can also be used to scroll through the buttons (button will highlight in blue). Once the correct device is highlighted, press the **ENTER** hardware key to go to the device's settings. The blank buttons indicate unused relays.

> The Device Channel screen is not zone specific. All configured devices will be displayed based on what device is configured to each output relay, regardless of which zone they are assigned to. Pressing one of the buttons will switch the current Zone number to the zone the device is configured for.

Use "Menu Input Hot Keys" screen to view the input device settings

From the **Home** screen, press the **Menu Hot Keys** button, then press the **Input Devices** button. This will open the **Menu Input Hot Keys** screen. A button will be displayed for each of the zone's configured input device types. This screen is Zone specific and will only show buttons for input types which are configured for the current zone. Use the **Zone** hardware key to switch between zones.

Cancel	Menu Hot Keys – Zone 1		09:50:56 08/04/20
Controller	Current Env. Conditions	Control Equipment Status	
Current Animal Information	History	Temperature Control Setting	
Min. Vent & Purge Settings	Static Pressure	Sound Alarm When...	
System/Control Device Setup	Test	Summary	
Alarms	Output Devices	Input Devices	

Cancel	Menu Input Hot Keys – Zone 1	09:51:20 08/04/20
Air Sensor	Whisker Switch	
Humidity Sensor	Position Sensor	
Static Pressure		
Feed Sensor		
Water Meter Sensor		
Digital Alarm		

Press one of the buttons on the **Menu Input Hot Keys** screen to go to settings screens for that input type. The **Up** and **Down Arrow** keys can also be used to scroll through the buttons (button will highlight in blue). Once the correct input type is highlighted, press the **ENTER** hardware key to go to the input settings.

> Pressing a button on the Input screen will open the settings screen for the first group number of that input type which is configured for the zone, not to a specific group number. Use the **Group +** and **Group –** buttons on the Settings screen to change to the desired group number.

Output and Input devices from System/Control Device Setup

It is also possible to get to the Output and Input device settings from the **System/Control Device Settings** screen.

From the **Home** Screen, press the **Menu Hot Keys** button, then press the **System/Control Device Setup** button. From there, either press the **Go to Output Device Settings** button to open the first output device configured for the zone or press the **Go to Input Device Settings** button to open the Air Probe settings for the zone. From there, use the **Left** and **Right Arrow** keys or swipe a finger across the screen to change which device type is being viewed.

Cancel	**SYSTEM & CONTROL DEVICE SET-UP Z1-S01** 09:52:20 08/04/20
	Enter Time of Day: 9:52
	Enter Date: 8/04/2020
	Power Up Load Delay Time: 0:00
	LIST, CHANGE, DELETE Control Device.
	ADD Control Device.
	ADD New Zone.
	DELETE a Zone.
	Go To OUTPUT DEVICE SETTINGS
	Go To INPUT DEVICE SETTINGS
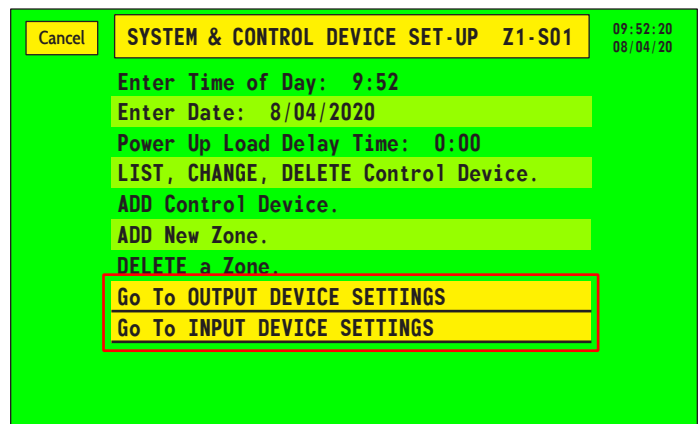
> Regardless of how you get to an Output or Input device's setting page, you can use the following methods to change which device's settings screen is being displayed.
> - Use the **Group +** button, **Group –** button, **Plus +** hardware key or **Minus –** hardware key to scroll through the configured group numbers for the same device type in the current zone.
> - Use the **Left** and **Right Arrow** hardware keys or **swipe a finger across the screen (left or right)** to scroll through the configured device types which are configured for the current zone.
> - Use the **ZONE** hardware key to change which Zone is currently being displayed. Note: There needs to be a another zone with the same device type configured before the current zone will change.

Setting up Input Devices

The input device screens are zone-specific screens. The zone being displayed is shown at the right side of the header as "Z1-S01". The "Z1" indicates the zone 1 settings are being displayed. Press the Zone hardware key to change the zone being viewed. A zone needs at least one of the viewed devices to be configured before it will be displayed.

Air Sensor Settings

> See the *Air Sensor Shared Device* section for more information on deleting an air sensor or changing it's module and/or channel number.

Clean air sensors are essential to proper operation. Dip the air sensors into a cup of room temperature water and swish around. Do not bump the sensor on the side of the cup. Shake off the water droplets and leave to dry. The sensors read cooler during the cleaning process so only perform cleaning when the building is empty (*or temporarily turn off the controller*). Verify the sensors are reading the correct temperature after they dry.

Each Air Sensor screen displays the settings for a particular device group. If more than one probe is configured for the zone, use the **Group +** and **Group -** buttons on the screen, or the **PLUS** and **MINUS** hardware keys to display/change a different group's settings.

Cable Length

`Cable Length:  100'`

Input the length of cable connecting the air sensor to the controller. The air sensor is an analog resistive device so improper cable length settings can cause erroneous temperature readings. If you enter the proper cable length and still get an erroneous reading, you can essentially calibrate the sensor by adding or subtracting the cable length value entered here. Adding about 5 to 15 feet of length (the variance depends on the cable gauge) drops the air sensor's temperature reading by 0.1 degree Fahrenheit.

```
Cancel   AIR SENSOR #1 SETTING          Z1-S01    13:01:42
                                                  04/16/20
         Cable Length:  100'
         Wire Gauge: 24AWG
         Temperature Offset:      0.0
         Location: BROOD
         Used for Wind Speed: YES
         Wind Speed CAL Values:   550/ 90

                                                  Group
                                                    +

                                                  Group
                                                    -
```

Wire Gauge / Diameter

`Wire Gauge: 24AWG`

Input the gauge of the cable connecting the air sensor to the controller. The air sensor is an analog resistive device so improper cable gauge settings can cause erroneous temperature readings. Use shielded wire, 16 to 24 gauge (.5 to 1.2mm) stranded, such as Carol® AWM style 2426, to connect sensors to input channels.

Temperature Offset

`Temperature Offset:      0.0`

Input the temperature offset needed to adjust the displayed temperature readings of the sensor to the actual temperature reading taken at the sensors location. Use this setting to correct any inaccurate reading of the sensor. The reading can be adjusted by +15 to -15 degrees Fahrenheit. The adjusted temperature is displayed for that sensor and is used to operate the system.

> **For your information: Changing the offset value by a large amount can cause temperature alarms, depending on the amount of the offset change and the temperature alarm settings.**

Location

`Location: BROOD`

Select the location of the air sensor. The location is important because the controller needs to know which sensors to use for the various house control mode settings (found in the Temperature Control Settings menu).

> **Note: You can set up devices in any zone at any time, but if you don't have an air sensor (or shared air sensor) installed in the zone, the zone will be alarming.**

Use for Wind Speed

`Used for Wind Speed: YES`

> ⚠️ **If you are using an effective environmental temperature (EET) air sensor, and you want to factor air speed into the temperature calculation, set this menu item to YES. If you are not using EET air sensors, this menu item must be set to NO.**

Cal Values

`Wind Speed CAL Values:   550/ 90`

If you are using an effective environmental temperature (EET) air sensor, input the calibration values printed on the sensor's tag. If no calibration values are available, use the default values that the controller displays. *Cal Values menu can not be changed for an air sensor if that air sensor's "Use for Wind Speed" setting is set to NO.*

Outside Air Sensor Settings

`Cable Length:  100'`

`Temperature Offset:     0.0`

`Wire Gauge: 24AWG`

The Outside Air Sensor is always #13 and has its own Cable Length, Wire Gauge, and Offset settings.

Air Sensor Shared Device

The Air Sensor Shared device is a special air sensor. *When installing an "Air Sensor Shared" device, the group/device number has to be unique, but the Module and Channel numbers need to match another "Air Sensor" device that is already been set up.* This allows a zone to share an air probe that is installed in another zone, allowing you to control devices based on the temperature in a different zone. If you try to install a shared air sensor to a station/channel that does not have an air probe installed, you will recive an error message.

`Location: BROOD`

The "Air Sensor Shared" device uses all the settings from the air probe that are being shared, except for the Location setting. The "Air Sensor Shared" Location setting has its own menu. This allows you to use an air probe installed in a Growout location to be used while the controller is in Brood mode, for example.

> **If you change the Module/Channel number of a "Air Sensor" device, make sure you change them for any associated "Air Sensor Shared" device or the shared device will not work and the module/ channel being used by the shared device will not be available.**
>
> **If you delete the "Air Sensor" associated with this "Air Sensor Shared" device, make sure to delete this shared device also. If the "Air Sensor" is deleted, but the "Air Sensor Shared" device isn't, the channel number of the "Air Sensor" will no longer be available and there will be alarms for the "Shared Sensor".**
>
> **If you change the Temperature Offset of the "Air Sensor" which is pointed to by the "Shared Air Sensor", the "Shared Air Sensor" reading will also be adjusted by the offset.**

Feeder Sensor Settings

The feed sensor measures amps and is typically used to determine if there should be a feeder alarm. The group number of a feed sensor and feeder do not have to match, but the group numbers do have to match if the "Off Time Exceeds" alarm is used to warn if a Feeder is off too long when it is supposed to be on.

When using a Feed Sensor, the On time of the device will be tracked any time the monitored device is on. This happens regardless of whether or not there is a Feeder with the same Group number as the Feed Sensor. This allows the ability to be notified by alarm that the device has ran too long regardless of how the device was turned on.

```
 Cancel   FEED SENSOR CALIBRATION        Z1-S01    15:06:55
                                                   04/16/20
          Feed Sensor #8 Min:  0.1A Actual:  0.0A
          Feed Sensor #8 CAL Value: 100
          Feed Sensor #9 Min:  0.1A Actual:  0.0A
          Feed Sensor #9 CAL Value: 100
```

The Off time of the Feed Sensor is tracked in two ways, depending on its Group number:

1. If a feeder and feed sensor have the same group number, the Off time of the feed sensor is only tracked when the controller says the feeder should be on based on the Feeder's run schedules. This allows the ability to be notified by alarm if the feeder was off for too long during a feeder schedule.
2. If there is no feeder with the same group number as the feed sensor, the Off time is tracked continuously. This allows the ability to be notified by alarm if a device does not turn on often enough, such as a device that is supposed to run at least every 2 hours.

See "Feed Sensor Alarms" in the "Sound Alarm When Menu" section of this manual for more information on how the Feed Sensor alarms work.

> **By having a Feed Sensor Group number not match a Feeder Group number, both the sensor and its alarm settings can be used to track the runtimes of any electrical device, as long as the On and Off amps of the device differ.**

If multiple feed sensors are configured, the settings for each sensor will be shown on the same screen. Select the line for the group number to change its values. If more than 5 feed sensors are configured, Page Up and Page Down buttons will be provided to view the settings on the additional pages.

Minimum Amps

`Feed Sensor #8 Min:  0.1A Actual:  0.0A`

Input a value less than the minimum amps draw of the motor. When the controller detects current higher than this value, it assumes the motor is running. This menu also displays the current actual reading.

Cal Value

`Feed Sensor #8 CAL Value: 100`

Unless otherwise specified in the feed sensor's documentation, the calibration value is 100.

Static Pressure Sensor Settings

ADC Cal 1 and ADC Cal 2

`Static Pressure ADC CAL 1:  6554`

`Static Pressure ADC CAL 2: 58982`

Input the ADC calibration values for the static pressure sensor.

```
Cancel   STATIC PRESSURE CALIBRATION     Z1-S01   13:01:47
                                                  04/16/20
         Static Pressure ADC CAL 1:  6554
         Static Pressure ADC CAL 2: 58982
         Static Pressure WC CAL 1: 0.000
         Static Pressure WC CAL 2: 0.250
```

WC Cal 1 and WC Cal 2

`Static Pressure WC CAL 1: 0.000`

`Static Pressure WC CAL 2: 0.250`

Input the Water Column calibration values for the static pressure sensor.

> **The values shown in these examples are the values typically used.**
> **Specific static pressure control settings are entered in the Static Pressure Settings menus.**

Humidity Sensor Settings

Up to three humidity sensors can be configured per zone. This page will display a line for each configured sensor.

```
Cancel   HUMIDITY SENSOR CALIBRATION     Z1-S01   15:06:49
                                                  04/16/20
         Humidity #01  CAL1 = 10485 CAL2 = 51118
         Humidity #02  CAL1 = 10485 CAL2 = 51118
         Humidity #03  CAL1 = 10485 CAL2 = 51118
```

Cal Value

`Humidity #01  CAL1 = 10485 CAL2 = 51118`

Input the calibration values shown on the tag attached to the humidity sensor. If no calibration values are available, use the default values shown below.
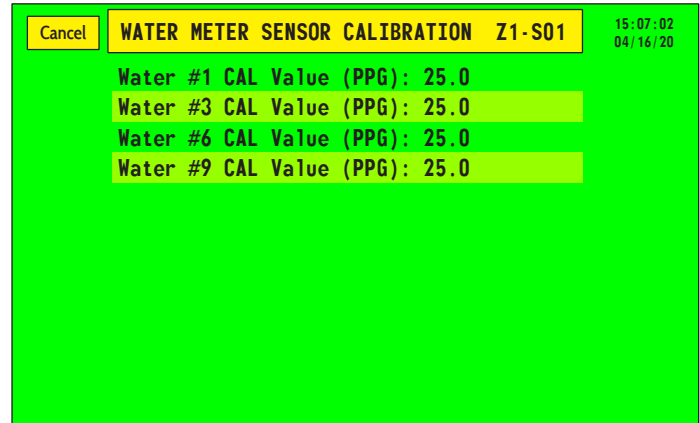
Water Meter Sensor Settings

Up to 9 water meters can be configured per zone.
This page will display a line for each configured meter.

Cal Value (PPG / PPL)

```
Water #1 CAL Value (PPG): 25.0
```

Input the pulses per gallon (PPG) or pulses per liter (PPL) calibration value for the water meter sensor. Unless otherwise specified, the value is 25.
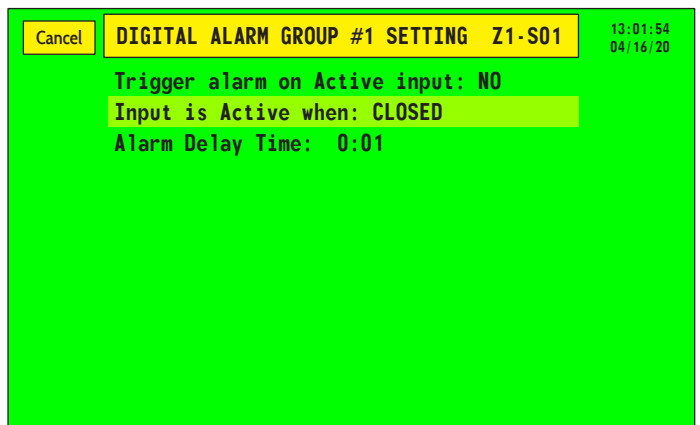
```
Cancel   WATER METER SENSOR CALIBRATION   Z1-S01      15:07:02
                                                      04/16/20
         Water #1 CAL Value (PPG): 25.0
         Water #3 CAL Value (PPG): 25.0
         Water #6 CAL Value (PPG): 25.0
         Water #9 CAL Value (PPG): 25.0
```

Digital Alarm Sensor Settings

Digital alarms provide warnings of almost any emergency condition you need to be informed about. Any no-voltage circuit ("dry" contact) that can be switched will provide an alarm to the controller. The term "**digital**" refers to two possible states for a circuit: **OPEN** and **CLOSED**. Set up each digital alarm input to sense for an **OPEN** or a **CLOSED** circuit.

Each Digital Alarm screen displays the settings for a particular device group. If more than one device is configured, use the **Group +** and **Group -** buttons on the screen, or the **PLUS** and **MINUS** hardware keys to display/change to a different group's settings.

```
Cancel   DIGITAL ALARM GROUP #1 SETTING   Z1-S01      13:01:54
                                                      04/16/20
         Trigger alarm on Active input: NO
         Input is Active when: CLOSED
         Alarm Delay Time:  0:01
```

Trigger Alarm on Active Input

```
Trigger alarm on Active input: NO
```

Set this to YES if you want the controller to alarm when the input is active.

Input is Active When

```
Input is Active when: CLOSED
```

Set this to **CLOSED** if you want the controller to alarm when the digital input circuit becomes closed. Set this to OPEN if you want the controller to alarm when the digital input circuit becomes open.

Alarm Delay Time

```
Alarm Delay Time:  0:01
```

Input the time (minutes and seconds) the alarm condition must exist before the alarm is triggered. For example, the controller should alarm when a door is left open. Set the Alarm Delay Time to 30 seconds to prevent a false alarm from normal building entry and exiting.

Position Sensor Settings

> **A position sensor is mainly used to verify the correct movement of a curtain, ridge vent, chimney damper or inlet that it is attached to. Its main purpose is to create an alarm situation if the reading from the position sensor does not match the attached device's calculated position from the controller.**

A secondary benefit of the position sensor is the ability of the controller to use the position sensor reading to correct the attached device's position. After the inlet device has moved, if the calculated position and the position sensor reading do not match, the controller will move the inlet device again to correct the position. ALL of the following have to be true in order for the controller to use the position sensor in this way.
1. The position sensor has to be attached to a curtain, ridge vent, chimney damper or inlet.
2. The position sensor has to be calibrated so the device and position sensor settings match.
3. The "Enable Position Alarm" has to be set to YES.
4. The difference between the device's calculated position and the position sensor reading has to be within the percentage set in the "Percent OUT of Position to alarm" setting.
5. The device's calculated position and the position sensor reading have to be more than 3 seconds of travel time apart.

If ALL the above are true, then if the controller finds that the device's calculated position and the position sensor's reading are different, the controller will move the device again until the calculated position and position sensor reading are within 3 seconds of time. If less than 3 seconds of travel time is required to make the position's match, the controller will not move the device again. If the positions are greater than the percentage to alarm, the controller will create an alarm and stop using the position sensor until the alarm is cleared. Once the alarm is cleared, the controller will assume the position sensor reading shows the device's correct position, and will move the device to its calculated position, if required.

> **Two conditions will cause the position sensor to be completely ignored by the controller.**
> 1. **If the position sensor is in an alarm state.**
> 2. **If the "Enable Position Alarm" setting is set to NO.**

Assign to a Device

`Attached to: Side Curtain #01`

Press the **PLUS** and **MINUS** keys to scroll through the list of installed curtains, inlets, ridge vents and chimneys. Press **ENTER** to assign the position sensor to the device it is attached to.

```
Cancel | POSITION SENSOR GROUP #1 SETTING: Z1-S01    13:02:38
                                                     04/16/20
         Attached to: Side Curtain #01
         Enable Position Alarm? NO                   Enter
         Percent OUT of Position to Alarm: 10%
         Press ENTER to calibrate this sensor
         ** POSITION SENSOR #1 NOT CALIBRATED **
```

Enable Position Alarm

`Enable Position Alarm? NO`

When this menu item is set to YES, the controller activates the alarm relay and displays an active alarm menu item if the expected device position is off by more than the Percent OUT of Position to Alarm setting (see below).

> **This setting has to be set to YES in order for the auto-correct feature of the position sensor and inlet device to work. If this is set to NO, it's the same as not having the position sensor installed.**

Percent OUT of Position to Alarm

`Percent OUT of Position to Alarm: 10%`

Set this menu item to the percentage the expected device position needs to be off before an alarm will be activated. This prevents false alarms when an inlet doesn't move smoothly. This value can be set from 0% to 80%, where the higher the percentage is, the farther the inlet has to be out of position before the controller will activate an alarm.

> **When setting this percentage, care should be taken to set it high enough to eliminate nuisance alarms but low enough to alarm when the position is off enough to cause problems with the animals.**

> Whether or not the alarm is enabled, if the expected device position (based on Open and Close times) differs three or more seconds from the inlet's current reading, the controller automatically corrects the time-based position. If the Enable Position alarm is set to Yes and there are no active position sensor alarms, then the position sensor reading is used to adjust the inlet. If the Enable Position alarm is set to No, the internal inlet's current reading is used to adjust the inlet.

Calibrate

Before attempting to calibrate a position sensor, be sure:
- The curtain, ridge vent, chimney damper or inlet device is properly wired.
- The position sensor is properly wired to the controller.
- The curtain, ridge vent, chimney damper or inlet device is configured in the controller software.
- The ON-OFF-AUTO switches for the device's open/close channels are set to AUTO.
- The Position Sensor Alarm setting is set to NO, otherwise an out-of-position alarm will activate.
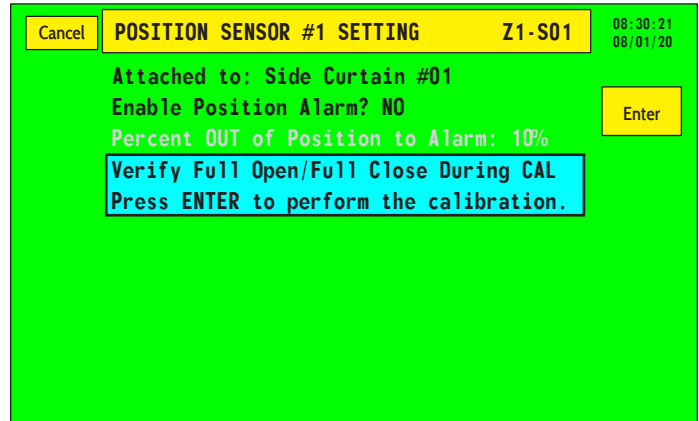
To start that calibration procedure, select "**Press ENTER to calibrate this sensor**" and press **ENTER**.

| Cancel | POSITION SENSOR #1 SETTING | Z1-S01 | 08:29:17 08/01/20 |

```
         Attached to: Side Curtain #01
         Enable Position Alarm? NO                 Enter
         Percent OUT of Position to Alarm: 10%
         Press ENTER to calibrate this sensor
         ** POSITION SENSOR #1 NOT CALIBRATED **
```

Position Sensor Settings - continued
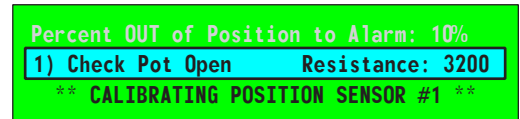
A reminder message to verify the device fully opens and closes is displayed. Press **ENTER** to proceed. An automated calibration process starts. Do not press any keys or move any switches during the calibration process.

During the calibration process, pressing **CANCEL** will abort the procedure, allowing you to fix any problems observed before trying again.

| Cancel | POSITION SENSOR #1 SETTING | Z1-S01 | 08:30:21 08/01/20 |

Attached to: Side Curtain #01
Enable Position Alarm? NO
Percent OUT of Position to Alarm: 10%
Verify Full Open/Full Close During CAL
Press ENTER to perform the calibration.

Enter
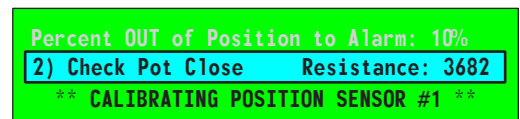
Once the calibration routine starts, the screen will display the 5-step process as it proceeds.
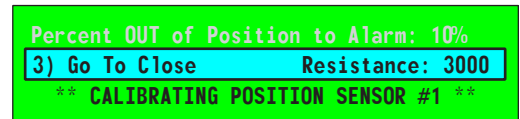
1. The controller tries to open the device for a few seconds to verify it moves open.

   Percent OUT of Position to Alarm: 10%
   1) Check Pot Open   Resistance: 3200
   ** CALIBRATING POSITION SENSOR #1 **
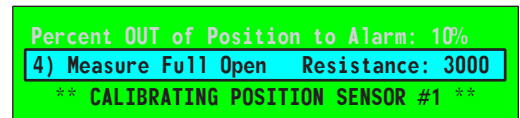
2. The controller tries to close the device for a few seconds to verify it moves closed.

   Percent OUT of Position to Alarm: 10%
   2) Check Pot Close   Resistance: 3682
   ** CALIBRATING POSITION SENSOR #1 **

3. The controller closes the device fully.

   Percent OUT of Position to Alarm: 10%
   3) Go To Close   Resistance: 3000
   ** CALIBRATING POSITION SENSOR #1 **
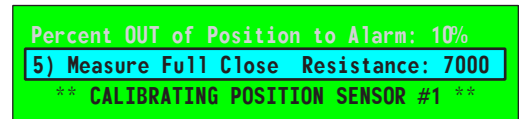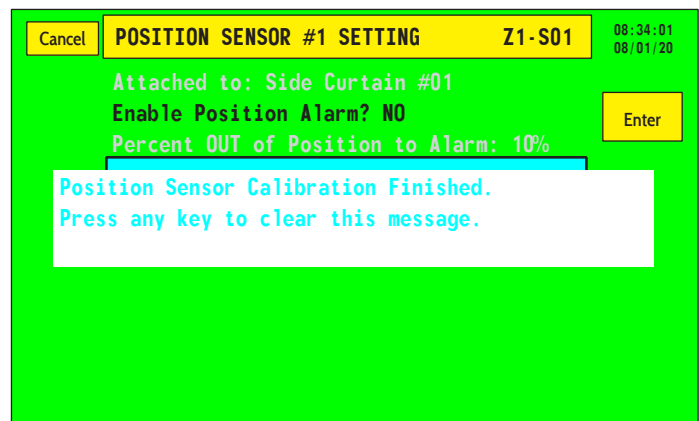
4. The controller opens the device fully measuring the time it takes to open.

   Percent OUT of Position to Alarm: 10%
   4) Measure Full Open   Resistance: 3000
   ** CALIBRATING POSITION SENSOR #1 **

5. The controller closes the device fully measuring the time it takes to close.

   Percent OUT of Position to Alarm: 10%
   5) Measure Full Close Resistance: 7000
   ** CALIBRATING POSITION SENSOR #1 **

A pop-up window will be displayed once the calibration procedure has finished. Press any key to clear the message.

| Cancel | POSITION SENSOR #1 SETTING | Z1-S01 | 08:34:01 08/01/20 |

Attached to: Side Curtain #01
Enable Position Alarm? NO
Percent OUT of Position to Alarm: 10%

Enter

Position Sensor Calibration Finished.
Press any key to clear this message.

Position Sensor Settings - continued

When a position sensor has been calibrated successfully, the Position Sensor screen will display the calibration information, as well as show the Position Sensor is calibrated.

Be sure to set **Enable Position Alarm** to **Yes**, and set the **Percent Out of Position to Alarm** value to start using the position sensor.

```
┌────────┬─────────────────────────────────────┬──────────┐
│ Cancel │ POSITION SENSOR #1 SETTING    Z1-S01│ 08:34:08 │
│        │                                     │ 08/01/20 │
├────────┴─────────────────────────────────────┴──────────┤
│      Attached to: Side Curtain #01                       │
│      Enable Position Alarm? NO               ┌─────────┐ │
│      Percent OUT of Position to Alarm: 10%   │  Enter  │ │
│     │Press ENTER to calibrate this sensor│   └─────────┘ │
│     ┌───────────────────────────────────────────┐        │
│     │ ** POSITION SENSOR #1 CALIBRATED **        │        │
│     │                                            │        │
│     │ Current Resistance when Stopped:   3000    │        │
│     │ Resistance - Open:  7000 Close:    3000    │        │
│     │ Travel Time - Open:  1:00 Close:   1:00    │        │
│     └───────────────────────────────────────────┘        │
│                                                          │
└──────────────────────────────────────────────────────────┘
```

If a problem occurs during the calibration procedure, or the calibration procedure is canceled, a pop-up window will appear explaining the reason for the failure. Press any key to clear the message, fix the problem and try calibrating the sensor again.

```
┌────────┬─────────────────────────────────────┬──────────┐
│ Cancel │ POSITION SENSOR #1 SETTING    Z1-S01│ 08:36:13 │
│        │                                     │ 08/01/20 │
├────────┴─────────────────────────────────────┴──────────┤
│      Attached to: Side Curtain #01                       │
│      Enable Position Alarm? NO               ┌─────────┐ │
│      Percent OUT of Position to Alarm: 10%   │  Enter  │ │
│   ┌──────────────────────────────────────────┴─────────┐ │
│   │ Position Sensor Not Calibrated! Reason:            │ │
│   │  A: Sensor Pot moving too slow.                    │ │
│   │ Press any key to clear this message.               │ │
│   └────────────────────────────────────────────────────┘ │
│                                                          │
└──────────────────────────────────────────────────────────┘
```

The possible abort codes and their meanings are:

O: Operator Requested Calibration STOP.
　　User pressed the CANCEL button/key before the calibration was completed.
A: Sensor Pot moving too slow.
　　The change in the reading of the sensor is too small (less than 2 ohms per second).
B: Sensor Pot not moving.
　　No movement was detected in the sensor when trying to move in either direction.
C: Close to Open Time less than 15 seconds.
　　Open travel time must be 15 seconds or greater to use a position sensor.
D: Open to Close Time less than 15 seconds.
　　Close travel time must be 15 seconds or greater to use a position sensor.
E: Travel Time less than 30 ohms.
　　The total ohm change when going from Open to Close, or Close to Open has to be a minimum of 30 ohms.

Whisker Switch

A Whisker Switch is an electrical contact that allows the controller to determine if a curtain, ridge vent, chimney damper or inlet is open or closed a set amount. The purpose of a whisker switch is to allow the controller to alarm if the inlet doesn't move correctly and allows the controller to shut off fans when the inlet is open. The switch circuit is closed when the inlet is opened and the circuit is opened when the inlet is closed.

```
┌─────────┬──────────────────────────────────┬─────────┐
│ Cancel  │ WHISKER SWITCH GROUP #1 SETTING: Z1-SO1 │ 13:02:24 │
│         │                                  │ 04/16/20 │
│         │ Attached to: Side Curtain #01    │         │
│         │ Fans turned OFF by: Curtain Opening │        │
│         │ Validate Switch - Low:   0  High:   0 │      │
│         │ Seconds delay alarm Out of Position:  15 │   │
└─────────┴──────────────────────────────────┴─────────┘
```

Assign to a Device

`Attached to: Side Curtain #01`

Press **ENTER** to assign a device to the whisker switch.

Press the **PLUS** and **MINUS** keys to scroll through the list of installed curtains, inlets, ridge vents and chimneys. Press **ENTER** to assign the whisker switch to the device it is attached to.

Fans turned OFF by

`Fans turned OFF by: Curtain Opening`

When using a Whisker Switch to turn fans on and off, there are two options to choose from:

1. Curtain Opening: the fan will turn off based on the internally calculated position of the airway device. The Fan's "Fans Off At Opening Of" setting is used to determine when the fan turns on and off. The state of the Whisker Switch is only used for alarm purposes with this option.

2. Whisker Switch: The fans will turn on and off based the state of the Whisker Switch regardless of the actual airway opening size. As long as the Fan's "Fans Off At Opening Of" setting is above 0, the fan will use the Whisker Switch state to turn on and off.

Validate Switch

`Validate Switch - Low:   0   High:   0`

Set the Low value to the closed inches/cm of the inlet where the switch circuit changes from closed to open. This shows the controller the inlet closed past the switch. Set the High value to the open inches/cm of the inlet where the switch circuit changes from opened to closed. This shows the controller the inlet opened past the switch.

These validation values are used to active an out-of-position alarm if the switch fails to toggle at the correct spot, indicating the inlet is not working correctly. The alarm will activate any time the calculated position of the inlet is below the Low setting, or above the High setting, and the state of the Whisker Switch is opposite of what it should be. Setting the High or Low value to 0, sets the other value to 0 and will disable the alarm. The alarm condition is not checked when the inlet's calculated opening size is within the Low and High validation range. This allows setting a wider Low/High range to help prevent nuisance alarms for switches that don't toggle instantly.

Alarm delay

`Seconds delay alarm Out of Position:  15`

An out-of-position alarm will activate if the switch and controller differ in whether the switch should be open or closed. Use this setting to set the number of seconds to delay the Whisker Switch alarm. The expected Whisker Switch's on/off state has to be incorrect for this many consecutive seconds before an alarm will activate. This prevents nuisance alarms when the Whisker Switch state changes for a short period of time due to the bouncing of the device caused by the wind, etc. This value can be set from 1 second to 600 seconds (10 minutes), but is typically set to 15 seconds.

> When a Whisker Switch alarm activates, any fan which uses the Whisker Switch to shut off, will be turned back on until the alarm is cleared by a user. This alarm will not auto-clear.
> You can assign both a Whisker Switch and Position Sensor to the same curtain/inlet. The Position Sensor will take precedence if one of each is assigned.

Setting up Output Devices

Sensor Assignment

This controller uses Shared Sensor Technology to control all the devices in the building. Any combination of sensors can be averaged to control any device. You may assign up to four sensors to each equipment group. Enter four zeros to assign all indoor temperature sensors to a group.
To change sensor numbers while you are setting up operating parameters for an output device (operating parameters are discussed later in this manual).

1. Press **ENTER** while you are viewing a menu item where sensors can be selected (usually displays Use Sensors).

   ENTER

   | Cancel | SIDEWALL FAN #1 SETTING | Z1-S01 | 11:18:05 08/02/20 |

   Use Sensors: ALL   (Avg 70.0)
   Operating Mode: Tunnel,Cool,Purge

2. Press the **PLUS** or **MINUS** keys to input the sensor number you want to have control the equipment group.

   + or **–**

3. Press **ENTER** to confirm.
4. Repeat steps 2-3 for each sensor.

   ENTER

   | Cancel | SIDEWALL FAN #1 SETTING | Z1-S01 | 11:18:05 08/02/20 |

   Use Sensors: 1, 2, 3, 4   (Avg 70.0)
   Operating Mode: Tunnel,Cool,Purge

5. If the cursor is still present, press **ENTER** until it disappears.

6. The average temperature of all controlling sensors is listed at the right.

Curtains and Inlets

Introduction:
You must designate how curtains and inlets will operate. Ridge vents are natural only. There are four basic operating modes:
* **Natural** - Operates for all ventilation below the Tunnel Entry Temperature. Often referred to as power, minimum, or natural ventilation. Natural curtains and inlets are closed during tunnel mode.
* **Tunnel** - Operates only during tunnel mode. Tunnel curtains and inlets are closed during natural mode.
* **Static** - Operates automatically based on the static pressure sensor readings. Static pressure control menus are displayed only when a static pressure sensor is installed. Static-pressure-controlled devices open or close based on the Open and Close values entered in the Static Pressure Setting menu.
* **Temp** - Operates based on temperature (typically curtains) or operates proportionally (typically inlets) based on the number of fans running.
The above modes are combined for the following menu choices.
* **Static Tunnel Only** - The device only operates during tunnel mode and is controlled by static pressure.
* **Temp Natural Only** - The device only operates during natural mode. An inlet opens or closes based on the number of fan groups running (proportional control). A curtain opens or closes based on its Open Temp and Close Temp.
* **Static Natural Only** - The device only operates during natural mode and is controlled by static pressure.
* **Temp Natural/Temp Tunnel** - During natural mode, an inlet operates based on the number of fan groups running (proportional control). A curtain operates based on its Open Temp and Close Temp settings. During tunnel mode, the inlet or curtain operates based on proportional control.
* **Temp Natural/Static Tunnel** - During natural mode, an inlet operates based on the number of fan groups running (proportional control). A curtain operates based on its Open Temp and Close Temp settings. During tunnel mode, the inlet or curtain operates based on static pressure.
* **Temp Tunnel Only** - The inlet or curtain operates only during tunnel mode and its position is based on the number of fan groups running (proportional control).
* **Static Natural/Temp Tunnel** - During natural mode, the device operates based on static pressure. During tunnel mode, the device operates based on proportional control.
* **Static Natural/Static Tunnel** - The device operates based on static pressure during natural mode and tunnel mode.

See Appendix 2 for a summary of how inlets/curtains behave in each mode.

Side Curtain Settings

```
Cancel   SIDE CURTAIN #1 SETTING          Z1-S01    14:51:49
                                                    06/02/20
         Use Sensors: ALL             (Avg  70.0)
         Open Temp:  72.0  Close Temp:   68.0
         Open   10"   and Pause:   0:03:00
         Close  10"   and Pause:   0:03:00
         Maximum Opening:   0   Below Temp:   70.0
         Static Pressure Pause Timer:   0:00
         Operate as: Temp Natural Only
          Tunnel Fan Proportional Settings
         Response Mode: STANDARD
  Page   Full Opening Size (Inches):   48"
  Down   Full Open Travel Time:   1:00
```

```
Cancel   SIDE CURTAIN #1 SETTING          Z1-S01    14:51:52
                                                    06/02/20
         Full Close Travel Time:   1:00
         Purge Opening Size (Inches):     6"
         Pre-Open Timer:  0:00
         Exercise Delay Days:  0
         Perform Exercise at:  0:00
         Perform Re-Sync at:  0:00
  Page   Tunnel Entry size:   0   Exit Size:  0
  Up
```

Use Sensors

```
Use Sensors: ALL             (Avg  70.0)
```

Input the group numbers of the air sensors you want to use for controlling the curtain. The controller uses Shared Sensor Technology to average the temperature readings of any sensors you want to use to control any device. This menu item only appears when the curtain uses a temperature-controlled mode (refer to the Operating Modes: Curtains and Inlets section).

Opening and Closing Temp

```
Open Temp:  72.0  Close Temp:   68.0
```

Input the temperatures at which the controller should open and close the side curtain (when the curtain is in a temperature-control mode). When the temperature is at or above the Open Temp, the controller opens the curtain as many inches as you designate (see below). When the temperature is at or below the Close Temp, the controller closes the curtain as many inches as you designate (see below).

> This menu item doesn't appear for curtains set up for tunnel or static control (refer to the Operating Modes: Curtains and Inlets section).

Open This Distance and Pause

```
Open   10"   and Pause:   0:03:00
```

Input the distance the controller should open the curtain before pausing. Then input the Pause time. After the Pause time, the controller checks the temperature and determines if it should open the curtain more, do nothing, or begin closing it.

> This menu item doesn't appear for curtains set up for static control (refer to the Operating Modes: Curtains and Inlets section).

The controller has a minimum motion time of three seconds. For example, if a curtain moves 60 inches in 60 seconds, 3 inches is the smallest change in opening size that can be made. Opening sizes should be set large enough to allow a minimum of three seconds movement from one setting to the next.

Close This Distance and Pause

`Close  10″  and Pause:  0:03:00`

Input the distance the controller should close the curtain before pausing. Then input the Pause time. After the PAUSE time, the controller checks the temperature and determines if it should close the curtain more, do nothing, or begin opening it.

> **This menu item doesn't appear for curtains set up for static control (refer to the Operating Modes: Curtains and Inlets section).**

Maximum Opening below Temperature

`Maximum Opening:   0   Below Temp:  70.0`

Set the maximum opening size of the curtain if the temperature is below a certain point. If the temperature is below the set value then the curtain will only open to the maximum opening size. If the temperature is higher than the set temperature then the curtain is allowed to open fully. This menu only appears if a position sensor is attached to it, is calibrated and set to alarm if out of position. If the position sensor is in an alarm state then the Maximum Opening is ignored.

Static Pressure Pause Timer

`Static Pressure Pause Timer:  0:00`

Input the time the curtain should pause after it moves due to a change in static pressure. The pause time prevents the curtain from responding too often to changes in static pressure. This menu item appears only when the curtain is set up to run according to static pressure. If the curtain moves too often, try increasing the time entered here.

Operating Mode

`Operate as: Temp Natural Only`

Refer to the Operating Modes: Curtains and Inlets section for a list of modes. This menu item appears only when a tunnel fan (allows for tunnel mode) or a static pressure sensor (allows for static pressure controlled modes) is installed. Otherwise, the controller assumes the curtain is Temp Natural Only.

> **Refer to the Temperature Control Settings section for information about interlocking a heater or ridge vent to your curtains. Interlocking a heater prevents it from turning on when the curtain is open more than one inch. Interlocking a ridge vent allows it to open and close in sync with a curtain resulting in enhanced air quality.**

Natural Mode Operation

After the pause time has expired, if the temperature is moving in the right direction, the curtain may pause for a second time to allow the environment to settle down before moving again.

There are three conditions that can cause natural curtains to react differently than described above.

Stop Sooner
The curtain immediately stops opening or closing when the temperature returns to between the Open Temp and Close Temp.

Abort Pause Time
The controller aborts the open or close pause time if the opposite movement temperature is reached during the pause time. This reduces drastic temperature changes inside the building especially in winter when rapid cooling can occur.

Skip a Movement (double the pause time)
After the pause time has expired, if the temperature is moving in the right direction, the curtain may pause for a second time to allow the environment to settle down before moving again.

Proportional Control (Tunnel Modes Only)

> **Tunnel Fan Proportional Settings**

After selecting "Tunnel Fan Proportional Settings", press **ENTER** to open a new window to see/set the proportional settings.

The following menu items allow the curtain to open proportionately to fans set up for proportional control. You must use a static pressure sensor (even if you don't plan on using one with the controller) to set up the curtain openings for each stage of fan ventilation. Measure the static pressure while one fan group is running and adjust the curtain opening until the static pressure is at the correct level. Record the curtain opening size. Next, measure the static pressure while two fan groups are running and adjust the curtain opening until the static pressure is at the correct level. Repeat the process until all of the fan groups are running.

```
Cancel   SIDE CURTAIN GROUP #1 SETTING   Z1-S01   13:00:17
                                                  04/16/20
 #01    Tunnel Fans ON: 0.0  Open:    0.0"
 #02    Tunnel Fans ON: 1.0  Open:   48.0"
 #03    Tunnel Fans ON: 2.0  Open:   48.0"
 #04    Tunnel Fans ON: 3.0  Open:   48.0"
 #05    Tunnel Fans ON: 4.0  Open:   48.0"
 #06    Tunnel Fans ON: 5.0  Open:   48.0"
 #07    Tunnel Fans ON: 6.0  Open:   48.0"
 #08    Tunnel Fans ON: 7.0  Open:   48.0"
 #09    Tunnel Fans ON: 8.0  Open:   48.0"
 Tunneling Open Sizes are: Proportional
   Tunnel Interlock 1:ALL FANS
```


Curtain opening when one fan group is running

Curtain opening when two fan groups are running

Curtain opening when three fan groups are running

Tunnel Fan Groups On \ Opening Size

```
#01   Tunnel Fans ON: 0.0  Open:    0.0"
```

```
#02   Tunnel Fans ON: 1.0  Open:   48.0"
```

```
#03   Tunnel Fans ON: 2.0  Open:   48.0"
```

Input the desired curtain opening size for each potential number of simultaneously operating tunnel fan groups. Fans are designated as tunnel in the Operating Mode menu (this includes combinations such as tunnel & cool). You can specify zero (a minimum opening size) through nine fan groups.

> **Variable speed tunnel fans can be entered in 0.5 increments to account for ramping operating speeds.**

Variable Speed Fan Power Settings
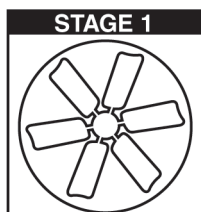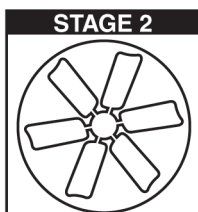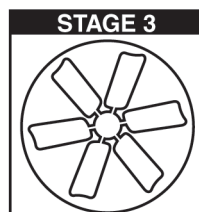
STAGE 1	STAGE 2	STAGE 3
Full Power = 30	Full Power = 30	Full Power = 30

Even though the variable speed fans in this example reach full power at 30, the controller considers each fan as "0.5" since the potential full power setting is 60. Refer to the *Fan Settings* section for more information about Full Power Setting.

```
#01   Tunnel Fans ON: 0.0  Open    0.0"

#02   Tunnel Fans ON: 0.5  Open   12.0"

#03   Tunnel Fans ON: 1.0  Open   24.0"

#04   Tunnel Fans ON: 1.5  Open   36.0"
```

> **If there is no "0 Tunnel Fans ON" position, the curtain will NOT open until the fan setting specified by the first ramp position table entry is reached. The zero position allows the controller to interpolate between zero and the next specified Fans ON position.**

Side Curtain Settings - continued

Proportional versus Stepping

`Tunneling Open Sizes are: Proportional`

This is an extension of the Tunnel Fan Groups On / Opening Size menu item. It allows two settings:

1. Proportional - the curtain will open based on a percentage of the Tunnel fans running between each level in the Fan Groups On settings. This allows a slow ramping of the opening of the curtain as the fans turn on and off.
2. Stepping - the curtain will open to the specified size for each level in the Tunnel Fan Groups On settings and will not move again until the number of fans running reaches the next level. The advantage of the Stepping setting is so the curtain does not open and close rapidly when a variable speed fan increases and decreases its speed.

Proportional versus Stepping

Fan Groups On/Sizes	# of Fans ON	Proportional Opening	Stepping Opening
#1 1/5 in.	1	5 inches	5 inches
	1.5	7.5 inches	5 inches
	2	10 inches	5 inches
	2.5	12.5 inches	5 inches
#2 3/15 in.	3	15 inches	15 inches

Tunnel Interlock to Fan

`Tunnel Interlock 1:ALL FANS`

This is an extension of the Tunnel Fan Groups On / Opening Size menu item. Instead of opening a curtain based on the number of fans running, you can interlock specific tunnel fans with curtains (open the curtain based on the number of interlocked fans running).

You can interlock up to nine specific fan groups with a curtain. Additional Interlock menu lines will be added as interlocked fans are added. This menu item limits the fan groups counted when determining the appropriate position of the curtain (refer to the previous Fan Groups On / Opening Size Menu). It only allows selection of installed fans whose "Use for Proportional Control" setting is YES.

> You can select each fan group only once for each curtain.

Tunnel Curtain #1

Tunnel #1
Tunnel #3
Tunnel #4
Tunnel #2

Tunnel Interlock to Fan

Interlock #	Fan	Fan ON Temp	Tunnel Curtain will Open
Interlock 1	Tunnel 1	80	12"
Interlock 2	Tunnel 2	82	24"
Interlock 3	Tunnel 3	84	36"
Interlock 4	Tunnel 4	86	48"
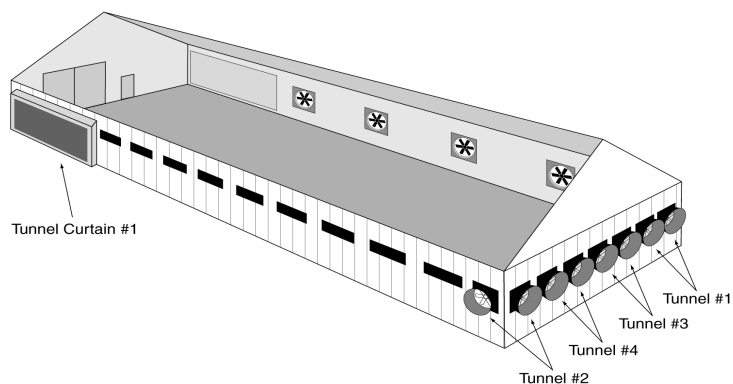
Response Mode

`Response Mode: STANDARD`

Select a response mode:

Standard – Allows the curtains to open and pause for the times you input.

Aggressive – Allows the curtains to move faster if the temperature is changing quickly. If the temperature is more than 2 degrees Fahrenheit or Celsius beyond the open or close temperature, the curtain opens or closes twice the distance you input and then pauses for only half the time. If the temperature moves further from the open or close temperature, the curtain moves further and more often.

Full Opening Size

`Full Opening Size (Inches):  48"`

Input the full opening size.

Full Open Travel Time

`Full Open Travel Time:  1:00`

Input the time it takes for the curtain to open completely. The controller uses this time to determine how open the curtain is, so enter the exact travel time. If a Position Sensor is attached to the curtain, the travel time will be set automatically when the Position Sensor is calibrated.

Full Close Travel Time

`Full Close Travel Time:  1:00`

Input the time it takes for the curtain to close completely. The controller uses this time to determine how closed the curtain is, so enter the exact travel time. If a Position Sensor is attached to the curtain, the travel time will be set automatically when the Position Sensor is calibrated.

Purge Opening Size

`Purge Opening Size (Inches):   6"`

The curtain can be used as a purge opening for purge fans. This menu item appears only if you have entered purge settings in the Purge Settings menu. Input zero to disable the curtain during the purge function. The purge opening size must be large enough to allow at least three seconds of movement.

> **Some curtains overlap the opening edge by several inches. A few inches of travel may not be enough to produce an opening. Make sure the purge setting allows travel beyond the edge of the opening.**

Pre-Open Timer

`Pre-Open Timer:  0:00`

This menu item allows static-pressure-controlled or proportional-controlled curtains to open in advance of a timed fan turning on ("timed" includes minimum ventilation cycles). Input the number of seconds, up to one minute, the curtain should start opening prior to the start of a timed fan. The pre-open time alleviates the spike in static pressure that might otherwise occur when fans turn on before curtains are adequately open.

> **Normal static-pressure or proportional control is resumed once the timed cycle begins and the fans turn on.**

Curtain Exercise Routine

This feature gives the ability to have the controller fully close the Sidewall curtains after long periods of being fully open. When curtains remain open for long periods of time, it is possible for rodents to build nests in the gathered curtain. This routine will help drive the rodents from the curtain. When the Exercise routine is being performed, the word "Exercising" is added to the Current Status screen of the curtain.

The exercise routine is only available when a curtain is set to one of the natural modes of operation based on temperature. If the curtain is controlled by static pressure or a position based on the number of fans running, then the exercise routine will not be performed and the following menus will not be displayed.

Exercise Delay Days

`Exercise Delay Days:  0`

Set the number of consecutive days the curtain has to be open greater than 50 % before the exercise routine is run. The curtain cannot close below 50% during this period in order for the routine to run. This value has to be greater than 0 before the exercise routine is performed.

Perform Exercise At

`Perform Exercise at:  0:00`

Set the time of day the exercise routine should run. At the set time each day, the controller will check how many consecutive days the curtain has been open greater than 50 %. If the number of days matches the Exercise Delay Days, the curtain will be closed completely and then opened again. Setting the time to 24:00 will disable the exercise routine. The Exercise Delay Days has to be greater than 0 for the menu to appear.

Exercise Aborted

If the exercise routine has not fully opened the curtain after 150% of the Open travel time plus the Close travel time, the routine will abort and return the curtain to natural ventilation mode operation.

Early finish to the exercise routine

Once the curtain has fully closed, three things can happen based on the current curtain temperature:

1. If the temperature is below the curtain's Close Temperature, the curtain will stay fully closed and normal operations will resume.
2. If the temperature is above the Close Temperature but below the Open Temperature, the curtain will open to 50% and normal operations will resume.
3. If the Temperature is above the Open Temperature, the curtain will open fully before normal operations resume.

Maximum Opening Size is ignored during the exercise routine. It is assumed that the temperature is hot enough for days-on-end and the Maximum Open Size Temperature is not in effect.

Perform Re-Sync

`Perform Re-Sync at:   0:00`

The curtains readjust themselves automatically with the controller when they open or close completely. When the device is within 1", or within three seconds of travel time, of fully open or closed, the channel is left on, allowing the limit switch of the curtain to stop the moving of the curtain. This allows both the curtain and controller to synchronize their positions.

However, you can have the curtain perform this re-synchronization manually once a day if needed. Set "Perform Re-Sync at" to the time of day to perform the re-synchronization. If the curtain is less than 50% open at the specified time, the controller will turn on the Close relay for the full amount of the Close Travel time of the device. If the curtain is more than 50% open, the Open relay will turn on for the full Open Travel time. This will make sure the device's actual opening size matches the controller's calculated opening.

- **If the curtain is moving when Re-Sync is supposed to happen, the Re-sync operation will wait until the curtain has stopped moving before it will turn the relay on for the full travel time.**
- **The Re-sync will happen regardless of what the controller is doing at the time of the Re-sync. So the Re-sync needs to be done at a time of day that will have the least effect on the environment of the barn. Example: you don't want the Re-sync to close the curtain when a lot of fans are running, which can cause the curtain to fail to reopen due to suction.**
- **If the curtain seems to be out of sync often, check to make sure the manual winch has been properly adjusted and the travel times of the device are accurate.**

Tunnel Enter and Exit opening sizes

`Tunnel Entry size:   0    Exit Size:  0`

These two settings allows the setting of the minimum opening size of the curtain before the controller will enter or exit tunnel mode. When the controller starts to enter Tunnel mode, any curtain open less than their "Tunnel Entry Size" will open to the Entry size setting. Any curtain that is open more than their "Tunnel Entry Size" will start to close, but will not close below the Entry size. Once all the curtains and inlets are open to at least their Entry size, the controller will go into Tunnel mode. When the controller starts to exit tunnel mode, the curtains and inlets will operate the same way as they did when entering Tunnel, but using the "Exit Size" value for its minimum opening size, before exiting tunnel mode.

- **All the curtains and inlets will open to their set sizes regardless of their operating modes. Once Tunnel mode or Natural Vent mode is entered, the curtains and inlets will operate based on their operating modes again.**

Curtain Movements at Power Up

When the controller is powered after a reset or power outage, curtains controlled by static pressure will:

- Go into their tunnel mode setting if the temperature is above the Tunnel Entry temperature.
- Fully close if the outside temperature is 10 degrees Fahrenheit (5.5 degrees Celsius) or more below the setpoint temperature. Then the curtains open to their proper opening size.
- Fully open if the outside temperature is not more than 10 degrees Fahrenheit (5.5 degrees Celsius) below the setpoint temperature. Then the curtains close to their proper opening size.

Ridge Vent Settings

Ridge vents operate in natural mode only so there is no operating mode selection as in other types of inlets.

> **ⓘ** **If you have interlocked ridge vents to curtains (see the Temperature Control Settings section) then only the Calibration, Full Open, Full Open Travel Time, Full Close Travel Time, Purge and Interlock menu items appear.**

Use Sensors

`Use Sensors: ALL          (Avg  70.0)`

Input the group numbers of the air sensors you want to use for controlling the ridge vent. The controller uses Shared Sensor Technology to average the temperature readings of any sensors you want to use to control any device.

```
Cancel   RIDGE VENT #1 SETTING        Z1-S01    14:51:58
                                                06/02/20
         Use Sensors: ALL           (Avg  70.0)
         Open Temp:  72.0  Close Temp:  68.0
         Open   7"   and Pause:  0:01:00
         Close  7"   and Pause:  0:01:00
         Response Mode: STANDARD
         Full Opening Size (Inches):  14"
         Full Open Travel Time:  0:45
         Full Close Travel Time:  0:45
         Purge Opening Size (Inches):   4"
         Interlock Curtain Grps:  ALL
         Perform Re-Sync at:  0:00
```

Opening and Closing Temp

`Open Temp:  72.0  Close Temp:  68.0`

Input the temperatures at which the controller should open and close the ridge vent. When the temperature is at or above the Open Temp, the controller opens the ridge vent as many inches as you designate (see below). When the temperature is at or below the Close Temp, the controller closes the ridge vent as many inches as you designate (see below).

Open This Distance and Pause

`Open   7"   and Pause:  0:01:00`

Input the distance the controller should open the ridge vent before pausing. Then input the Pause time. After the Pause time, the controller checks the temperature and determines if it should open the ridge vent more, do nothing, or begin closing it.

> **ⓘ** **The controller has a minimum motion time of three seconds. Opening sizes should be set large enough to allow a minimum of three seconds movement from one setting to the next.**

Close This Distance and Pause

`Close   7"   and Pause:  0:01:00`

Input the distance the controller should close the ridge vent before pausing. Then input the Pause time. After the PAUSE time, the controller checks the temperature and determines if it should close the ridge vent more, do nothing, or begin opening it.

Ridge Vent Settings - continued

Response Mode

`Response Mode: STANDARD`

Select a response mode:

Standard – Allows the ridge vent to open and pause for the times you input.

Aggressive – Allows the ridge vent to move faster if the temperature is changing quickly. If the temperature is more than 2 degrees Fahrenheit or Celsius beyond the open or close temperature, the ridge vent opens or closes twice the distance you input and then pauses for only half the time. If the temperature moves further from the open or close temperature, the ridge vent moves further and more often.

Full Opening Size

`Full Opening Size (Inches):  14"`

Input the full opening size.

Full Open Travel Time

`Full Open Travel Time:  0:45`

Input the time it takes for the ridge vent to open completely. The controller uses this time to determine how open the ridge vent is, so enter the exact travel time. If a Position Sensor is attached to the ridge vent, the travel time will be set automatically when the Position Sensor is calibrated.

Full Close Travel Time

`Full Close Travel Time:  0:45`

Input the time it takes for the ridge vent to close completely. The controller uses this time to determine how closed the ridge vent is, so enter the exact travel time. If a Position Sensor is attached to the ridge vent, the travel time will be set automatically when the Position Sensor is calibrated.

Purge Opening Size

`Purge Opening Size (Inches):   4"`

The ridge vent can be used as a purge opening for purge fans. This menu item appears only if you have entered purge settings in the Purge Settings menu. Input zero to disable the ridge vent during the purge function. The purge opening size must be large enough to allow at least three seconds of movement.

Interlock Curtain Groups

`Interlock Curtain Grps:  ALL`

Input up to six curtain groups.

If you have set the Ridge to Curtains Interlock (refer to the Temperature Control Settings section) you can specify the curtain groups here. Interlocking ridge vents to curtains enhances air quality in a building while maintaining good temperature control. When ridge vents are interlocked, their open and close settings are ignored. The interlocked ridge vent attempts to open the same number of inches as the curtain with the largest opening size. For example, a curtain has a maximum opening size of 48 inches, and the ridge vent's maximum opening size is 10 inches. As the curtain opens, the ridge vent will also open the same amount as the curtain. When the curtain is open 10 inches, the ridge vent will be fully open at 10 inches.

Perform Re-Sync

`Perform Re-Sync at:  0:00`

The Ridge Vents readjust themselves automatically with the controller when they open or close completely. When the device is within 1", or within three seconds of travel time, of fully open or closed, the channel is left on, allowing the limit switch of the device to stop the moving of the device. This allows both the Ridge Vent and controller to synchronize their positions.

However, you can have the device perform this re-synchronization manually once a day if needed. Set "Perform Re-Sync at" to the time of day to perform the re-synchronization. If the device is less than 50% open at the specified time, the controller will turn on the Close relay for the full amount of the Close Travel time of the device. If the device is more than 50% open, the Open relay will turn on for the full Open Travel time. This will make sure the device's actual opening size matches the controller's calculated opening size. Set the value to 0:00 to disable this feature. Set it to 24:00 to have it run at midnight.

> - **If the device is moving when Re-sync is supposed to happen, the Re-sync operation will wait until the device has stopped moving before it will turn the relay on for the full travel time.**
> - **The Re-sync should be done at a time of day that will have the least effect on the environment of the barn, such as early morning when it is less likely a lot of fans will be running.**
> - **If the device seems to be out of sync often, check to make sure the manual winch has been properly adjusted and the travel times of the device are accurate. Also check to make sure the device settings allow the device to fully close or open at some point.**

Chimney Damper Settings

The chimney damper is a unique device because it contains a fan and an inlet. If you use this type of device, install the fan portion as a ridge fan and the damper portion as a chimney damper.

```
┌─────────────────────────────────────────────────┐
│ Cancel   CHIMNEY DAMPER GROUP #1 SETTING  Z1-S01  15:01:45 │
│                                                   04/16/20 │
│        #01    Cool Fans ON: 0.0  Open:    0.0"    │
│        #02    Cool Fans ON: 1.0  Open:   12.0"    │
│        #03    Cool Fans ON: 2.0  Open:   12.0"    │
│        #04    Cool Fans ON: 3.0  Open:   12.0"    │
│        #05    Cool Fans ON: 4.0  Open:   12.0"    │
│        #06    Cool Fans ON: 5.0  Open:   12.0"    │
│        #07    Cool Fans ON: 6.0  Open:   12.0"    │
│        #08    Cool Fans ON: 7.0  Open:   12.0"    │
│        #09    Cool Fans ON: 8.0  Open:   12.0"    │
│ Page      Cooling Open Sizes are: Proportional    │
│ Down    Interlock 1:ALL RIDGE FANS                │
└─────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│ Cancel   CHIMNEY DAMPER GROUP #1 SETTING  Z1-S01  13:01:23 │
│                                                   04/16/20 │
│        Full Opening Size (Inches):  12"           │
│        Full Open Travel Time:  1:00               │
│        Full Close Travel Time:  1:00              │
│        Perform Re-Sync at:  0:00                  │
│                                                   │
│ Page                                              │
│ Up                                                │
└─────────────────────────────────────────────────┘
```

Proportional Control

The following menu items allow the chimney damper to open or close based on the number of ridge fan groups running. When interlocked fans are disabled due to open curtains (or no ridge fans are installed), the chimney damper opens or closes based on curtain opening size. The chimney damper attempts to open the same number of inches as the curtain with the largest opening size. For example, a curtain has a maximum opening size of 48 inches, and the chimney damper's maximum opening size is 10 inches. When the curtain is open 10 inches, the chimney damper is fully open at 10 inches.

Cool Fan Groups On \ Opening Size

```
#01    Cool Fans ON: 0.0  Open:    0.0"
```
```
#02    Cool Fans ON: 1.0  Open:   12.0"
```

Input the desired chimney damper opening size for each potential number of simultaneously operating ridge fan groups. The fans must be designated as cool in the Operating Mode menu (this includes combinations such as tunnel & cool). You can specify one through nine fan groups.

> When variable speed ridge fans are installed, they can be entered in 0.5 increments to account for ramping operating speeds.

Interlock to Fan

```
Interlock 1:ALL RIDGE FANS
```

This is an extension of the Cool Fan Groups On / Opening Size menu item. Instead of opening a chimney damper based on the number of fans running, you can interlock specific ridge fans with a chimney damper. That way, the chimney damper opens based on interlocked ridge fans.

Interlock up to nine specific ridge fan groups with a chimney damper. Additional Interlock menu lines will be added as interlocked fans are added. This menu item only allows selection of ridge fans whose "Use for Proportional Control" setting is YES. You can select each fan group only once for each chimney damper.

Chimney Damper Settings - continued

Proportional versus Stepping

`Cooling Open Sizes are: Proportional`

This is an extension of the Cooling Fan Groups On / Opening Size menu item. It allows two settings:

Proportional - the curtain will open based on a percentage of the fans running between each level in the Fan Groups On settings. This allows a slow ramping of the opening of the curtain as the fans turn on and off.

Stepping - the curtain will open to the specified size for each level in the Fan Groups On settings and will not move again until the number of fans running reaches the next level. The advantage of the Stepping setting is so the curtain does not open and close rapidly when a variable speed fan increases and decreases its speed.

An example of this would be:

Fan Groups On/Sizes	# of Fans ON	Proportional Opening	Stepping Opening
#1 1/5 in.	1	5 inches	5 inches
	1.5	7.5 inches	5 inches
	2	10 inches	5 inches
	2.5	12.5 inches	5 inches
#2 3/15 in.	3	15 inches	15 inches

Full Opening Size

`Full Opening Size (Inches):  12"`

Input the full opening size.

Full Open Travel Time

`Full Open Travel Time:  1:00`

Input the time it takes for the chimney damper to open completely. The controller uses this time to determine how open the damper is, so enter the exact travel time. If a Position Sensor is attached to the Chimney Damper, the travel time will be set automatically when the Position Sensor is calibrated.

Full Close Travel Time

`Full Close Travel Time:  1:00`

Input the time it takes for the chimney damper to close completely. The controller uses this time to determine how closed the damper is, so enter the exact travel time. If a Position Sensor is attached to the Chimney Damper, the travel time will be set automatically when the Position Sensor is calibrated.

Perform Re-Sync at 0:00

`Perform Re-Sync at:  0:00`

The Chimney Dampers readjust automatically with the controller when they open or close completely. When the device is within 1", or within three seconds of travel time, of fully open or closed, the channel is left on, allowing the limit switch of the device to stop the moving of the device. This allows both the Chimney Damper and controller to synchronize their positions.

However, you can have the device perform this re-synchronization manually once a day if needed. Set "Perform Re-Sync at" to the time of day to perform the re-synchronization. If the device is less than 50% open at the specified time, the controller will turn on the Close relay for the full amount of the Close Travel time of the device. If the device is more than 50% open, the Open relay will turn on for the full Open Travel time. This will make sure the device's actual opening size matches the controller's calculated opening size. Set the value to 0:00 to disable this feature. Set it to 24:00 to have it run at midnight.

- If the device is moving when Re-sync is supposed to happen, the Re-sync operation will wait until the device has stopped moving before it will turn the relay on for the full travel time.
- The Re-sync should be done at a time of day that will have the least effect on the environment of the barn, such as early morning when it is less likely a lot of fans will be running.
- If the device seems to be out of sync often, check to make sure the manual winch has been properly adjusted and the travel times of the device are accurate. Also check to make sure the device settings allow the device to fully close or open at some point (Example: have at least one "Fans On" setting at 0.0" opening size and one setting at full opening size).

Sidewall, Tunnel & Ceiling Inlet Settings

Inlets are typically a proportionally controlled device so the menu items Open this distance and Close this distance are not used. Instead, when an inlet needs to open or close more, the proportional control or static pressure control settings are used.

```
┌────────┬──────────────────────────────────────┬─────────┐
│ Cancel │ SIDEWALL INLET #1 SETTING    Z1-S01  │14:52:03 │
│        │                                      │06/02/20 │
│        │  Static Pressure Pause Timer:  0:00  │         │
│        │  Operate as: Static Natural Only     │         │
│        │   Natural Fan Proportional Settings  │         │
│        │   Tunnel Fan Proportional Settings   │         │
│        │  Full Opening Size (Inches):  12"    │         │
│        │  Full Open Travel Time:  1:00        │         │
│        │  Full Close Travel Time:  1:00       │         │
│        │  Purge Opening Size (Inches):  0"    │         │
│        │  Pre-Open Timer:  0:00               │         │
│ Page   │  Tunnel Entry size:  0   Exit Size: 0│         │
│ Down   │  Perform Re-Sync at:  0:00           │         │
└────────┴──────────────────────────────────────┴─────────┘
```

```
┌────────┬──────────────────────────────────────┬─────────┐
│ Cancel │ SIDEWALL INLET #1 SETTING    Z1-S01  │14:52:05 │
│        │                                      │06/02/20 │
│        │  Close to   0.0 when curtain >=  0.0 │         │
│        │  Close Override Temperature:  70.0   │         │
│        │  Looking at(1): ALL Sidewall Curtains│         │
│        │                                      │         │
│        │                                      │         │
│ Page   │                                      │         │
│ Up     │                                      │         │
│        │                                      │         │
│        │                                      │         │
│        │                                      │         │
└────────┴──────────────────────────────────────┴─────────┘
```

> ℹ **The controller has a minimum motion time of three seconds. Opening sizes should be set large enough to allow a minimum of three seconds movement from one setting to the next.**

Static Pressure Pause Timer

`Static Pressure Pause Timer:  0:00`

Input the time the inlet should pause after it moves due to a change in static pressure. The pause time prevents the inlet from responding too often to changes in static pressure. This menu item appears only when the inlet is set up to run according to static pressure. If the inlet moves too often, try increasing the time entered here.

The following display screens use readings from one of each three inlet groups. The inlet groups are all the same, so for the purpose of space, we have used some from each group.

Operating Mode

`Operate as: Static Natural Only`

Refer to the *Operating Modes* section for a list of operating modes.

Proportional Control

`Natural Fan Proportional Settings`

`Tunnel Fan Proportional Settings`

After selecting one of these lines/buttons, press **ENTER** to open a new window to see/set the proportional settings.

The following menu items allow the inlet to open proportionately to fans set up for proportional control. Inlets typically open proportionately to the fans. You must use a static pressure sensor (even if you don't plan on using one with the controller) to set up the inlet openings for each stage of fan ventilation. Measure the static pressure while one fan group is running and adjust the inlet opening until the static pressure is at the correct level. Record the inlet opening size. Next, measure the static pressure while two fan groups are running and adjust the inlet opening until the static pressure is at the correct level. Repeat the process until all of the fan groups are running.

Inlet opening when one fan group is running. | Inlet opening when two fan groups are running. | Inlet opening when three fan groups are running.

Inlet Openings Explained.eps
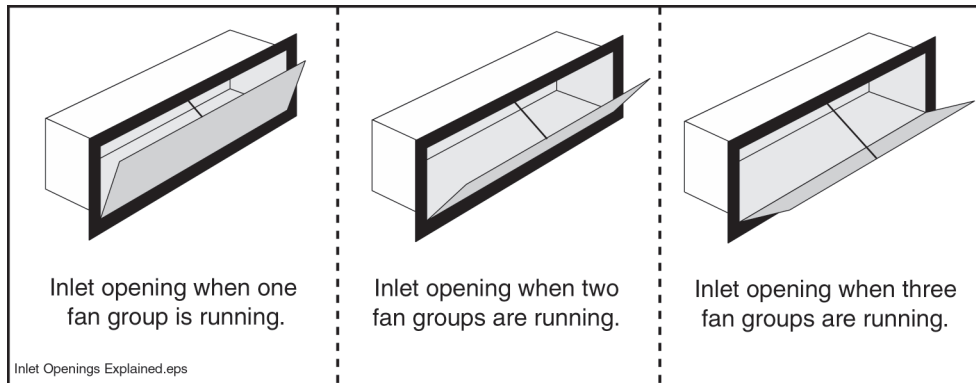
Cool Fan Groups On \ Opening Size

| #01 | Cool Fans ON: 0.0 | Open: | 0.0" |

| #02 | Cool Fans ON: 1.0 | Open: | 12.0" |

| #03 | Cool Fans ON: 2.0 | Open: | 12.0" |

Input the desired inlet opening size for each potential number of simultaneously operating cool fan groups. Fans are designated as cool in the Operating Mode menu (this includes combinations such as tunnel & cool). You can specify zero (a minimum opening size) through nine fan groups.

```
Cancel   SIDEWALL INLET #1 SETTING        Z1-S01    13:00:37
                                                    04/16/20
         #01     Cool Fans ON: 0.0  Open:    0.0"
         #02     Cool Fans ON: 1.0  Open:   12.0"
         #03     Cool Fans ON: 2.0  Open:   12.0"
         #04     Cool Fans ON: 3.0  Open:   12.0"
         #05     Cool Fans ON: 4.0  Open:   12.0"
         #06     Cool Fans ON: 5.0  Open:   12.0"
         #07     Cool Fans ON: 6.0  Open:   12.0"
         #08     Cool Fans ON: 7.0  Open:   12.0"
         #09     Cool Fans ON: 8.0  Open:   12.0"
           Cooling Open Sizes are: Proportional
         Natural Interlock 1:ALL FANS
```

When variable speed fans are installed, they can be entered in 0.5 increments to account for ramping operating speeds.

> **If there is no "0 Cool Fans ON" position, the inlet will NOT open until the fan setting specified by the first ramp position table entry is reached. The zero position allows the controller to interpolate between zero and the next specified Fans ON position.**
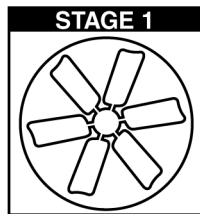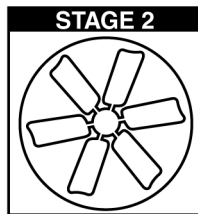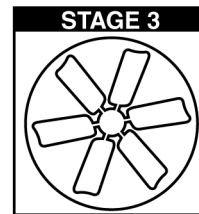
```
Variable Speed Fan Power Settings

        STAGE 1              STAGE 2              STAGE 3

    Full Power = 30      Full Power = 30      Full Power = 30

Even though the variable speed fans in this example reach full power at 30, the
controller considers each fan as "0.5" since the potential full power setting is 60.
Refer to the Fan Settings section for more information about Full Power Setting.

    #01    Tunnel Fans ON: 0.0   Open   0.0"

    #02    Tunnel Fans ON: 0.5   Open  12.0"

    #03    Tunnel Fans ON: 1.0   Open  24.0"

    #04    Tunnel Fans ON: 1.5   Open  36.0"
```

Proportional versus Stepping

`  Cooling Open Sizes are: Proportional  `

This is an extension of the Cooling Fan Groups On / Opening Size menu item. It allows two settings: Proportional - the inlet will open based on a percentage of the Cooling fans running between each level in the Fan Groups On settings. This allows a slow ramping of the opening of the inlet as the fans turn on and off. *Continue to next page.*

Stepping - the inlet will open to the specified size for each level in the Cooling Fan Groups On settings and will not move again until the number of fans running reaches the next level. The advantage of the Stepping setting is so the inlet does not open and close rapidly when a variable speed fan increases and decreases its speed.

Proportional versus Stepping

Fan Groups On/Sizes	# of Fans ON	Proportional Opening	Stepping Opening
#1 1/5 in.	1	5 inches	5 inches
	1.5	7.5 inches	5 inches
	2	10 inches	5 inches
	2.5	12.5 inches	5 inches
#2 3/15 in.	3	15 inches	15 inches

Natural Interlock to Fan

`Natural Interlock 1:ALL FANS  `

This is an extension of the Cool Fan Groups On / Opening Size menu item. Instead of opening an inlet based on the number of fans running, you can interlock specific fans with inlets (open the inlet based on the number of interlocked fans running).

You can interlock up to nine fan groups with an inlet. Additional Interlock menu lines will be added as interlocked fans are added. This menu item limits the fan groups counted when determining the appropriate position of the inlet (refer to the previous Fan Groups On / Opening Size Menu). This menu item only allows selection of installed fans whose "Use for Proportional Control" setting is YES.

Sidewall #1
Sidewall #2
Sidewall #3
Sidewall #4
Inlet Group #1
Tunnel #1

Interlock Fan

Interlock #	Fan	Fan ON Temp	Tunnel Curtain will Open
Interlock 1	Sidewall 1	80	1"
Interlock 2	Sidewall 2	82	3"
Interlock 3	Sidewall 3	84	5"
Interlock 4	Sidewall 4	86	8"
Interlock 5	Tunnel 1 *	90	11"

* Needs to be in Tunnel & Cool operating mode
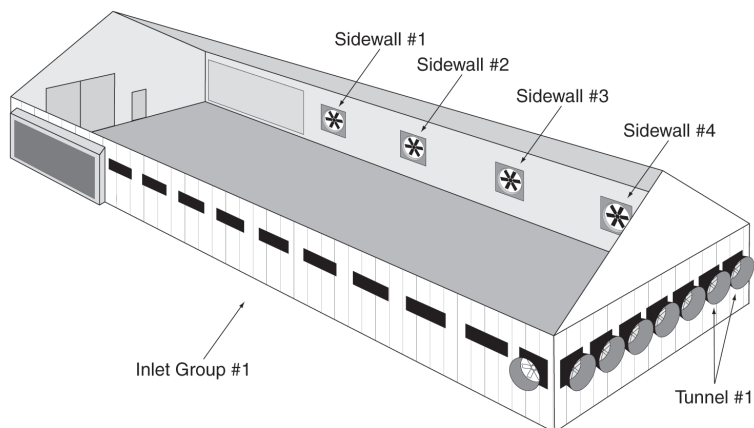
You can select each fan group only once for each inlet.

Tunnel Fans Groups On \ Opening Size

```
#01    Tunnel Fans ON: 0.0  Open:    0.0"
```
```
#02    Tunnel Fans ON: 1.0  Open:   12.0"
```
```
#03    Tunnel Fans ON: 2.0  Open:   12.0"
```

Input the desired inlet opening size for each potential number of simultaneously operating tunnel fan groups. Fans are designated as tunnel in the Operating Mode menu (this includes combinations such as tunnel & cool). You can specify zero (a minimum opening size) through nine fan groups.



```
Cancel    SIDEWALL INLET #1 SETTING        Z1-S01    13:00:37
                                                     04/16/20
          #01    Tunnel Fans ON: 0.0  Open:    0.0"
          #02    Tunnel Fans ON: 1.0  Open:   12.0"
          #03    Tunnel Fans ON: 2.0  Open:   12.0"
          #04    Tunnel Fans ON: 3.0  Open:   12.0"
          #05    Tunnel Fans ON: 4.0  Open:   12.0"
          #06    Tunnel Fans ON: 5.0  Open:   12.0"
          #07    Tunnel Fans ON: 6.0  Open:   12.0"
          #08    Tunnel Fans ON: 7.0  Open:   12.0"
          #09    Tunnel Fans ON: 8.0  Open:   12.0"
          Tunneling Open Sizes are: Proportional
           Tunnel Interlock 1:ALL FANS
```

> **Variable speed tunnel fans can be entered in 0.5 increments to account for ramping operating speeds.**

If there is no "0 Tunnel Fans ON" position, the inlet will NOT open until the fan setting specified by the first ramp position table entry is reached. The zero position allows the controller to interpolate between zero and the next specified Fans ON position.

Proportional versus Stepping

This is an extension of the Tunnel Fan Groups On / Opening Size menu item. It allows two settings:
Proportional - the inlet will open based on a percentage of the Tunnel fans running between each level in the Fan Groups On settings. This allows a slow ramping of the opening of the inlet as the fans turn on and off.

Stepping - the inlet will open to the specified size for each level in the Tunnel Fan Groups On settings and will not move again until the number of fans running reaches the next level. The advantage of the Stepping setting is so the inlet does not open and close rapidly when a variable speed fan increases and decreases its speed.

Proportional versus Stepping

| Fan Groups On/Sizes	# of Fans ON	Proportional Opening	Stepping Opening
#1 1/5 in.	1	5 inches	5 inches
	1.5	7.5 inches	5 inches
	2	10 inches	5 inches
	2.5	12.5 inches	5 inches
#2 3/15 in.	3	15 inches	15 inches

Tunnel Interlock to Fan

`Tunnel Interlock 1:ALL FANS`

This is an extension of the Tunnel Fan Groups On / Opening Size menu item. Instead of opening an inlet based on the number of fans running, you can interlock specific tunnel fans with inlets (open the inlet based on the number of interlocked fans running).

You can interlock up to nine fan groups with an inlet. Additional Interlock menu lines will be added as interlocked fans are added. This menu item limits the fan groups counted when determining the appropriate position of the inlet (refer to the previous Fan Groups On / Opening Size Menu). This menu item only allows selection of installed fans whose "Use for Proportional Control" setting is YES.

Tunnel Inlet #2

Tunnel #1
Tunnel #3
Tunnel #4
Tunnel #2

You can select each fan group only once for each inlet.

Interlock Fan

Interlock #	Fan	Fan ON Temp	Tunnel Curtain will Open
Interlock 1	Tunnel 1	80	12"
Interlock 2	Tunnel 2	82	24"
Interlock 3	Tunnel 3	84	36"
Interlock 4	Tunnel 4	86	48"

Full Opening Size

`Full Opening Size (Inches):  12"`

Input the full opening size.

Full Open Travel Time

`Full Open Travel Time:  1:00`

Input the time it takes for the inlet to open completely. The controller uses this time to determine how open the inlet is, so enter the exact travel time. If a Position Sensor is attached to the Inlet, the travel time will be set automatically when the Position Sensor is calibrated.

Full Close Travel Time

`Full Close Travel Time:  1:00`

Input the time it takes for the inlet to close completely. The controller uses this time to determine how closed the inlet is, so enter the exact travel time. If a Position Sensor is attached to the Inlet, the travel time will be set automatically when the Position Sensor is calibrated.

Purge Opening Size

`Purge Opening Size (Inches):  0"`

The inlet can be used as a purge opening for purge fans. This menu item appears only if you have entered purge settings in the Purge Settings menu. Input zero to disable the inlet during the purge function. The purge opening size must be large enough to allow at least three seconds of movement.

Pre-Open Timer

`Pre-Open Timer:  0:00`

This menu item allows static-pressure-controlled or proportional-controlled inlets to open in advanced of a timed fan turning on ("timed" includes minimum ventilation cycles). Input the number of seconds, up to one minute, the inlet should start opening prior to the start of a timed fan. The pre-open time alleviates the spike in static pressure that might otherwise occur when fans turn on before inlets are adequately open.

Normal static-pressure or proportional control resumes once the timed cycle begins.

Tunnel Enter and Exit Opening sizes

`Tunnel Entry size:   0   Exit Size:  0`

These two settings allow the setting of the minimum opening size of the inlet before the controller will enter or exit tunnel mode. When the controller starts to enter Tunnel mode, any inlet open less than their "Tunnel Entry Size" will open to the Entry size setting. Any inlet that is open more than their "Tunnel Entry Size" will start to close, but will not close below the Entry size. Once all the curtains and inlets are open to at least their Entry size, the controller will go into Tunnel mode. When the controller starts to exit tunnel mode, the curtains and inlets will operate the same way as they did when entering Tunnel, but using the "Exit Size" value for its minimum opening size, before exiting tunnel mode.

> ⚠️ **All the curtains and inlets will open to their set sizes regardless of their operating modes. Once Tunnel mode or Natural Vent mode is entered, the curtains and inlets will operate based on their operating modes again.** ⚠️

Perform Re-Sync at 0:00

```
Perform Re-Sync at:   0:00
```

The inlets readjust automatically with the controller when they open or close completely. When the device is within 1", or within three seconds of travel time, of fully open or closed, the channel is left on, allowing the limit switch of the device to stop the moving of the device. This allows both the inlet and controller to synchronize their positions. However, you can have the device perform this re-synchronization manually once a day if needed. Set "Perform Re-Sync at" to the time of day to perform the re-synchronization. If the device is less than 50% open at the specified time, the controller will turn on the Close relay for the full amount of the Close Travel time of the device. If the device is more than 50% open, the Open relay will turn on for the full Open Travel time. This will make sure the device's actual opening size matches the controller's calculated opening size. Set the value to 0:00 to disable this feature. Set it to 24:00 to have it run at midnight.

> - If the device is moving when Re-sync is supposed to happen, the Re-sync operation will wait until the device has stopped moving before it will turn the relay on for the full travel time.
> - The Re-sync should be done at a time of day that will have the least effect on the environment of the barn, such as early morning when it is less likely a lot of fans will be running.
> - If the device seems to be out of sync often, check to make sure the manual winch has been properly adjusted and the travel times of the device are accurate. Also check to make sure the device settings allow the device to fully close or open at some point (Example: have at least one "Fans On" setting at 0.0" opening size and one setting at full opening size).

Curtain Override of Sidewall and Ceiling inlets.

This feature provides the ability to move the inlets to a specified position, regardless of the number of fans running, once a sidewall curtain is opened far enough to provide adequate air movement. This feature is only available for Sidewall and Ceiling inlets and only when one of the three Natural operating modes is configured (Temp Natural Only, Temp Natural/Temp Tunnel, and Temp Natural/Static Tunnel).

The way this feature works is the inlet will continue to operate normally, which is to open and close based on the number of fans running. Once a curtain opens to the specified setting, the inlet will disregard the number of fans running and will move to the inlet opening size specified and stay there. Once the curtain closes below the specified opening size, the inlet will return to normal operations based on the number of fans running again.

> This feature is ignored while in Tunnel Mode. If the inlets are set to operate while in Tunnel Mode, they will operate based on the number of Tunnel fans running, regardless of curtain opening sizes.

The following three menus are associated with the "Curtain Override" feature:

Close To / When Curtain >=

```
Close to   0.0 when curtain >=   0.0
```

Set the Close To setting to the opening size of the inlet when the "Curtain Override" feature is enabled and in effect. Set the When Curtain >= setting to the minimum opening size of the curtain in order for this feature to take effect. Note: If the Curtain size is set to 0, this feature is disabled, and the inlet will continue to run based on the number of fans running, regardless of curtain opening size.

The next two menus will only show if the "When Curtain >=" setting is above 0.

Close Override Temperature

`Close Override Temperature:  70.0`

Set this setting to a temperature where the inlet should start ignoring the Curtain Open size and return to normal operations. This allows the inlet to be used again when the temperature gets high and more air is needed to cool the room. Once the temperature gets above this setting, the temperature has to drop 0.5 degrees below this setting before the inlet will start looking at the curtain open sizes again.

Looking At

`Looking at(1): ALL Sidewall Curtains`

If there is more than one sidewall curtain being used during Natural mode, it is possible to restrict the curtains used for this feature. Up to four sidewall curtains can be selected. If no curtains are selected, then the feature will take effect as soon as any curtain opens to the curtain opening size. If some curtains have been set, then the feature will only take effect when one of the selected curtains opens to the curtain opening setting, regardless of the opening sizes of the unselected curtains.

> An inlet will still perform its Re-Sync function as scheduled, even if the "Curtain Override" feature is in effect. In addition, while a curtain is performing its Re-Sync or Exercise routine, the inlet could possibly move due to the "Curtain Override" feature.

Inlet Movements at Power Up

When the controller is powered after a reset or power outage, inlets controlled by static pressure will:

• Go into their tunnel mode setting if the temperature is above the Tunnel Entry temperature.
• Fully close if the outside temperature is 10 degrees Fahrenheit (5.5 degrees Celsius) or more below the setpoint temperature. Then the inlets will open to their proper opening size.
• Fully open, if the outside temperature is not more than 10 degrees Fahrenheit (5.5 degrees Celsius) below the setpoint temperature. Then the inlets will close to their proper opening size.

The controller checks the inside air sensors if no outside air sensor is installed.

Furnace, Heater & Brooder Settings

Use Sensors

`Use Sensors: ALL          (Avg  70.0)`

Input the group numbers of the air sensors you want
to use for controlling the furnace, heater or brooder.
The controller uses Shared Sensor Technology to
average the temperature readings of any sensors you
want to use to control any device.

```
Cancel   FURNACE #1 SETTING        Z1-S01   14:51:28
                                            06/02/20
         Use Sensors: ALL          (Avg  70.0)
         Temp ON:  68.0  OFF:  70.0      Actual
         Temp ON:  68.0  OFF:  70.0      Adjusted
         Lower Temp by  0.0 from  0:00 to  0:00
         Interlock Curtain Grps:  ALL
         Use During Heat Purge: NO
         BTUs      0    Has Pilot Light: NO
```

On and Off Temps

`Temp ON:  68.0  OFF:  70.0      Actual`

Press **ENTER** to input the temperature at which the controller should turn on the furnace, heater or brooder. Press
ENTER again to input the temperature at which the controller should turn the device off.

> The "Actual" wording will only appear when the "Lower Temp by" setting is greater than 0. (See below for more details.)

`Temp ON:  68.0  OFF:  70.0      Adjusted`

This menu is read only and will only appear if the next menu, "Lower Temp By x from x:xx to x:xx", is set. The menu
shows what the on and off temperature of the heater will be during the time period when the temperature is
lowered in the barn. (*See next menu option for more details*.)

Lower Temp By

`Lower Temp by  0.0 from  0:00 to  0:00`

This menu allows you to have the temperature of the barn lowered at night, when the animals are less active and do
not require as much heat. Set the "Lower Temp By" to the number of degrees to lower the on and off temperature
settings of the heater during the time of day specified. Set this value to 0.0 to disable the feature. Set the "From" time
to the time of day when the On/Off Temperature should be lowered. Set the "To" time to the time of day when the
On/Off Temperature should be returned to the normal, higher on/off temperatures. Note: there is no ramping of the
temperature settings when switching between the lowered On/Off temperatures and normal On/Off temperatures.

Interlock Curtain Groups

`Interlock Curtain Grps:  ALL`

If you have set the Heater to Curtains Interlock (refer to the Temperature Control Settings section) specify the curtain
(and ridge vent) groups here. When interlocking is enabled for heaters (and brooders and furnaces), and the controller
detects that the heater's ON Temp has been reached, the heater will not turn on if the interlocked curtains are open
more than about one inch.

> Input up to six curtain groups. Enter all zeros to interlock the heater with all groups.

Use During Heat Purge

`Use During Heat Purge: NO`

Set Use During Heat Purge to YES to have this heater used to heat the building before a purge. (*See **Purge Settings** for more information.*)

BTU's

`BTUs        0     Has Pilot Light: NO`

The controller will perform a simple calculation to get a rough estimate of the number of gallons used by the heating devices based on the size of the heater and whether the heater has a pilot light. Enter the BTU size (in thousands) of the heating unit. If the heating unit has a pilot light then set the "Has Pilot Light" setting to YES.

> **The Gallons used per heating device and the total gallons used are displayed under the Summary menus. The gallons used calculations are very rough estimates and should not be used to determine the amount of gas left in the tanks.**

Vari-Brooder and Vari-Heater Settings

Vari-Heaters and Vari-Brooders work differently than standard, fixed output heaters. For variable heating devices, a Target temperature is set, which the heater tries to maintain by varying the gas/heat output. The purpose of this is to try and maintain the temperature in the building as close to the Target temperature as possible and eliminate the wild swings seen with fixed output heaters. The longer the temperature stays below the Target temperature, the higher the heat output will be. As the temperature approaches the Target temperature the heat output will decrease. Over time the heater will find a heat output that allows the temperature to hover within a degree or two of the Target temperature.

```
Cancel   VARIHEATER #1 SETTING    Z1-S01        14:51:32
                                                06/02/20
         Gas Regulator: Module:  2  Channel:  4
         Use Sensors: ALL             (Avg  70.0)
         Target Temp:  68.0  OFF:  70.0
         Target Temp:  68.0  OFF:  70.0 ADJUSTED
         Lower Temp by  0.0 from  0:00 to  0:00
         Interlock Curtain Grps:  ALL
         Use During Heat Purge: NO
         BTUs Minimum  75000 Maximum 250000
         Alarm When heater is at MAX for  0:00:00
         Shut OFF heater on ALARM: NO
```

> One thing to remember is variable heaters will rarely turn off. Unlike fixed output heaters, where they turn on and off as needed causing wide swings in temperature, a variable heater will work to maintain the temperature at the Target temperature and will only turn off if the temperature in the barn is increasing due to factors other than the heaters running. This can be confusing to some, as the heater is always running. But if you check the Current Equipment Status for the heater, you will notice that it rarely runs at maximum output, which helps save gas and money.
>
> When adding a Vari-Heater and Vari-Brooder to the controller's device list, the Module and Channel numbers entered need to be the module and channel number of the output relay where the heater's power supply is attached to.

Gas Regulator

```
Gas Regulator: Module:  2  Channel:  4
```

Enter the Module and Channel number of the Analog Output board where the Gas Regulator of the heater is attached. **NOTE:** When first installed, this is the first menu and has to be set before the other menus will appear.

> When the Toggle switch is set to the On position, the actual output of a variable heating device will be set based on the temperature of the zone. If temperature is high enough where the heater should be off, the heating device will operate at either minimum output or maximum output, depending on the default output of the heater. Otherwise, the output will be set to the required output needed to reach and maintain the temperature of the zone at the Target Temperature.

Use Sensors

```
Use Sensors: ALL             (Avg  70.0)
```

Input the group numbers of the air sensors you want to use for controlling the vari-brooders and vari-heaters. The controller uses Shared Sensor Technology to average the temperature readings of any sensors you want to use to control any device.

Target Temperature

`Target Temp:  68.0  OFF:  70.0`

This is the desired temperature of the barn. The variable heating device will adjust the output of the device to reach and maintain this temperature. Once this temperature is reached, the heater will continue to run, making small adjustments to the heater output to maintain the temperature.

> **The "Actual" wording will only appear when the "Lower Temp by" setting is greater than 0. (See below for more details).**

`Target Temp:  68.0  OFF:  70.0 ADJUSTED`

This menu is read only and will only appear if the menu, "Lower Temp By x from x:xx to x:xx", is set. The menu shows what the on and off temperature of the heater will be during the time period when the temperature is lowered in the barn.

Lower Temp By

`Lower Temp by   0.0 from  0:00 to  0:00`

This menu allows you to have the temperature of the barn lowered at night when the animals are less active and do not require as much heat. Set the "Lower Temp By" to the number of degrees to lower the Target Temperature setting of the heater during the time of day specified. Set this value to 0.0 to disable the feature. Set the "From" time to the time of day when the Target Temperature should be lowered. Set the "To" time to the time of day when the Target Temperature should be returned to the normal, higher Target Temperatures. Note: there is no ramping of the temperature settings when switching between the lowered Target Temperatures and normal Target Temperatures.

Interlock Curtain Groups

`Interlock Curtain Grps:  ALL`

If you have set the Heater to Curtains Interlock (refer to the Temperature Control Settings section) specify the curtain (and ridge vent) groups here. When interlocking is enabled, the heater will not turn on if the interlocked curtains are open more than about one inch.

> **Input up to six curtain groups. Enter all zeros to interlock the heater with all groups.**

Use During Heat Purge

`Use During Heat Purge: NO`

Set Use During Heat Purge to YES to have this heater used to heat the building before a purge. (*See* **Purge Settings** *for more information.*)

> **When used for Heat Purging, the variable heat device's output will be set to maximum, regardless of the current temperature.**

BTUs Minimum / Maximum

`BTUs Minimum  75000 Maximum 250000`

Set the Minimum and Maximum BTUs (in thousand) as stated on the variable heater. These values are used to determine the current running BTUs displayed in the Current Equipment Status, to calculate the average running BTUs for the hourly history records, and in calculating a rough estimate of the number of gallons used by the heating device, which is displayed under the Summary menu.

> The Gallons used per heating device and the total gallons used are displayed under the Summary menus. The gallons used calculations are very rough estimates and should not be used to determine the amount of gas left in the tanks.

Alarm When Heater is at MAX for

`Alarm When heater is at MAX for  0:00:00`

This setting allows an alarm to activate if the heater runs at maximum output for the set amount of time. Unless the zone is very cold, such as during the start of a new group, the variable heating devices should run at less than full output most of the time. If the device is running at maximum output for a long time, it usually indicates a problem with the heater.

Shut OFF Heater on Alarm

`Shut OFF heater on ALARM: NO`

This setting only appears when the "Alarm When Heater is at MAX for" setting is greater than 0. It provides the ability to turn the heater off if the heater is running at maximum output for too long. Running at maximum output for too long usually indicates a problem with the heater.

Cool Pad, Mister & Fogger Settings

```
Cancel   COOL PAD LOW GROUP #1 SETTING    Z1-S01    12:59:35
                                                    04/16/20
         Use Sensors: ALL              (Avg  N/A)
         Cycle #1 ON Temp:   90.0
         Cycle #1 Timer ON: 0:00:00  OFF: 0:10:00
         Cycle #2 ON Temp:   90.1
         Cycle #2 Timer ON: 0:00:00  OFF: 0:10:00
         Cycle #3 ON Temp:   90.2
         Cycle #3 Timer ON: 0:00:00  OFF: 0:10:00
         Cycle #4 ON Temp:   90.3
         Cycle #4 Timer ON: 0:00:00  OFF: 0:10:00
 Page    FULL ON Temp: 110.0   OFF Temp:   79.0
 Down    Time of Day Enable:  0:00 Disable: 24:00
```

```
Cancel   COOL PAD LOW GROUP #1 SETTING    Z1-S01    12:59:42
                                                    04/16/20
         HUMIDITY Disable: 100% ReEnable: 100%
         TEMP+HUMIDITY Disable: 220 ReEnable: 220
         Minimum ON Temp:  80.0
         Min Temps: 90.0, 90.1, 90.2, 90.3,110.0



 Page
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```

Use Sensors

```
Use Sensors: ALL              (Avg  N/A)
```

Input the group numbers of the air sensors you want to use for controlling the cool pad, mister or fogger (mister or fogger is not available as a menu item on some controllers). The controller uses Shared Sensor Technology to average the temperature readings of any sensors you want to use to control any device.

Cycle On Temp and On/Off Timers

```
Cycle #1 ON Temp:   90.0
```

```
Cycle #1 Timer ON: 0:00:00  OFF: 0:10:00
```

When the temperature is between the OFF Temp and the FULL ON Temp, the controller scans the on temperature values input here. It locates the current temperature and uses the ON and OFF timers specified for that temperature. If Cycle Timers are not set up, the controller simply uses the FULL ON Temp and the OFF Temp.

Cycle one should be the lowest temperature and cycle four should be the highest. The cycle one temperature is usually slightly higher than the OFF Temp.

Setting the ON and OFF timers to any non-zero value enables their operation. When the ON timer is complete, the OFF timer starts running. When it is complete, the ON timer starts again. This cycle repeats for as long as the cycle timer is on.

Input an ON TEMP as well as the ON and OFF times for each cycle you want to use.

> If the Cycle Timers are not going to be used and the device should run continuously until the Temperature drops below the Off Temperature, the Cycle #1 On Temperature should be set at or above the Full On Temperature setting, the Cycle #1 On Time should be set to a non-zero value and the Off Time be set to 0.   Otherwise the device will turn on above the Full On Temperature and shut off below the Full On Temperature.

Full On and Off Temp

```
FULL ON Temp: 110.0   OFF Temp:   79.0
```

The FULL ON Temp is the temperature at which the controller should turn on evaporative cooling continuously. When the temperature is between the OFF Temp and the FULL ON Temp, the cycle table is used.

Time of Day to Enable / Disable

```
Time of Day Enable:  0:00 Disable: 24:00
```

The cool pad, mister or fogger (evaporative cooling devices) can be enabled for a certain period of day to prevent having the device turned on at an undesirable time. The device only operates between the enable and disable times. The times input here must be in 24 hour clock format.

Humidity Disable / Re-Enable

```
HUMIDITY Disable: 100% ReEnable: 100%
```

Evaporative cooling loses its effectiveness as humidity inside the building increases. Input a relative humidity level at which evaporative cooling should be disabled. Then, input the level at which evaporative cooling will be re-enabled.

When the humidity reaches the Disable value, the evaporative cooling device remains disabled until the humidity drops to the ReEnable value. Set the Disable or ReEnable value to 100 percent to have the controller ignore the disable/re-enable feature entirely.

> **To use this feature, the controller must have a humidity sensor attached.**

Stress Index Disable

```
TEMP+HUMIDITY Disable: 220 ReEnable: 220
```

Either high temperature or high humidity can stress animals, but a combination of high temperature and high humidity is very stressful and it can be deadly. The combination of humidity plus temperature is called the stress index.

Input a stress index level at which evaporative cooling should be disabled. Then, input a stress index level at which evaporative cooling will be re-enabled.

This chart illustrates how different combinations of temperature and humidity produce a Stress Index of 175.

Degrees Fahrenheit	+ Relative Humidity	= Stress Index
75	100	175
80	95	175
85	90	175
90	85	175
95	80	175
100	75	175
105	70	175
110	65	175

Set the Disable or ReEnable value to 220 to have the controller ignore the disable/enable feature entirely.

To enable this feature, an air sensor and humidity sensor must be installed.

Minimum On Temp

The Cycle On Temps, as well as the Full On Temp will adjust when the Temperature Setpoint is changed. As the temperature ramps down over the growing period (assuming you use the temperature ramping feature), you may reach a temperature at which evaporative cooling should not be used.

`Minimum ON Temp:  80.0`

Specify a Minimum On Temp for the evaporative cooling devices. If you have set up staged cycles for a device, the minimum is applied to Cycle 1. The temperature differences for the other cycles are maintained (cycle one should be set up as the lowest temperature when you use cycles).

The device will not turn on unless the temperature is at or above the temperature you input here. This value is static and will not change with the Temperature Setpoint.

`Min Temps: 90.0, 90.1, 90.2, 90.3,110.0`

The read-only Min Temps menu shows the actual Cycle On temperature, as well as the Full On Temp based on the Minimum ON Temp setting. These On temperatures will be used to operate the evaporative cooling deivce. These values could be higher than the user-set Cycle and Full ON settings if a change in the Temperature Setpoint caused the user-set Cycle 1 On Temp to drop below the Minimum On Temp setting.

The following charts illustrate the effect of using a Minimum On Temp for an evaporative cooling device.
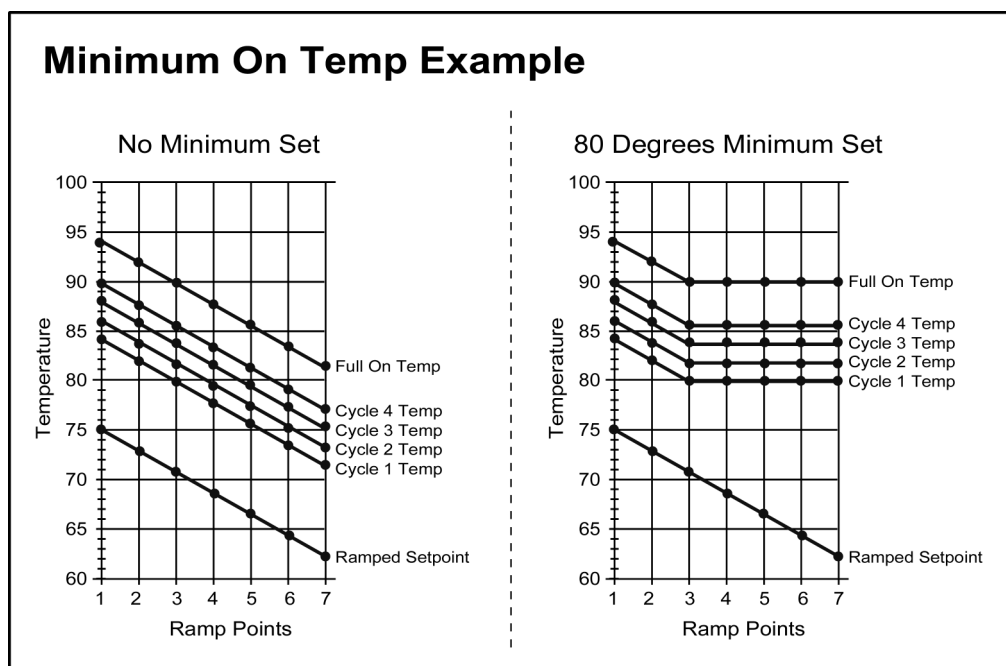
Stir, Hemi, Sidewall, Tunnel, Pit and Ridge Fan Settings

(Includes: Vari-Stir, Vari-Hemi, Vari-Side, Vari-Tunnel, Vari-Pit and Vari-Ridge, VFD-Stir, VFD-Hemi, VFD-Side, VFD-Tunnel, VFD-Pit and VFD-Ridge)

Introduction

This section provides information for fixed-speed fans, variable-speed fans and VFD-fans *which have the same functions/screens available. Any exceptions are appropriately listed.*

Note: When adding a VFD-Fan to the controller, the module and channel selected must be configured to an analog output board, not to a normal on/off relay or a variable speed relay.

```
Cancel   SIDEWALL FAN #1 SETTING        Z1-S01   11:18:05
                                                 08/02/20
         Use Sensors: ALL              (Avg  70.0)
         Operating Mode: Tunnel,Cool,Purge
         ON Temp:  74.0      OFF Temp:  72.0
         Run Mode: Temp Or Timed
         ON Timer:  0:00:00  OFF Timer:  0:10:00
         Run While ENTRY/EXIT of Tunnel Mode?:NO
         Use for Proportional Control?: YES
         Fans OFF at Curtain Opening of  25"
         Fan OVERRIDE Curtain Open Temp:  80.0
         Looking at(1): ALL Sidewall Curtains
```

```
Cancel   VARI-SIDE FAN #1 SETTING       Z1-S01   11:35:39
                                                 08/01/20
         Use Sensors: ALL              (Avg  70.0)
         Operating Mode: Tunnel,Cool,Purge
         ON Temp:  74.0      OFF Temp:  72.0
         Fan ON Power Setting:  25
         Power Ramping Start Temp:  78.0
         FULL Power Temp:  84.0
         FULL Power Setting:  60
         Run Mode: Temp Or Timed
         ON Timer:  0:00:00  OFF Timer:  0:10:00
Page     Timed Power Setting:  60
Down     Purge Mode Power Setting:  60
```

```
Cancel   VARI-SIDE FAN #1 SETTING       Z1-S01   11:35:46
                                                 08/01/20
         Run While ENTRY/EXIT of Tunnel Mode?:NO
         Use for Proportional Control?: YES
         Fans OFF at Curtain Opening of  20"
         Fan OVERRIDE Curtain Open Temp:  80.0
         Looking at(1): ALL Sidewall Curtains


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```

```
Cancel   VFD-SIDEWALL #1 SETTING        Z1-S01   11:19:29
                                                 08/02/20
         Use Sensors: ALL              (Avg  70.0)
         Operating Mode: Cool & Purge
         ON Temp:  74.0      OFF Temp:  72.0
         Fan ON Power Setting:   1
         Power Ramping Start Temp:  78.0
         FULL Power Temp:  84.0
         FULL Power Setting: 100
         Run Mode: Temp Or Timed
         ON Timer:  0:00:00  OFF Timer:  0:10:00
Page     Timed Power Setting: 100
Down     Purge Mode Power Setting: 100
```

```
Cancel   VFD-SIDEWALL #1 SETTING        Z1-S01   11:35:46
                                                 08/01/20
         Run While ENTRY/EXIT of Tunnel Mode?:NO
         Use for Proportional Control?: YES
         Fans OFF at Curtain Opening of  12"
         Fan OVERRIDE Curtain Open Temp:  80.0
         Looking at(1): ALL Sidewall Curtains
         Control Voltage: 0 to 10 volts
Page     Power Relay(optional): Mod:  0   Chan:  0
Up
```

Use Sensors

`Use Sensors: ALL            (Avg  70.0)`

Input the group numbers of the air sensors you want to use for controlling the fan group. The controller uses Shared Sensor Technology to average the temperature readings of any sensors you want to use to control any device.

Operating Mode

`Operating Mode: Tunnel,Cool,Purge`

Each fan can operate in one of nine different operating modes:

Cool – The fan exhausts hot air from the building. The fan turns on when the temperature rises to the ON temperature and turns off when the building cools to the OFF temperature (if set up to run on temperature).

Heat – The fan blows hot air into the building from a warmer area. The fan turns on at a low temperature set as the ON temperature and turns off at a higher temperature set as the OFF temperature.

Purge – The fan runs during a purge cycle to clear humidity, ammonia, and bad air from the building. The fan runs based on the purge settings you entered in the Purge Settings menu.

Cool & Purge – The fan runs in cool mode when the temperature is at or above the fan's ON temperature and during purge cycles when the temperature is below the ON temperature.

Heat & Purge – The fan runs in heat mode when the temperature is below the fan's ON temperature and during purge cycles when the temperature is above the ON temperature.

Tunnel – The fan runs during tunnel mode. Tunnel mode moves air from the tunnel inlets, through the building, and out through the tunnel fans. It closes all natural sidewall inlets and curtains. Typically, more groups of tunnel fans turn on as the temperature rises.

Tunnel & Cool – The fan runs in cool mode when the temperature is below the Tunnel Entry temperature (refer to the Temperature Control Setting section) and in tunnel mode when the temperature is at or above fan's ON temperature.

Tunnel & Purge – The fan runs during purge cycles when the temperature is below the Tunnel Entry temperature and in tunnel mode when the temperature is at or above the fan's ON temperature.

Tunnel, Cool, Purge – The fan runs during purge cycles when the temperature is below the ON temperature, in cool mode when the ON temperature is reached, and in tunnel mode when the temperature is at or above the fan's ON temperature.

Fan On and Off Temps

`ON Temp:  74.0     OFF Temp:  72.0`

Input the temperatures at which the fan group should turn on and turn off.

Fan ON Power Setting

```
Fan ON Power Setting:  25
```

For Vari-Speed fans, input a value from 0 (off) to 60 (full power). For VFD-Fans, input a value from 0% to 100%. This is for the power level the fan should operate at when the temperature is at or above the ON Temp.

```
ON Temp:  74.0     OFF Temp:  72.0
Test New Power Setting: YES
Power Ramping Start Temp:  78.0
```

Test the power setting as you adjust it by selecting YES when prompted. Press the **PLUS** or **MINUS** keys to switch between YES and NO.

> **The RPM of most PSC type fan motors is controlled by varying the amount of power (voltage) applied. The way a PSC motor responds to a given power setting varies considerably between fan motor manufacturers. One motor may require a setting of 50 to run at full speed while another just 35.**

Variable speed fans always get a five second full power burst (see the Full Power Setting menu item) at start up before adjusting to the specified power setting.

Power Ramp Starting Temp

```
Power Ramping Start Temp:  78.0
```

Input the temperature at which power ramping should start. The power level of a variable speed and VFD fan ramps up and down as the temperature fluctuates. The power level fluctuates from the "Fan On Power Setting" (see above), when the temperature is at this setting, to the "Full Power Setting" (see below).

Full Power Temp

```
FULL Power Temp:  84.0
```

Input the temperature at which the fan group should be operating at the FULL Power Setting (see below).

Full Power Setting

```
FULL Power Setting:  60
```

Input the power setting value the fan group should operate at when the FULL Power Temp is reached (see above). For Vari-Speed fans, input a value from 0 (off) to 60 (full power). For VFD-Fans, input a value from 0% to 100%.

```
FULL Power Temp:  84.0
FULL Power Setting:  60
Run Mode: Temp Or Timed
```

Test the power setting as you adjust it by selecting YES when prompted. Press the **PLUS** or **MINUS** keys to switch between YES and NO.

Power Ramping Example

The graph below shows how the fan power automatically adjusts as the building temperature rises from 70 degrees to 95 degrees and falls back to 70 degrees again.

Fan Run Mode:	Temp Only
ON Temp:	80 degrees
Fan ON Power Setting:	30
OFF Temp:	75 degrees
Power Ramping Start Temp:	85 degrees
Full Power Temp:	90 degrees
Full Power Setting:	50
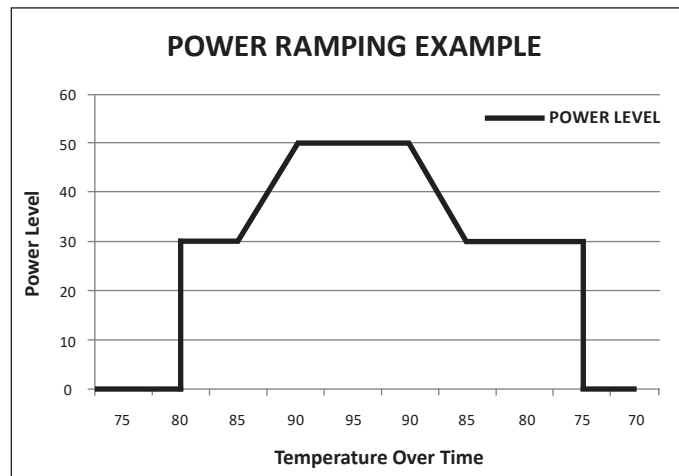
Observe that fan power stays at zero until the ON Temp is reached. As temperature falls the power stays at the Fan ON Power setting until the OFF Temp is reached.

Fan Run Mode

`Run Mode: Temp Or Timed`

Each fan can operate in one of five different run modes. The ON/OFF temperature descriptions below assume "cool" fans. Reverse the description for "heat" fans.

Temp Only – The fan runs when the temperature is at or above the ON temperature. The fan turns off when the temperature is at or below the OFF temperature.

Timed Only – The fan cycles on and off continuously based on the ON and OFF times you input.

Temp or Timed – The fan runs according to temperature control when the temperature is at or above the ON setting. The fan runs according to timed setting when the temperature drops back to or below the OFF setting.

Temp and Timed – The fan runs according to the timed settings when the temperature is at or above the ON setting. When the temperature drops back to or below the OFF setting, the fan does not operate.

Temp or Minimum Ventilation – The fan runs according to temperature control when the temperature is at or above the ON setting. The fan runs according to the minimum ventilation times (entered in the Minimum Ventilation and Purge Settings menu) when the temperature drops back to or below the OFF setting. This mode does not appear for stir fans.

Fan On and Off Timers

`ON Timer:  0:00:00  OFF Timer:  0:10:00`

This item is for timed fans. Input the number of hours, minutes and seconds (up to nine hours) you want the fan group to run when in a timed mode. Then, input the number of hours, minutes and seconds (up to nine hours) you want the fan group to remain off after the ON Timer is complete.

Timed Power Setting

`Timed Power Setting:  60`

This item is for timed fans. Input the power setting that should be used when the fan is operated on time. For Vari-Speed fans, input a value from 0 (off) to 60 (full power). For VFD-Fans, input a value from 0% to 100%.

```
ON Timer:  0:00:00  OFF Timer:  0:10:00
Test New Power Setting: YES
Purge Mode Power Setting:  60
```

Test the power setting as you adjust it by selecting YES when prompted. Press the **PLUS** or **MINUS** keys to switch between YES and NO.

Purge Mode Power Setting

`Purge Mode Power Setting:  60`

Input the power setting that should be used for this fan when the building is in purge mode. For Vari-Speed fans, input a value from 0 (off) to 60 (full power). For VFD-Fans, input a value from 0% to 100%.

```
Timed Power Setting:  60
Test New Power Setting: YES
```

Test the power setting as you adjust it by selecting YES when prompted. Press the **PLUS** or **MINUS** keys to switch between YES and NO.

Run While ENTRY/EXIT of Tunnel Mode

`Run While ENTRY/EXIT of Tunnel Mode?:NO`

Select this feature when you want the fan group to run while the building transitions into or out of tunnel mode. Typically, several fans are allowed to run during the transition to continue effective ventilation. Too many fans can create excessive suction and cause inlets to stick shut.

Use for Proportional Control

`Use for Proportional Control?: YES`

Select this feature when you want the fan group to be used in proportional control. When a fan group is included in proportional control, it is counted in determining the total number of fan groups running. The total number of running fan groups determines the positioning of inlets and curtains. Refer to the Curtain Settings and Inlet Settings sections for more information about proportional control.

> - **Stir fans cannot be used for proportional control since they are not designed to produce negative static pressure in a building.**
> - **"Use for Proportional Control" should be set to No, if this fan's "Fans OFF at Curtain Opening of" setting is non-zero, causing the fan to turn off when the curtain or inlet is open wide enough. Otherwise, the fan status and inlet/curtain opening size will conflict causing the airway to continually open and close, because the proportional fan will be turning on and off.**

Curtain Open Size Inhibits Fans

In buildings where curtains, inlets and fans are used, it may be desirable to inhibit a fan group when any curtain\inlet is open enough to provide natural ventilation. This is especially useful in applications where ridge fans are used. The following menu items only appear when a position sensor or whisker switch is installed on at least one curtain or inlet and there are no active out-of-position alarms.

> If using a whisker switch, when the fan shuts off will depend on how the whisker switch's "Fans turned OFF by" setting is configured (see Whisker Switch section for more information).

Fans OFF at Curtain Opening of

`Fans OFF at Curtain Opening of   20"`

Input an opening size at which the fan group should be disabled.

Override Fans Off

`Fan OVERRIDE Curtain Open Temp:   80.0`

This menu item is an extension of the Fans Off menu item described above. When the temperature reaches the value you input here, the fan group resumes operation according to its time and temperature settings. The temperature input here changes daily if a temperature ramp table is set up.

Using certain curtains\inlets to determine if fan should run

`Looking at(1): ALL Sidewall Curtains`

By default the Fans Off setting is determined by any curtain. If any curtain opens above the Fans Off setting, the fan will shut off. By default, inlets are not considered to determine when the fans should turn off.

> It is possible to change this default behavior. Set the Looking At menus to select up to 4 different curtains and inlets to be used to determine if the fan should be running. Only curtains/inlets that have a position sensor and\or a whisker switch attached can be used.

`Fan OVERRIDE Curtain Open Temp:   80.0`
`Looking at(1): ALL Sidewall Curtains`

Will use the largest opening size of all available curtains to determine if fan should be on or off.

`Fan OVERRIDE Curtain Open Temp:   80.0`
`Looking at(1): Side Curtain #02`
`Looking at(2):   NOT USED`

Uses only "Side Curtain #02" opening size to determine if fan should be on or off.

`Fan OVERRIDE Curtain Open Temp:   80.0`
`Looking at(1): Side Curtain #02`
`Looking at(2): Side Curtain #01`
`Looking at(3):  No More Available`

Will use the larger opening of "Side Curtain #01" or "Side Curtain #02" to determine if the fan should be on or off.

A good example for using this would be to allow Pit fans in a hog barn to turn off when the inlets are open enough to allow circulation of air.

> **Warning:**
> **"Use For Proportional Control" should be set to NO for this fan if you set one of the Looking At settings to an inlet that uses the number of running fans to determine the opening size. Having this set to YES can cause the fan to turn on and off and the inlet to open and close constantly.**

VFD Fan settings only

Control Voltage Setting

```
Control Voltage: 0 to 10 volts
```

VFD fans are controlled by applying a voltage to the motor. The fan can be set up to operate based on 0-to-10 volts, where the fan is off at 0 volts and is fully on at 10 volts, or as 10-to-0 volts, where the fan is off at 10 volts and full on at 0 volts. Set this setting to indicate which option to use to control the fan.

Power Relay (optional)

```
Power Relay(optional): Mod:  0  Chan:  0
```

If the VFD fan requires a relay to activate it, use this optional setting to set the module and channel of the On/Off relay to be used to energize the motor before applying power to it.

Lights Settings

Age, On Time and Off Time

```
# 1 Age=   0 ON= 0:00 OFF= 0:00
```

30 time slots are provided to allow turning the lights on and off based on the age of the animals. To set the timer slots, enter the age of the animals the time slot should be used for and then enter the times to turn on and off the lights. A new slot will be added as the previous one is filled in. The on and off times use a 24-hour clock format. To set a light group for continuous on, set the ON time to 00:00 and the OFF time to 24:00.

```
Cancel   LIGHTS GROUP #1 SETTING        Z1-S01    12:56:40
                                                   04/16/20
         Run for:  0:00:00
         # 1 Age=  5 ON=  8:00 OFF=  9:00
         # 2 Age=  5 ON= 15:45 OFF= 16:30
         # 3 Age= 10 ON= 10:10 OFF= 12:25
         # 4 Age=  0 ON=  0:00 OFF=  0:00
```

You can enter as many time slots per age as are available. There is no incremental ramping of the times between age settings. The program uses the time slots with the oldest Age setting that is less than or equal to the current animal age and uses those Age slots to control the lights. Example: In the images above, the controller will use time slots #1 and #2 from Age 5 to Age 9. At Age 10, the controller will use only time slot #3. *There are a total of 30 slots, "Settings #1 - #30" available.*

You can enter the time slots in any order you want. Shortly after you enter the information, the controller will sort the time slots from the earliest Age to the oldest Age. When sorting, any schedule with the same On time and Off time will be removed. This allows the easy removal of schedules by setting the time settings to the same value.

Schedules can be set up to work across midnight. This is accomplished by setting the Off Time of the schedule before the On Time of the same schedule. This will cause the device to turn on one day, and turn off the following day. The exception to the above rule is at midnight when the change in animal age causes a new set of schedules to become active and the current ones inactive. The device will turn on or off as needed at midnight to conform to the new age's schedules.

Instant Run

```
Run for:  0:00:00
```

The "Run For" feature provided the ability to immediately turn on the lights for the set amount of time. When the time is set, the lights will turn on, the timer will count down and when it reaches 0:00:00, the lights will return to normal operations based on the Light's Age/On/Off schedules. This allows the ability to turn on the lights temporarily without having to worry about turning them off.

Feeder Settings

Age, On Time and Off Time

```
# 1 Age=  0 ON= 0:00 OFF= 0:00
```

30 time slots are provided to allow turning the Feeders on and off based on the age of the animals. To set the timer slots, enter the age of the animals the time slot should be used for and then enter the times to turn on and off the feeders. A new slot will be added as the previous one is filled in. The on and off times use a 24-hour clock format. To set a feeder group for continuous on, set the ON time for to 00:00 and the OFF time to 24:00. Press the UP and DOWN arrow keys to change the Setting number.

```
┌────────────────────────────────────────────────────┐
│ Cancel  FEEDER GROUP #1 SETTING        Z1-S01  12:56:28 │
│                                                04/16/20 │
│         Run for:   0:00:00                           │
│         # 1 Age=   5 ON=  8:00 OFF=  9:00            │
│         # 2 Age=  10 ON= 10:10 OFF= 12:25            │
│         # 3 Age=   0 ON=  0:00 OFF=  0:00            │
│                                                      │
└────────────────────────────────────────────────────┘
```

You can enter as many time slots per age as are available. There is no incremental ramping of the times between age settings. The program uses the time slots with the oldest Age setting that is less than or equal to the current animal age and uses those Age slots to control the lights. Example: In the images above, the controller will use time slot #1 from Age 5 to Age 9. At Age 10, the controller will use time slot #2. Schedules from previous time slots are not carried over when a new Age group is reached. In the previous example, if you still want the feeders on from 8 to 9 at age 10, you need to add the schedule a second time changing the Age to 10.

You can enter the time slots in any order you want. Shortly after you enter the information, the controller will sort the time slots from the earliest Age to the oldest Age. When sorting, any schedule with the same On time and Off time will be removed. This allows the easy removal of schedules by setting the time settings to the same value.

Schedules can be set up to work across midnight. This is accomplished by setting the Off Time of the schedule before the On Time of the same schedule. This will cause the device to turn on one day, and turn off the following day. The exception to the above rule is at midnight when the change in animal age causes a new set of schedules to become active and the current ones inactive. The device will turn on or off as needed at midnight to conform to the new age's schedules.

Instant Run

```
Run for:   0:00:00
```

The "Run For" feature provided the ability to immediately turn on the Feed system for the set amount of time. When the time is set, the feed system will turn on, the timer will count down and when it reaches 0:00:00, the feed system will return to normal operations based on the Feeder's Age/On/Off schedules. This allows the ability to turn on the feed system temporarily without having to worry about turning them off, such as when the feed in a bin hangs up, or the bin runs out and you have to start a new one.

> **The amount of time the feed system runs, when this feature is enabled and a feed sensor is used, is recorded in the Actual and Calculated hourly history runtimes for the Feeder in the same way the runtimes are recorded for a normal feed schedule.**

VariLights Settings

In order to use the VariLight devices, the 0 to 10 volt Analog Output expansion board is required.
The variable light devices operate on a 0 to 10 volt circuit which allows for the variation of the light intensity over a set period of time. It also allows the ramping up and down of the intensity to help keep the animals calm.

Operational parameters

To use the variable lights, different age period schedules are set up to tell the device when to turn on, when to turn off, and what intensity percentage to be at when on. Each schedule can operate in one of two ways:

```
┌──────┬─────────────────────────────────────┬──────────┐
│Cancel│ VARILIGHTS GROUP #1 TIMER SETTING Z1-S01 │12:56:34│
│      │                                     │04/16/20  │
├──────┴─────────────────────────────────────┴──────────┤
│  Run for:  0:00:00 at   0%                             │
│  Minimum Ramp ON Percent:   0%                         │
│  OFF to ON Ramp Time[Minutes]: 0                       │
│  ON to OFF Ramp Time[Minutes]: 0                       │
│  # 1 Age=  5 ON= 9:00 OFF= 13:00   75% D/D             │
│  # 2 Age= 10 ON= 8:00 OFF= 14:00   50% D/D             │
│  # 3 Age= 10 ON=10:00 OFF= 10:15   95% SPK             │
│  # 4 Age=  0 ON= 0:00 OFF=  0:00    0% D/D             │
└───────────────────────────────────────────────────────┘
```

1. Dusk-to-Dawn (D/D) – this type of schedule will use the Minimum Ramp On Percent, and the two Ramp Time settings to ramp the light intensity up starting at the On time, and ramp down the intensity before the Off time. Note: all ramping occurs within the On time and the Off time of the schedule.

2. Light Spike (SPK)– this type of schedule works like a normal light schedule. At the On time, the device's intensity will be set to the schedule's defined percentage, and at the Off Time the device's intensity will be returned to the correct percentage based on the time of day.
   a) If there is a Dusk-To-Dawn schedule active at the time the Light Spike schedule's Off time is reached, the intensity will be returned to that schedule's calculated percentage, based on the time of day. If there are no other schedules active at the end of a Light Spike schedule, the device will turn off.

> There can be more than one schedule active at any one time, including multiple D/D and SPK schedules at the same time. If there are, the light spike schedules take precedence over any Dusk-to-Dawn schedules. For any overlapping schedules of the same type, the one with the closes On time before the current time of day will be used. Between overlapping Dusk-to-Dawn schedules, the device's Ramp times will be used to ramp from the first schedule's light intensity to the second schedule's intensity and back as needed.

Midnight crossings and Age Period changes

Schedules can be set up to work across midnight. This is accomplished by setting the Off Time of the schedule before the On Time of the same schedule. This will cause the device to turn on one day, and turn off the following day.

The exception to the above rule is at midnight when the change in animal age causes a new set of schedules to become active and the current ones inactive. For a device that is active at midnight on the current day but is not active on the next day, due to the age change, the device will turn off at midnight, with the device ramping down before midnight if the schedule is a Dusk-to-Dawn schedule. If the device is not active during the previous day, but is active at midnight of the new day due to the Age change, the device will turn on at midnight, with the device ramping up after midnight for Dusk-to-Dawn schedules. If there are active schedules on both sides of midnight during the Age change, ramping between the two intensities of any Dusk-to-Dawn schedules will occur sometime around midnight.

VariLights Settings-continued

Order of Precedence

Since there are multiple ways to operate the variable lights, the order of precedence is as follows:
1. Any testing of the device (Test menu).
2. Using the Instant On Feature (Run For menu).
3. Light Spikes – regardless of intensity.
    a) For overlapping light spike schedules, the schedule with the closes On time before the current time of day will take precedence.
    b) Note: If the newly activated schedule's intensity is lower than the current intensity from another schedule (D/D or SPK), the intensity will be lowered.
4. Dusk-to-Dawn – regardless of intensity.
    a) For overlapping D/D schedules, the schedule with the closes On time before the current time of day will take precedence.
    b) Note: If the newly activated schedule's intensity is lower than the current intensity from another D/D schedule the intensity will be lowered.

Instant Run

`Run for:  0:00:00 at   0%`

The "Run For" feature provided the ability to immediately turn on the lights for the set amount of time at the defined intensity percentage. When the time is set, the lights will turn on to the defined intensity without ramping, the timer will count down, and when it reaches 0:00:00, the lights will return to normal operations based on the time of day. This allows the ability to turn on the lights temporarily without having to worry about turning them off.

Minimum Ramp On Percent

`Minimum Ramp ON Percent:   0%`

The "Minimum Ramp On Percent" is the beginning light intensity percentage when the device turns on and starts ramping up, and the lowest percentage the intensity level will ramp down to before it shuts off. **This setting is used for all the schedules set up for this device**. The range is from 0% to 100%. Note: if the Light Intensity Percentage of the schedule is lower than the Minimum Ramp On Percent, there will be no ramping for that schedule. The intensity level will be set to the schedule's Intensity setting at the On time and turned off at the Off Time.

OFF to ON Ramp Time[minutes]

`OFF to ON Ramp Time[Minutes]: 0`

Set this value to the number of minutes the device should take to ramp up from Minimum Ramp On Percent to a schedule's set Intensity percentage. The device will turn on to the Minimum Percent at the On time, then take this many minutes to ramp up to the set intensity. **This setting is used for all the schedules of this device**. The range is from 0 minutes (no ramping) to 90 minutes. Note: the actual ramp time could be shorter if the difference between the On time and the Off time is shorter than the time it takes to ramp up, then ramp down.

VariLights Settings - continued

ON to OFF Ramp Time[minutes]

`ON to OFF Ramp Time[Minutes]: 0`

Set this value to the number of minutes the device should take to ramp down from the schedule's set Intensity percentage to the Minimum Ramp On Percent before the device shuts off. The device will start ramping down this many minutes before the Off time and reach the Minimum Percent at the Off time, then shut off. **This setting is used for all the schedules of this device**. The range is from 0 minutes (no ramping) to 90 minutes. Note: the actual ramp time could be shorter if the difference between the On time and the Off time is shorter than the time it takes to ramp up, then ramp down.

Age, On, Off, %, D/D

`# 1 Age=   5 ON= 9:00 OFF= 13:00   75% D/D`

`# 2 Age= 10 ON= 8:00 OFF= 14:00   50% D/D`

`# 3 Age= 10 ON=10:00 OFF= 10:15   95% SPK`

50 time slots are provided to allow turning the lights on and off based on the age of the animals.
To set the timer slots:
1. Enter the age of the animals the time slot should be used for, then enter the times to turn on and off the lights. The on and off times use a 24-hour clock format. To set a light group for continuous on, set the ON time to 00:00 and the OFF time to 24:00.
2. Set the light Intensity level the lights should be on during normal running. This value can be from 0% (schedule disabled) to 100% (full on).
3. Set the value to determine if the schedule is a normal Dusk-to-Dawn schedule (D/D) or a light spike (SPK).

You can enter as many time slots per age as are available. There is no incremental ramping of the times between age settings. The program uses the time slots with the oldest Age setting that is less than or equal to the current animal age and uses those Age slots to control the lights. Example: In the images above, the controller will use time slots #1 from Age 5 to Age 9. At Age 10, the controller will use time slots #2 and #3. #2 will ramp up to 50% at the On time and ramp down from 50% and shut off at the Off time. #3 will cause the light intensity to jump from 50% to 95% from 10:00 to 10:15 without any ramping (light spike). (There are 50 slots available, with new slots added as schedules are entered.)

You can enter the time slots in any order you want. Shortly after you enter the information, the controller will sort the time slots from the earliest Age to the oldest Age. When sorting, any schedule with the same On time and Off time will be removed. This allows the easy removal of schedules by setting the time settings to the same value.

Test Control Center Hardware

This menu allows you to test the input and output channels of the controller. After selecting a test to perform, press **ENTER** to initiate the test.

Any changes you make during this test are terminated after 60 seconds.

```
Cancel  TEST CONTROL CENTER HARDWARE        12:55:15
                                            04/16/20
        Touch to select ALARM RELAY TEST!!!
        Touch to select OUTPUT TEST!!!         Enter
        Touch to select INPUT TEST!!!
        Touch to select SWITCH output test
        Touch to select DIGITAL INPUT TEST
        Touch to select KeyBoard Test
        Simulator Temperature:    N/A
                                                 +

                                                 -
```
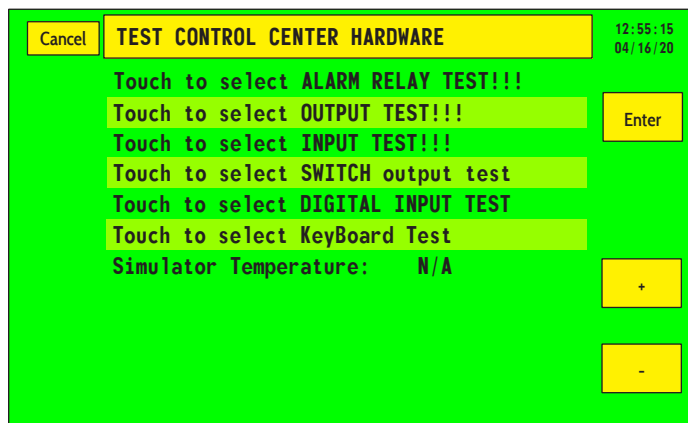
Test Alarm Relay

`Touch to select ALARM RELAY TEST!!!`

This menu item tests the integrity of the controller's alarm relay, and any attached visual or audible warning devices.

To energize the alarm relay, press the **PLUS** key. Any installed warning devices should activate.

To turn off the alarm relay, press the **MINUS** key.

Press **CANCEL** to return to the test menu.

```
Cancel  TEST CONTROL CENTER HARDWARE        08:47:00
                                            08/26/20
        Alarm relay is OFF - Press +/- to CHANGE



        Press CANCEL to exit test.
                                                 +

                                                 -
```
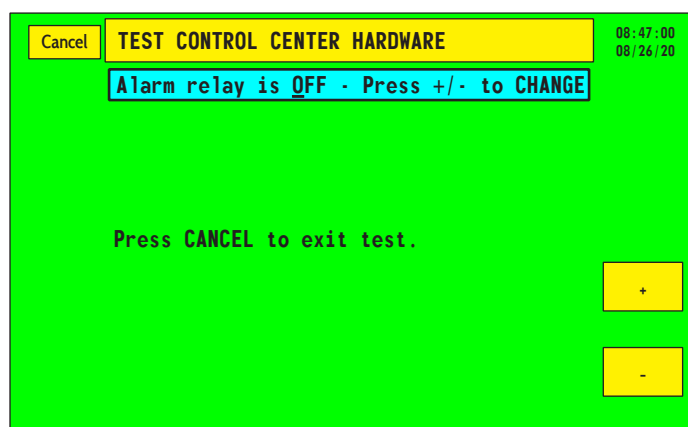
Test Outputs

`Touch to select OUTPUT TEST!!!`

This menu item tests the controller's output relays.

You must have a device installed on a relay before that relay can be tested.

Select which station/module (if applicable) and output channel (called relay on some controllers) to test by scrolling through the station and channel numbers with the **PLUS** and **MINUS** keys.

After you've selected an output channel by pressing **ENTER**, the display changes to show you what device is currently installed on that relay.

```
Cancel  TEST CONTROL CENTER HARDWARE        08:47:12
                                            08/26/20
        TEST OUTPUT at MODULE   1 CHANNEL   1   Enter


        Press CANCEL to exit test.
                                                 +

                                                 -
```
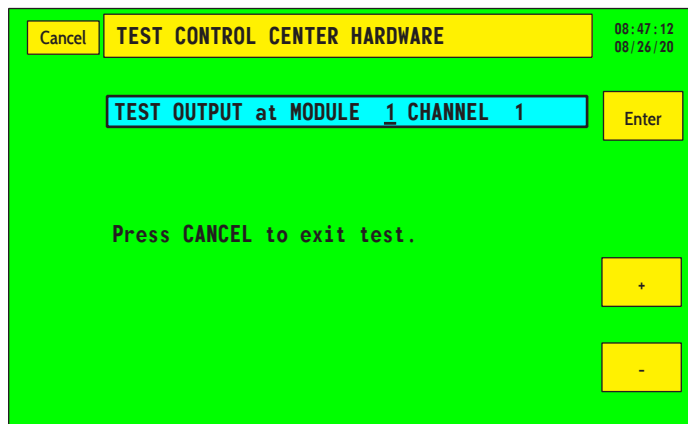
> For Vari-Heater and Vari-Brooder devices, select the output channel of the device, not the Gas module channel.

On/Off relays

Turn the output channel on or off by using the **PLUS** and **MINUS** keys as shown with the Alarm Relay test. If you are testing an interlocked channel, the controller turns off the sister channel if necessary prior to beginning the test.

```
┌──────────────────────────────────────────────┐
│ ┌──────┐ ┌────────────────────────────┐ 08:47:48 │
│ │Cancel│ │ TEST CONTROL CENTER HARDWARE│ 08/26/20 │
│ └──────┘ └────────────────────────────┘       │
│                                                │
│        TEST OUTPUT at MODULE    1 CHANNEL   1  │
│        TEST OUTPUT of RIDGE VENT #01           │
│        OUTPUT is OFF - Press +/- to CHANGE     │
│                                                │
│        Press CANCEL to exit test.              │
│                                         ┌────┐ │
│                                         │ +  │ │
│                                         └────┘ │
│                                         ┌────┐ │
│                                         │ -  │ │
│                                         └────┘ │
└──────────────────────────────────────────────┘
```
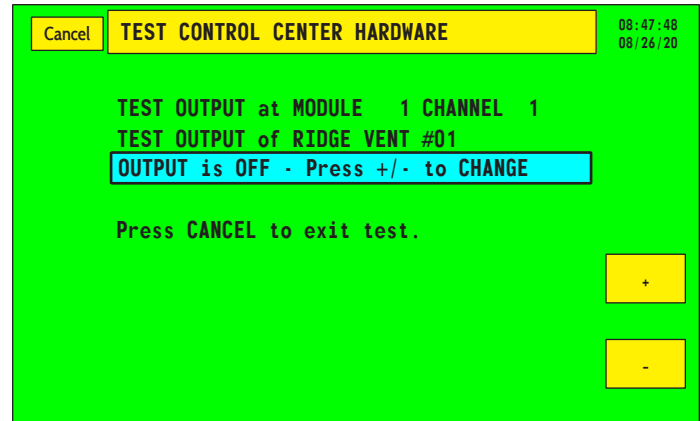
Variable Speed Fan Outputs

For variable speed fans, the first number displayed is the current power level of the output channel. Use the **Plus** and **Minus** keys to set the second value to the power level being tested, then press **ENTER** to send that power level to the device.

```
┌──────────────────────────────────────────────┐
│ ┌──────┐ ┌────────────────────────────┐ 09:05:42 │
│ │Cancel│ │ TEST CONTROL CENTER HARDWARE│ 08/26/20 │
│ └──────┘ └────────────────────────────┘       │
│                                         ┌─────┐│
│        TEST OUTPUT at MODULE    2 CHANNEL  5  │Enter││
│        TEST OUTPUT of VFD-SIDEWALL #02   └─────┘│
│        OutPut set to:     0   77               │
│        ** +/- to change, ENTER to update **    │
│        Press CANCEL to exit test.              │
│                                         ┌────┐ │
│                                         │ +  │ │
│                                         └────┘ │
│                                         ┌────┐ │
│                                         │ -  │ │
│                                         └────┘ │
└──────────────────────────────────────────────┘
```
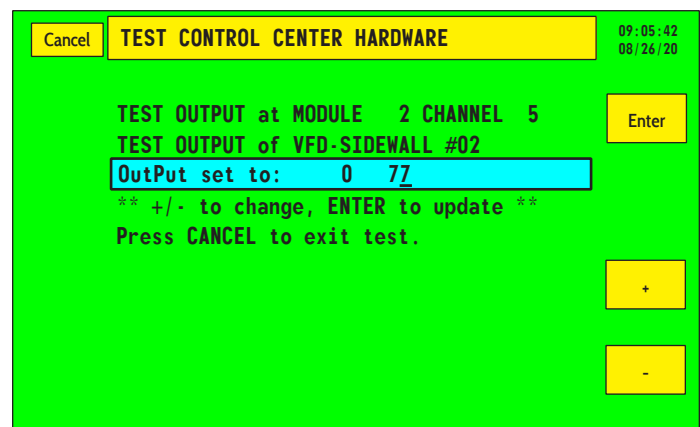
0-to-10 volt and 10-to-0 volt Outputs

These outputs are the 0 to 10 volt devices attached to an add-on Analog Output board (0 to 10 volt relays).

The first number is the last value sent to the Analog Output relay. The second number is used to set the new value to send. Use the **PLUS** and **MINUS** keys to change the second value, then press **ENTER** to send the value to the board.

For VariLights, Vari-Heater, and Vari-Brooder devices, the acceptable ADC values are 0 to 4095. For 0-to-10 volt devices, 0 is off, 4095 is full power. For 10-to-0 volt devices, 4095 is off, 0 is full on. If the optional power relay is set, that relay will also be turned on or off as needed.

For VFD fans, the acceptable values are 0% to 100%.

> **When testing a Vari-Heater or Vari-Brooder, enter the station/module and channel of the relay that powers the heater, not the station and channel of the Analog Output board where the Gas Regulator is attached.**

Test Inputs

Touch to select INPUT TEST!!!

This menu item displays the sensor input as interpreted by the controller.

You must have a device installed on an input before that input can be tested.

This is designed for use by technicians when troubleshooting controller components or sensors. Select which input channel to test by scrolling through the input numbers with the **PLUS** and **MINUS** keys.

After you've selected an input by pressing **ENTER**, the display shows the value of the input signal as reported by the analog to digital converter. The value will be a five-digit number such as 34056. The controller takes another reading each time you press **ENTER**.

```
Cancel    TEST CONTROL CENTER HARDWARE          08:48:26
                                                08/26/20

          TEST INPUT at MODULE    2 CHANNEL 01    Enter


             Press CANCEL to exit test.


                                                  +


                                                  -
```

```
Cancel    TEST CONTROL CENTER HARDWARE          08:48:33
                                                08/26/20

          TEST INPUT at MODULE    2 CHANNEL   1    Enter
          TEST INPUT of AIR SENSOR #01
          Input reading      34141 - ENTER to READ_

             Press CANCEL to exit test.
```

Test Output Status

Touch to select SWITCH output test

This menu item displays the On/Off status of the output relays. Select which station/module to test by scrolling through the station numbers with the **PLUS** and **MINUS** keys.

```
Cancel    TEST CONTROL CENTER HARDWARE          08:49:06
                                                08/26/20

          OUTPUT STATUS for MOD   1             Enter



             Press CANCEL to exit test.


                                                  +


                                                  -
```

Test Control Center Hardware - continued

After you've selected a number by pressing **ENTER**, the display changes to show you the channel numbers of the output relays which are currently on. Flip the toggle switch to verify a channel is working.

Cancel	**TEST CONTROL CENTER HARDWARE**	08:49:31 08/26/20

ON outputs for MOD 01

4 12 14 17 20 23

Enter

Press CANCEL to exit test.

TEST ends in 33 Seconds.
Touch a key to reset.

+

-

Test Digital Input

Touch to select DIGITAL INPUT TEST

This test displays the digital inputs that are currently open for the selected station. Press the **PLUS** or **MINUS** keys to select a station number.

Cancel	**TEST CONTROL CENTER HARDWARE**	08:50:18 08/26/20

TEST DIGITAL INPUT for MOD   1

Enter

Press CANCEL to exit test.

+

-

Press **ENTER** to display the digital inputs that are currently open.

Cancel	**TEST CONTROL CENTER HARDWARE**	08:50:27 08/26/20

TEST DIGITAL INPUT for MOD   2
OPEN INPUTS on MOD 02
   12 13 14

Press CANCEL to exit test.

TEST ends in 52 Seconds.
Touch a key to reset.

Test Keyboard Keys

Touch to select KeyBoard Test

This test allows the testing of the keys on the front of the controller. When you press **ENTER**, you are given 60 seconds for testing. During that time, press any of the hotkey push buttons on the front panel of the controller to verify the system is seeing the key press. The name of the key being pressed will be displayed in the blue highlighted line.

```
Cancel   TEST CONTROL CENTER HARDWARE        08:51:08
                                             08/26/20

         KeyBoard TEST end in 49 Seconds
         Touch a key to see description.

         NoKeyHit
```
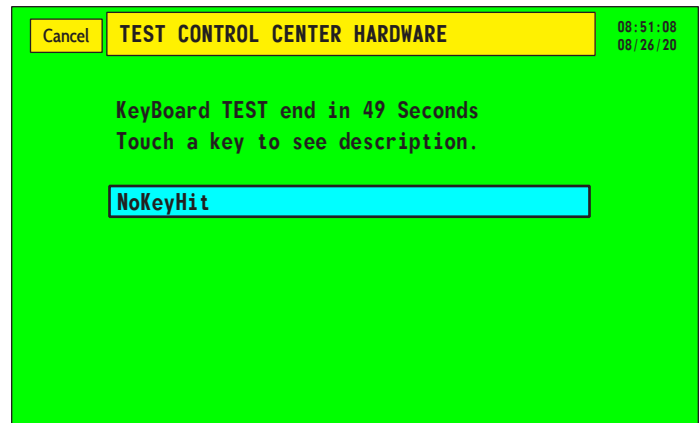
Temperature Control Simulation

Simulator Temperature: N/A

This test option allows you to test the output relays of the devices by simulating a temperature reading for the Air/Temp sensors. To use it, Press **ENTER** and use the **+** and **−** keys to set the simulated temperature to the desired degrees, then press **ENTER** again. When the controller goes to read a temperature probe, it will use this simulated temperature instead to operate the system. Note: it can take 15 to 60 seconds before a Temperature sensor starts using the simulated readings.

```
Cancel   TEST CONTROL CENTER HARDWARE        08:53:07
                                             08/26/20
         Touch to select ALARM RELAY TEST!!!
         Touch to select OUTPUT TEST!!!           Enter
         Touch to select INPUT TEST!!!
         Touch to select SWITCH output test
         Touch to select DIGITAL INPUT TEST
         Touch to select KeyBoard Test
         Simulator Temperature:    78.7           +

                                                  -
```
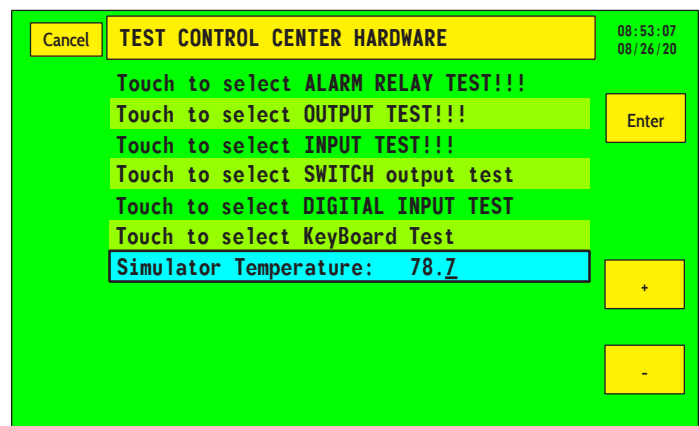
Pressing **CANCEL** will not disable this feature, allowing the viewing of other screens while using the simulated temperature. There are two ways to disable this feature:

1. Stop pressing keys on the controller for 10 minutes. The simulated temperature will reset to N/A and the system will start using the real temperature probes again.
2. Set the simulated temperature on this screen to -55.0. The value will change to N/A and the system will start using the real temperatures probes immediately.

Summary Menu

```
┌─────────────────────────────────────────┐  ┌─────────────────────────────────────────┐
│ Cancel  SUMMARY FOR 04/16/2020  Z1-S01  12:55:19 │  │ Cancel  SUMMARY FOR 04/16/2020  Z1-S01  12:55:23 │
│                                  04/16/20 │  │                                  04/16/20 │
│      Low   N/A @ 00:00   High  N/A @ 00:00 │  │        Hemi Fan#1 c) 0:00:00              │
│     Water Meter Sensor #1 Used:     0     │  │       Tunnel Fan#1 c) 0:00:00             │
│          Feed Sensor#9 c) 0:00:00         │  │     Vari-Ridge Fan#1 c) 0:00:00           │
│             Feeder#1 c) 0:00:00           │  │      Vari-Side Fan#1 c) 0:00:00           │
│            Brooder#1 c) 0:00:00           │  │      Vari-Stir Fan#1 c) 0:00:00           │
│        Vari-Brooder#1 c) 0:00:00          │  │        Vari-Hemi#1 c) 0:00:00             │
│           Furnace#1 c) 0:00:00    ┌──────┐│  │ Page  Vari-Tunnel Fan#1 c) 0:00:00 ┌──────┐│
│         VariHeater#1 c) 0:00:00   │Date +││  │ Up    VFD-Stir Fan#1 c) 0:00:00    │Date +││
│          Ridge Fan#1 c) 0:00:00   └──────┘│  │       VFD-Sidewall#1 c) 0:00:00    └──────┘│
│ Page   Sidewall Fan#1 c) 0:00:00  ┌──────┐│  │ Page   VFD-Tunnel#1 c) 0:00:00     ┌──────┐│
│ Down      Stir Fan#1 c) 0:00:00   │Date -││  │ Down    VFD-Ridge#1 c) 0:00:00     │Date -││
│                                   └──────┘│  │                                   └──────┘│
└─────────────────────────────────────────┘  └─────────────────────────────────────────┘
```

The Summary menus provide a list of the daily high/low temperature readings and the daily runtimes and/or usage history of select devices. The top line shows the Day being viewed. The values shown for the devices and readings are from midnight to midnight of the displayed day. *If viewing the current day, the current hour's readings are not included in the values.*

Press the **UP** and **DOWN** arrow keys to scroll though the pages of devices and readings for the displayed date. Swiping a finger up and down on the screen will also scroll the list. If there is more than one of a device types installed, such as two Sidewall fans, each device will be

```
┌─────────────────────────────────────────┐
│ Cancel  SUMMARY FOR 04/16/2020  Z1-S01  12:55:25 │
│                                  04/16/20 │
│         VFD-Hemi#1 c) 0:00:00             │
│      Cool Pad High#1 c) 0:00:00           │
│       Cool Pad Low#1 c) 0:00:00           │
│        In-House Fog#1 c) 0:00:00          │
│          Brooder#1  Gallons    0.00       │
│          Furnace#1  Gallons    0.00       │
│       VariBrooder#1 Gallons    0.00  ┌──────┐│
│ Page   VariHeater#1 Gallons    0.00  │Date +││
│ Up   All Heaters Total Gallons   0.00 └──────┘│
│                                      ┌──────┐│
│                                      │Date -││
│                                      └──────┘│
└─────────────────────────────────────────┘
```

displayed in order, before displaying the next device type. Press the **PLUS** or **MINUS** keys, or **Date +** or **Date -** buttons to change the date.

> As you navigate the menus, "Searching History Record for data" will be displayed briefly while the data is retrieved from the SD card and totaled.

The following menus can be displayed, depending on the devices set up in the controller.

Daily High/Low Temperature

```
Low   N/A @ 00:00   High  N/A @ 00:00
```

Displays the daily low and high temperature.

Water Sensor - Daily water usage

```
Water Meter Sensor #1 Used:     0
```

Total water used for the day.

Feed Sensor Runtime

```
Feed Sensor#9 c) 0:00:00
```

Daily runtime of the Feed Sensor showing the amount of time the motor current was flowing through the sensor.

Output Device Run Times

Feeder#1 c) 0:00:00	Sidewall Fan#1 c) 0:00:00
Furnace#1 c) 0:00:00	Vari-Side Fan#1 c) 0:00:00

Daily runtimes of the output devices. The output devices that show this menu are the fans, heaters, cool pads/ misters, and feeders. This screen will show two values "c" and "a". The "c" value is the amount of time during the day the device should have been on based on the controller settings. The "a" value shows the amount of time the relay was actually on. *If the "c" and "a" values do not match, it may be due to the toggle switch for that relay not being in the Auto position.*

Heater/Vari-Heater/Furnace/Brooder/Vari-Brooder Gallon Usage

Furnace#1 Gallons   0.00

Daily gallons used by the heating device, based on the runtime of the heating device. For the Vari-Heater/Vari-Brooder, the gallons used is calculated from the runtime of the heater using the average BTU output of the heater for each hour the heater ran.

Total Gallons Used

All Heaters Total Gallons   0.00

Total gallons used by all heating devices for the day.

> **ℹ** The Heating device gallons are very rough estimates and should not be used to determine the amount of gas left in the tanks.

> **📝** There are no Summary menus for the lights or inlets/curtains.

Alarm History

Alarm history displays conditions or events that may cause an active alarm condition. The Alarm History will display the current status of the last 20 alarm conditions. The Error Detail is a long-term record of any type of system, device or building abnormality that provides important information to help evaluate system problems. The Error Log screens can have multiple entries per alarm, detailing the different states of the alarm with time stamps. These alarm details are stored on the SD card which can display previous alarms that no longer appear in the Alarm History screens.

The Alarm History screen can be navigated to in multiple ways.

1. From the Home screen, press the Alarm button. Note: if this button is red, there are active alarms which have activate the alarm relay. These should be investigated, fixed and cleared.
2. From the Menu Hot Key screen, press the Alarm Button.
3. Swiping a finger from left-to right across the Home screen.

Alarm History
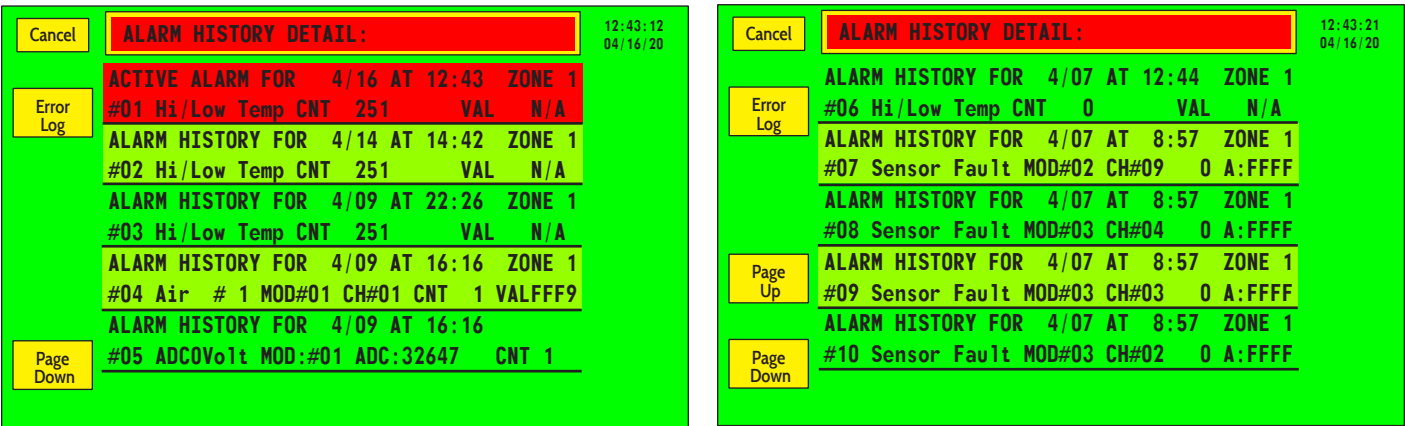
The alarm history stores up to 20 of the most recent alarms. An alarm record is created each time a new type of alarm condition is detected. Most alarm conditions require multiple occurrences to activate the alarm relay. All alarm records that are currently active or were previously active will always be displayed.

Each alarm is displayed as a two-line box separated by a black line, as shown above. The top line indicates if the alarm is active, as well as the date and time the alarm condition was last recorded. Depending on the alarm type, the second line shows the type of alarm, how many times it has been recorded (up to 255), and what the value was to cause the alarm condition.
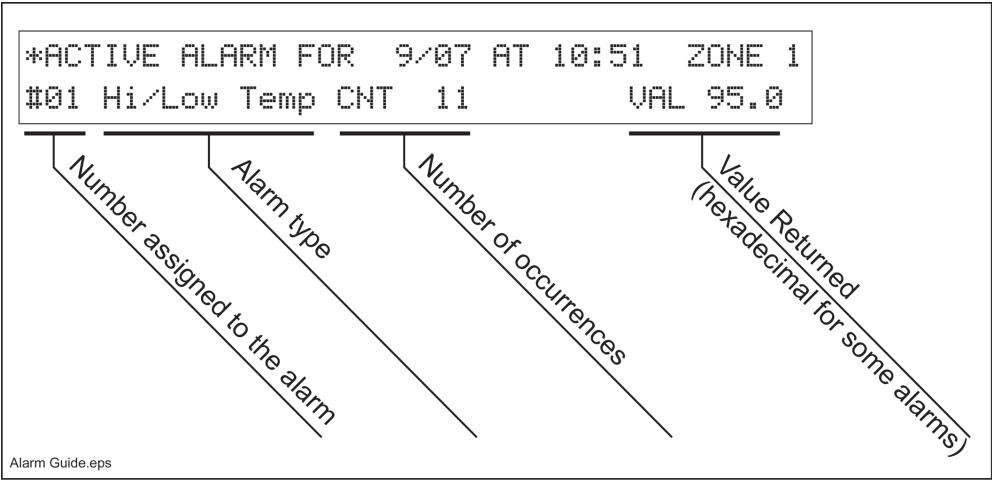
A red heading, as shown in both screens above, indicate there is at least one active alarm present. The first image above shows the first alarm is red, indicating the alarm is active. If there are no other red lines on the screen, as seen in the second image above, use the Page Up and Page Down buttons to find the active alarms.

To clear an active alarm, or to clear the current count of non-active alarm, first select the alarm to clear by touching either line of the specific alarm box, or use the **Up Arrow** or **Down Arrow** hardware key to scroll to the alarm you wish to clear. Once selected, the alarm box background will turn blue. Press the **ENTER** button or hardware key to clear the alarm and reset the count to 0.

Note: Some alarms are automatically cleared when the alarm condition is no longer detected.

Use the **Page Up** and **Page Down** buttons to view additional alarm history, if available.

```
Cancel    ALARM HISTORY DETAIL:                    12:43:12
                                                   04/16/20
          ACTIVE ALARM FOR    4/16 AT 12:43   ZONE 1
Error     #01 Hi/Low Temp CNT   251       VAL    N/A
Log       ALARM HISTORY FOR   4/14 AT 14:42   ZONE 1
          #02 Hi/Low Temp CNT   251       VAL    N/A
          ALARM HISTORY FOR   4/09 AT 22:26   ZONE 1
          #03 Hi/Low Temp CNT   251       VAL    N/A
          ALARM HISTORY FOR   4/09 AT 16:16   ZONE 1
          #04 Air  # 1 MOD#01 CH#01 CNT  1 VALFFF9
          ALARM HISTORY FOR   4/09 AT 16:16
Page      #05 ADCOVolt MOD:#01 ADC:32647    CNT 1
Down
```

Press the **Error Log** button to open a screen that displays the details for the alarms.

*Zone 0" alarms occur when an alarm relates to all zones (if applicable). For example, a possible hardware problem would generate a Zone 0 alarm.

Error Detail

The Alarm Error Log Detail screen is an activity log for the alarm records which are saved on the SD card and can go back years. Press the **Error Log** button on the Alarm History screen to view these details. These details are informational only and can not be selected. Using the **Page Up** and **Page Down** buttons or **Up** and **Down Arrow** hardware keys to scroll the pages.

Press the **CANCEL** button or hardware key to return to the Alarm History screen.

```
Cancel    ALARM ERROR LOG DETAIL:                  12:43:49
                                                   04/16/20
          ERROR DETAIL ON  4/16 AT 12:07:05
          Power Up
          ERROR DETAIL ON  4/16 AT 12:00:00 ZONE 1
          Hi/Low Temp CNT 227          VAL   N/A
          ERROR DETAIL ON  4/16 AT 11:56:23 ZONE 1
          Hi/Low Temp CNT  10          VAL   N/A
Page      ERROR DETAIL ON  4/16 AT 11:56:14 ZONE 1
Up        Hi/Low Temp CNT   1          VAL   N/A
          ERROR DETAIL ON  4/16 AT 11:55:41
Page      Power Up
Down
```

The Alarm Detail screen is displayed only when no security passwords are set up for the controller, or a level 5 security password has been entered on the Controller screen.

Information from an alarm record is saved in the error detail under any of the following conditions:

• On the first occurrence of any error or alarm condition.

• On the first occurrence during the current hour.

• When the occurrence of an error causes it to be an active alarm.

• When you manually clear an active alarm.

• When the active alarm is cleared by the system because the error condition (High Temp, Feeder OFF time, etc.) no longer exists.

Possible Alarm Conditions

The following alarms may be displayed. They are not listed in any particular order. The alarms will be displayed in the order that they first occur.

| |
|---|
| #01 Hi/Low Temp CNT 200   VAL 101.9 |
| Temperature exceeded alarm limits. |
| #01 Air #01 STA#01 CH#02 CNT251 VALFFFE |
| Invalid temperature reading from air sensor. |
| #01 24-Hour Water Used - CNT 2 |
| The total gallons used in the past 24 hours dropped more than the alarm percent drop setting. |
| #01 ADC5Volt STA#01 ADC:32789 CNT 104 |
| Malfunction in the power supply or analog circuit on the station. |
| #01 ADC9Volt STA#02 ADC:65531 CNT 20 |
| Malfunction in the power supply or analog circuit on the station. |
| #01 ADC0Volt STA#03 ADC:32802 CNT 3 |
| Malfunction in the power supply or analog circuit on the station. Possible faulty ground going to the controller or station. |
| #01 Erase Error: Sctr:04   CNT 1 |
| Error erasing parameters, history, or errors in the system FLASH memory. |
| #01 Write Error: Sctr:05 Add:1034 CNT 1 |
| Error writing parameters, history, or errors to the system FLASH memory. |
| #01 Voltage Low CNT 12 |
| A low power condition was detected when updating FLASH memory. The 12 VDC supplied by the control power supply is low. Check input voltage for correct value. |
| #01 Temp Chg STA01/05 78.1 30.9 CNT 1 |
| An air sensor reading has changed more than 15 degrees Fahrenheit (or about 8.5 degrees Celsius) from the last reading. The new reading is marked with an "*" (to the left of the affected temp reading) in current conditions, and is ignored until it reads within 15 degrees of the previous temperature reading. |
| #01 Water #2 GPH Exceeds Limit CNT 105 |
| The water flow exceeded the set limit. |
| #01 Feed Sensor #01 ON Time Exceeded |
| The feed sensor run time has exceeded the set limit. This alarm may also show "OFF Time Exceeded" or "Overload Detected" or "No-Load Detected." |
| #01 W.Dog CNT 1 |
| The program watch dog timer caused the system to reset. |
| #01 Comm 13 STA#10 CH#11 CNT145 |
| There is an error communicating with portions of the control or other stations (expansion, modem or serial interface). |
| #01 Low Stat Press CNT 140 VAL 0.250 |
| Static pressure has fallen below the limits you entered. This alarm may also show "High Stat Press" or "Lo Cyc Stat Press" or "Fan Lo Stat Press." |
| #01 Digital Alarm #1 Activated CNT 130 |
| The digital alarm has been activated. |
| #01 Sidewall Inlet #1 Out of Position |
| The position sensor is reporting a device position that is different than what the controller expected based on the device's Open and Close times. |
| #01 Position Sta 01/05   C: 11.9 A: 75.0 |
| A position sensor or Whisker Switch is reporting a device position that is different than what the controller expected. For a Position Sensor, C is the controller calculated position and A is the position sensor reported position. For a Whisker Switch, C is the controller calculated position and A is the Whisker Switch reported percentage open. |
| #01 Position Sensor 2 Bad Reading |
| The position sensor is reporting bad reading. The reported ohms are out of range of the fully open to fully closed ohms. |
| #01 HUMIDITY STA#01 CH#03 CNT 12 VALC17C |
| A humidity sensor is giving an invalid reading. |

Updating the controller software

Controller/SD Card Instruction

Updates to the controller software are done using either
a VALCO® provided SD card, or a VALCO® provided hex file.

If the update was provided as a hex file only (for example,
you received the update by email):

1. Disconnect power to the controller.
2. Remove the current SD card from the controller.
3. Using a computer, with an SD card reader, and using a
   Windows operating system, copy the provided hex file
   to the root directory of the SD card.
4. Follow the procedures outlined below.

Installing the SD card
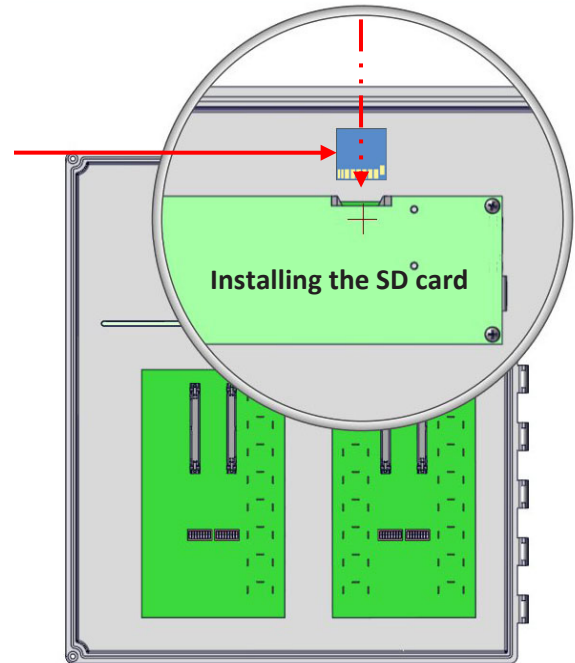
	Removing the SD card without disconnecting the power may cause an "SD Card Error" alarm if the controller needs to access the card while it is removed. It is best to disconnect power from the controller anytime the SD card is not installed in the controller.

To perform the update, the following general steps will be performed:
Read warnings below before you begin.

1. Disconnect power to the controller.
2. If the update is on an SD card other than the one running on the controller, remove the current SD card from
   the controller.
3. Insert the SD card containing the update.
4. Restart the controller.
5. Scroll to and select the update file.
6. Press ENTER to start the update.
7. Remove the update card when requested.
   A. If the update file is on the original SD card, press Cancel to continue.
8. Reinsert the original SD card.
9. Power up the controller and resume operations.

See the following pages for more detailed instructions.

	If you fail to reinsert the original SD card, the controller will no longer contain your previous history and alarm records.

> ### Warning!
> 1. DO NOT shut off the controller while the update is proceeding. Doing so will corrupt the software on the controller and will not work correctly, if at all. If the software becomes corrupted, the controller will have to be updated again before it will start working.
> 2. When working with the original SD card, do not delete or rename any of the files on the SD card. These files contain all the information needed to set up and run the controller and also contain all the Alarm and History information of the controller. If these files are deleted or changed in any way, you may have to set up the controller again from the beginning.
> 3. When updating the controller, manually set the toggle switches for the Output relays as needed to control the environment of the barn. During the update process, the controller is not monitoring or controlling the devices in the barn. Once the update is done, the controller will resume operations and you can set the toggle switches back into their normal operating positions.
> 4. The Alarm relay is activated during the update and will set off any alarm system attached to the controller.

Detailed instructions for updating the Controller

Note: the following steps require using the hardware keys, as no buttons will appear on the screen.
During the update procedure, when the system is waiting for input and no key has been pressed for 20 seconds, the update procedure will be aborted, and the system will start up using the currently installed software.

1. After installing an SD card with a valid update hex file added to the root folder, power up the controller. The screen will display information on the bootloader version.

```
Ventra XT Bootloader        v 01.01.23
Compiled Jan  6 2020 @ 17:11:45
```

2. When requested, press the **ENTER** key to start the update procedure or the **CANCEL** key to skip the update process and continue using the current version of software.

```
To load file from SD card, press ENTER.
To skip program load, press CANCEL.
```

3. Press the **+ (Plus)** key to view the available update files found on the installed SD card or the **CANCEL** key to skip the update process and continue using the current version of software.

```
Select the program file to load.

Press CHANGE + to see the file list.
Press CANCEL to exit without loading.
```

4. A screen will appear displaying information on the first available update file found on the SD card. This screen provides the following informa-tion.

File: name of the hex file found on the SD card.

Vers: software version information contained within the hex file.

ID: The software ID, which should contain the version information, as well as the date of the update.

Reset: debug information for Tech Support.

```
File: XT_Hex_Beta_03_2020-01-27 Boot.hex
Vers: XT X0.00.00.03
ID:   XT X0.00.00.03 01-27-20
Reset: 0x9D036000

Press CHANGE +, CHANGE - to scroll list.
Press ENTER to load this file.
Press CANCEL to exit without loading.
```

a. While on the screen, use the **+ (Plus)** key and **– (Minus)** key to view information on other hex files found on the SD card. Note: the last screen in the list will display information about the software version currently installed on the controller (see image to the right).

Note: Only files with a .hex extension that are compatible with this controller will be displayed.

b. Or, press **CANCEL** to exit the update procedure and start the controller with the currently installed software.

```
Current loaded app:
Vers: XT X0.00.00.02
ID:   XT X0.00.00.02 01-12-20
Reset: 0x9D036000


Press CHANGE - to scroll list.
Press CANCEL to exit without loading.
```

5. Once you have found the file you wish to use for updating, press **ENTER** to start the update process. During the update process, the following screens will appear. Note: do not power down the controller while the process is working. Doing so will corrupt the software and the update procedure will need to be run again to completion.

```
Ventra XT Bootloader        v 01.01.23
Validating update file (command  8,193)
```

```
Ventra XT Bootloader        v 01.01.23
File verified: XT_hex_Beta_03_2020-01-27
 Boot.hex
```

```
Ventra XT Bootloader        v 01.01.23
Processing update (command  3,073)
```

```
Ventra XT Bootloader        v 01.01.23
Verifying memory image (command  5,121)
```

```
Ventra XT Bootloader        v 01.01.23
Update completed successfully.
```

6. Once the update procedure is finished, you will be asked to remove the update SD card and insert the original SD card.

   a. This can be done without powering down the controller.

   b. Once the original SD card has been reinserted, the controller will continue to start up.

   c. If the update file was on the original SD card, press **CANCEL** to continue.

```
Ventra XT Bootloader        v 01.01.23
Please remove software update SD card.
```

```
Ventra XT Bootloader        v 01.01.23
Please insert original SD memory card.
```

7. Once the original SD card has been reinserted, or **CANCEL** was pressed, the controller will finish the update procedure and start up.

```
Ventra XT Bootloader        v 01.01.23
SD card free space = 15,547 MB.
```

```
Ventra XT Bootloader        v 01.01.23
********************************
```

Start Up Options

When the controller powers up, you can run some optional procedures before the controller starts to control the environment of the building. These options include:

- Creating a new parameter set.
- Creating a copy of a parameter set from an existing parameter set, either on the same SD card or another SD card.
- Changing the current Parameter Set used by the controller.
- Clearing the alarm records stored in memory.
- Clearing the current hours' history record.

To access the Start Up Options, press **ENTER** a few seconds after the controller starts and the screen to the right is displayed.

If you are asked for a password when you press **ENTER**, you will need to enter the Options password before you can continue with the options. See Password for Parameter Set Options section for information on the Options password.

```
Checking Real Time Clock.....
StartUp Procedure Options: SET PASSWORD
Enter Options Password: 0xxxxxxx
```

Cancel	Controller Power-Up Self Testing.	10:17:45 01/29/20
	COPYRIGHT (C) 1995-2020. Valco Industries Inc All Rights Reserved Checking Real Time Clock.....	Enter
	StartUp Procedure Options: Press ENTER to change!	
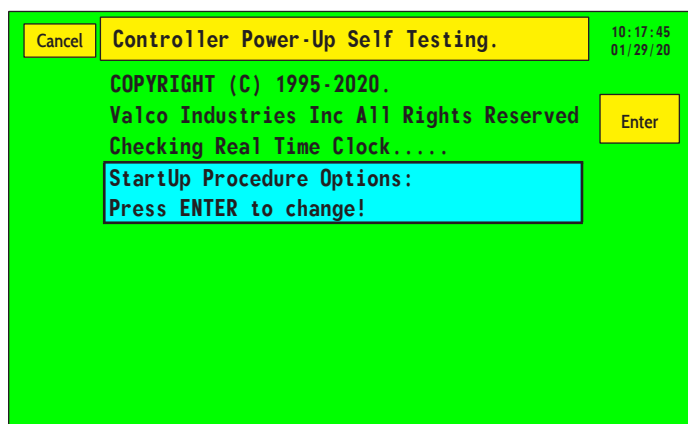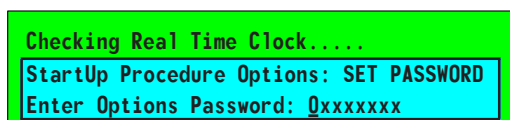
The first option allows you to copy an existing Parameter Set, either to the same SD card or to another SD card. Press **ENTER** to skip this option or use the **PLUS** or **MINUS** key to set this option to YES, then press **ENTER** to run the copy procedure. *(see **Creating or Copying Parameter Sets** section for more information on this procedure.)*

Cancel	Controller Power-Up Self Testing.	12:40:14 08/02/20
	COPYRIGHT (C) 1995-2020. Valco Industries Inc All Rights Reserved Checking Real Time Clock.....	Enter
	StartUp Procedure Options: COPY PARMS--- Copy Parameter File on SD CARD? NO	
		Hour +
		Hour -
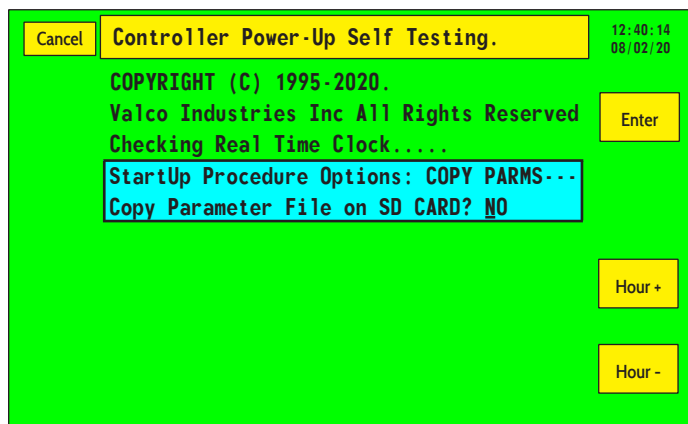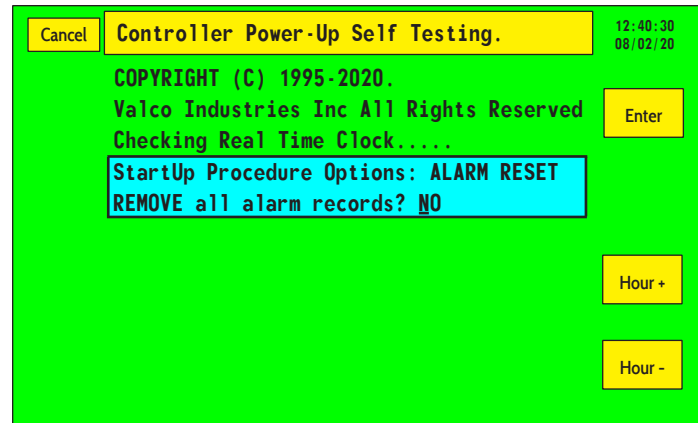
The second option allows you to create a new Parameter Set or to change the Parameter Set used by the controller to control the environment. Use the **PLUS** and **MINUS** key to set the number to an existing Parameter set, which will be loaded, or to an unused number to have a new Parameter Set created. Press **ENTER** to save the new parameter number and to continue to the next option. *(See **Creating New Parameter Sets** section for more information.)*

Cancel	Controller Power-Up Self Testing.	12:40:24 08/02/20
	COPYRIGHT (C) 1995-2020. Valco Industries Inc All Rights Reserved Checking Real Time Clock.....	Enter
	StartUp Procedure Options: Parameter Set Load Parameter Set Number: 2	
		Hour +
		Hour -

155
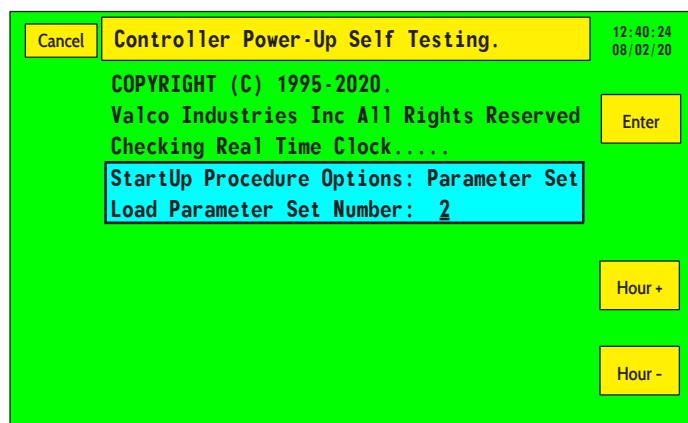
The third option allows the clearing of the 20-slot Alarm table stored in memory. Press the **PLUS** key to set the option to YES, if you want to clear the memory table. Press **ENTER** to continue to the next option.
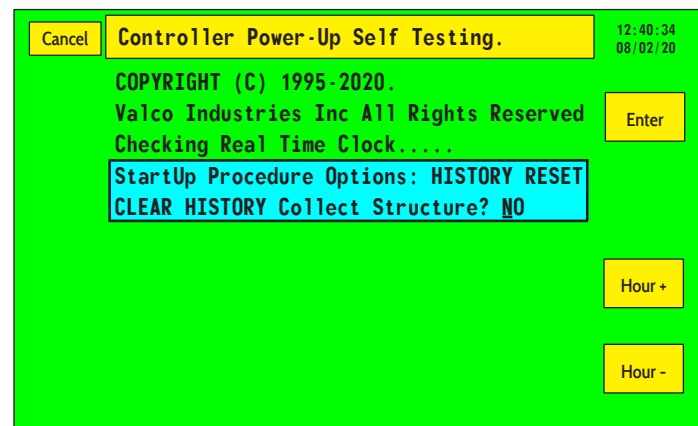
Cancel	**Controller Power-Up Self Testing.**	12:40:30 08/02/20
	COPYRIGHT (C) 1995-2020.	
	Valco Industries Inc All Rights Reserved	Enter
	Checking Real Time Clock.....	
	StartUp Procedure Options: ALARM RESET REMOVE all alarm records? NO	
		Hour +
		Hour -

The fourth option allows the clearing of the current hour's history table stored in memory. Press the **PLUS** key to set the option to YES, if you want to clear the memory table. Press **ENTER** to continue.
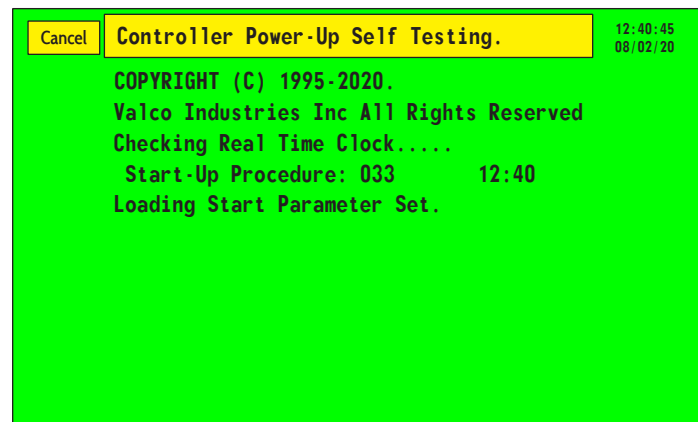
| Cancel	**Controller Power-Up Self Testing.**	12:40:34 08/02/20
	COPYRIGHT (C) 1995-2020.	
	Valco Industries Inc All Rights Reserved	Enter
	Checking Real Time Clock.....	
	StartUp Procedure Options: HISTORY RESET CLEAR HISTORY Collect Structure? NO	
		Hour +
		Hour -

The third and fourth options only clear the alarm and history tables in memory. All alarm records and history records stored on the SD card are retained.

At this point, the controller will load the selected parameter set, if it exists on the SD card, or create a new parameter set, and continue with the startup of the controller.

If creating a new parameter set, the controller will ask for the global parameters to be used for the parameter set. *(See **Global Parameters – (Initial Setup)** section for information on how to set those options.)*

Cancel	**Controller Power-Up Self Testing.**	12:40:45 08/02/20
	COPYRIGHT (C) 1995-2020.	
	Valco Industries Inc All Rights Reserved	
	Checking Real Time Clock.....	
	Start-Up Procedure: 033 12:40	
	Loading Start Parameter Set.	

Parameter Sets

Introduction

The Ventra XT™ allows the user to set up 24 different Parameter Sets to be used by the controller. A Parameter Set is a complete set of operating parameters the controller uses to control the input and output devices to maintain the correct environmental conditions for the animals.

These Parameter sets can be used in multiple ways. Instead of changing operating parameters multiple times during a grow out period, the user can set up multiple Parameter sets, with different parameters for the different ages of the animals, and change the Parameter set number as the animals grow. The Parameter Sets can also be used for seasonal changes to the operating parameters. Instead of changing multiple parameter settings each time the seasons change, or the animals grow, just change the Parameter Set number being used by the controller.

> 1. **The current Parameter Set being used by the controller is displayed in the upper right hand corner of most screens, "S01".**
> 2. **Each Parameter Set is completely independent of the other Parameter sets. The settings from one Parameter Set will not affect the operation of the controller when a different Parameter Set is selected. However, the History and Alarm records are controller-based and will not be affected by changes in Parameter Sets. This allows for a continuous record of the history and alarms of the controller, regardless of the operating parameters.**

When the controller is first started, it will use Parameter Set #1 as the initial parameter set. Once the Global Parameters are set, use the information from the rest of the manual, beginning with the *Setting up the Control Software* section, to configure the controller.

Once Parameter Set #1 is set up there are two ways to create new Parameter Sets. You can copy an existing parameter set to the same or another SD card, or you can create a new Parameter set and start from scratch.

Copying Parameter Sets

This option allows you to copy an existing Set and save the steps of setting up all the inputs and outputs again. *This option does not change the active parameter set*. The steps are:

1. Save the current parameter set.

    a) Press the **Home** key
    b) Select the **Menu Hot Keys** button.
    c) Select the **Controller** button.
    d) Select the **Save Configuration** button.
    e) Press **ENTER** to save the parameters to the SD card.

2. Restart the controller.

3. When the **Startup Procedure Options** selection appears, as shown to the right, press **ENTER**.

4. If an "Options" password has been entered, enter the 8-digit password to access the Startup Options menus. *(See **Password for Parameter Set Options** section for more information.)*
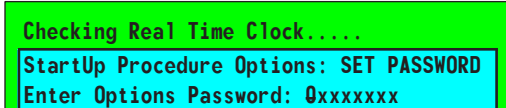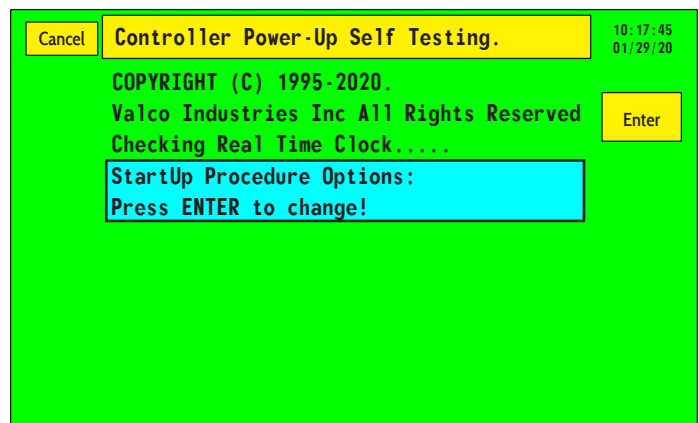
Copying Parameter Sets - continued

5. Press the **PLUS** key to set "Copy Parameter File on SD CARD?" to YES.

```
StartUp Procedure Options: COPY PARMS---
Copy Parameter File on SD CARD? YES
```

6. Press **ENTER** to continue.

7. If you are copying a parameter set from a different SD card than the one currently in the controller, remove the current SD card from the controller and insert the SD card you want to copy a parameter set from into the controller.

```
StartUp Procedure Options: COPY PARMS---
Insert SOURCE SD CARD. Press ENTER....
```

8. Once the correct SD card is inserted in the controller, press the **ENTER** key to continue.

9. Using the **PLUS** and **MINUS** keys, select the Parameter Set number you want to copy from.

```
StartUp Procedure Options: COPY PARMS---
Source Set Number:  1
```

10. Press **ENTER** to continue.

   a) If you select a parameter set number **that does not exist** on the SD card and press **ENTER**, you will receive a SD Card Error message and **will need to cycle the power on the controller to repeat all the steps again**, this time selecting an existing parameter set number.

```
StartUp Procedure Options: COPY PARMS---
Insert DESTINATION SD CARD. Press ENTER.
```

11. The "Insert DESTINATION SD CARD" screen will be displayed.

   a) If you are copying the parameter set from one SD card to another SD card, remove the current SD Card from the controller and insert the SD card you want to copy to into the controller.

   b) If you are just copying the parameter set to a different set number on the same SD card that you are copying from, then continue to the next step.

12. Press **ENTER** to continue.

```
StartUp Procedure Options: COPY PARMS---
Destination Set Number:  3
```

13. Using the **PLUS** and **MINUS** keys, select the Parameter Set number you want to copy to.

   a) Make sure you set the correct parameter set number to copy to. If the SD card contains a parameter set that matches the number you selected, that parameter set will be updated to match the parameter set you are copying from.

14. Press **ENTER** to continue.

15. After the copy is created, you can either copy another parameter set or restart the controller.

   a) To copy another parameter set, press **ENTER** and repeat the steps starting with step 7.

   b) If you are done copying parameter sets, cycle the power on the controller to restart normal operations.

```
┌────────┬──────────────────────────────────────┬─────────┐
│ Cancel │ Controller Power-Up Self Testing.    │ 12:42:48│
│        │                                      │ 08/02/20│
│          COPYRIGHT (C) 1995-2020.                       │
│          Valco Industries Inc All Rights Reserved │Enter│
│          Checking Real Time Clock.....                  │
│           PARAMETER COPY FINISHED!  Press ENTER         │
│           to copy another Set or CYCLE THE POWER.       │
└─────────────────────────────────────────────────────────┘
```
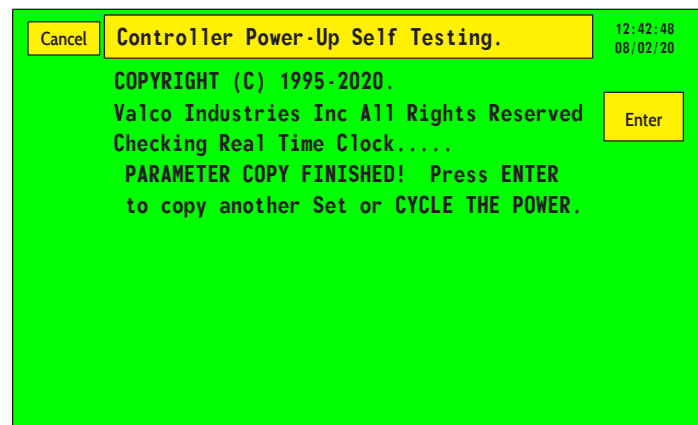
> **ℹ** Due to memory constraints and file sizes, only one Parameter set can be copied at a time. To copy all the parameter sets from one SD card to another, either repeat the steps above for each parameter set or use a computer, with a SD card reader, to copy all the files from one SD card to the other.

> If you receive a message stating "Cycle POWER to controller to continue...", too much time elapsed before a key was pressed and the controller needs to be restarted.

> Copying parameter sets does not change the current parameter set used to control the building's environment. See "Changing Parameter Sets" to load one of the newly copied parameters sets.

Creating New Parameter Sets

This option requires you to set up the Global parameters, install the input and output devices and set all the associated settings. This option changes the active parameter set to the one you create. The steps are:

1. Save the current parameter set.

   a) Press the **Home** key
   b) Select the **Menu Hot Keys** button.
   c) Select the **Controller** button.
   d) Select the **Save Configuration** button.
   e) Press **ENTER** to save the parameters to the SD card.

2. Restart the controller.

3. When the **Startup Procedure Options** selection appears, as shown to the right, press **ENTER**.

```
Cancel  Controller Power-Up Self Testing.      10:17:45
                                               01/29/20
        COPYRIGHT (C) 1995-2020.
        Valco Industries Inc All Rights Reserved    Enter
        Checking Real Time Clock.....
        StartUp Procedure Options:
        Press ENTER to change!
```

4. If an "Options" password has been entered, enter the 8-digit password to access the Startup Options menus. *(See **Password for Parameter Set Options** section for more information.)*

```
Checking Real Time Clock.....
StartUp Procedure Options: SET PASSWORD
Enter Options Password: 0xxxxxxx
```
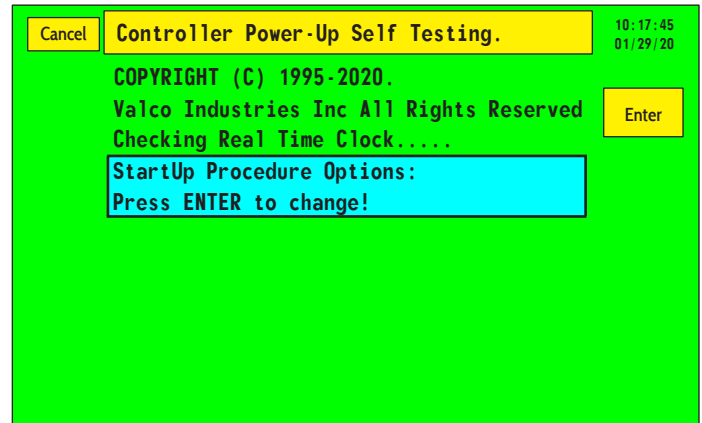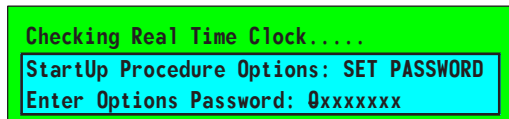
5. Leave "Copy Parameter File on SD CARD?" set to NO and press **ENTER**.

```
StartUp Procedure Options: COPY PARMS---
Copy Parameter File on SD CARD? NO
```

6. Press the **PLUS** and **MINUS** keys to select an unused Parameter Set number.

```
StartUp Procedure Options: Parameter Set
Load Parameter Set Number:  2
```

   f) If you select the number of an existing Parameter Set, that Parameter set will be loaded into the controller memory and be used to control the environment.
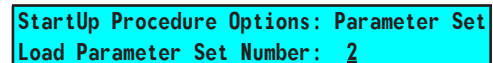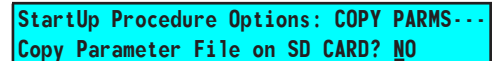
7. Press **ENTER** to continue.

8. Optional: Press the **PLUS** key to set "REMOVE all alarm records?" to Yes if you want to clear the current Alarm table in the controller.

```
StartUp Procedure Options: ALARM RESET
REMOVE all alarm records? NO
```

   g) Only the 20-slot alarm table in memory is cleared. The Alarm Detail records, which are stored on the SD card, will not be deleted.

9. Press **ENTER** to continue.

```
StartUp Procedure Options: HISTORY RESET
CLEAR HISTORY Collect Structure? NO
```
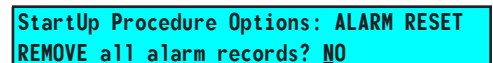
10. Optional: Press the **PLUS** key to set "CLEAR HISTORY Collect Structure?" to Yes if you want to clear the current hour's history record stored in memory.

   h) Only the current hour's history in memory is cleared. All previous history records, which are stored on the SD card, will not be deleted.
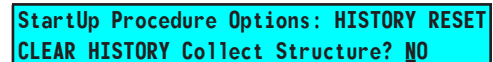
11. Press **ENTER** to continue.

12. The controller will now load a new, blank, parameter set, using the number you selected and continue the normal startup operations.
   i) You will be asked to set the Global parameters for the set during the startup procedure.
   j) Once the controller starts, you will need to add and set up all the input and output devices for the new parameter set.

When changing Parameter Sets, no information is transferred to the new parameter set. Before changing parameter sets be sure to record important settings you want to transfer to the new parameter set, such as the animal's age and weight, the Temperature, Humidity, and Static Pressure setpoints, etc. Once the parameter set is changed, enter the recorded information into the new parameter set.

Changing Parameter Sets

Once there are multiple Parameter Sets set up, use the same steps explained in **Creating New Parameter Sets** in the previous section to select an existing Parameter set number from the SD card. When finished, the selected parameter set will be loaded and used to control the room.

Note: if the global parameter settings are asked for when the selected set is loaded, a non-existent parameter number was entered. Repeat the steps, but select an existing number.

Editing an Existing Parameter Set

In order to make changes to an existing Parameter Set, the Parameter Set needs to be loaded into memory. Use the steps in "**Changing Parameter Sets**" above to load the Parameter Set you want to change into memory.

When you load a Parameter Set into memory, the controller will use the loaded Parameter Set to control the devices. It is not possible to make changes to one Parameter Set, while another Set is controlling the devices.

Password for Parameter Set Options

It is possible to set an 8-digit password to prevent unauthorized people from accessing the Startup options and from copying or changing Parameter Sets. When this password is set and **ENTER** is pressed when the "Press **ENTER** to change" screen appears, the correct password needs to be entered or the controller will not allow access to the startup options. To enter the password use the **PLUS** or **MINUS** keys to change the number under the cursor and the **LEFT** or **RIGHT** Arrow keys to change the cursor position.

To enter/change the Startup options password:

1. Press the **Home** key.
2. Press the **Menu Hot Key** button.
3. Press **System / Control Device Setup** button.
4. Press the **Right** arrow key or swipe a finger across the screen
   from right to left to view the Global Parameters settings.
5. Select the **Enter Options Password** line.
6. Press **ENTER** to change the password.
   a) Use the **PLUS** or **MINUS** keys to change the number under the cursor
      and the **LEFT** or **RIGHT** Arrow keys to change the cursor position.
7. Press **ENTER** again to save the password.

A security level of 7 is needed to view and change the Options password.

Resetting the Control to a "New State"
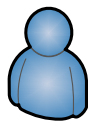
ADVANCED USERS:

On a rare occasion there might be cause to reset the control to a "new or factory fresh state." *Instructions are listed below.*

1. Using a PC, delete all the files and directories on the SD card. *(You can format the card but this is not necessary.)*

2. Reinsert the SD Card and restart the controller.

3. Press **ENTER** at the Start-Up Prodcedure Optiton and set the Options as shown in the screens below.

```
StartUp Procedure Options: COPY PARMS---
Copy Parameter File on SD CARD? NO
```

```
StartUp Procedure Options: Parameter Set
Load Parameter Set Number:   1
```

```
StartUp Procedure Options: ALARM RESET
REMOVE all alarm records? YES
```

```
StartUp Procedure Options: HISTORY RESET
CLEAR HISTORY Collect Structure? YES
```

This will clear out all the old parameter sets, as well as the controller memory, and start the controller with a clean, blank, Parameter Set #1 and request new global parameters (animal type, etc.).

Progressive Heating and Cooling Example

Temperature

70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
21.1	21.7	22.2	22.8	23.3	23.9	24.4	25.0	25.6	26.1	26.7	27.2	27.8	28.3	28.9	29.4	30.0	30.6	31.1	31.7	32.2

Furnace Group 1
Furnace Group 2
Furnace Group 3
Furnace Group 4
Heater/Brooder Group 1
Heater/Brooder Group 2
Heater/Brooder Group 3
Sidewall Fan Group 1
Sidewall Fan Group 2
Curtain Group 1 (open based on temp)
Curtain Group 2 (open based on temp)
Stir Fan Group 1
Stir Fan Group 2
Tunnel Fan Group 1
Tunnel Inlet Group 1
Tunnel Fan Group 2
Tunnel Inlet Group 2
Tunnel Fan Group 3
Tunnel Inlet Group 3
Tunnel Fan Group 4
Tunnel Inlet Group 4
Tunnel Fan Group 5
Tunnel Inlet Group 5
Cool Pad - Cycle 1
Cool Pad - Cycle 2
Cool Pad - Cycle 3
Cool Pad - Cycle 4

Cool fans and natural-only inlets shut off during tunnel mode.

As the temperature rises above the setpoint, more fans run and inlets open further.

If sidewall ventilation isn't enough to cool the animals, the building transitions into tunnel mode. Only tunnel fans and inlets are used to create a wind chill effect.

(tunnel inlets open proportional to fans running)

Evaporative cooling is used on very hot days as long as the humidity isn't so high that the water fails to evaporate.

Tunnel Entry

Tunnel Exit

Temperature setpoint

Note the Tunnel Group 1 Off Temp is set lower than the Tunnel Exit temperature. This ensures that some ventilation will be provided as the temperature drops back to the Tunnel Exit value. Be certain enough tunnel fans have an Off Temp lower than the Tunnel Exit value to maintain adequate ventilation throughout tunnel mode.

Legend
Heating Device Temp On   Cooling Device Temp Off
Heating Device Temp Off   Cooling Device Temp On

Sample Device Setpoints.vsd

APPENDIX 2 - Curtain and Inlet Behavior

Curtain and Inlet Behavior

Device	Mode Assigned to Device	Behavior During:	
		Natural Mode	Tunnel Mode
Curtain	Static Tunnel Only	Closed.	Operates based on static pressure.
	Temp Natural Only	Operates based on the device's Opening Temp and Closing Temp.	Closed.
	Static Natural Only	Operates based on static pressure.	Closed.
	Temp Natural/Temp Tunnel	Operates based on the device's Opening Temp and Closing Temp.	Operates based on proportional control
	Temp Natural/Static Tunnel	Operates based on the device's Opening Temp and Closing Temp.	Operates based on static pressure.
	Temp Tunnel Only	Closed.	Operates based on proportional control
	Static Natural/Temp Tunnel	Operates based on static pressure.	Operates based on proportional control
	Static Natural/Static Tunnel	Operates based on static pressure.	Operates based on static pressure.
Inlet	Static Tunnel Only	Closed.	Operates based on static pressure.
	Temp Natural Only	Operates based on proportional control.	Closed.
	Static Natural Only	Operates based on static pressure.	Closed.
	Temp Natural/Temp Tunnel	Operates based on proportional control	Operates based on proportional control
	Temp Natural/Static Tunnel	Operates based on proportional control	Operates based on static pressure.
	Temp Tunnel Only	Closed.	Operates based on proportional control
	Static Natural/Temp Tunnel	Operates based on static pressure.	Operates based on proportional control
	Static Natural/Static Tunnel	Operates based on static pressure.	Operates based on static pressure.

Operates based on static pressure - A static pressure sensor monitors negative static pressure inside the building and adjusts the inlet or curtain based on your static pressure Setpoint, Open and Close settings (Static Pressure menu).

Operates based on proportional control - The controller monitors the number of fan groups designated for proportional control that are running. The curtain or inlet is adjusted according to this number and the settings you enter in the device's Fan Groups On \ Opening Size menu.

Operating Modes Summary.vsd

APPENDIX 3 - Service Technician Features

Service Technician Features:
The new service technician security level allows access to additional menus that support the following functions:

> **To use these features: User must call VAL-CO® customer service to access.**

Zone Copy: This allows the technician or operator to set up all the devices and parameters in a zone, and then copy all those devices and their settings to another zone. This screen is found in the System Setup menus.

Expansion Module Disable: This setting will cause the controller to stop attempting to communicate with the specified Station number (not allowed for Station Number 1). This is a temporary setting useful for servicing or troubleshooting the system. Once power is reset, all Stations will be enabled. This screen is found in the System Setup menus.

Number of Hours a curtain is 50% open: This curtain setting allows a service technician to set the number of hours a curtain has been open at least 50%. It is used to test the Curtain Exercise Routine. This screen is found in each of the Curtain's menus.

APPENDIX 4 - Troubleshooting

1. Power/Display		
No Display.	1.1a	Verify the controller has power by turning a toggle switch to ON. If a light comes on, try step 1.1b. If no light, you probably do not have power coming to the controller. Check 1.2a.
	1.1b	Display is too light. Press DISPLAY DARK on controller keypad for several seconds.
	1.1c	A row of dark boxes means that no software exists on the HMI display board. Power down and insert a SD card with a current update file on it. Obtain from VAL-CO® Service. Power up, wait 20 minute for update to complete. Power down reinstall operating SD card. Power up.
	1.1d	Replace HMI display board
No Power.	1.2a	Circuit breakers are tripped or turned off.
	1.2b	Fuse on the controller power supply is blown. Replace with equivalent.
	1.2c	Terminal connections on power supply are not tight.
Display light keeps turning off.	1.3a	Normal operation. It's programmed to turn off one minute after you're done using the keypad. This will add years to its useful life and save electricity.

2. Sensor Readings		
Temperature reading is N/A or –412°.	2.1a	Air sensor is disconnected or wire is cut. Check continuity in cable/sensor. Resistance through the cable and sensor should be about 1100 ohms. If higher check for cable, splice, or sensor damage.
	2.1b	Temperature is beyond the operating range (Outside –60°F to 120°F, Inside 30°F to 130°F).
	2.1c	Sensor is defective. Connect new sensor.
	2.1d	If readings are N/A, verify that sensor is installed by checking the List Control Devices menu.
	2.1e	Replace Interconnect board
Temperature reading is wrong.	2.2a	Check temperature at sensor with an accurate thermometer.
	2.2b	Wrong wire gauge input. Read wire gauge from wire and input in Sensor Calibration & Setting menu for all air sensors.
	2.2c	Wrong cable length input. Check cable length to each sensor and input to Sensor Calibration & Setting menu.
	2.2d	Mis-calibrated sensor. Adjust by adding/subtracting cable length. Add about 7 feet (varies by wire gauge) to drop the reading by 0.1 degree F. Subtract length to increase reading. Offset in degrees may be entered if software version 2.13 or higher.
	2.2e	Sensors mis-numbered in programming. Verify position of sensors by dipping in water then swinging rapidly to cool them. Within 20 seconds, you should see a noticeably cooler reading for that sensor (Current Status menu). If sensors are misnumbered, a different sensor reading will drop. To correct, you must rewire the sensors in question to the proper input channels.
	2.2f	Sensor or connection splice is bad. Cut sensor above splice. Cut off splice. Reconnect and check to see if sensor is working. If not, replace sensor.

	2.2e	If all sensors are reading low by about the same amount, the control board must be replaced.
	2.3b	Ensure there is nothing draining the 12 volt supply to the input. If there is, disconnect the other device. Then turn off the power to the controller and back on again.
	2.3c	Replace sensor.
Feeder sensor is wired but reading improperly.	2.4a	Is the amperage set above zero and below the actual amperage reading?
	2.4b	Is the wire running through the loop of the sensor?
	2.4c	If there is a second feeder wire, do the two run the same direction through the sensor loop?
	2.4d	Have you set feeder ON/OFF time cycles? The sensor will not read power outside of a feeder ON cycle.
3. Equipment		
One equipment group does not turn on.	3.1a	Is the controller on?
	3.1b	Manually turn the toggle switch for that group to ON. If the equipment turns on, go to 3.1c. If it does not turn on, go to 3.1d.
	3.1c	Check the programming for the equipment group. The group is either not installed or is not set up right. Check *Operating Manual* for information on how to set up this type of equipment.
	3.1d	Check the fuse by the appropriate relay. Replace it if it is blown. Otherwise, do you hear the relay inside the enclosure click when you turn the toggle switch ON and OFF? If it clicks, go to 3.1m. If not, go to 3.1e.
	3.1e	Do other groups in the same column turn on? If not, open the enclosure and check ribbon cable connection from relay board to control board. If it still does not turn on, go to 3.1f.
	3.1f	If there is still no relay click when you flip the switch ON, bypass the relay to see if equipment works. If it does, change out relay board.
	3.1m	Check the circuit breaker for that equipment group. If tripped or off, turn on. If on, go to 3.1n-p.
	3.1n	Equipment may not be wired correctly. Verify wiring of all groups by turning them on one at a time manually and making sure the equipment is on.
	3.1o	Wire may be damaged. Check wiring for damage. Verify wire connection in electrical box and at equipment.
	3.1p	Equipment may be bad.
	3.1q	Are sensors properly programmed? Verify that your sensor parameters are entered properly and that temp sensors are properly numbered. See item 2.2.
Nothing runs when on AUTO.	3.2a	Beginning Head Count is zero. Must be more than zero for auto control to operate.
	3.2b	Check the List Equipment menu. Equipment may not have been programmed into the controller.

Fuses/circuit breakers keep blowing on a channel.	3.3a	Verify that you don't have more than 16A on the circuit. You may have to divide the equipment on that channel or wire in a contactor. If your thermal-protected contactor is shutting the group off, check to see it is set for the proper amperage.
	3.3b	Motor may not have thermal overload protection device or may not be impedance protected.
	3.3c	Equipment is defective, shorting out circuit.
	3.3d	Wire may be damaged. Follow wire to check condition. Especially possible if plastic Romex® wire staples were not used to hold wires.
	3.3e	Relay board may need to be replaced.
Group turns off when another group turns on.	3.4a	Interlock is enabled for a channel. Check the Channel Interlocking section of the *Installation Manual* for information on adjusting Channel Interlock switches.
Feeder is not turning on.	3.6a	If feeder turns on when you manually turn it to ON, you must program the feeder cycles. Check the *Operation Manual* for setting up feeder cycles.
	3.6b	Scroll through alarms and clear any feeder run time alarms. Excessive feeder run time alarms turn off feeder.
Curtain is open more/ less than machine says.	3.7a	Check curtain drops. Do the curtains need to be cranked up manually and reconnected to the curtain drops?

	3.7b	Turn the curtain close or open channel ON and move curtain to top or bottom manually. Turn back to AUTO. The curtain will self adjust the next time it tries to open or close completely.
	3.7c	Are the limit switches on the curtain machine set properly?
My static pressure is too high/low.	3.8a	Refer to the *Operation Manual* for information on adjusting the curtain/inlet open size settings to the number of fans running.
Equipment groups are set to come on at same temp but don't.	3.9	Is the Power Up Load Delay Time set more than a few seconds? This will delay the time between groups turning on for the first five minutes after the controller is powered up.
Furnace does not start.	3.10	Has the furnace been off during summer months? Have you bled the line?
	3.10a	Is the furnace/heater interlocked with a curtain? If it is, the heater will not start if the curtain is open.
Variable Speed Relays not working correctly.	3.11	Check to make sure the DIP switches at the top left corner of the Switch Boards are set correctly.
4. Setpoint Temperature		
The setpoint I set yesterday didn't hold. It's too low today.	4.1a	If your animal age was 1 yesterday and you set up ramping yesterday, your animal age is changing daily. If you want to return to an age of 1, go to the Current Animal Information menu (Current Bird Information menu for controllers used in poultry operation).
	4.1b	Make sure that ramping is set up properly. For an explanation of ramping, see the *Operation Manual*.

I want to make a one day or short term change in my setpoint without changing everything.	4.2a	You can change the ramp temporarily without changing any settings by using the Ramp Offset in the Temperature Control Settings menu. Raise or lower the temperature up to 12 degrees Fahrenheit. You must change it back to zero when you want to return to your normal settings.
I've input my ramp points and setpoints, but nothing's working.	4.3a	Is your animal age between ramp points? The controller calculates setpoint temperatures for in-between ages each day at midnight. In that case, the setpoint temperature won't appear to be adjusted until the next day.
	4.3b	Check the Temperature Control menu item to ensure the controller isn't in a "parked" (OFF) state.
5. Security		
Someone has changed the parameters I set.	5.1	Add a password code for security (see the *Operation Manual*). The controller is not secure without a password. Those who need to can collect data from the controller but they will be limited in what they can change.
I forgot my password.	5.2	Call service and ask for a one-day password.

6. Control Pad		
I can't get out of a menu category.	6.1a	Press CANCEL until you move to the first menu screen.
	6.1b	If you press keys and the menu does not change, you are probably still in the process of changing information. Finish making your change with PLUS/MINUS. Press ENTER to confirm. If you do not want the changes you've made, press CANCEL to prevent an accidental change from being entered into the controller. Now you should be ready to move to another menu screen.
I have no idea where I am in the menu system.	6.2	Press CANCEL three times. You will always return to the starting menu by using CANCEL.
I'm unable to change the group number.	6.3	Use PLUS/MINUS to change a group number. After you press ENTER to change a parameter, you cannot change the group until you confirm your choice with ENTER or exit with CANCEL.
		If you change duty cycles for fogger/mister/cool pad groups or the number of fans for curtains or inlets, the process is a little different. While on a duty cycle/fan group menu, PLUS/MINUS changes the cycle/fan groups number rather than the group number. To change group, scroll with UP to the FULL ON menu. Press PLUS/MINUS to change the group number. Press DOWN to move into the duty cycle/fan group menus, and change your cycle parameters for that group.
How can I change from Spanish to English:	6.4	Press PLUS and MINUS at the same time.

7. Alarm		
I get alarms on screen but no alarm dial out or siren.	7.1a	Do you have an auto dialer or audio alarm hooked to the controller? The controller has an alarm connection but does not provide an alarm.
	7.1b	Have you cleared previous alarms? Check the Alarms/Error menu for an active alarm. Press ENTER to clear an alarm.
	7.1c	Are your controller alarms hooked up as a normally closed series circuit? Do you have a short across the wires between the controller and the alarm that prevents the controller from communicating alarms to the alarm device?
	7.1d	Is the alarm hooked up to the alarm relay connection on the controller input/output board?
I get constant alarms.	7.2a	Is the alarm device hooked up to the proper normally closed or normally open side of the alarm relay?
My feeder/water alarms are increasing.	7.3a	As your animals grow, they consume more water and feed. Assuming they are healthy, that you have no leaks in the water or feed lines, and that feed and water are getting to the animals, you probably need to raise your limits.
	7.3b	If your feeder shows a constant run time, make sure the Minimum Amps calibration setting for the feeder sensor is above 0.

8. Communications		
Communications station is not talking with the controller.	8.1a	Are the communications station and controllers wired properly? Multiple controllers should be wired in parallel with the communications station. Check the polarity (+/-) of the connections. See the instructions that came with the communications station.
	8.1b	Is the modem set right for terminal or non-terminal position in wiring order? See the instructions that came with the communications station.
	8.1c	Ensure you have entered the controller's serial number in the communication software.

| 9. Purge Settings		
My controller never purges.	9.1a	Purging does not occur when the curtains are open, so if they are always open, it will appear that purging does not occur.
	9.1b	Purge ON/DELAY times are incorrect. Make sure your times are in hours, minutes and seconds. Refer to the *Operation Manual* for Purge Settings.
	9.1c	High/low temp inhibits are wrong. Purges will not occur when inside temperature is above high temp inhibit or below low temp inhibit.
	9.1d	Do you have any sidewall fan groups designated as Purge fans?
	9.1e	Are curtains set for the Natural operating mode and the Opening Temp is too low? If curtains are opening on their own, they restart purge timer.
	9.1f	Do you have purge openings for curtains or inlets set above zero?
	9.1g	If Natural operating mode and only using humidity purge, make sure the humidity sensor is working correctly
Fans purge, but they all run at separate times.	9.2a	Check the time settings for your purge fans.
	9.2b	Is the Power Up Load Delay Time set too long? More than a few seconds?

10. Inlet/Curtain Settings

Full opening not enough or too much.	10.1a	Check the Fan Groups On and Full Opening Size menu items to make sure both are correct.
	10.1b	Is the cable machine at the end of its run? Maybe it is geared wrong. Change the pulley system to allow a wider opening.
	10.1c	Check run time and full opening distance. If these are not correct, the inlet/curtain will not open properly for any setting.
Not opening when fans run.	10.2a	Have you set them up to open proportionally to number of fan groups running? See the *Operation Manual* for setting up inlets and curtain openings.
Not shutting completely.	10.3a	Is the Minimum Opening Size correct? Choose zero if you want them to shut all the way.
	10.3b	If the Equipment Status screen shows a 0 inch opening and the machine is on the Close limit then use a manual winch to close the device completely.

11. Position Sensor

I keep getting Out of Position Alarms.	11.1a	Run the calibration process for the position sensor that appears to be causing the problem. Refer to the *Operation Manual* for instructions. Check the position sensor to controller wiring.
	11.1b	Check whisker switch wiring and operation; compare to Current Equipment Status screen.

12. Static Pressure

|		
My inlets or curtains are opening more than they need.	12.1a	Under the inlet or curtain menu, check the Fan Groups On X Open Size XX" menu items. These settings are minimum openings for your inlets with a given number of fan groups on.
My inlets aren't responding to fans going on.	12.2a	Fan groups for exhausting air should be marked Yes for proportional control in the fan menus.
My Fan On Static Pressure Below alarm is not working.	12.3a	The alarm's delay time must be set for less than the fan run time. The alarm is checked only when one or more fans set as proportional are running.
My inlets keep moving and can't find a proper position.	12.4a	Are you trying to run two groups of static pressure controlled devices at once? For example, two sets of inlets? Set one to open automatically to fixed positions (Operating mode: Natural only) and the other to respond to static pressure.
	12.4b	Increase the Static Pressure Pause Timer setting in the inlet menu.
	12.4c	Full Open and Full Close distances and times need to be set accurately.
	12.4d	Setpoint Close and Open may be too tight to the Static Pressure Setpoint.
Static Pressure reading .250 constantly.	12.5a	The static pressure sensor is not connected to input terminal.

APPENDIX 5 - Ventra XT™ Parts List
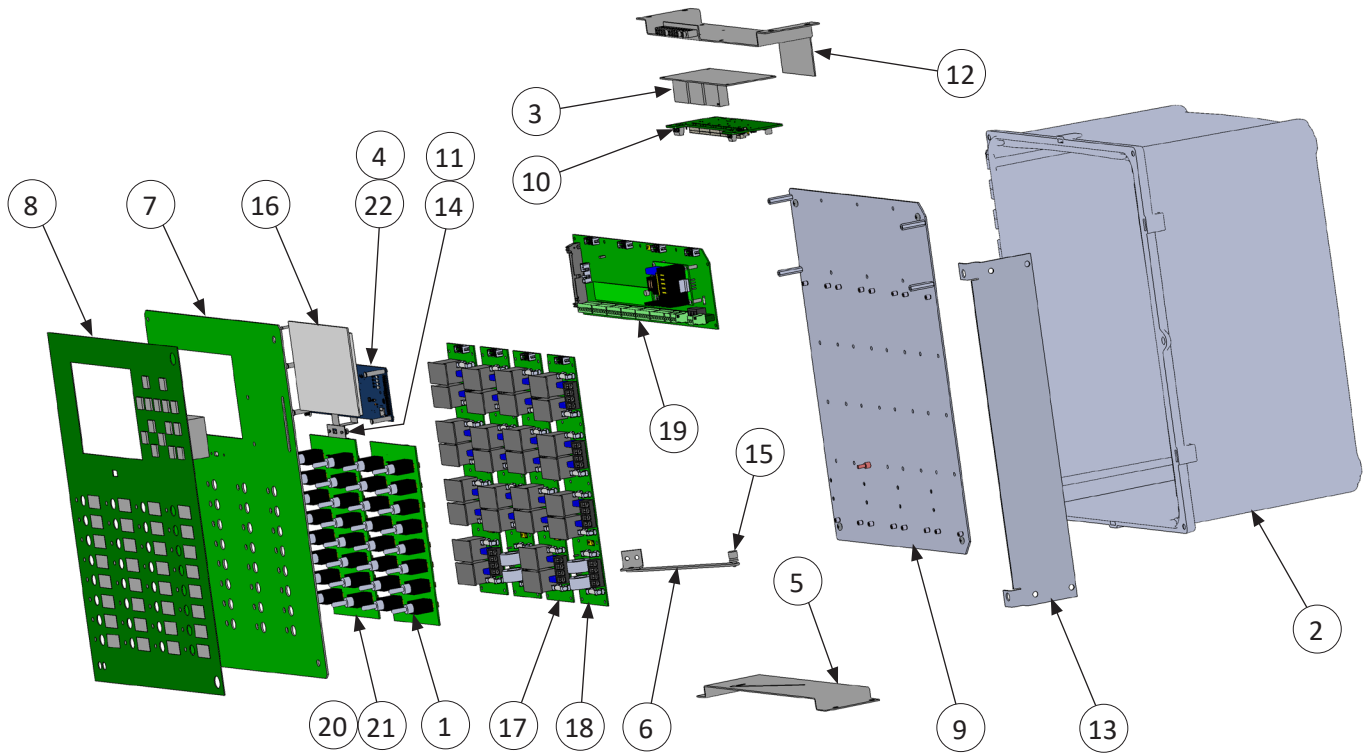
KEY	PART #	DESCRIPTION	QTY		
			16 CH	24 CH	32 CH
VENTRA XT CONTROL - 16 CH, 24 CH & 32 CH PARTS					
1	920898	TOGGLE SWITCH BOOT, BLACK SILICONE	16	24	32
2	921008	ENCLOSURE, 18" X 16"	1	1	1
3	921410	ANALOG OUTPUT BOARD ASSEMBLY	1	1	1
4	921484	PCB VIDEO GRAPHICS DAUGHTER BOARD ASSEMBLY	1	1	1
5	921595	END BRACKET SUPPORT	1	1	1
6	921596	LATCH BAR ASSEMBLY	1	1	1
7	921598	PANEL WITH INSERTS, ASSEMBLY	1	1	1
8	921673	MEMBRANE OVERLAY, 16 CHANNEL	1	-	-
	921674	MEMBRANE OVERLAY, 24 CHANNEL	-	1	-
	921597	MEMBRANE OVERLAY, 32 CHANNEL	-	-	1
9	921700	INNER MOUNTING PLATE	1	1	1
10	921734	ANALOG INPUT EXPANSION BOARD	1	1	1
11	921820	IR BD, ASSEMBLY	1	1	1
12	921821	WALL BRACKET ASSEMBLY, ANALOG BOARD	1	1	1
13	921822	PANEL STOP BRACKET ASSEMBLY	1	1	1
14	921840	IR BD GASKET	1	1	1
15	921858	KNURLED KNOB	1	1	1
16	924019	LCD TOUCHSCREEN, 7" COLOR	1	1	1
17	PA-201-001	OUTPUT BOARD #1 (8 NO ELECTROMECHANICAL RELAYS) V1	SEE RELAY BOARD CHART		
18	PA-201-002	OUTPUT BOARD #2 (6 NO RELAYS +2 VARIBLE SPEED) V1	SEE RELAY BOARD CHART		
19	PA-201-004	INTERCONNECT BOARD V1	1	1	1
20	PA-201-006	TOGGLE SWITCH CIRCUIT BOARD V1 TYPE A (16 OUT)	1	1	2
21	PA-201-007	TOGGLE SWITCH CIRCUIT BOARD V1 TYPE B (8 OUT)	-	1	-
22	PA-201-008	HMI CIRCUIT BOARD V3.1	1	1	1

KEY	PART #	DESCRIPTION	QTY
		VENTRA XT CONTROL - COMMON PARTS	
23	920900	RIBBON CABLE, HMI TO INTERCONNECT BOARD	1
24	920901	RIBBON CABLE, INTERCONNET TO RELAY BOARD	4
25	920902	RIBBON CABLE, SWITCH BOARD TO SWITCH BOARD	1
26	920903	RIBBON CABLE, INTERCONNECT TO SWITCH BOARD	1
27	920905	POWER RELAY, SPST, 30A, 12VDC, PLUGGABLE	1
28	920906	FUSE, 15A, 250V, T-LAG CRM MDA (VARIBLE SPEED FUSE)	1
29	920907	FUSE, 20A, 250 V T-LAG CRM MDA (RELAY FUSE)	1
30	920908	FUSE, 4A, 250 V IEC FA LBC, 5 X 20MM (POWER SUPPLY 12V FUSE)	1
31	920909	FUSE, 2A, IEC SLO-BLO, 5 X 20MM (POWER SUPPLY 120V FUSE)	1
32	921403	SD CARD ASSEMBLY	1
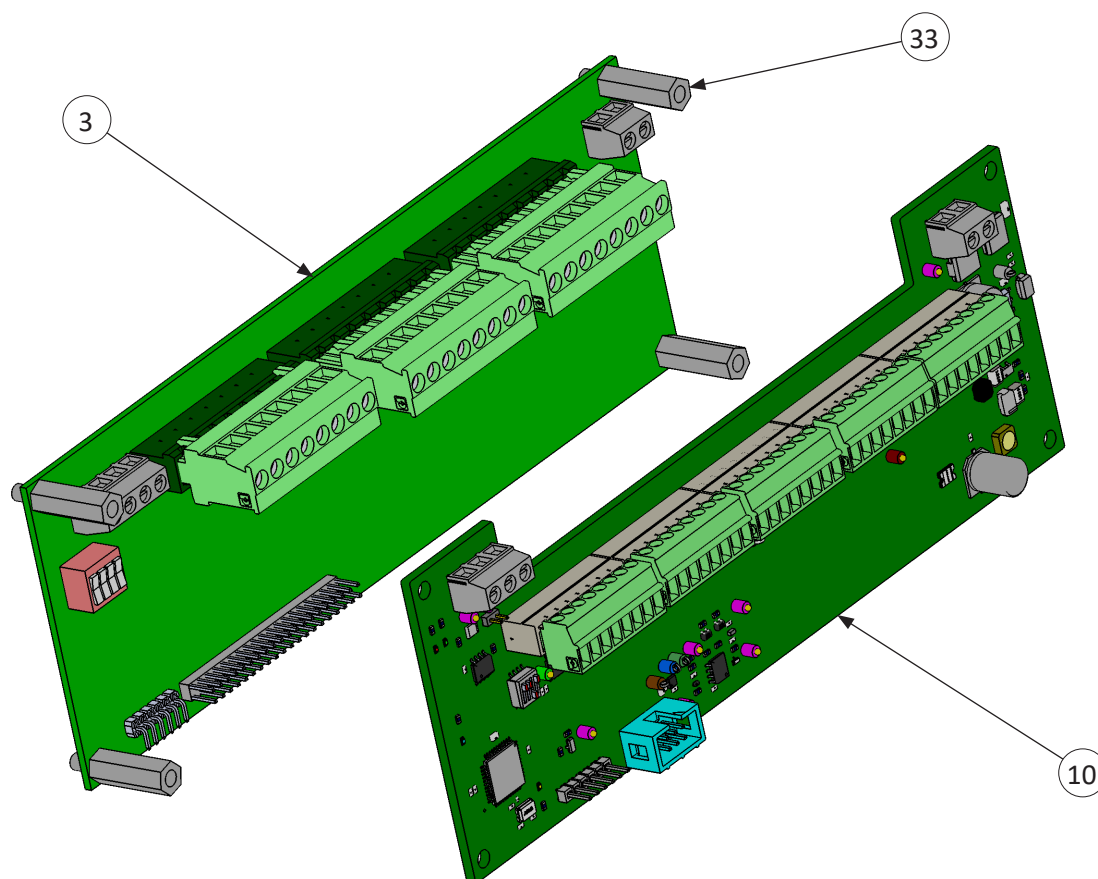
KEY	PART #	DESCRIPTION	QTY
		VENTRA XT CONTROL - ANALOG BOARDS	
3	921410	ANALOG OUTPUT BOARD	1
10	921734	ANALOG INPUT EXPANSION BOARD	1
33	921848	6-32 X 3/4" HEC STANDOFF, M/F	4

Relay Board Chart

PART #	DESCRIPTION	PA-201-001 BOARD	PA-201-002 BOARD
	VENTRA XT CONTROL - MODEL NUMBERS & RELAY BOARDS PER UNIT		
VXT-016-001	VENTRA XT CONTROL, 16 RELAY OUT	2	-
VXT-016-201	VENTRA XT CONTROL, 14 RELAY OUT	1	1
VXT-016-401	VENTRA XT CONTROL, 12 RELAY OUT	-	2
VXT-024-001	VENTRA XT CONTROL, 24 RELAY OUT	3	-
VXT-024-201	VENTRA XT CONTROL, 22 RELAY OUT	2	1
VXT-024-401	VENTRA XT CONTROL, 20 RELAY OUT	1	2
VXT-032-001	VENTRA XT CONTROL, 32 RELAY OUT	4	-
VXT-032-401	VENTRA XT CONTROL, 28 RELAY OUT	2	2
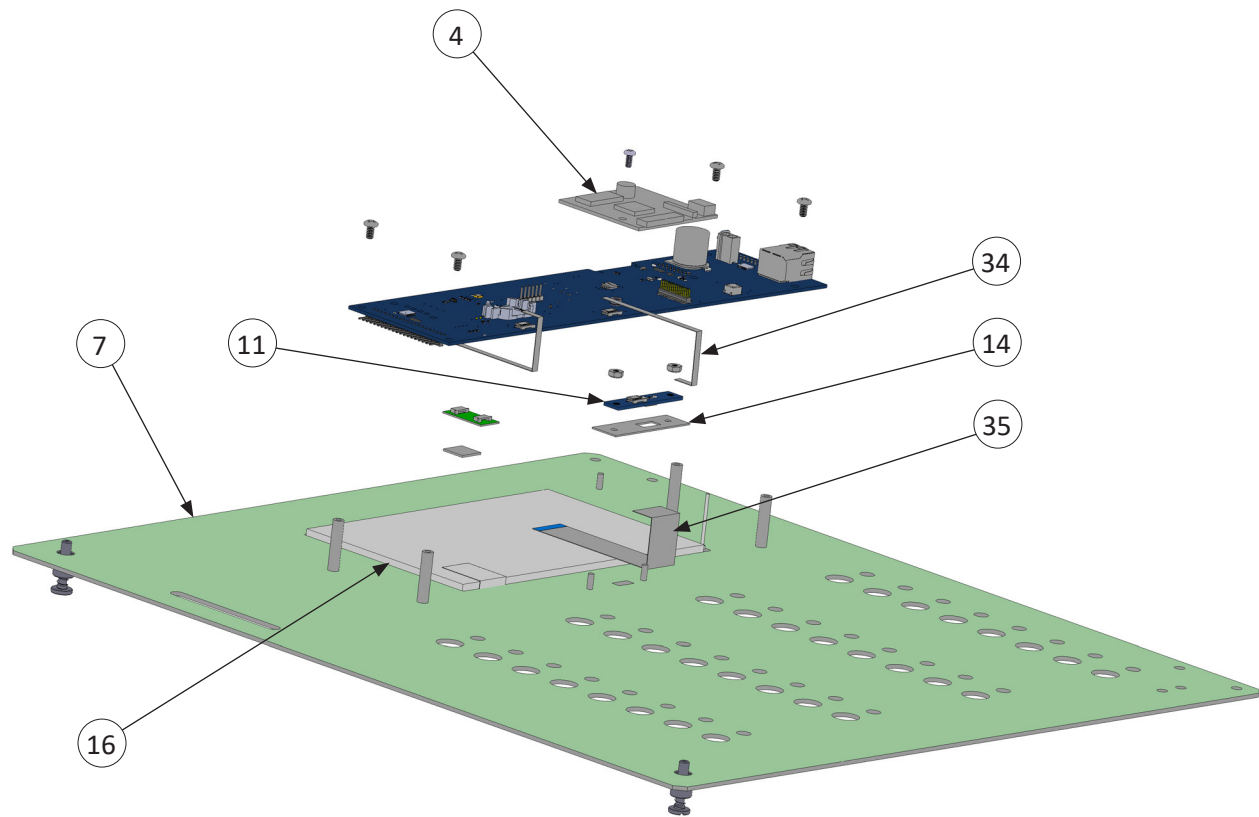
KEY	PART #	DESCRIPTION	QTY
		VENTRA XT CONTROL - DISPLAY PARTS	
4	921484	PCB VIDEO GRAPHICS DAUGHTER BOARD ASSEMBLY	1
7	921598	PANEL WITH INSERTS, ASSEMBLY	1
11	921820	IR BD, ASSEMBLY	1
14	921840	IR BD GASKET	1
16	924019	LCD TOUCHSCREEN, 7" COLOR	1
34	921784	EXTENDER CABLE DIGIKEY WM11392-ND	2
35	921853	CABLE 40 POS DISPLAY TO DAUGHTER BOARD	1

APPENDIX 6 - Sensor Data Sheet

Air Sensors	Cable Length	Wire Gauge	Location (If applicable)	Input Channel Number	Sensor Cal. Numbers
Air/Temp #1					
Air/Temp #2					
Air/Temp #3					
Air/Temp #4					
Air/Temp #5					
Air/Temp #6					
Air/Temp #7					
Air/Temp #8					
Air/Temp #9					
Air/Temp #10					
Air/Temp #11					
Air/Temp #12					
Outside Air/Temp #13					

Humdity Sensor	Cal. #1 (10485 is default)	Cal. #2 (51118 is default)	Input Channel Number
Humidity #0			

Water Meter Sensor	PPG Cal. (25 is default)	Input Channel Number
Water Meter #1		

Feed Sensor	Cal. # (100 is default)	Minimum Amps	Input Channel Number
Feeder #1			
Feeder #2			

Static Pressure Sensor	ADC Cal. #1 (6554 is default)	ADC Cal. #2 (58982 is default)	WC Cal. #1 (0.000 is default)	WC Cal. #2 (0.250 is default)	Input Channel Number
SPS #1					

Building Name:	Building Number:	Zone Number:

Sensor Calibration Worksheet.vsd

APPENDIX 7 - Parameter and Security Recording

Farm/Site				Date	
	Building			Zone	

CURRENT ANIMAL INFORMATION					
Today's Age		Weight			
Finishing Age		Weight			
Beginning Head Count					
Total Mortality Head Count					
Total Sold Head Count					

****Adjust set-point to desired temperature before changing any parameters****

TEMPERATURE CONTROL SETTINGS				
Temp Set-point				
Temp Control	Actual	- -	Eff.	
House Control Mode (Bird)				
Ridge to Curtain Interlock		*No Interlock, Interlock		
Heater to Curtain Interlock		* No Interlock, Zone Interlock, All Zones Interlock		
Enter Tunnel Temp				
Exit Tunnel Temp				
Remain in Tunnel Time				
Enable Tunnel Entry Min Outside Temp				
Today's Age				
Ramp Point #1	Age		Temp	
Ramp Point #2	Age		Temp	
Ramp Point #3	Age		Temp	
Ramp Point #4	Age		Temp	
Ramp Point #5	Age		Temp	
Ramp Point #6	Age		Temp	
Ramp Point #7	Age		Temp	
Ramp Point #8	Age		Temp	
Ramp Point #9	Age		Temp	
Ramp Point #10	Age		Temp	
Ramp Point #11	Age		Temp	
Ramp Point #12	Age		Temp	
Temperature Ramp Offset				
Floor Type				
Close Curtains Below Outside Temp				

APPENDIX 7 - Parameter and Security Recording

STATIC PRESSURE SET-POINTS					
Natural Set-point					
Close		Open			
Tunnel Set-point					
Tunnel Close and Open points are based on the Natural close and Open points					
Ramp Point #01		SP			
Ramp Point #02		SP			
Ramp Point #03		SP			
Ramp Point #04		SP			
Ramp Point #05		SP			
MINIMUM VENT & PURGE SETTINGS					
Minimum Vent Timer		ON		OFF	
Ramp Point #1	Age		On		Off
Ramp Point #2	Age		On		Off
Ramp Point #3	Age		On		Off
Ramp Point #4	Age		On		Off
Ramp Point #5	Age		On		Off
Ramp Point #6	Age		On		Off
Ramp Point #7	Age		On		Off
Ramp Point #8	Age		On		Off
Ramp Point #9	Age		On		Off
Purge ON Time			Delay		
Humidity Purge Set-Point					
Humidity Purge ON			Delay		
Purge Inhibit Temp LOW			HIGH		
Before Purge Raise Temperature to					
Time to Abort Heat before Purge					

APPENDIX 7 - Parameter and Security Recording

SOUND ALARM WHEN….						
Fixed High Temp Exceeds						
Temperature Above			Below			
Outside Temp Influence HI Alarm Temp						
Feeder #1 ON Time Exceeds						
Feeder #2 ON Time Exceeds						
Feeder #1 OFF Time Exceeds						
Feeder #2 OFF Time Exceeds						
Water #1 GPH Flow Exceeds						
Water #1 24-Hr. DROP						
Humidity Sensor Reading is Invalid						
Static Pressure Stays Above		for				
High Pressure Alarm Open All Inlets						
Static Pressure Stays Below		for				
Fan ON Static Pressure Below		for				
Humidity sensor # (1-3) Is Invalid						
Highest/Lowest Air Probes Differ By						

(FURNACE – HEATER – BROODER) #1				Zone	
Use Sensors					
ON Temp		Lower Temp By		From		To	
OFF Temp				Ch		Sta	
Use During Heat Purge					
Interlock Curtain Grps					

(FURNACE – HEATER – BROODER) #				Zone	
Use Sensors					
ON Temp		Lower Temp By		From		To	
OFF Temp				Ch		Sta	
Use During Heat Purge					
Interlock Curtain Grps					

(FURNACE – HEATER – BROODER) #				Zone	
Use Sensors					
ON Temp		Lower Temp By		From		To	
OFF Temp				Ch		Sta	
Use During Heat Purge					
Interlock Curtain Grps					

APPENDIX 7 - Parameter and Security Recording

VARI- (PIT – SIDEWALL – RIDGE – STIR – TUNNEL) FAN #1			Zone		
Use Sensors					
Operating Mode		Ch		Sta	
ON Temp		OFF Temp			
Fan ON Power Setting					
Power Ramping Start Temp					
Full Power Temp					
Full Power Setting					
Run Mode					
On Timer		OFF Timer			
Timed Power Setting					
Purge Mode Power Setting					
Run While ENTRY/EXIT of Tunnel Mode?					
Use for Proportional Control?					
Fans OFF at Curtain Opening					
Fan OVERRIDE Curtain Open Temp					
Looking At #1					
Looking At #2					
Looking At #3					
Looking At #4					

VARI- (PIT – SIDEWALL – RIDGE – STIR – TUNNEL) FAN #			Zone		
Use Sensors					
Operating Mode		Ch		Sta	
ON Temp		OFF Temp			
Fan ON Power Setting					
Power Ramping Start Temp					
Full Power Temp					
Full Power Setting					
Run Mode					
On Timer		OFF Timer			
Timed Power Setting					
Purge Mode Power Setting					
Run While ENTRY/EXIT of Tunnel Mode?					
Use for Proportional Control?					
Fans OFF at Curtain Opening					
Fan OVERRIDE Curtain Open Temp					
Looking At #1					
Looking At #2					
Looking At #3					
Looking At #4					

APPENDIX 7 - Parameter and Security Recording

VARI- (PIT – SIDEWALL – RIDGE – STIR – TUNNEL) FAN #		Zone	
Use Sensors			
Operating Mode		Ch	Sta
ON Temp	OFF Temp		
Fan ON Power Setting			
Power Ramping Start Temp			
Full Power Temp			
Full Power Setting			
Run Mode			
On Timer	OFF Timer		
Timed Power Setting			
Purge Mode Power Setting			
Run While ENTRY/EXIT of Tunnel Mode?			
Use for Proportional Control?			
Fans OFF at Curtain Opening			
Fan OVERRIDE Curtain Open Temp			
Looking At #1			
Looking At #2			
Looking At #3			
Looking At #4			
(PIT – SIDEWALL – TUNNEL – STIR - RIDGE) FAN #1		Zone	
Use Sensors			
Operating Mode		Ch	Sta
ON Temp	OFF Temp		
Run Mode			
Run While ENTRY/EXIT of Tunnel Mode?			
Use for Proportional Control?			
Fans OFF at Curtain Opening			
Fan OVERRIDE Curtain Open Temp			
Looking At #1			
Looking At #2			
Looking At #3			
Looking At #4			

APPENDIX 7 - Parameter and Security Recording

(PIT – SIDEWALL – TUNNEL – STIR - RIDGE) FAN #			Zone	
Use Sensors				
Operating Mode		Ch		Sta
ON Temp		OFF Temp		
Run Mode				
Run While ENTRY/EXIT of Tunnel Mode?				
Use for Proportional Control?				
Fans OFF at Curtain Opening				
Fan OVERRIDE Curtain Open Temp				
Looking At #1				
Looking At #2				
Looking At #3				
Looking At #4				

(PIT – SIDEWALL – TUNNEL – STIR - RIDGE) FAN #			Zone	
Use Sensors				
Operating Mode		Ch		Sta
ON Temp		OFF Temp		
Run Mode				
Run While ENTRY/EXIT of Tunnel Mode?				
Use for Proportional Control?				
Fans OFF at Curtain Opening				
Fan OVERRIDE Curtain Open Temp				
Looking At #1				
Looking At #2				
Looking At #3				
Looking At #4				

(PIT – SIDEWALL – TUNNEL – STIR - RIDGE) FAN #			Zone	
Use Sensors				
Operating Mode		Ch		Sta
ON Temp		OFF Temp		
Run Mode				
Run While ENTRY/EXIT of Tunnel Mode?				
Use for Proportional Control?				
Fans OFF at Curtain Opening				
Fan OVERRIDE Curtain Open Temp				
Looking At #1				
Looking At #2				
Looking At #3				
Looking At #4				

APPENDIX 7 - Parameter and Security Recording

(PIT – SIDEWALL – TUNNEL – STIR - RIDGE) FAN #			Zone	
Use Sensors				
Operating Mode		Ch		Sta
ON Temp		OFF Temp		
Run Mode				
Run While ENTRY/EXIT of Tunnel Mode?				
Use for Proportional Control?				
Fans OFF at Curtain Opening				
Fan OVERRIDE Curtain Open Temp				
Looking At #1				
Looking At #2				
Looking At #3				
Looking At #4				

(PIT – SIDEWALL – TUNNEL – STIR - RIDGE) FAN #			Zone	
Use Sensors				
Operating Mode		Ch		Sta
ON Temp		OFF Temp		
Run Mode				
Run While ENTRY/EXIT of Tunnel Mode?				
Use for Proportional Control?				
Fans OFF at Curtain Opening				
Fan OVERRIDE Curtain Open Temp				
Looking At #1				
Looking At #2				
Looking At #3				
Looking At #4				

(PIT – SIDEWALL – TUNNEL – STIR - RIDGE) FAN #			Zone	
Use Sensors				
Operating Mode		Ch		Sta
ON Temp		OFF Temp		
Run Mode				
Run While ENTRY/EXIT of Tunnel Mode?				
Use for Proportional Control?				
Fans OFF at Curtain Opening				
Fan OVERRIDE Curtain Open Temp				
Looking At #1				
Looking At #2				
Looking At #3				
Looking At #4				

APPENDIX 7 - Parameter and Security Recording

SIDE CURTAIN #1					Zone				
Use Sensors									
Open Temp		Close Temp		Ch		Sta			
Open		and Pause							
Close		and Pause							
Maximum Opening			Below Temp						
Static Pressure Pause Timer									
Operating Mode									
Tunnel Fans #1	On		Open						
Tunnel Fans #2	On		Open						
Tunnel Fans #3	On		Open						
Tunnel Fans #4	On		Open						
Tunnel Fans #5	On		Open						
Tunnel Fans #6	On		Open						
Tunnel Fans #7	On		Open						
Tunnel Fans #8	On		Open						
Tunnel Fans #9	On		Open						
Tunnel Interlock 1		Tunnel Interlock 2		Tunnel Interlock 3					
Tunnel Interlock 4		Tunnel Interlock 5		Tunnel Interlock 6					
Tunnel Interlock 7		Tunnel Interlock 8		Tunnel Interlock 9					
Tunneling Open Sizes are		Proportional		Stepping					
Response Mode									
Full Opening Size									
Full Open Travel Time									
Full Close Travel Time									
Purge Opening Size									
Exercise Delay Days									
Perform Exercise at									
Perform Re-Sync At		Tunnel Entry size		Tunnel Exit Size					
SIDE CURTAIN #					Zone				
Use Sensors									
Open Temp		Close Temp		Ch		Sta			
Open		and Pause							
Close		and Pause							
Maximum Opening			Below Temp						
Static Pressure Pause Timer									
Operating Mode									

Tunnel Fans #1	On		Open		
Tunnel Fans #2	On		Open		
Tunnel Fans #3	On		Open		
Tunnel Fans #4	On		Open		
Tunnel Fans #5	On		Open		
Tunnel Fans #6	On		Open		
Tunnel Fans #7	On		Open		
Tunnel Fans #8	On		Open		
Tunnel Fans #9	On		Open		
Tunnel Interlock 1		Tunnel Interlock 2		Tunnel Interlock 3	
Tunnel Interlock 4		Tunnel Interlock 5		Tunnel Interlock 6	
Tunnel Interlock 7		Tunnel Interlock 8		Tunnel Interlock 9	
Tunneling Open Sizes are		Proportional		Stepping	
Response Mode					
Full Opening Size					
Full Open Travel Time					
Full Close Travel Time					
Purge Opening Size					
Exercise Delay Days					
Perform Exercise at					
Perform Re-Sync At		Tunnel Entry size		Tunnel Exit Size	
SIDE CURTAIN #				Zone	
Use Sensors					
Open Temp		Close Temp		Ch	Sta
Open		and Pause			
Close		and Pause			
Maximum Opening		Below Temp			
Static Pressure Pause Timer					
Operating Mode					
Tunnel Fans #1	On		Open		
Tunnel Fans #2	On		Open		
Tunnel Fans #3	On		Open		
Tunnel Fans #4	On		Open		
Tunnel Fans #5	On		Open		
Tunnel Fans #6	On		Open		
Tunnel Fans #7	On		Open		
Tunnel Fans #8	On		Open		
Tunnel Fans #9	On		Open		

APPENDIX 7 - Parameter and Security Recording

Tunnel Interlock 1		Tunnel Interlock 2			Tunnel Interlock 3		
Tunnel Interlock 4		Tunnel Interlock 5			Tunnel Interlock 6		
Tunnel Interlock 7		Tunnel Interlock 8			Tunnel Interlock 9		
Tunneling Open Sizes are		Proportional		Stepping			
Response Mode							
Full Opening Size							
Full Open Travel Time							
Full Close Travel Time							
Purge Opening Size							
Exercise Delay Days							
Perform Exercise at							
Perform Re-Sync At		Tunnel Entry size			Tunnel Exit Size		
SIDE CURTAIN #					Zone		
Use Sensors							
Open Temp		Close Temp		Ch		Sta	
Open		and Pause					
Close		and Pause					
Maximum Opening			Below Temp				
Static Pressure Pause Timer							
Operating Mode							
Tunnel Fans #1	On		Open				
Tunnel Fans #2	On		Open				
Tunnel Fans #3	On		Open				
Tunnel Fans #4	On		Open				
Tunnel Fans #5	On		Open				
Tunnel Fans #6	On		Open				
Tunnel Fans #7	On		Open				
Tunnel Fans #8	On		Open				
Tunnel Fans #9	On		Open				
Tunnel Interlock 1		Tunnel Interlock 2			Tunnel Interlock 3		
Tunnel Interlock 4		Tunnel Interlock 5			Tunnel Interlock 6		
Tunnel Interlock 7		Tunnel Interlock 8			Tunnel Interlock 9		
Tunneling Open Sizes are		Proportional		Stepping			
Response Mode							
Full Opening Size							
Full Open Travel Time							
Full Close Travel Time							
Purge Opening Size							
Exercise Delay Days							
Perform Exercise at							
Perform Re-Sync At		Tunnel Entry size			Tunnel Exit Size		

SIDE CURTAIN #					Zone		
Use Sensors							
Open Temp		Close Temp			Ch	Sta	
Open		and Pause					
Close		and Pause					
Maximum Opening			Below Temp				
Static Pressure Pause Timer							
Operating Mode							
Tunnel Fans #1	On		Open				
Tunnel Fans #2	On		Open				
Tunnel Fans #3	On		Open				
Tunnel Fans #4	On		Open				
Tunnel Fans #5	On		Open				
Tunnel Fans #6	On		Open				
Tunnel Fans #7	On		Open				
Tunnel Fans #8	On		Open				
Tunnel Fans #9	On		Open				
Tunnel Interlock 1		Tunnel Interlock 2		Tunnel Interlock 3			
Tunnel Interlock 4		Tunnel Interlock 5		Tunnel Interlock 6			
Tunnel Interlock 7		Tunnel Interlock 8		Tunnel Interlock 9			
Tunneling Open Sizes are		Proportional		Stepping			
Response Mode							
Full Opening Size							
Full Open Travel Time							
Full Close Travel Time							
Purge Opening Size							
Exercise Delay Days							
Perform Exercise at							
Perform Re-Sync At		Tunnel Entry size			Tunnel Exit Size		

APPENDIX 7 - Parameter and Security Recording

RIDGE VENT #1				Zone			
Use Sensors							
Open Temp		Close Temp		Ch		Sta	
Open		and Pause					
Close		and Pause					
Response Mode							
Full Opening Size							
Full Open Travel Time							
Full Close Travel Time							
Purge Opening Size							
Interlock Curtain Groups							
Perform Re-Sync							

RIDGE VENT #				Zone			
Use Sensors							
Open Temp		Close Temp		Ch		Sta	
Open		and Pause					
Close		and Pause					
Response Mode							
Full Opening Size							
Full Open Travel Time							
Full Close Travel Time							
Purge Opening Size							
Interlock Curtain Groups							
Perform Re-Sync							

(MISTER – IN HOUSE FOGGER – COOL CELL PUMP) #1				Zone			
Use Sensors							
Time of Day Enable		Disable		Ch		Sta	
HUMDITY Disable		ReEnable					
TEMP+HUMIDITY Disable			ReEnable				
Full ON Temp		OFF Temp					
Cycle #1 ON Temp							
Cycle #1 Timer On			OFF				
Cycle #2 ON Temp							
Cycle #2 Timer On			OFF				
Cycle #3 ON Temp							
Cycle #3 Timer On			OFF				
Cycle #4 ON Temp							
Cycle #4 Timer On			OFF				
Minimum ON Temp							

APPENDIX 7 - Parameter and Security Recording

(MISTER – IN HOUSE FOGGER – COOL CELL PUMP) #1				Zone	
Use Sensors					
Time of Day Enable		Disable		Ch	Sta
HUMDITY Disable		ReEnable			
TEMP+HUMIDITY Disable		ReEnable			
Full ON Temp		OFF Temp			
Cycle #1 ON Temp					
Cycle #1 Timer On		OFF			
Cycle #2 ON Temp					
Cycle #2 Timer On		OFF			
Cycle #3 ON Temp					
Cycle #3 Timer On		OFF			
Cycle #4 ON Temp					
Cycle #4 Timer On		OFF			
Minimum ON Temp					

(INLET>> CEILING – SIDEWALL – TUNNEL) #1					
Static Pressure Pause Timer					
Operate as			Ch		Sta
#01	Cool Fans ON		Open		
#02	Cool Fans ON		Open		
#03	Cool Fans ON		Open		
#04	Cool Fans ON		Open		
#05	Cool Fans ON		Open		
#06	Cool Fans ON		Open		
#07	Cool Fans ON		Open		
#08	Cool Fans ON		Open		
#09	Cool Fans ON		Open		

Natural Interlock 1		Natural Interlock 2		Natural Interlock 3	
Natural Interlock 4		Natural Interlock 5		Natural Interlock 6	
Natural Interlock 7		Natural Interlock 8		Natural Interlock 9	

Cooling Open Sizes are		Proportional		Stepping	
#01	Tunnel Fans ON		Open		
#02	Tunnel Fans ON		Open		
#03	Tunnel Fans ON		Open		
#04	Tunnel Fans ON		Open		
#05	Tunnel Fans ON		Open		
#06	Tunnel Fans ON		Open		
#07	Tunnel Fans ON		Open		
#08	Tunnel Fans ON		Open		
#09	Tunnel Fans ON		Open		

Tunnel Interlock 1		Tunnel Interlock 2		Tunnel Interlock 3		
Tunnel Interlock 4		Tunnel Interlock 5		Tunnel Interlock 6		
Tunnel Interlock 7		Tunnel Interlock 8		Tunnel Interlock 9		
Tunnel Opening Sizes are		Proportional		Stepping		
Full Opening Size						
Full Open Travel Time						
Full Close Travel Time						
Purge Opening Size						
Pre-Open Timer						
Perform Re-Sync At		Tunnel Entry Size		Tunnel Exit Size		
(INLET>> CEILING – SIDEWALL – TUNNEL) #						
Static Pressure Pause Timer						
Operate as				Ch		Sta
#01	Cool Fans ON		Open			
#02	Cool Fans ON		Open			
#03	Cool Fans ON		Open			
#04	Cool Fans ON		Open			
#05	Cool Fans ON		Open			
#06	Cool Fans ON		Open			
#07	Cool Fans ON		Open			
#08	Cool Fans ON		Open			
#09	Cool Fans ON		Open			
Natural Interlock 1		Natural Interlock 2		Natural Interlock 3		
Natural Interlock 4		Natural Interlock 5		Natural Interlock 6		
Natural Interlock 7		Natural Interlock 8		Natural Interlock 9		
Cooling Open Sizes are		Proportional		Stepping		
#01	Tunnel Fans ON		Open			
#02	Tunnel Fans ON		Open			
#03	Tunnel Fans ON		Open			
#04	Tunnel Fans ON		Open			
#05	Tunnel Fans ON		Open			
#06	Tunnel Fans ON		Open			
#07	Tunnel Fans ON		Open			
#08	Tunnel Fans ON		Open			
#09	Tunnel Fans ON		Open			

Tunnel Interlock 1		Tunnel Interlock 2		Tunnel Interlock 3		
Tunnel Interlock 4		Tunnel Interlock 5		Tunnel Interlock 6		
Tunnel Interlock 7		Tunnel Interlock 8		Tunnel Interlock 9		
Tunnel Opening Sizes are		Proportional		Stepping		
Full Opening Size						
Full Open Travel Time						
Full Close Travel Time						
Purge Opening Size						
Pre-Open Timer						
Perform Re-Sync At		Tunnel Entry Size		Tunnel Exit Size		
Close to		When curtain >=		Close Curtain Override Temp		
Looking At (1)		Looking At (2)		Looking At (3)		
Looking At (4)						

(Chimney Damper) #1

#01	Cool Fans ON		Open				
#02	Cool Fans ON		Open		Ch		Sta
#03	Cool Fans ON		Open				
#04	Cool Fans ON		Open				
#05	Cool Fans ON		Open				
#06	Cool Fans ON		Open				
#07	Cool Fans ON		Open				
#08	Cool Fans ON		Open				
#09	Cool Fans ON		Open				

Interlock 1		Interlock 2		Interlock 3		
Interlock 4		Interlock 5		Interlock 6		
Interlock 7		Interlock 8		Interlock 9		
Cooling Opening Sizes are		Proportional		Stepping		
Full Opening Size						
Full Open Travel Time						
Full Close Travel Time						
Perform Re-Sync At						

APPENDIX 7 - Parameter and Security Recording

(Chimney Damper) #								
#01	Cool Fans ON		Open					
#02	Cool Fans ON		Open					
#03	Cool Fans ON		Open			Ch	Sta	
#04	Cool Fans ON		Open					
#05	Cool Fans ON		Open					
#06	Cool Fans ON		Open					
#07	Cool Fans ON		Open					
#08	Cool Fans ON		Open					
#09	Cool Fans ON		Open					

Interlock 1		Interlock 2		Interlock 3		
Interlock 4		Interlock 5		Interlock 6		
Interlock 7		Interlock 8		Interlock 9		
Cooling Opening Sizes are		Proportional		Stepping		
Full Opening Size						
Full Open Travel Time						
Full Close Travel Time						
Perform Re-Sync At						

APPENDIX 7 - Parameter and Security Recording

		Zone	
POSITION SENSOR #1			
Attached To			
Enable Position Alarm?		Ch	Sta
Percent Out of Position to Alarm		% (0 – 80)	

		Zone	
POSITION SENSOR #			
Attached To			
Enable Position Alarm?		Ch	Sta
Percent Out of Position to Alarm		% (0 – 80)	

		Zone	
POSITION SENSOR #			
Attached To			
Enable Position Alarm?		Ch	Sta
Percent Out of Position to Alarm		% (0 – 80)	

		Zone	
Whisker Switch #1			
Attached To		Ch	Sta
Validate Switch - Low		High	
Seconds delay Alarm Out of Position			

		Zone	
Whisker Switch #			
Attached To		Ch	Sta
Validate Switch - Low		High	
Seconds delay Alarm Out of Position			

		Zone	
Whisker Switch #			
Attached To		Ch	Sta
Validate Switch - Low		High	
Seconds delay Alarm Out of Position			

		Zone	
Digital Alarm #1			
Trigger Alarm on Active Input			
Input is Active when		Ch	Sta
Alarm Delay Time			

APPENDIX 7 - Parameter and Security Recording

Digital Alarm #				Zone		
Trigger Alarm on Active Input						
Input is Active when		Ch		Sta		
Alarm Delay Time						
Digital Alarm #				Zone		
Trigger Alarm on Active Input						
Input is Active when		Ch		Sta		
Alarm Delay Time						

(FEEDER – LIGHTS) #				Zone		
Setting #1 AGE		ON=		OFF=		
Setting #2 AGE		ON=		OFF=	Ch	Sta
Setting #3 AGE		ON=		OFF=		
Setting #4 AGE		ON=		OFF=		
Setting #5 AGE		ON=		OFF=		
Setting #6 AGE		ON=		OFF=		
Setting #7 AGE		ON=		OFF=		
Setting #8 AGE		ON=		OFF=		
Setting #9 AGE		ON=		OFF=		
Setting #10 AGE		ON=		OFF=		
Setting #11 AGE		ON=		OFF=		
Setting #12 AGE		ON=		OFF=		
Setting #13 AGE		ON=		OFF=		
Setting #14 AGE		ON=		OFF=		
Setting #15 AGE		ON=		OFF=		
Setting #16 AGE		ON=		OFF=		
Setting #17 AGE		ON=		OFF=		
Setting #18 AGE		ON=		OFF=		
Setting #19 AGE		ON=		OFF=		
Setting #20 AGE		ON=		OFF=		
Setting #21 AGE		ON=		OFF=		
Setting #22 AGE		ON=		OFF=		
Setting #23 AGE		ON=		OFF=		
Setting #24 AGE		ON=		OFF=		
Setting #25 AGE		ON=		OFF=		
Setting #26 AGE		ON=		OFF=		
Setting #27 AGE		ON=		OFF=		
Setting #28 AGE		ON=		OFF=		
Setting #29 AGE		ON=		OFF=		
Setting #30 AGE		ON=		OFF=		

APPENDIX 7 - Parameter and Security Recording

(FEEDER – LIGHTS) #					Zone			
Setting #1 AGE		ON=		OFF=				
Setting #2 AGE		ON=		OFF=		Ch		Sta	
Setting #3 AGE		ON=		OFF=				
Setting #4 AGE		ON=		OFF=				
Setting #5 AGE		ON=		OFF=				
Setting #6 AGE		ON=		OFF=				
Setting #7 AGE		ON=		OFF=				
Setting #8 AGE		ON=		OFF=				
Setting #9 AGE		ON=		OFF=				
Setting #10 AGE		ON=		OFF=				
Setting #11 AGE		ON=		OFF=				
Setting #12 AGE		ON=		OFF=				
Setting #13 AGE		ON=		OFF=				
Setting #14 AGE		ON=		OFF=				
Setting #15 AGE		ON=		OFF=				
Setting #16 AGE		ON=		OFF=				
Setting #17 AGE		ON=		OFF=				
Setting #18 AGE		ON=		OFF=				
Setting #19 AGE		ON=		OFF=				
Setting #20 AGE		ON=		OFF=				
Setting #21 AGE		ON=		OFF=				
Setting #22 AGE		ON=		OFF=				
Setting #23 AGE		ON=		OFF=				
Setting #24 AGE		ON=		OFF=				
Setting #25 AGE		ON=		OFF=				
Setting #26 AGE		ON=		OFF=				
Setting #27 AGE		ON=		OFF=				
Setting #28 AGE		ON=		OFF=				
Setting #29 AGE		ON=		OFF=				
Setting #30 AGE		ON=		OFF=				
(FEEDER – LIGHTS) #					Zone			
Setting #1 AGE		ON=		OFF=				
Setting #2 AGE		ON=		OFF=		Ch		Sta	
Setting #3 AGE		ON=		OFF=				
Setting #4 AGE		ON=		OFF=				
Setting #5 AGE		ON=		OFF=				
Setting #6 AGE		ON=		OFF=				
Setting #7 AGE		ON=		OFF=				
Setting #8 AGE		ON=		OFF=				

Setting #9 AGE		ON=		OFF=			
Setting #10 AGE		ON=		OFF=			
Setting #11 AGE		ON=		OFF=			
Setting #12 AGE		ON=		OFF=			
Setting #13 AGE		ON=		OFF=			
Setting #14 AGE		ON=		OFF=			
Setting #15 AGE		ON=		OFF=			
Setting #16 AGE		ON=		OFF=			
Setting #17 AGE		ON=		OFF=			
Setting #18 AGE		ON=		OFF=			
Setting #19 AGE		ON=		OFF=			
Setting #20 AGE		ON=		OFF=			
Setting #21 AGE		ON=		OFF=			
Setting #22 AGE		ON=		OFF=			
Setting #23 AGE		ON=		OFF=			
Setting #24 AGE		ON=		OFF=			
Setting #25 AGE		ON=		OFF=			
Setting #26 AGE		ON=		OFF=			
Setting #27 AGE		ON=		OFF=			
Setting #28 AGE		ON=		OFF=			
Setting #29 AGE		ON=		OFF=			
Setting #30 AGE		ON=		OFF=			

				Zone	
(VARIABLE LIGHTS) #					

Minimum Ramp On percent				Off to On Ramp time (Minutes)			On to Off Ramp time (Minutes)		
Setting #1 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #2 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #3 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #4 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #5 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #6 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #7 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #8 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #9 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #10 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #11 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #12 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #13 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #14 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	
Setting #15 AGE		ON=		OFF=		Intensity (%)		D/D or Spike	

Setting #16 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #17 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #18 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #19 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #20 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #21 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #22 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #23 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #24 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #25 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #26 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #27 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #28 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #29 AGE		ON=		OFF=	Intensity (%)	D/D or Spike
Setting #30 AGE		ON=		OFF=	Intensity (%)	D/D or Spike

SENSOR CALIBRATIONS & SETTINGS

Air Sensor #01 Cable Length		Zone			
Air Sensor #01 Wire Gauge					
Air Sensor #01 Location		Ch		Sta	
Air #01 CAL Values					
Air #01 Use for Wind Speed					
Air Sensor #02 Cable Length		Zone			
Air Sensor #02 Wire Gauge					
Air Sensor #02 Location		Ch		Sta	
Air #02 CAL Values					
Air #02 Use for Wind Speed					
Air Sensor #_____ Cable Length		Zone			
Air Sensor #_____ Wire Gauge					
Air Sensor #_____ Location		Ch		Sta	
Air #____ CAL Values					
Air #____Use for Wind Speed					
Shared Air Sensor #___ Location		Ch		Sta	
Shared Air Sensor #___ Location		Ch		Sta	
Shared Air Sensor #___ Location		Ch		Sta	

APPENDIX 7 - Parameter and Security Recording

SENSOR CALIBRATIONS & SETTINGS		(continued)			
Air Sensor #_____ Cable Length		Zone			
Air Sensor #_____ Wire Gauge					
Air Sensor #_____ Location		Ch		Sta	
Air #_____ CAL Values					
Air #_____ Use for Wind Speed					
Air Sensor #13 Cable Length		Ch		Sta	
Air Sensor #13 Wire Gauge					
Humidity Sensor #01		**Zone**			
Humidity CAL 1 Value					
Humidity CAL 2 Value		Ch		Sta	
Humidity Sensor #02		Zone			
Humidity CAL 1 Value					
Humidity CAL 2 Value		Ch		Sta	
Humidity Sensor #03		**Zone**			
Humidity CAL 1 Value					
Humidity CAL 2 Value		Ch		Sta	
Static Pressure Sensor #0		Zone			
ADC CAL 1 Value					
ADC CAL 2 Value		Ch		Sta	
WC CAL 1 Value					
WC CAL 2 Value					
Feed #1 Minimum		Actual XX	Ch		Sta
Feed #1 Minimum		Actual XX	Ch		Sta
Water #1 CAL Value (PPG)		Ch		Sta	
Power Up Load Delay Time					
Password		Security Level			
Password		Security Level			
Password		Security Level			
Password		Security Level			
Password		Security Level			
Password		Security Level			
Password		Security Level			
Software Revision					
Control Center Serial Number					

APPENDIX 8 - Controller Info & Security Settings

Main Controller Menus			Min	Max	Security levels	
					Display	Edit
Software Revision Number					0	na
Revision Date Time					0	na
Control Center Serial Number					0	7
Enter Password			0000	9999	0	0
Edit Password			0000	9999	5	5
Security Level			0	9	5	5
Watch Dog Address Display Table					9	na
Compile Options					5	na
Valco Companies					0	na

Security Levels

Security levels are used to limit the information users are able to change in the controller software
as well as in the database file.

Level	Access
0	Users at this level can view but not change settings.
1	Users can set Animal Information, Air Sensor settings and humidity Sensor Settings. Also has access to instant On feature in feeders and lights.
2	Users can set Temperature setpoint and Ramping Offset, Time and Date.
3	Users at this level can change feeder and Light times. Can also change the Variable Speed fan's Power ON setting and the Temperature Alarms settings.
4	Users at this level can change all settings except for adding/deleting control devices and passwords.
5-6	Users at this level are allowed to make any changes, except change the Serial number and the Startup Options password in the Global Parameters.
7	Users at this level are allowed to make all changes, including the Serial Number and Startup Options password. Note: This is the default setting until you set up passwords and assign security levels. At least one person must be given access at this level in order to set up passwords and usernames for other people using this application.
9	Support access security level. This level allows support personnel to access controller without passwords.

APPENDIX 9 - Animal Information Min/Max Settings

Current Animal Information Shows when controller is set to Hog	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Today's Age	0		0		900		1		0	1
Today's Weight	0	0.0	0	0.0	9999	500.0	1	0.1	0	1
Finish Age	0		0		900		1		0	1
Finish Weight	0	0.0	0	0.0	9999	500.0	1	0.1	0	1
Beginning Head Count	1		0		9999		1		0	1
Total Mortality Head Count	0		0		9999		1		0	1
Total Sold Head Count	0		0		9999		1		0	1

Note: Min/Max values are for the Total values. When changing the Totals the edit value can go to minus the max value also. The total will never go below the Min value or above the Max value.

Current Bird Information Show when controller is set to Bird	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Today's Bird Age	0		0		900		1		0	1
Today's Bird Weight	0.0	0	0.0	0	99.9	65000	0.1	1	0	1
Projected Finishing Age	0		0		900		1		0	1
Projected Finishing Weight	0.0	0	0.0	0	99.9	65000	0.1	1	0	1
Beginning Bird Count	1		0		32700		1		0	1
Mortality Bird Count	0		0		32700		1		0	1
Total Sold Bird Count	0		0		32700		1		0	1

Note: Min/Max values are for the Total values. When changing the Totals the edit value can go to minus the max value also. The total will never go below the Min value or above the Max value.

APPENDIX 10 - Temperature Control Min/Max Settings

Temperature Control Settings	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Temp Setpoint (See Note 7 & 8)	70.0	21.1	-60.0	-51.1	160.0	71.1	0.1		0	2
Temp Control	Actual		Off		Actual *---------- Eff.				0	4
House Control Mode (Bird Only)	Growout2		"Brood", Growout1, Growout2						0	4
Simulator Temperature	-55.0		-55.0		160		0.1		9	9
Ridge To Curtains (See Note 4)	No Interlock		"No Interlock" and "Interlock"						0	4
Heat to Curtains (See Note 5)	No Interlock		"No Interlock", "Zone Interlock" & "All Zone Interlock"						0	4
Enter Tunnel Temp (See Note 3)	85.0	29.4	-60.0	-51.1	160.0	71.1	0.1		0	4
Exit Tunnel Temp (See Note 3)	80.0	26.6	-60.0	-51.1	160.0	71.1	0.1		0	4
Remain in Tunnel Time (See Note 3)	1:00:00		0:00:00		9:00:00		N/A		0	4
Enable Tunnel Entry. Outside Temp (Note 1 & 3)	0.0	0.0	0.0	0.0	75.0	23.9	0.1		0	4
Today's Age (See Note 6)	0		0		900		1		0	4
Ramp Point #1 TO #12									0	4
Age	0		0		900		1		0	4
Temp	70.0	21.1	-60	-51.1	160	71.1	0.1		0	4
Temperature Ramp Offset	0.0		-12.0		+12.0		0.1		0	2
Floor Type (Hog Only)	Concrete		"Concrete" and "Other"						0	4
Close Curtains Below Outside Temp (See Note 2)	-60.0	-51.1	-60.0	-51.1	160.0	71.1	0.1		0	4

Note 1: Enabled only an Outside Temp Sensor are installed and Power vented

Note 2: Enabled only when a Curtain and an Outside Temp Sensor are installed and Power vented

Note 3: Enabled only with a Fan installed and set to a Tunnel mode

Note 4: Enabled only when a Ridge Vent and a Curtain are installed

Note 5: Enabled only when a Curtain is installed and either a Heater, Furnace, or Brooder is installed

Note 6: If Temperature Ramp Table has values set, then changing age will cause Setpoint to change (See Note 8 & Ramp Table Theory)

Note 7: If Ramping is on then this is disabled

Note 8: Changing the Setpoint will cause the following values to change:

- Temperature Control Settings
  - Temp Setpoint
  - Enter and Exit Tunnel Temp
    Close Curtains Below Outside Temp
- Purge and Minimum Vent Settings
  - Low and High Temp Inhibit
    Before Purge Raise Temperature
- Sound Alarm When settings
  - High Temp Exceeds (not Fixed)
  - Low Temp Drops Below
- Fixed Fans – Stir, Sidewall, Tunnel, Ridge, Pit
  - On/Off Temp
  - Fans OFF at Curtain Opening of
- Variable Fans - Stir, Side, Tunnel, Ridge, Pit
  - On/Off Temp
  - Ramp Start Temp
  - Full Power Temp
    Fans OFF at Curtain Opening of

- Heater Settings – Brooder, Furnace, Heater
  - On/Off Temp
- Mister Settings – In House Fogger, Cool Pad Low/High, Mister
  - Full On/Off Temp
  - Cycle On Temps
- Curtain Inlets
  - Open/Close Temps

> **Ramp Table Theory:**
>
> If Age #1 is zero or Animal Age is zero, then Ramping is Off and all other values in Ramp table are ignored.
>
> As Animal Age changes, the Temp Setpoint is changed to that Age's Setpoint in Ramp Table or incremented based on Ages and Setpoints in Ramp Table (See Note 8)
>
> If the Ramp Table Age is less than or equal to the previous Ramp Table Age then that Setpoint and all additional Setpoints are ignored and Ramping is turned off.

APPENDIX 11 - Purge and Min. Vent Min/Max Settings

Building Purge Settings This shows when no fans are installed except Stir fans	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Purge Time	0:00:00		0:00:00		9:00:00		N/A		0	4
Delay Time (Purge)	3:00:00		0:00:01		18:00:00		N/A		0	4
Humidity Setpoint (See Note 1)	100		0		100		1		0	4
Humidity Purge Time (See Note 1)	0:00:00		0:00:00		9:00:00		N/A		0	4
Delay Time (Humidity Purge) (See Note 1)	1:00:00		0:00:00		9:00:00		N/A		0	4
Purge Inhibit Temp LOW (See Note 2)	60.0	15.6	-60.0	-51.1	159.9	71.0	0.1		0	4
High (Purge Inhibit Temp) (See Note 2)	74	23.3	Low Temp + 0.1		160.0	71.1	0.1		0	4
Before purge raise Temperature to: (See Note 2)	70.0	21.1	SetPoint		Setpoint + 5.0	Setpoint + 2.7	0.1		0	4
Time to Abort Heat before Purge (See Note 2)	0:00		0:00		59:59		N/A		0	4

Note 1: Enabled only when Humidity Sensor is installed

Note 2: Enabled when a heater is installed with "Use During Heat Purge" set to Yes and Purge Time and Delay are non-zero
or Humidity Setpoint is 1% to 99% and Humidity Purge Time and Delay are non-zero

Minimum Vent Settings This show when fans are installed other than Stir fans	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Minimum Vent Timer ON	0:00		0:00		59:59		N/A		0	4
Off (Minimum Vent Timer)	0:00		0:00		59:59		N/A		0	4
Min Vent #1 to #9									0	4
Age	0		0		900		1		0	4
On\Off times	0:00		0:00		59:59		N/A		0	4
Humidity Setpoint (See Note 1)	100		0		100		1		0	4
Humidity Purge Time (See Note 1)	0:00:00		0:00:00		9:00:00		N/A		0	4
Delay Time (Humidity Purge) (See Note 1)	1:00:00		0:00:00		9:00:00		N/A		0	4
Purge Inhibit Temp LOW (See Note 2)	60.0	15.6	-60.0	-51.1	159.9	71.0	0.1		0	4
High (Purge Inhibit Temp) (See Note 2)	74.0	23.3	Low Temp + 0.1		160.0	71.1	0.1		0	4
Before purge raise Temperature to: (See Note 2)	70.0	21.1	SetPoint		Setpoint + 5.0	Setpoint + 2.7	0.1		0	4
Time to Abort Heat before Purge (See Note 2)	0:00		0:00		59:59		N|A		0	4

Note 1: Enabled only when Humidity Sensor is installed and a Fan is set to a Purge mode

Note 2: Enabled when a heater is installed with "Use During Heat Purge" set to Yes and Humidity Setpoint is 1% to 99% and Humidity Purge Time and Delay are non-zero

APPENDIX 12 - Static Pressure Min/Max Settings

Static Pressure Settings	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Setpoint - Natural	0.040		WCCal1 + offset of Setpoint minus Close		WCCal 2 - offset of Open minus Setpoint		0.001		0	4
Close	0.030		WCCal 1		Setpoint		0.001		0	4
Open	0.050		Setpoint		WCCal 2		0.001		0	4
Setpoint - Tunnel (Note 1) (Open and close settings are set at setpoint Natural)	0.040		WCCal1 + offset of Setpoint minus Close		WCCal 2 - offset of Open minus Setpoint		0.001		0	4
Ramp #x Temperature (Note 2)	-60.0	-51.1	-60.0	-51.1	160.0	71.1	0.1		0	4
Pressure (Note 2)	0.000		WCCal 1		WCCal 2		0.001		0	4

Note 1: Only available when Fan installed and set to a Tunnel mode. Open and close settings Info only settings. They are set at Setpoint - Natural

Note 2: Only Available when Outside air sensor installed

Note 3: WCCal values are from Static Pressure Sensor settings with defaults of WCCal1- 0.000 & WCCal2 - 0.250 With a max of 6.500

The Static Pressure controls are coded as:

1. Keep the set point between the WC-Cal1 and the WC-Cal2.

2. The Close must be between the WC-Cal1 and the set point.

3. The Open must be between the WC-Cal2 and the set point.

4. When Setpoint changes, the Open and Close values change accordingly

5. Ramping occurs when next ramp Temp is above the previous one

APPENDIX 13 - Sound Alarm When....Min/Max Settings

Sound Alarm When....	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Fixed High Temp Exceeds	90.0	32.2	-60.0	-51.1	160.0	71.1	0.1		0	4
Temperature Above	80.0	26.6	-59.9	-51.0	160.0	71.1	0.1		0	4
Below	60.0	15.6	-60.0	-51.1	Above Temp -0.1		0.1		0	4
Outside Temp Influence HI Alarm Temp	No		Yes or No				N/A		0	4
Feed #x On Time Exceeds (See Note 2)	0:00:00		0:00:00		18:00:00		N/A		0	4
Feeder #x OFF Time Exceeds (See Note 2)	0:00:00		0:00:00		18:00:00		N/A		0	4
Water #x GPH Flow Excceeds (Note 1)	0		0		9999		1		0	4
Water #x 24-Hr. DROP (Note 1)	0%		0		100		1		0	4
Static Pressure Stays Above (See Note 3)	0.250		WCCal1		WCCal2		0.001		0	4
For (Static Pressure Stays Above) (See Note 3)	0:00		0:00		59:59		N/A		0	4
High Pressure Alarm Open All Inlets (See Note 3)	Yes		Yes/No		N/A				0	4
Static Pressure Stays Below (See Note 3)	0.250		WCCal1		WCCal2		0.001		0	4
For (Static Pressure Stays Below) (See Note 3)	0:00		0:00		59:59		N/A		0	4
Fan ON Static Pressure Below (See Note 3)	0.250		WCCal1		WCCal2		0.001		0	4
For (Fan ON Static Pressure Below) (See Note 3)	0:00		0:00		59:59		N/A		0	4
Humidity Sensor #xx Reading Is Bad (See Note 4)	No		"No" or "Yes"				N/A		0	4
Highest/Lowest Air Probes differ by:	99		10		99		1		0	4

Note 1: Water Meter settings enabled only when Water Sensor is installed

Note 2: Feed Sensor settings enabled only when Feed Sensor is installed

Note 3: Static pressure settings enabled only when Static Pressure Sensor installed

Note 4: Humidity setting enabled only when Humidity sensor installed

APPENDIX 14 - Sensor Min/Max Settings

Air Sensors (including the Outside Sensor (#13))		Defaults		Min		Max		Steps By		Security levels	
		English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Air Sensor #X Cable Length		100	30	1		9999		1		0	1
Air Sensor #X Wire Diameter		24	0.6	English allows only "16", "18", "20", "22" & "24" Metric allows only "0.5", "0.6", "0.7", "0.8", '0.9", "1.0", "1.1" & "1.2"						0	1
Air Sensor #X Temperture Offset		0.0		-15	-8.3	15	8.3	0.1		0	1
Air Sensor #X Location (Bird only)		Brood		"Brood", "Growout1", "Growout2"						0	1
Air #xx Use for Wind Speed		Yes		Yes/No						0	1
Air #xx Cal Values (Note 1)		550/90		400/40		1200/200		1		0	1
Note 1: Only enabled if Use for Wind Speed is Yes											
Note: Outside Sensor does not have Location or Wind speed											

Air Sensors Shared		Defaults		Min		Max		Steps By		Security levels	
		English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Air Sensor #X Location (Bird only)		Brood		"Brood", "Growout1", "Growout2"						0	1
Air Sensor Shared uses the values from the Air Sensor it is attached to but it does have its own Location setting for Birds											

Humidity Sensors		Defaults		Min		Max		Steps By		Security levels	
		English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Humidity #xx Cal 1		10485		0		Cal Value 2 - 1		1		0	1
Cal 2		51118		Cal Value 1 + 1		65535		1		0	1

Static Pressure Sensors		Defaults		Min		Max		Steps By		Security levels	
		English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
ADC Cal 1		6554		0		ADC Cal 2		1		0	4
ADC Cal 2		58982		ADC Cal 1		65535		1		0	4
WC Cal 1		0.000		0.000		WC Cal 2		0.001		0	4
WC Cal 2		0.250		WC Cal 1		6.500		0.001		0	4

Feed Sensors		Defaults		Min		Max		Steps By		Security levels	
		English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Minimum Amps		0.1		0.0		25.0		0.1		0	4
Cal Value		100		0		999		1		0	4

Water Meter		Defaults		Min		Max		Steps By		Security levels	
		English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Cal Value (PPG) or (PPL)		25.0		0.0		99.9		0.1		0	4

Digital Alarm	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Trigger alarm on Active Input	No		"No" or "Yes"				N/A		0	4
Input is Active when	Closed		"Closed" or "Open"				N/A		0	4
Alarm Delay Time	0:01		0:00		59:59		N/A		0	4

Position Sensor (See Note 1)	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Attached To	Shows what Position Sensor is attached to - Allows all inlets installed						N/A		0	4
Enable Position Alarm	Yes		"No" or "Yes"				N/A		0	4
Percent OUT of Position to Alarm (Note 2)	10		0		80		1		0	4
Note 1: Shows "Sensor Not Calibrated" unless attached to an Inlet and calibrated correctly										
Note 2: Only enabled if Enable Position Alarm is Yes										

Whisker Switch	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Attached To	Shows what Whisker Switch is attached to - Allows all inlets installed						N/A		0	4
Validate Switch - Low	0		0		High Max - 1		1		0	4
High	0		Low value + 1		Note 1		1		0	4
Seconds delay alarm Out of Position	15		0		600		1		0	4
Note 1: The High Max value is the Full Open size of the airway device the Whisker Switch is attached to										

APPENDIX 15 - System & Control Device Setup

	Security levels	
	Display	Edit
Time Setup	0	2
Date Set-up	0	2
Power Up Load Delay time	0	4
Press Enter to LIST Control Devices	0	0
Press Enter to ADD Control Devices	5	5
Press Enter to CHANGE Control Devices	5	5
Press Enter to DELETE Control Devices	5	5
Press Enter to ADD New Zone	5	5
Press Enter to DELETE New Zone	5	5
Disable Module with Address	9	9
Copy Zone/Mod: to Zone/Mod	9	9
Global Parameters		
Display Language	0	0
Card Free Space	0	N/A
Number of Switches on front panel	0	0
Enter Options Password	0	

APPENDIX 16 - Fan Min/Max Settings

Stir, Sidewall, Tunnel, Ridge, Pit (Hog Only) Fan Settings	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Use Sensors	ALL (0,0,0,0)		0		# of Sensors installed		1 (Only sensor #'s)		0	4
Operating Mode Note: Tunnel Fan default is Tunnel	Cool		"Cool", "Heat", "Purge", "Cool & Purge", "Heat & Purge", "Tunnel", "Tunnel & Cool", "Tunnel & Purge", "Tunnel, Cool ,Purge"						0	4
On Temp - All but Heat modes	74.0	23.3	-59.9	-51.0	160.0	-71.1	0.1		0	4
Heat Modes	74.0	23.3	-60.0	-51.1	159.9	-71.0	0.1		0	4
Off Temp - All but Heat modes	72.0	22.2	-60.0	-51.1	On Temp - 0.1		0.1		0	4
Heat Modes	72.0	22.2	On Temp + 0.1		160.0	-71.1	0.1		0	4
Fan Run Mode	Temp Only		"Temp or Timed", "Temp or Minimum Vent", "Temp and Timed", "Temp Only", "Timed Only"						0	4
On Timer	0:00:00		0:00:00		9:00:00		N/A		0	4
Off Timer	0:10:00		0:00:00		9:00:00		N/A		0	4
Run While Entry/Exit of Tunnel Mode	No		No		Yes		N/A		0	4
Use For Proportional Control Note: Not Available for Stir Fans	Yes		No		Yes		N/A		0	4
Fans Off at Curtain Opening of Note: Not available for Tunnel mode	0		0		250		1		0	4
Fan Override Curtain Open Temp Note: Not Available for Tunnel mode	80.0	26.6	-60.0	-51.1	160.0	71.1	0.1		0	4
Looking at(x): (x = 1 to 4)	All curtains/inlets		Curtains/inlets with Position Sensor or Whisker Switch						0	4

Variable Speed Stir, Sidewall, Tunnel, Ridge, Pit (Hog Only) Fan Settings	Defaults English	Defaults Metric	Min English	Min Metric	Max English	Max Metric	Steps By English	Steps By Metric	Security levels Display	Security levels Edit
Use Sensors	ALL (0,0,0,0)		0		# of Sensors installed		1 (Only sensor #'s)		0	4
Operating Mode Note: Tunnel Fan default is Tunnel	Cool		"Cool", "Heat", "Purge", "Cool & Purge", "Heat & Purge", "Tunnel", "Tunnel & Cool", "Tunnel & Purge", "Tunnel, Cool ,Purge"						0	4
On Temp - All but Heat modes	74.0	23.3	-59.9	-51.0	160.0	-71.1	0.1		0	4
Heat Modes	74.0	23.3	-60.0	-51.1	159.9	-71.0	0.1		0	4
Off Temp - All but Heat modes	72.0	22.2	-60.0	-51.1	On Temp - 0.1		0.1		0	4
Heat Modes	72.0	22.2	On Temp + 0.1		160.0	-71.1	0.1		0	4
Fan ON Power Setting	25		1		60		1		0	4
Power Ramping Start Temp	78.0	25.5	Off Temp + 0.1		160.0	71.1	0.1		0	4
Heat Modes	72.0	22.2	-60.0	-1.1	Off Temp - 0.1		0.1		0	4
FULL Power Temp			Off Temp + 0.1		160.0	71.1	0.1		0	4
Heat Modes	84.0	28.8	-60.0	-51.1	Off Temp - 0.1		0.1		0	4
FULL Power Setting	60		1		60		1		0	4
Run Mode	Temp Only		"Temp or Timed", "Temp and Minimum Vent", "Temp and Timed", "Temp Only", "Timed Only"						0	4
On Timer	0:00:00		0:00:00		9:00:00		N/A		0	4
Off Timer	0:10:00		0:00:00		9:00:00		N/A		0	4
Timer Power Setting	60		1		60		1		0	4
Purge Mode Power Setting (Note 1)	60		1		60		1		0	4
Run While Entry/Exit of Tunnel Mode	No		No		Yes		N/A		0	4
Use For Proportional Control Note: Not Available for Stir Fans	Yes		No		Yes		N/A		0	4
Fans Off at Curtain Opening of Note: Not available for Tunnel mode	0		0		250		1		0	4
Fan Override Curtain Open Temp Note: Not Available for Tunnel mode	80.0	26.6	-60.0	-51.1	160.0	71.1	0.1		0	4
Looking at(x): (x = 1 to 4)	All curtains/inlets		Curtains/inlets with Position Sensor or Whisker Switch						0	4

Note 1: Enabled only when fan is set to purge, Humidity Setpoint is less than 100 and Humidty Purge Time and Delay Time are greater than 0:00:00

See next page for determining which fan settings are enabled and disabled based on the fan's Run Mode.

Sidewall, Tunnel, Ridge Pit (Bird Only) Fan Settings (Enabled and Disabled - X means Enabled) Run Mode	Temp or Timed	Timed Only	Temp Only	Temp and Timed	Temp or Minimum Vent
Use Sensors	X	X	X	X	X
Operating Mode	X	X	X	X	X
On \ Off Temp	X		X	X	X
Run Mode	X	X	X	X	X
On \ Off Timer	X	X		X	
Run While Entry/Exit of Tunnel Mode	X	X	X	X	X
Use For Proportional Control Note: Always disabled for Stir Fans	X	X	X	X	X
Fans Off at Curtain Opening of Note: Not available for Tunnel Mode	Enabled Only when Postion Sensor/Whisker Switch is installed to a curtain and is calibrated correctly and Operating Mode is not Tunnel				
Fan Override Curtain Open Temp Note: Not Available for Tunnel Mode	Enabled Only when Fans Off at Curtain Opening is Enabled and Fans Off at Curtain Opening is greater than 0				
Looking at(x): (x = 1 to 4)	Enabled Only when Fans Off at Curtain Opening is Enabled and Fans Off at Curtain Opening is greater than 0				

Variable Speed Stir, Sidewall, Tunnel, Ridge Pit (Hog Only) Fan Settings (Enabled and Disabled - X means Enabled) Run Mode	Temp or Timed	Timed Only	Temp Only	Temp and Timed	Temp or Minimum Vent
Use Sensors	X	X	X	X	X
Operating Mode	X	X	X	X	X
On / Off Temp	X		X	X	X
Fan ON Power Setting	X		X	X	X
Power Ramping Start Temp	X		X	X	X
FULL Power Temp	X		X	X	X
FULL Power Setting	X		X	X	X
Run Mode	X	X	X	X	X
On \ Off Timer	X	X		X	
Timer Power Setting	X	X		X	X
Purge Mode Power Setting	Note 1	Note 1	Note 1	Note 1	Note 1
Run While Entry/Exit of Tunnel Mode	X	X	X	X	X
Use For Proportional Control Note: Always disabled for Stri Fans	X	X	X	X	X
Fans Off at Curtain Opening of Note: Not available for Tunnel mode	Enabled Only when Postion Sensor/Whisker Switch is installed to a curtain and is calibrated correctly and Operating Mode is not Tunnel				
Fan Override Curtain Open Temp Note: Not Available for Tunnel mode	Enabled Only when Fans Off at Curtain Opening is Enabled and Fans Off at Curtain Opening is greater than 0				
Looking at(x): (x = 1 to 4)	Enabled Only when Fans Off at Curtain Opening is Enabled and Fans Off at Curtain Opening is greater than 0				

Note 1: Enabled only when fan is set to purge, Humidity Setpoint is less than 100 and Humidty Purge Time and Delay Time are greater than 0:00:00

APPENDIX 17 - Cool Pads, Fogger & Mister Min/Max Settings

Cool Pad Low/High, In House Fogger (Bird) and Mister (Hog) Settings	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Use Sensors	ALL (0,0,0,0)		0		# of Sensors installed		1 (Only sensor #'s)		0	4
Time of Day to Enable	0:00		0:00		24:00		N/A		0	4
Disable	24:00		0:00		24:00		N/A		0	4
Humidity Disable (See Note 1)	100		0		100		1		0	4
ReEnable (See Note 1)	100		0		Humidity Disable		1		0	4
Temp+Humidity Disable (See Note 1)	220		30		220		1		0	4
ReEnable (See Note 1)	220		30		T + RH Disable		1		0	4
Full On Temp	110.0	43.3	-59.9	-51.0	160.0	71.1	0.1		0	4
Off Temp	79.0	26.1	-60.0	-51.1	On Temp - 0.1		0.1		0	4
Cycle # X On Temp	90.0 to 90.3	32.2 to 32.5	-60.0	-51.1	160.0	71.1	0.1		0	4
Cycle # X On Timer	0:00:00		0:00:00		9:00:00		N/A		0	4
Off Timer	0:10:00		0:00:00		9:00:00		N/A		0	4
Minimum On Temp	80.0	26.6	-60.0	-51.1	160.0	71.1	0.1		0	4
Min Temps	90.0, 90.1, 90.2, 90.3, 110.0	32.2, 32.3, 32.4, 32.5, 43.3	Calculated valves equal to Cycle #1 thru #4 On Temps and Full On Temp. If Min On temp is Greater than Cycle #1 On Temp then Values equal Cycle On Temps + Offset of Min On Temp to Cycle #1 Temp						0	4

Note 1: Enabled only if Humidity Sensor Installed

Menus that appear for Cool Pad Low/High, In House Fogger (Bird) and Mister (Hog)

Enabled and Disabled (X means Enabled)	No Humidity Sensor	With Humidity Sensor								
Use Sensors	X	X								
Time of Day to Enable / Disable	X	X								
Humidity Disable / ReEnable(See Note 1)		X								
Temp+Humidity Disable / ReEnable(See Note 1)		X								
Full On Temp / Off Temp	X	X								
Cycle On Temp #X	X	X								
Cycle On / Off Timer #1 to #4	X	X								
Minimum On Temp	X	X								
Min Temps										

Note 1: Enabled only if Humidity Sensor Installed

APPENDIX 18 - Side Curtain Min/Max Settings

Side Curtain Settings	Defaults		Min		Max		Steps By	
	English	Metric	English	Metric	English	Metric	English	Metric
Use Sensors	ALL (0,0,0,0)		0		# of Sensors installed		1 (Only sensor #'s)	
Open Temp	72..0	22.2	-59.9	-51.0	160.0	71.1	0.1	
Close Temp	68.0	20.0	-60.0	-51.1	On Temp - 0.1		0.1	
Open	10	25	1		250		1	
Pause (Open)	0:03:00		0:00:10		9:00:00		N/A	
Close	10	25	1		250		1	
Pause (Close)	0:03:00		0:00:10		9:00:00		N/A	
Maximum Opening (See Note 8)	0		0		250		1	
Below Temp	Setpoint		Setpoint		Setpoint + 40 degrees		0.1	
Static Pressure Pause Timer (See Note 4)	0:00		0:00		1:00		N/A	
Operate as (See Note 1 and 3)	Temp Natural Only		"Temp Natural Only", "Temp Natural/Temp Tunnel", "Temp Natural/Static Tunnel", "Temp Tunnel Only", "Static Natural Only", "Static Natural/Temp Tunnel", "Static Natural/Static Tunnel", "Static Tunnel Only"					
Tunnel Fans ON #01 to #09	0 to 8		0		9		1 or 0.5	
Tunnel Fans Open - #01 default is 0	48.0	121	0.0	0	250.0	250	0.1	1
Tunnel Fan Interlocks	All Fans		Interlock up to 9 installed fans that have "Use for Proportional Control" set to "Yes", except Stir fans					
Tunneling Open Sizes are:	Proportional		Proportional or Stepping					
Response Mode	Standard		"Standard" and "Aggressive"					
Full Opening Size	48	121	1		250		1	
Full Open Travel Time	6:00		0:05		59:59		N/A	
Full Close Travel Time	6:00		0:05		59:59		N/A	
Purge Opening Size (See Note 2)	6	15	0		250		1	
Pre-Open Timer (See Note 4)	0:00		0:00		1:00		N/A	
Exercise Delay Days (See Note 5)	0		0		30		1	
Perform Exercise at (See Note 6)	0:00		0:00		24:00		N/A	
Number Hours 50% Open (Note 7)	0		0		250		1	
Tunnel Entry Size/Exit Size	0		0		Full Open size		1	
Perform Re-Sync at	0:00		0:00		24:00		N/A	

Note 1: Enabled only if Static Pressure sensor installed or a fan installed and Tunnel is part of Operating Mode

Note 2: Enabled only if Purge On/Off times are greater than 0:00:00, if power building then Humidity Sensor needs to be installed and one fan includes Purge and Humidity Purge Time and Delay has to be greater than 0 and Humidity Purge Setpoint is between 1 and 99

Note 3: Static Modes will only show if Static Pressure Sensor Is Installed

Note 4: Enabled only if Static Pressure sensor installed and Operating mode includes Static Natural

Note 5: Enabled only if Operate As includes Temp Natural

Note 6: Enabled only if Exercise Delay Days is greater then 0

Note 7: Enabled only in Tech Security mode

Note 8: Enabled only when attached to Position Sensor that is calibrated, alarm is enabled and not alarming

See next page for a table showing which settings are enabled/disabled based on the Operate As setting.

Menus that appear for Side Curtain Based on "Operate As"

Enabled and Disabled (X means Enabled)

| **Natural** → | Operate | —- | Temp | Temp | Temp | —- | Static | Static | Static |
Tunnel →	Disabled	Static	—-	Temp	Static	Temp	—-	Temp	Static
Use Sensors	X		X	X	X				
Open/Close Temp	X		X	X	X				
Open & Pause	X		X	X	X				
Close & Pause	X		X	X	X				
Maximum Opening/Below Temp	Note 4		Note 4	Note 4	Note 4				
Static Pressure Pause Timer		X			X		X	X	X
Operate as (See Note 1)		Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
Tunnel Fans ON / Open				X		X		X	
Tunnel Interlock				X		X		X	
Tunneling Open Sizes are:				X		X		X	
Response Mode	X		X	X	X				
Full Opening Size	X	X	X	X	X	X	X	X	X
Full Open Travel Time	X	X	X	X	X	X	X	X	X
Full Close Travel Time	X	X	X	X	X	X	X	X	X
Purge Opening Size (See Note 2)	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
Pre-Open Timer (Note 4)							X	X	X
Exercise Delay Days	X		X	X	X				
Perform Exercise at	Note 3		Note 3	Note 3	Note 3				
Number Hours 50% Open	Shows in Tech Security mode only								
Tunnel Entry Size/Exit Size		X	X	X	X	X	X	X	X
Perform Re-Sync at	X	X	X	X	X	X	X	X	X

Important Note: Static Modes will only show if Static Pressure Sensor Is Installed

Note 1: Enabled only if Static Pressure sensor installed or a fan installed and Tunnel is part of Operating Mode

Note 2: Enabled only if Purge On/Off times are greater than 0:00:00.   If power building then Humidity Sensor needs
        to be installed and one fan has to run during Purge and Humidity Purge Time and Delay has to be greater than 0

Note 3: enabled only when Exercise Delay Days > 0

Note 4: Enabled only when attached to Position Sensor that is calibrated, alarm is enabled and not alarming

APPENDIX 19 - Ridge Vent Min/Max Settings

Ridge Vent	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Use Sensors	ALL (0,0,0,0)		0		# of Sensors installed		1 (Only sensor #'s)		0	4
Open Temp	72..0	22.2	-59.9	-51.0	160.0	71.1	0.1		0	4
Close Temp	68.0	20.0	-60.0	-51.1	On Temp - 0.1		0.1		0	4
Open	7	17	1		250		1		0	4
Pause (Open)	0:01:00		0:00:10		9:00:00		N/A		0	4
Close	7	17	1		250		1		0	4
Pause (Close)	0:01:00		0:00:10		9:00:00		N/A		0	4
Response Mode	Standard		"Standard" and "Aggressive"						0	4
Full Opening Size	14	35	1		250		1		0	4
Full Open Travel Time	0:45		0:05		59:59		N/A		0	4
Full Close Travel Time	0:45		0:05		59:59		N/A		0	4
Purge Opening Size (See Note 1)	4	10	0		250		1		0	4
Interlock Curtain Groups (See Note 2)	All (0,0,0,0,0,0)		0		9		1		0	4
Perform Re-Sync at	0:00		0:00		24:00		N/A		0	4

Note 1: Enabled only if Purge On/Off times are greater than 0:00:00, if power building then Humidity Sensor needs to be installed and one fan has to run during Purge and Humidity Purge Time and Delay has to be greater than 0

Note 2: Enabled only if Side Curtain installed and Ridge to Curtain Interlock set to Interlock

Menus that appear for Ridge Vent		
Enabled and Disabled (X means Enabled)		
Natural		No
Tunnel	Inter-lock	Inter-lock
Use Sensors		X
Open / Close Temp		X
Open / Pause		X
Close / Pause		X
Response Mode		X
Full Opening Size	X	X
Full Open Travel Time	X	X
Full Close Travel Time	X	X
Purge Opening Size (See Note 1)	Note 1	Note 1
Interlock Curtain Groups (See Note 2)	Note 2	
Perform Re-Sync at	X	X

Note 1: Enabled only if Purge On/Off times are greater than 0:00:00, if power building then Humidity Sensor needs to be installed and one fan has to run during Purge and Humidity Purge Time and Delay has to be greater than 0

Note 2: Enabled only if Side Curtain installed and Ridge to Curtain Interlock set to Interlock

APPENDIX 20 - Inlets Min/Max Settings

Sidewall, Tunnel, Ceiling Inlet Settings	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Static Pressure Pause Timer (Note 3)	0:00		0:00		1:00		N/A		0	4
Operate as (Note 1)	Temp Natural Only		"Temp Natural Only", "Temp Natural/Temp Tunnel", "Temp Natural/Static Tunnel", "Temp Tunnel Only", "Static Natural Only", "Static Natural/Temp Tunnel", "Static Natural/Static Tunnel", "Static Tunnel Only"						0	4
#1 to 9 Cool Fans ON	0 to 8		0		9		1 or 0.5		0	4
Open (#1 default is 0)	12.0	30	0.0	0	250.0	250	0.1	1	0	4
Natural Interlocks	All Fans Except Stir Fans		Interlock up to 9 installed fans that have "Use for Proportional Control" set to "Yes"						0	4
Cooling Open Sizes are:	Proportional		Proportional or Stepping						0	4
#1 to 9 Tunnel Fans ON	0		0		9		1 or 0.5		0	4
Open (#1 default is 0)	12.0	30	0.0	0	250.0	250	0.1	1	0	4
Tunnel Fan Interlocks	All Fans Except Stir Fans		Interlock up to 9 installed fans that have "Use for Proportional Control" set to "Yes"						0	4
Tunneling Open Sizes are:	Proportional		Proportional or Stepping						0	4
Full Opening Size	12	30	1		250		1		0	4
Full Open Travel Time	1:00		0:05		59:59		N/A		0	4
Full Close Travel Time	1:00		0:05		59:59		N/A		0	4
Purge Opening Size (See Note 2)	0		0		250		1		0	4
Pre-Open Timer (not Tunnel Inlets)	0:00		0:00		1:00		N/A		0	4
Tunnel Entry Size/Exit Size: (Note 4)	0		0		Full Open Size		1		0	4
Perform Re-Sync at	0:00		0:00		24:00		N/A		0	4
Close To xx when Curtain >= xx (Note 5)	0		0.0	0	250.0	250	0.1	1	0	4
Close Override Temperature (Note 6)	70.0	21.1	-60	-51.1	160	71.1	0.1		0	4
Looking at(x): (x = 1 to 4) (Note 6)	All Side Curtains		All available Side Curtains						0	4

Note: Operate As Static Modes will only show if Static Pressure Sensor Is Installed

Note 1: Enabled only if Static Pressure sensor installed or a fan installed and Tunnel is part of Operating Mode

Note 2: Enabled only if Purge On/Off times are greater than 0:00:00. If power building then Humidity Sensor needs to be installed and one fan has to run during Purge and Humidity Purge Time and Delay has to be greater than 0

Note 3: Enabled only if Static Pressure sensor installed

Note 4: Enabled in Tunnel Fans when configured

Note 5: Enabled only for Temp Natual Modes.

Note 6: Enabled only when "Close To" Curtain size is greater than 0.

APPENDIX 21 - Chimney Damper Min/Max Settings

Sidewall, Tunnel, Ceiling Inlet Settings - Menus that appear for Inlets Based on "Operate As" - Enabled and Disabled (X means Enabled)									
Natural	Operate	—-	Temp	Temp	Temp	—-	Static	Static	Static
Tunnel	Disabled	Static	—-	Temp	Static	Temp	—-	Temp	Static
Static Pressure Pause Timer (See Note 3)		X			X		X	X	X
Operate as (See Note 1)		X	X	X	X	X	X	X	X
Cool Fans ON / Open	X		X	X	X				
Natural Interlocks	X		X	X	X				
Cooling Open Sizes are:	X		X	X	X				
Tunnel Fans ON / Open				X		X		X	
Tunnel Interlocks				X		X		X	
Tunneling Open Sizes are:				X		X		X	
Full Opening Size	X	X	X	X	X	X	X	X	X
Full Open Travel Time	X	X	X	X	X	X	X	X	X
Full Close Travel Time	X	X	X	X	X	X	X	X	X
Purge Opening Size (See Note 2)	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
Pre-Open Timer (Not Tunnel Inlets)	X		X	X	X		X	X	X
Tunnel Entry Size/Exit Size:		X	X	X	X	X	X	X	X
Perform Re-Sync at	X	X	X	X	X	X	X	X	X
Close To xx when Curtain >= xx (Note 5)	X		X	X	X				
Close OverrideTemperature (Note 6)	Note 5		Note 5	Note 5	Note 5				
Looking at(x): (x = 1 to 4) (Note 6)	Note 5		Note 5	Note 5	Note 5				

Note: Static Modes will only show if Static Pressure Sensor Is Installed

Note 1: Enabled only if Static Pressure sensor installed or a fan installed and Tunnel is part of Operating Mode

Note 2: Enabled only if Purge On/Off times are greater than 0:00:00. If power building then Humidity Sensor needs to be installed and one fan has to run during Purge and Humidity Purge Time and Delay has to be greater than 0

Note 3: Enabled only if Static Pressure sensor installed

Note 5: Enabled only for Temp Natual Modes.

Note 6: Enabled only when "Close To" Curtain size is greater than 0.

Chimney Damper Settings	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Cool Fans ON									0	4
#01 to #09 Fans ON (No Variable Fans)	0 - 8		0, 1, 2, 3, 4, 5, 6, 7, 8, 9				1		0	4
#01 to #09 Fans ON (Variable Fans)	0.0 to 8.0		0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0				0.5		0	4
#01 to #09 Cool Fans Open	0.0	0	0.0	0	250.0	250	0.1	1	0	4
Fan Interlocks	All Ridge Fans		Interlock up to 9 installed Ridge Fans that have "Use for Proportional Control" set to "Yes"						0	4
Cooling Open Sizes are:	Proportional		Proportional or Stepping						0	4
Full Opening Size	12	30	1		250		1		0	4
Full Open Travel Time	1:00		0:05		59:59		N/A		0	4
Full Close Travel Time	1:00		0:05		59:59		N/A		0	4
Perform Re-Sync at	0:00		0:00		24:00		N/A		0	4

Note: All Menus are enabled at all times

APPENDIX 22 - Miscellaneous Device Min/Max Settings

Feeder and Lights	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Settings # 1 to 30									0	3
Age	0	0	0		900		1		0	3
Starting Time	00:00		00:00		24:00		N/A		0	3
Stop Time	00:00		00:00		24:00		N/A		0	3
Run For (VP 1.00.03+ and Ventra/Gaintrac 6.00)	0:00:00		0:00:01		18:00:00		N/A		0	1
Note: All Menus are enabled at all times										

VariLights	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Settings #1 to 50 (new row added as needed)									0	3
Age	0	0	0		900		1		0	3
Starting Time	00:00		00:00		24:00		N/A		0	3
Stop Time	00:00		00:00		24:00		N/A		0	3
Light Intensity (%)	0		0		100		1		0	3
Dusk-to-Dawn or Spike	D/D		D/D or SPK				N/A		0	3
Minimum Ramp on Percent	0		0		100		1		0	3
OFF to ON Ramp Time [Minutes]	0		0		90		1		0	3
ON to OFF Ramp Time [Minutes]	0		0		90		1		0	3
Run For 0:00:00	0:00:00		0:00:00		18:00:00		N/A		0	1
At 0%	0		0		100		1		0	1
Note: All Menus are enabled at all times										

Brooder (Bird), Heater (Hog) and Furance	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Use Sensors	ALL (0,0,0,0)		0		# of Sensors installed		1 (Only sensor #'s)		0	4
Temp ON	68.0	20.0	-60.0	-51.1	159.9	71.0	0.1		0	4
OFF Actual	70.0	21.1	On Temp + 0.1		160.0	71.1	0.1		0	4
Temp On Off Adjusted	Read Only, visible only when "Lower Temp By" is set									
Lower Temp by	0.0		0.0		15.0		0.1		0	4
From x:xx to x:xx	00:00		00:00		24:00		N/A		0	4
Interlock Curtain Groups (See Note 1)	All (0,0,0,0,0,0)		0		9		1		0	4
Use During Heat Purge (See Note 2)	No		Yes or No				N/A		0	4
Ventra only below here										
BTUs	0		0		999000		1000		0	4
Has Pilot Light:	No		Yes or No				N/A		0	4
Note 1: Enabled only when a "Side Curtain" or "Ridge Vent" is installed and "Heater to Curtain Interlock" is set to "Zone Interlock" or "All Zone Interlock"										
Note 2: Enabled only when a Humidity Sensor is installed, Fan set to purge, RH Stpoint less than 100 and purge time above 0										

Variable Brooder (Bird), Heater (VP Only)	Defaults		Min		Max		Steps By		Security levels	
	English	Metric	English	Metric	English	Metric	English	Metric	Display	Edit
Use Sensors	ALL (0,0,0,0)		0		# of Sensors		1 (Only sensor #'s)		0	4
Lower Temp by	0.0		0.0		15.0		0.1		0	4
From x:xx to x:xx	00:00		00:00		24:00		N/A		0	4
Interlock Curtain Groups (See Note 1)	All (0,0,0,0,0,0)		0		9		1		0	4
Use During Heat Purge (See Note 2)	No		Yes or No				N/A		0	4
BTUs - Minimum / Maximum	0		0		999000		1000		0	4
Temp Target	68.0	20.0	-60.0	-51.1	159.9	71.0	0.1		0	4
OFF Actual	70.0	21.1	Target Temp + 0.1		160.0	71.1	0.1		0	4
Alarm When Heater is at MAX for	0:00:00		0:00:00		18:00:00		N/A		0	4
Shut Off on Alarm	No		No		Yes		N/A		0	4
Gas Regulator: Module	0		2		16		1		0	4
Channel:	0		1		12		1		0	4

Note 1: Enabled only when a "Side Curtain" or "Ridge Vent" is installed and "Heater to Curtain Interlock" is set to "Zone Interlock" or "All Zone Interlock"

Note 2: Enabled only when a Humidity Sensor is installed, Fan set to purge, RH Stpoint less than 100 and purge time above 0

Menus that appear for Brooder (Bird), Heater (Hog) and Furnace			
Enabled and Disabled (X means Enabled)	Zone	All Zone	No
	Interlock	Inter-lock	Inter-lock
Use Sensors	X	X	X
On Temp/Off Temp Actual	X	X	X
On Temp/Off Temp Adjusted	X	X	X
Lower Temp by / From / To	X	X	X
Interlock Curtain Groups (See Note 1)	X	X	
Use During Heat Purge (See Note 2)	X	X	X
BTUs / Has Pilot Light: (VP, non- Variable only)	X	X	X
BTUs - Minimum / Maximum (VP, Variable only)	X	X	X
Temp Target / Off (VP, Variable only)	X	X	X
Alarm When Heater is at MAX for (VP, Variable only)	X	X	X
Shut Off on Alarm	X	X	X
Gas Regulator: Module / Channel (VP, Variable only)	X	X	X

Note 1: Enabled only when a "Side Curtain" or "Ridge Vent" is installed and "Heater to Curtain Interlock" is set to "Zone Interlock" or "All Zone Interlock"

Note 2: Enabled only when a Humidity Sensor is installed, Fan set to purge, RH Stpoint less than 100 and purge time above 0

APPENDIX 23 - (MAIN) Menu Guide

CONTROLLER	CURRENT ENVIRONMENT CONDITIONS	CONTROL EQUIPMENT STATUS	CURRENT ANIMAL INFORMATION
Software Revision Number Revision Date/Time Control Center Serial Number Enter Password / Security Level Edit Password / Security Level Table Compile Options Copyright Information	Avg Actual Temp **E** Avg Actual-*-Effective Temp Sensor Temps 1-4 Sensor Temps 5-8 Sensor Temps 9-12 Outside Temp **E** Avg Air speed 1-4 **E** Avg Air speed 5-8 **E** Avg Air speed 9-12 Relative Humidity 1-3 Avg Static Pressure Ventilation Mode **H** Animal Stress Index (needs Age and Weight above zero)	**B** Brooder Groups **H** Heater Groups Furnace Groups VariLights Groups Stir Fan Groups Sidewall Fan Groups Tunnel Fan Groups **H** Pit Fan Groups Ridge Fan Groups Vari-Stir Fan Groups Vari-Side Fan Groups Vari-Tunnel Fan Groups **H** Vari-Pit Fan Groups Vari-Ridge Fan Groups Cool Pad Low Groups Cool Pad High Groups **B** In House Fog Groups **H** Mister Groups Side Curtain Groups Sidewall Inlet Groups Tunnel Inlet Groups Ceiling Inlet Groups Ridge Vent Groups Chimney Damper Groups Feeder Groups 24 Hr Feeder Run Time Feeder Total Run Time Light Groups Digital Alarm Groups Whisker Switch Groups 24 Hr Water Used Total Gallons Used	Today's Age / Weight Finish Age / Weight Beginning Head Count Total Mortality Head Count Total Sold Head Count

Legend

B - Bird Only

H - Hog Only

E – EET Capable Controllers Only

Note: Some menu items will not be visible if devices/equipment have not been installed.

HISTORY	TEMPERATURE CONTROL SETTING	MINIMUM VENT and PURGE SETTINGS	STATIC PRESSURE
Temperature Control **B** House Control Mode Setpoint Temperature Avg Temperature Zone Avg Temp High/Low Temps (actual) Low @ / High @ **E** Avg Air Speed Avg Outside Temp Avg Humidity Static Pressure Setpoint High/Low Static Pressure Purge Cycles (Humidity/ Timed) Mortality changed this hour by: **H** Stress Index **B** Brooder Grp ON Time Furnace Grp ON Time **H** Heater Grp ON Time Stir Fan Grp ON Time Sidewall Fan Grp ON Time Tunnel Fan Grp ON Time **H** Pit Fan Grp ON Time Ridge Fan Grp ON Time Vari-Stir Fan Grp ON Time Vari-Side Fan Grp ON Time Vari-Tunnel Fan Grp ON Time **H** Vari-Pit Fan Grp ON Time Vari-Ridge Fan Grp ON Time Cool Pad Low Grp ON Time Cool Pad High Grp ON Time **B** In House Fog Grp ON Time **H** Mister Grp ON Time Side Curtain Grp Avg Open Side Curtain Grp Actual Sidewall Inlet Grp Avg Open Sidewall Inlet Grp Actual Tunnel Inlet Grp Avg Open Tunnel Inlet Grp Actual Ceiling Inlet Grp Avg Open Ceiling Inlet Grp Actual Ridge Vent Grp Avg Open Ridge Vent Grp Actual Chimney Damper Avg Open Chimney Damper Grp Actual Feeder Grp ON Time Water Meter Amount used System Restart Incidents	Temp Setpoint Ramping ON/OFF Temp Control **B** House Control Mode Ridge to Curtains Interlock Heater to Curtains Interlock Enter Tunnel Temperature Exit Tunnel Temperature Remain in Tunnel Time Enable Tunnel Entry Outside Temp Today's Age Ramp Point / Age / Temp Temperature Ramp Offset **H** Floor Type Close Curtains Below Outside Temp	Minimum Vent Timer On/Off Min Vent #X Age/On/Off (X equals 1 to 9) Humidity Purge Setpoint Humidity Purge On/Delay Purge Inhibit Low/High Temp Before purge raise Temperature to Time to Abort Heat before Purge ————OR———— Purge Time On/Delay Humidity Purge Setpoint Humidity Purge On/Delay Purge Inhibit Low/High Temp Before purge raise Temperature to Time to Abort Heat before Purge	Natural Setpoint / Close / Open Tunnel Setpoint / Close / Open Ramp #X Temp / Static Pressure (X equals 1 to 5)

SOUND ALARM WHEN....	DEVICE/EQUIPMENT SETTINGS	TEST CONTROL CENTER HARDWARE	SUMMARY
Fixed High Temp Exceeds Temperature Above Feeder ON Time Exceeds Feeder OFF Time Exceeds Stat Press Stays Above High Pressure Alarm Open ALL inlets Stat Press Stays Below Fan ON Stat Press Below Hightest/Lowest Air Probes differ by	Feeder Lights Vari-Ridge Fan **H** Vari-Pit Fan Vari-Tunnel Fan Vari-Side Fan Vari-Stir Fan Ridge Fan **H** Pit Fan Tunnel Fan Sidewall Fan Stir Fan **B** In House Fog **H** Mister Cool Pad High Cool Pad Low **H** Heater Furnace **B** Brooder Chimney Damper Ceiling Inlet Tunnel Inlet Sidewall Inlet Ridge Vent Side Curtain Position Sensor Tunnel Inlet Sidewall Inlet Ridge Vent Side Curtain Whisker Switch Digital alarm Water Meter Sensor Humidity Sensor Static Pressure Sensor Feed Sensor Outside Air Sensor Air Sensor Shared Air Sensor	Test Alarm Relay Test Outputs Test Inputs Test Output Status Test Digital Input Test KeyBoard Keys Temperature Control Simula-tion For the devices listed under the DEVICE/EQUIPMENT SETTINGS column, the settings are submenus of this main menu. Press **ENTER** to access the submenus. The guide to the submenus are listed on the next (3) three pages.	Low / High Water Meter Sensor Feed Sensor Feeder **B** Brooder Furnace **H** Heater **H** Pit Fan Ridge Fan Sidewall Fan Stir Fan Tunnel Fan **H** Vari-Pit Fan Vari-Ridge Fan Vari-Side Fan Vari-Stir Fan Vari-Tunnel Fan Cool Pad High Cool Pad Low **H** Mister **B** In-House Fogger **B** Brooder Gallons Furnace Gallons **H** Heater Gallons All Heaters Total Gallons

# APPENDIX 24 - (SUBMENU) Menu Guide DEVICE/EQUIPMENT SETTINGS

System-wide Parameters Setup - quick instructions

To get to the System and Control Device Setup screen:

1. Press the Home key.
2. Press the Menu Hot Keys button
3. Press the System/Control Device Setup button.

> - You can set the Language setting anytime from within the GLOBAL PARAMETER SETTINGS menu by pressing the right arrow key when viewing the SYSTEM & CONTROL DEVICE SET-UP menu.
> - A Global Parameters menu appears if you delete all of the installed devices. Global Parameters allows for basic configuration such as Hogs or Birds, English or Metric measurement, Fahrenheit or Celsius temperature, and English or Spanish language.

4. Select "Add Control Device" and press Enter.

5. Use the (+) or (-) key to navigate from one device to the next.

SYSTEM & CONTROL DEVICE SET-UP Z1-S01 13:17:14 08/03/20 Enter Time of Day: 13:17 Enter Date: 8/03/2020 Power Up Load Delay Time: 0:00 LIST, CHANGE, DELETE Control Device. ADD Control Device. ADD New Zone. DELETE a Zone. Go To OUTPUT DEVICE SETTINGS Go To INPUT DEVICE SETTINGS Cancel	**SYSTEM & CONTROL DEVICE SET-UP Z1-S01** 14:14:46 08/03/20 ADD:Air Sensor # 1 Z1-S01 to Module 01 Channel 01. Cancel <--- Enter ---> Next Device Previous Device

Below is a list of available devices to chose from: (B) = Bird only   (H) = Hog only

VariLights	Stir Fan	(B) Brooder	Side Curtain
Feeder	Hemi Fan	Vari - Brooder	Position Sensor
Lights	VFD Ridge Fan	Vari - Heater	Whisker Switch
Vari - Ridge Fan	(H) VFD Pit Fan	Chimney Damper	Digital Alarm
(H) Vari - Pit Fan	VFD Tunnel Fan	Ceiling Inlet	Water Meter Sensor
Vari - Tunnel Fan	VFD Side Fan	Tunnel Inlet	Humidity Sensor
Vari - Side Fan	VFD Hemi Fan	Sidewall Inlet	Static Pressure Sensor
Vari - Stir Fan	(B) In House Fog	Ridge Vent	Feed Sensor
Vari - Hemi Fan	(H) Mister	Side Curtain	Outside Air Sensor
Ridge Fan	Cool Pad High	Position Sensor	Air Sensor Shared
(H) Pit Fan	Cool Pad Low	Tunnel Inlet	Air Sensor
Tunnel Fan	(H) Heater	Sidewall Inlet	
Sidewall Fan	Furnace	Ridge Vent	

6. Once you have located and selected the device to add, use the **RIGHT** or **LEFT** menu arrows to move the cursor (_) to the desired setting (channel, etc.). To change the default number, use the (+) or (-) keys.

7. Press **ENTER** to accept the settings and then press **ENTER** again to confirm the settings.

The controller returns you to the <u>"Add a Control Device"</u> selection (Step # 4) to select another control device.

When you are done adding devices, proceed to Device Parameters on the next page.

> *Pressing the Cancel key allows you to back out of a selection if no changes are desired or if you enter a selection unintentionally.*

Device Parameters - quick instructions

1. When your input and output devices have been entered, select the "Go to Output Device Settings" or "Go to Input Device Settings" and press **ENTER** to go to the first device settings screen.

2. Use the **RIGHT** or **LEFT** menu arrows to locate the devices just installed so that you can enter your detailed parameter settings.

> *If you do not install a device, the menu heading will not be displayed.*

3. To change a parameter setting, select it and press **ENTER**, then use the plus and minus keys (+ −) to increase and decrease the value.

4. Press **ENTER** to save the change or Cancel to discard the change.

FEEDER AND LIGHTS	STIR, SIDEWALL, TUN-NEL, PIT (HOG) AND RIDGE FANS	VARI-STIR, VARI-SIDE, VARI-TUNNEL, VARI-PIT *(HOG)* AND VARI-RIDGE	BROODER *(BIRD)* HEATER *(HOG)* AND FURNACES

Setting #X Age= 0 ON= 0:00, OFF= 0:00
 { 0:00-24:00}
 (X = 1 - 30)
 Run For
 	
 VARI-LIGHTS
 	
 Seting #X Age=0
 ON=0:00, OFF=0:00
 0% D/D or SPK
 Minimum Ramp ON
 Percent
 OFF to ON Ramp Time
 ON to OFF Ramp Time
 Run For X at 0%
	Use Sensors
	 Operating Mode
	 ON Temp / OFF Temp
	 Run Mode
	 ON Timer / OFF Timer
	 Run While ENTRY/EXIT of Tunnel Mode?
	 Use for Proportional Control? (Not in Stir fans)
	 Fans OFF at Curtain Opening (Note 1)
	 Fan OVERRIDE Curtain Open (Note 2)
	 Looking At (x) (Note 2)
	 ---------------------- 	
	 Note 1: Enabled only if Position Sensor is installed and Calibrated and Operating Mode is not Tunnel only and Position Sensor alarm is on
	 Note 2: Enabled only when Fans Off At Curtain Opening is enabled and is greater than 0.
		Use Sensors
		 Operating Mode
		 ON Temp / OFF Temp
		 Fan ON Power Setting
		 Power Ramping Start Temp
		 Full Power Temp
		 Full Power Setting
		 Run Mode
		 ON Timer / OFF Timer
		 Timed Power Setting
		 Purge Mode Power Setting
		 Run While ENTRY/EXIT of Tunnel Mode?
		 Use for Proportional Control? (Not in Stir fans)
		 Fans OFF at Curtain Opening (Note 1)
		 Fan OVERRIDE Curtain Open (Note 2)
		 Looking At (x) (Note 2)
		 ---------------------- 	
		 Note 1: Enabled only if Position Sensor is installed and Calibrated and Operating Mode is not Tunnel only
		 Note 2: Enabled only when Fans Off At Curtain Opening is enabled and is greater
			Use Sensors
			 Temp ON / OFF Actual
			 Temp ON / OFF Adjusted
			 Lower Temp By: From/To
			 Interlock Curtain Grps
			 Use During Heat Purge
			 BTUs/Has Pilot Light
			
			 VARI-BROODER VARI-HEATER *(Ventra - ONLY)*
			
			 Use Sensors
			 Lower Temp By: From/to
			 Interlock Curtain Grps
			 Use Duing Heat Purge
			 BTUs Minimum/Maximum
			 Target Temp/Off Actual
			 Target Temp/Off Adjusted
			 Alarm When Heater is at MAX for:
			 Shut Off on Alarm
			 Gas Regulator: Module/Channel

COOL PAD LOW/HIGH, In House Fog *(bird),* and Mister *(hog)*	SIDE CURTAIN	SIDEWALL, TUNNEL AND CEILING INLETS	RIDGE VENT
Use Sensors Time of Day to Enable/Disable Humidity Disable/Re-enable Temp+Humidity Disable/Re-enable FULL ON Temp / OFF Temp Cycle #X ON Temp Cycle #X ON Timer / OFF Timer Minimum ON Temp Min Temps (X=1 - 4)	Use Sensors Static Pressure Pause Timer Open Temp / Close Temp Open This Distance & Pause Close This Distance & Pause Maximum Opening /Below Temp Operate As Tunnel Fans ON X, Open Size Tunnel Interlock Y to Fan Tunnel Opening Sizes are: Response Mode Full Opening Size Full Open Travel Time Full Close Travel Time Purge Opening Size Pre-Open Timer Exercise Delay Days Perform Exercise At Number Hours 50% Open Tunnel Entry Size/Exit Size Perform Re-Sync at:	Static Pressure Pause Timer Operate As Cool Fans ON X, Open Size Natural Interlock X to Fan Cooling Opening Sizes are: Tunnel Fans ON X, Open Size Tunnel Interlock X to Fan Tunnel Opening Sizes are: Full Opening Size Full Open Travel Time Full Close Travel Time Purge Opening Size Pre-Open Timer (Not Tunnel Inlets) Tunnel Entry Size/Exit Size Perform Re-Sync at (Sidewall / Ceiling Inlets Only) Close To/When Curtain>= Close Override Temperature Looking at (Y) (x=0-9) (Y=1-4)	Use Sensors Open Temp / Close Temp Open This Distance & PAUSE Close This Distance & PAUSE Response Mode Full Opening Size Full Open Travel Time Full Close Travel Time Purge Opening Size Interlock Curtain Groups Perform Re-Sync at:

CHIMNEY DAMPER	DIGITAL ALARM	WHISKER SWITCH	POSITION SENSOR
Cool Fans On X, Open Size Interlock X to Ridge Fan Cooling Opening Sizes are: Full Opening Size Full Open Travel Time Full Close Travel Time Perform Re-Sync (X=0 - 9)	Trigger alarm on Active input Input is Active when Alarm Delay Time	Attached To Validate Switch – Low \ High Seconds delay alarm Out of Position	Attached To Press Enter to calibrate this sensor Enable Position Alarm? Percent OUT of Position to Alarm ---------------------- Note: These menus appear when calibrating: 1) Check Pot Open / Resistance 2) Check Pot Close / Resistance 3) Go To Close / Resistance 4) Measure Full Open / Resistance 5) Measure Full Close / Resistance

SENSOR CALIBRATION AND SETTING

Air Sensor Cable Length
Air Sensor Wire Gauge/Diameter
Air Sensor Temperature Offset
B Air Sensor Location
E Air Sensor Cal Values
E Use for Wind Speed
Humidity CAL 1 Cal 2
Static Pressure ADC Cal 1
Static Pressure ADC Cal 2
Static Pressure WC Cal 1
Static Pressure WC Cal 2
Feed Minimum / Actual
Feed CAL Value
Water Cal Value

APPENDIX 25 - Customer Service

Dealer Name: _____

Street / PO Box _____

City _____

State / Province _____

Customer Service
210 E. Main Street
Coldwater, OH 45828
800.998.2526

Zip / Postal _____

Phone _____

Fax _____

E-mail _____

Web site _____

North America:
Phone: 800.99VALCO (800.998.2526)
Fax: 419.678.2200
Email: sales@val-co.com

International:
Phone: (+1) 419.678.8731
Fax: (+1) 419.678.2200
Email: intl.sales@val-co.com