MicroZone™

Automatic Lamp & Mat Heating Control

HerdStar™

PM-MCM100-01-240
8/02/7

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1400 Madison Ave, Suite 504
Mankato, MN 56001
PH: 507-344-8005 FAX: 507-344-8009
www.herdstar.com

Thank you for purchasing a MicroZone Lamp & Mat supplement heat control system from HerdStar LLC.

Overview

Your MicroZone system provides a cost-effective way to automatically adjust the heat output from supplemental heaters that provide localized heat for newborn animals. By automatically varying the heat output of infrared lamps or electric heating mats, based on room temperature changes and a growing animal's needs, the animal's microenvironment can be thermally optimized. The results are: healthier animals, a reduction in pre-weaned mortality, lower labor costs, longer equipment life and a 20+% savings in energy costs compared to manually-controlled heating devices.

Components

A MicroZone system consists of four basic components:

MicroZone MC100 Lamp and Mat Controller

This is the main control unit of the MicroZone system. The MicroZone MC100 monitors room temperature, or mat temperature, and varies the power to the heat lamps or mats from 0 to 100 percent. It does this using the MicroZone Power Modulator based on the measured temperature and its relationship to the programmed temperature control band. It also provides the programmable temperature ramp to adjust your power settings based on animal age. One MC100 can control up to twelve MPM100 power modulators.

MicroZone MPM100 Power Modulator

The MicroZone MPM100 regulates the power going to the heat lamps or heating mats in response to commands from the MC100 control module.

MicroZone MPS100 Power Supply

The MPS100 supplies the operating voltage for the MC100 control module.

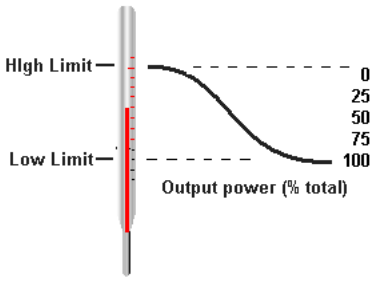
Temperature-Sensing Probe

This allows the MC100 Controller to accurately measure the room temperature of your animal's environment, resulting in optimized power settings for your lamps or electric heating mats. One or two temperature sensors can be used to monitor the room or mat temperature. When two sensors are used, the MC100 will use the average temperature of the two sensors to adjust the power to the heat lamps or mats.

Features

Temperature Control Band

Understanding the temperature control band is the key to understanding the operation of the MicroZone system.



- If the room temperature is above the HIGH LIMIT the MC100 controller sets the MPM100 power level to 0%: a STANDBY, or no heat condition.
- If the room temperature is below the LOW LIMIT the controller sets the power output level to 100%: a FULL POWER, maximum heat condition.
- If the room temperature is between the HIGH and LOW limit (the TEMPERATURE CONTROL BAND), the controller sets the output power to a proportional value based on the measured temperature and the temperature control band.

- The circuit may also be set manually to either FULL POWER or STANDBY on the Power Modulators, overriding the MC100 controller.

Soft Start

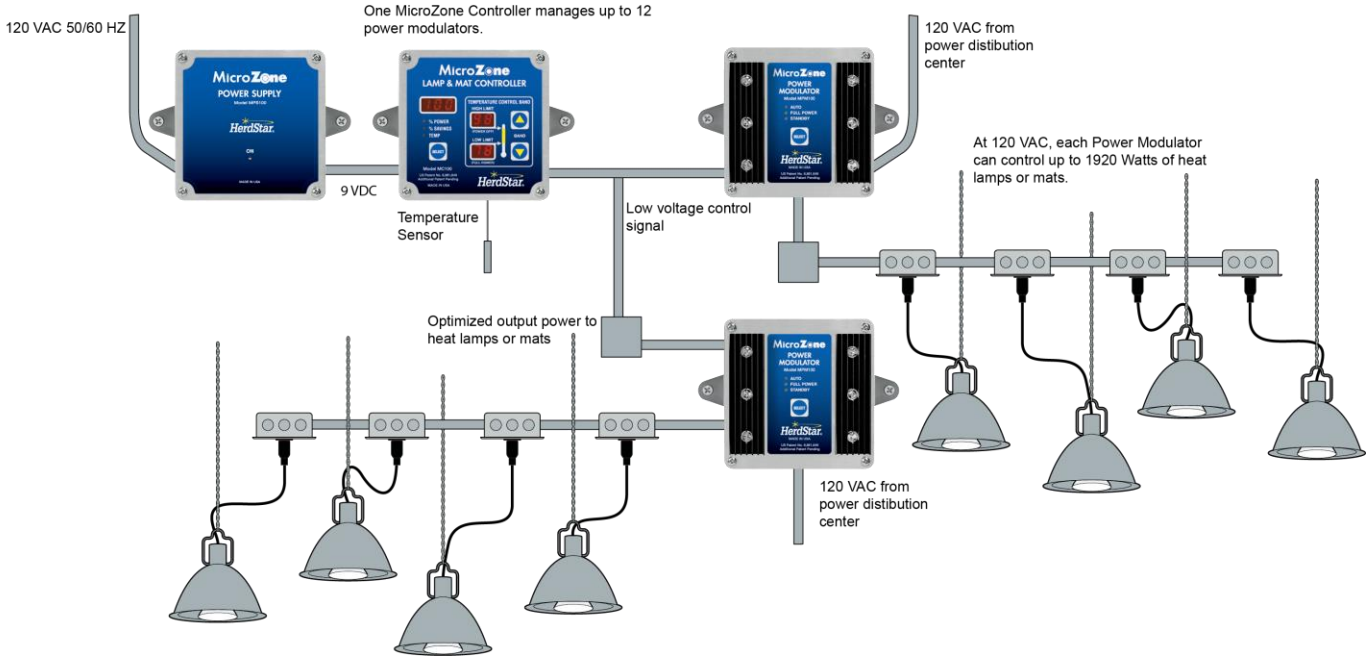
After a power outage, power is slowly reapplied to the heaters until the desired power level is reached. This will extend the lifetime of infrared heat lamps by reducing the power surge, and also lower the peak electricity demand placed on backup generators.

Temperature Ramp

Temperature Ramping will automatically reduce the temperature control band daily to adjust for the reduced heating requirements of growing animals.

System Setup / Operation

Here's a simplified diagram to show how the MicroZone units interconnect. A qualified electrician can easily wire the units using standard electrical wire. See the ***MicroZone Installation Manual*** for detailed wiring information.



Initial System Configuration

New MicroZone installations require a one-time system configuration procedure before use. In this mode you can change what type of heating devices are connected, whether you want temperature displayed in Fahrenheit or Celsius, and the type and number of temperature sensors.

Changing System Configuration / Displaying Software Revision

1. On the MC100 Controller, press and hold the SELECT key for approximately 8 seconds ("H L" will be displayed above the SELECT key).
2. Press the UP or DOWN buttons to select between "HL" for heat lamps and "HP" for heating pad (mats).
3. Press the SELECT key again, until °F or °C is displayed.

4. Press the UP  or DOWN  buttons to select between °F or °C, for Fahrenheit or Celsius temperature readings.
5. Press the SELECT key again to advance to sensor types and number of sensors.
6. This is your temperature sensor setting. See the ***Temperature Sensor Options*** section below for details on how to set this up to work with your configuration.
7. Press the SELECT key again to display the correction factor setting. This will be displayed as "c 0" (default setting). See the ***Correction Factor*** section below for details on how this setting works, and what it can do for your configuration.
8. Press the SELECT key again to display the software revision. Both HIGH and LOW limits will show "- -". This information may be needed if you are reporting a problem to the HerdStar service department.

After 20 seconds of keypad inactivity, the control will return to the normal display.

Temperature Sensor Options

There are several options available for temperature sensors to monitor your rooms. One or two temperature sensors can be used to monitor rooms. Two sensors may be used in large rooms to average the temperature of the room. (**Note**: when two sensors are used the MC100 will use the mean (average) of the two sensors to control the heat lamps or mats).

1. On the MC100 Controller, press and hold the SELECT key for approximately 8 seconds ("H L" will be displayed above the SELECT key).
2. Release the SELECT key, and press the SELECT key twice. The display will now show the default temperature sensor selection (t1A). This is the selection for one (1) HerdStar supplied temperature sensor. See the table below for additional temperature sensor selections.
3. Press the BAND UP  or DOWN  buttons to change the temperature sensor until you have the desired sensor selected. (**When using heat mat sensors, be sure the heat pad setting, "HP", is selected in the System Configuration section above**).

After 20 seconds of keypad inactivity, the control will return to the normal display.

Displayed	# Sensors	Sensor Type
t1A	1	Type A: (Herdstar TS3, 10KΩ @ 25°C) DEFAULT
t1b	1	Type b: 1KΩ @ 25°C. Used in Hog Hearth heat mats.
t1c	1	Type C: 5KΩ @ 25°C. Used in Kane heat mats.
t1d	1	Type d: Not currently used. Functions same as t1A.
t2A	2	Type A: (Herdstar TS3, 10KΩ @ 25°C)
t2b	2	Type b: 1KΩ @ 25°C. Used in Hog Hearth heat mats.
t2c	2	Type C: 5KΩ @ 25°C. Used in Kane heat mats.
t2d	2	Type d: Not currently used. Functions same as t1A.

Correction Factor

The correction factor is for users who use their mat manufacturer's sensor mat instead of the supplied MicroZone TS3 temperature sensor, or for users who have a TS3 installed in their mat. These users often experience a temperature "offset" between the temperature measured (as reported by the MC100 Controller) and the mat surface temperature. This offset is typically several degrees. The correction factor is a simple temperature offset, which adds or subtracts the set correction factor from the measured temperature. The user must decide what (if any) value to use. The default value is 0 (no correction). Press the BAND UP  or DOWN  buttons to change this setting between –9 and 9. Negative values indicate a subtraction from the measured temperature; positive values an addition.

Changing Control Settings

Control settings determine the temperature range that your MicroZone system will maintain.

Adjusting temperature settings

This will move the temperature control band up or down to adjust the heat output of the heating devices.

From the normal display mode, press the BAND UP or DOWN buttons until the temperature at which you want the heating devices to turn completely off is displayed on the HIGH LIMIT display. Both the High and Low limit values will change together as you move the temperature control band up or down. The percent (%) power display will also change as you raise or lower the temperature band. If you hold down an arrow key for approximately 3 seconds, the temperature will begin to change at a higher rate.

After 20 seconds of keypad inactivity, the control will return to the normal display.

Adjusting Temperature Control Bandwidth

This will set the range between your HIGH and LOW temperature limits.

1. From the normal display mode, press and hold the SELECT key for approximately 5 seconds. The LOW LIMIT display will start to flash; the HIGH LIMIT display will remain steady.
2. Note the difference in degrees between the HIGH and LOW LIMITS. This is your temperature control bandwidth. This example shows a temperature control band of 18° F (default).
3. Press the BAND UP or DOWN buttons to change the lower limit value until you have the desired range between the high and low limits. If you hold down an arrow key for approximately 3 seconds, the temperature will begin to change at a higher rate.

After 20 seconds of keypad inactivity, the control will return to the normal display. (**Note**: only the LOW LIMIT is changed during this process. To change the HIGH LIMIT, adjust the temperature setting as described in the previous section.)

Adjusting Temperature Ramp

The temperature ramp is the amount that the MicroZone will lower your temperature setting (temperature control band) every 24-hour period to account for reduced heating requirements as your animals grow.

1. On the MC100 Controller, press and hold the SELECT key. After 5 seconds, the LOW LIMIT display starts to flash.
2. Release the SELECT key, and press the SELECT key again. The display will now show the ramp value. This example shows a ramp value of 1.5° F. This is the amount the control will lower the HIGH LIMIT *and* LOW LIMIT temperature settings every 24-hour period.
3. Press the BAND UP or DOWN buttons to change the ramp value until you have the desired temperature drop per day displayed (**setting this to .0 disables the ramping feature**).

After 20 seconds of keypad inactivity, the control will return to the normal display.

Service

Cleaning

Do not clean the MicroZone modules with a pressure washer. Use a washcloth soaked in warm water containing a mild detergent and disinfectant.

Servicing and Repair

Your MicroZone modules contain NO USER SERVICEABLE PARTS. If the product stops working for any reason, it must be repaired by a qualified service technician or returned to the factory for repair.

Troubleshooting

Common problems include incorrect wiring, tripped circuit breakers, burned out heat lamps or mats, damaged power cords, etc. Internal diagnostics of the unit can detect other problems as follows:

"E-t" displayed – There is a problem associated with the temperature sensing probe or its cable.

Flashing "888" displayed – The MC100 needs to be returned to the factory for repair.

Flashing AUTO indicator – Communications between the Controller MC100 and the Modulator have failed. *The communications wiring may have been damaged or become disconnected.*

Intermittent AUTO Indicator – The power modulator has detected a short circuit. When this happens the power modulator will immediately turn off the output power, and after a 5 second delay, slowly re-apply power. If the short circuit condition remains, the output power is turned off and the cycle repeats until the condition is corrected. This feature protects the MicroZone modules from a catastrophic failure. ***When infrared lamps are initially plugged in, or supply circuit breaker turned on, the high surge current may cause this error code to be momentarily displayed.***

Resetting to Factory Default Settings

To restore your MicroZone to its factory default settings, turn off power to the MC100 controller. While holding the SELECT key on the controller, reapply power to the system. The default settings will be restored.

For assistance, make sure you have checked the parameters on the MicroZone. If you still need assistance or have questions regarding the operation of your MicroZone system, contact:

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Specifications

Operating Environment: 0° F to 105°, 10 to 95% RH (indoor use only)

MPS100 MicroZone Power Supply
Input Voltage: 120VAC, 0.1A, 50/60Hz
Output Supply: 200mA max output at 9 VDC
Output Capacity: Maximum of 5 MicroZone Controllers within 200 feet using 18AWG, two-conductor wire.

MC100 MicroZone Controllers
Input Power: 9VDC
Temperature Specifications: +/- 2 degrees Fahrenheit at 30'
+/- 2.5 degrees Fahrenheit at 2000' using 22AWG two-conductor cable
+/- 2.5 degrees Fahrenheit at 5000' using 18AWG two-conductor cable
Communications Output Capacity: Maximum of 12 MPM MicroZone Power Modulators within 500 feet using 18AWG two-conductor wire.

Temperature sensing probe error: Less than 2° F (HerdStar supplied TS3 sensor)

MPM100 MicroZone Power Modulator
Input Power: 120/240VAC, 16A Maximum
Load Rating: 0-120VAC or 0-240VAC (2kW@120V or 4kw@240V Maximum)
Load Type: Resistive or Incandescent

Electrical protection: Short circuit, overload and voltage surge
Noise filter: FM radio filter
Enclosures: Weather tight (approximately 4" x 4" x 2")

IMPORTANT:
Do not exceed the listed Load Rating and Operating Environment limits, or attempt to use the MicroZone as an electronic speed control for electric motors.

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