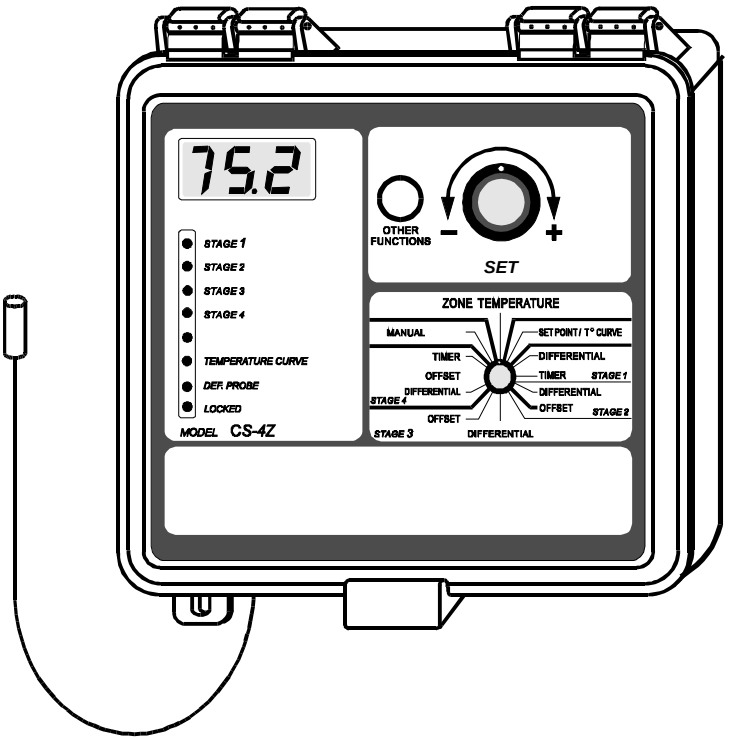
# Temperature Controller

# CS-4Z

## User's Guide




Read this guide carefully before using the controller.

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# PRECAUTIONS

We strongly recommend installing supplementary natural ventilation as well as a back-up thermostat on at least one cooling stage (refer to the wiring diagram enclosed with this user's manual to connect the thermostat).

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

The room temperature where the controller is located MUST ALWAYS REMAIN BETWEEN 32°F AND 104°F (0°C TO 40°C).

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

**DO NOT SPRAY WATER ON THE CONTROLLER**

**FOR CUSTOMER USE**
Enter the serial number located on the side of the controller below for future reference.

Model number: **CS-4Z**
Serial number: _____

# FEATURES

The CS-4Z is an electronic device used for environmental control in livestock buildings. It allows the user to maintain a specified target temperature by controlling the operation of ventilation and heating equipment. Four stages of either constant speed fans or heating units can be connected to the unit.

The main features of the CS-4Z are as follows:

**THREE-DIGIT DISPLAY**

A three-digit display provides a high level of accuracy, allowing the user to specify a temperature to within one tenth of a degree (in Fahrenheit or Celsius units).

**PILOT LIGHTS INDICATING STATE OF OUTPUTS**

Pilot lights indicating the state of outputs allow the user to monitor the operation of the system without having to enter the building.

**MINIMUM VENTILATION CYCLE**

When ventilation is not required for cooling, the first stage fans can be operated either continously or intermittently to reduce the level of humidity and supply oxygen to the room.

**TEMPERATURE CURVE**

The controller can be set to automatically change the temperature set point over a given period of time in accordance with the user's requirements by specifying a temperature curve with up to six different points each.

**TWO INDEPENDENT TEMPERATURE PROBE INPUTS**

The controller can be configured to operate two independent temperature zones for heating or cooling.

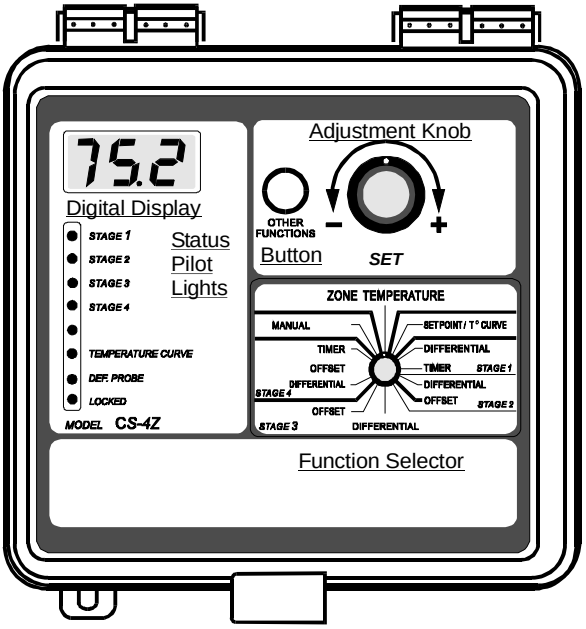
## OVERLOAD AND OVERVOLTAGE PROTECTION

Fuses are installed at the input and outputs of the controller to protect its circuitry in the case of an overload or overvoltage.

## COMPUTER CONTROL

The controller can be connected to a computer, thus making it possible to centralize the management of information and diversify control strategies.

# LOCATION OF THE CONTROLS




## CONTROLLER STATUS LEDS

| LED | MEANING |
|---|---|
| STAGE 1 | TURNS ON WHEN STAGE 1 FANS OR HEATING UNITS ARE ON. |
| STAGE 2 | TURNS ON WHEN STAGE 2 FANS OR HEATING UNITS ARE ON. |
| STAGE 3 | TURNS ON WHEN STAGE 3 FANS OR HEATING UNITS ARE ON. |
| STAGE 4 | TURNS ON WHEN STAGE 4 FANS, HEATING OR MIST UNITS ARE ON. |
| TEMPERATURE CURVE | TURNS ON WHEN THE TEMPERATURE CURVE IS ACTIVATED |
| DEF. PROBE | TURNS ON WHEN A DEFECTIVE PROBE IS DETECTED |
| LOCKED | TURNS ON WHEN THE PARAMETERS ARE LOCKED |

## INTERNAL SWITCHES

| # | OFF | ON |
|---|---|---|
| 1 | UNLOCKED PARAMETERS | LOCKED PARAMETERS |
| 2 | FAHRENHEIT DEGREES | CELSIUS DEGREES |
| 3 | RESERVED | |
| 4 | RESERVED | |
| 5 | RESERVED | |
| 6 | RESERVED | |
| 7 | RESERVED | |

**NOTE :** When the controller is shipped from the factory, all the switches are set to OFF.

# FACTORY SETTINGS

| PARAMETER | | FACTORY SETTINGS | RANGE OF VALUES |
|---|---|---|---|
| Temperature Set Point | | 75 °F (23.9 °C) | -40 to 99.9 °F (-40 to 37.7 °C) |
| Temperature Curve[a] | | OFF | days < 100 |
| Stage 1 | Differential | 2.0 °F (1.1 °C) | 0.5 to 20 °F (0.3 to 11.1 °C) -0.5 to -20 °F (-0.3 to -11.1 °C) |
| | Time On | 15 seconds | 0 to 900 seconds |
| | Time Off | 0 seconds | 0 to 900 seconds |
| Stage 2 | Differential | 2.0 °F (1.1 °C) | 0.5 to 20 °F (0.3 to 11.1 °C) |
| | Offset | 4.0 °F (2.2 °C) | -40 to 40 °F (-22.2 to 22.2 °C) |
| Stage 3 | Differential | 2.0 °F (1.1 °C) | 0.5 to 20 °F (0.3 to 11.1 °C) |
| | Offset | 6.0 °F (3.3 °C) | -40 to 40 °F (-22.2 to 22.2 °C) |
| Stage 4 | Time On | 15 seconds | 0 to 900 seconds |
| | Time Off | 0 seconds | |
| | Offset | 8.0 °F (4.4 °C) | -40 to 40 °F (-22.2 to 22.2 °C) |
| | Differential | 2.0 °F (1.1 °C) | 0 to 20 °F (0 to 11.1 °C) |

**NOTES** :

i) These initial parameter settings will not be retained in the controller's memory. Each new setting will replace the preceeding one.

ii) If the power supply is cut off, the last parameter settings will be retained in memory until the power is restored.

(a) The range of values for curve temperatures is 35°F to 99.9°F (1.7°C to 37.7°C).

# INSTALLATION

## MOUNTING INSTRUCTIONS

Slide the latch on the front cover and lift the cover. Mount the enclosure on the wall using three screws. Be sure the electrical knockouts are at the bottom of the enclosure in order to prevent water from entering the controller. Insert the screws in the mounting holes provided in three corners of the enclosure and tighten. Fasten the three black caps provided with the controller onto the three mounting holes.

## CONNECTIONS

To connect the controller, refer to the wiring diagram enclosed with this user's manual.

- Set the voltage switch to the appropriate voltage.
- Use the electrical knockouts provided at the bottom of the enclosure. Do not make additional holes in the enclosure, particularly on the side of the enclosure when using a computer communications module.
- If a stage is used for heating, it may be necessary to install a transformer in order to supply the appropriate voltage to the heating unit.




ALL WIRING MUST BE DONE BY AN AUTHORIZED ELECTRICIAN AND MUST COMPLY WITH APPLICABLE CODES, LAWS AND REGULATIONS. BE SURE POWER IS OFF BEFORE DOING ANY WIRING TO AVOID ELECTRICAL SHOCKS AND EQUIPMENT DAMAGE.

## TEMPERATURE PROBES

### ❶ Connecting the Probes

The controller is supplied with one temperature probe connected to terminal # 1. If an additional probe is used, it must be connected to terminal # 2.

**CAUTION**: Probes operate at low voltage and are insulated from the supply. Be sure that probe cables remain insulated from all high voltage sources. In particular, do not route the probe cables through the same electrical knockout as other cables. Do not connect the shield from the probe cable to a terminal or a ground.

### ❷ Extending the Probes

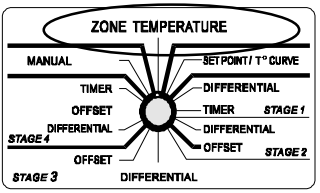
Each probe can be extended up to 500 feet (150 meters). To extend a probe:

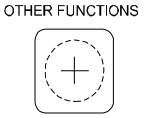
- Use a shielded cable of outside diameter between 0.245 and 0.260 in (6.22 and 6.60 mm) (the cable dimensions should not be under 18 AWG) to ensure the cable entry is liquid tight. Do not ground the shielding.
- It is preferable to weld the cable joint to ensure a proper contact between the two cables.

**CAUTION:** Do not run probe cables next to other power cables. When crossing over other cables, cross at 90°.

## ❸ Defective Probes

If a defective probe is detected, the Defective Probe Pilot Light turns on. The room temperature shown on the display is then the average temperature measured by the probes in working condition. The controller will operate according to this temperature.
To identify the defective probe:




- Set the selection knob to **ZONE TEMPERATURE**. The average room temperature is displayed.

- Press the push-button. If probe 1 connected to terminal # 1 is not defective, the letters"**PR1**" are displayed, alternating with the temperature measured by the probe. Otherwise, the letters "**PR1**" are displayed, alternating with the letter "**P**".

- Press the push-button once again. If probe 2 is not defective, the letters "**PR2**" are displayed, alternating with the temperature measured by the probe. If the probe is defective, the letters "**PR2**" are displayed, alternating with the letter "**P**".

# CHANGING THE PARAMETER SETTINGS

## THE MEANING OF A FLASHING DISPLAY

The display will flash in certain cases and not in others. The flashing indicates that the value shown can be adjusted. A value that is not flashing cannot be adjusted.




## LOCKING THE PARAMETER SETTINGS

The parameter settings can be locked to prevent accidentally modifying them. When the settings are locked, only the temperature set point can be modified (as long as the temperature curve is deactivated).

To lock the parameter settings:

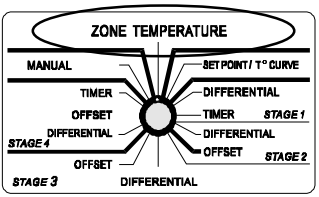
- Set internal switch # 1 to **ON**. The Locked Parameter Pilot Light turns on.

To unlock the parameter settings:

- Set internal switch # 1 to **OFF**. The Locked Parameter Pilot Light turns off.

# ADJUSTING THE TEMPERATURE

## VIEWING TEMPERATURES




1. Temperatures are displayed to one tenth of a degree. To display the desired temperature, set the selection knob to **ZONE TEMPERATURE**. The readout can display values from -40.0°F to 120.0°F ( -40.0°C to 48.9°C).

2. Temperatures can be displayed in Celsius or Fahrenheit units. To change the default units, use internal switch # 2.

3. When the temperature drops below -9.9, the negative sign is displayed separately, alternating with the numerical value.

### ❶ To View Room Temperature

The room temperature is the average value of the temperatures measured by both probes.

- Set the selection knob to **ZONE TEMPERATURE**. The room temperature is displayed, alternating with the word "**ALL**".

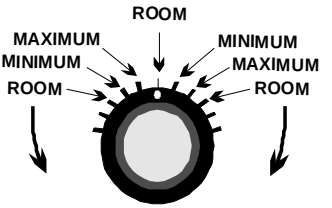
### ❷ To View Zone Temperatures

- Set selection knob to **ZONE TEMPERATURE**. The room temperature is displayed.
- Press the push-button. The letters "**PR1**" are displayed, alternating with the temperature measured by the probe connected to terminal # 1.
- Press the push-button once again. The letters "**PR2**" are displayed, alternating with the temperature measured by probe 2.

## ❸ To View Minimum / Maximum Temperatures

The minimum and maximum temperatures are the lowest and highest temperature values recorded since the last reset. The average minimum and maximum temperatures are stored as well as the individual probe minimum and maximum temperatures.

- Set the selection knob to **ZONE TEMPERATURE**. The room temperature is displayed. You can also choose to display the maximum and minimum temperatures measured by the probes individually. If you press the push-button once, the temperature measured by probe 1 is displayed. If you press the push-button once again, the temperature measured by probe 2 is displayed.

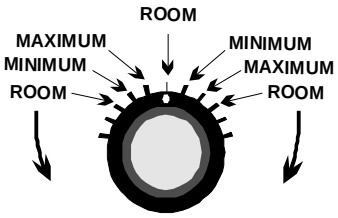



- Turn the adjustment knob clockwise by one notch. The minimum temperature flashes on the display.
- Turn the adjustment knob clockwise one notch further. The maximum temperature flashes on the display.
- Turn the adjustment knob clockwise a third notch. The room temperature is displayed again.
- If the adjustment knob is turned counterclockwise, the display sequence is reversed (room-maximum-minimum-room).

## MINIMUM / MAXIMUM TEMPERATURE RESET

- Set the selection knob to **ZONE TEMPERATURE**. The room temperature is displayed. You can also choose to reset the maximum and minimum temperatures measured by the probes individually. If you press the push-button once, the temperature measured by probe 1 is displayed. If you press the push-button once again, the temperature measured by probe 2 is displayed.

- Turn the adjustment knob clockwise (or counterclockwise) one notch and leave in this position for at least 10 seconds. The minimum (or maximum) temperature flashes on the display. After 10 seconds, the display stops flashing and the ambient temperature is displayed. The reset is now completed.




The controller resets the minimum and maximum temperatures by erasing the current values in memory. It then begins to store the new minimum and maximum temperatures in memory.

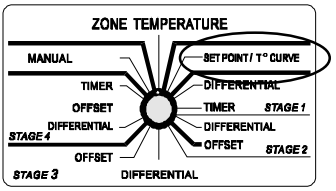
**CAUTION:** To avoid resetting the minimum and maximum temperatures while viewing them, return to the room temperature within the 10-second delay using the adjustment knob.

## TEMPERATURE SET POINT

The temperature set point is the target room temperature. It can be adjusted between -40.0°F and 99.9°F (-40.0°C and 37.7°C).

## TO ADJUST TEMPERATURE SET POINT

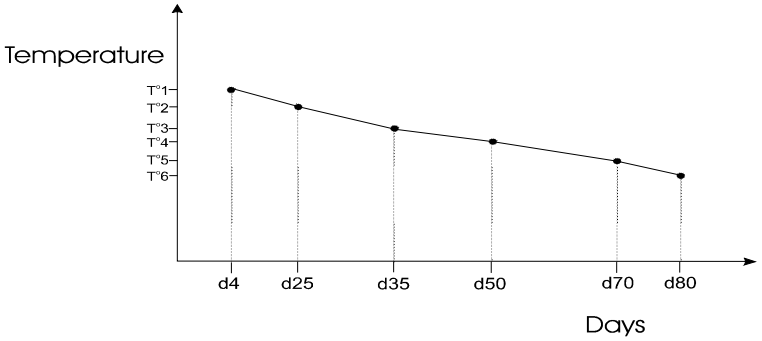
- Set the selection knob to **SET POINT/ T° CURVE**.The current set point flashes on the display.
- Use the adjustment knob to adjust the set point to the desired value.




**NOTE**: The temperature set point can be adjusted only if the temperature curve is deactivated (see following section).

## TEMPERATURE CURVE

The user can define a temperature curve to adjust the set point automatically over a given time period.



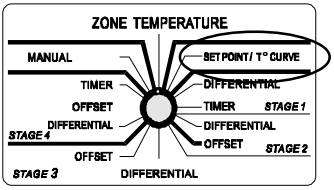

A curve is defined using six points. Each point specifies a day number and a set point for that day. Once the points of the curve are defined, the curve must be activated. The controller will change the temperature set point every hour in a linear fashion between consecutive points of the curve. When the last point of the curve is reached, the temperature set point for that day is maintained until the curve is reactivated.

NOTES :
i) All six points of the curve must be specified. If six points are not needed, repeat the last temperature value for each unnecessary point.

ii) Certain restrictions apply to reduce the risk of errors:

- The highest possible day number is 99.
- Decreasing day numbers are not allowed.
- Increasing temperatures are not allowed.
- The temperature variation cannot exceed 3°F (1.6°C) per day.

## ❶ To Specify the Temperature Curve




- Set the selection knob to **SET POINT/ Tº CURVE**. The current temperature set point flashes on the display.
- Press the push-button. The word **OFF** is displayed indicating that the temperature curve is deactivated. If this is not the case, see below to deactivate the curve.

Repeat the following steps for each of the six points:

- Press the push-button once again. The letter "**d**" followed by a day number flashes on the display.
- Using the adjustment knob, set the day number to the desired value.
- Press the push-button once again. The current temperature set point flashes on the display.
- Using the adjustment knob, adjust the set point to the desired value.

Once the six points of the curve have been specified, activate the curve as explained below.

**NOTE**: Make sure the temperature curve is deactivated before specifying new points (see below).

## ❷ To Activate Temperature Curve

If you have just finished specifying the points on the curve:

- Press the push-button once again. The word **OFF** flashes on the display.
- Turn the adjustment knob clockwise one notch and leave in this position for at least 10 seconds. The word **ON** flashes on the display and after 10 seconds, the Temperature Curve Pilot Light turns on indicating that the temperature curve is now activated.
- Set the selection knob to **ZONE TEMPERATURE**.

If you have previously defined the points on the curve:

- Set the selection knob to **SET POINT / T° CURVE**. The current value of the temperature set point flashes on the display.
- Press the push-button. The word **OFF** flashes on the display.
- Press the push-button to display the points of the curve currently defined until the word **OFF** appears (thirteen clicks).
- Turn the adjustment knob clockwise one notch and leave in this position for at least 10 seconds. The word **ON** flashes on the display and after 10 seconds, the Temperature Curve Pilot Light turns on indicating that the temperature curve is now activated.
- Set the selection knob to **ZONE TEMPERATURE**.

## ❸ To View Current Temperature Set Point / To View or Adjust Current Day Number

When the temperature curve is activated, the current temperature set point and day number can be viewed at any time. The current day number can also be adjusted in order to move forward or backward on the temperature curve.

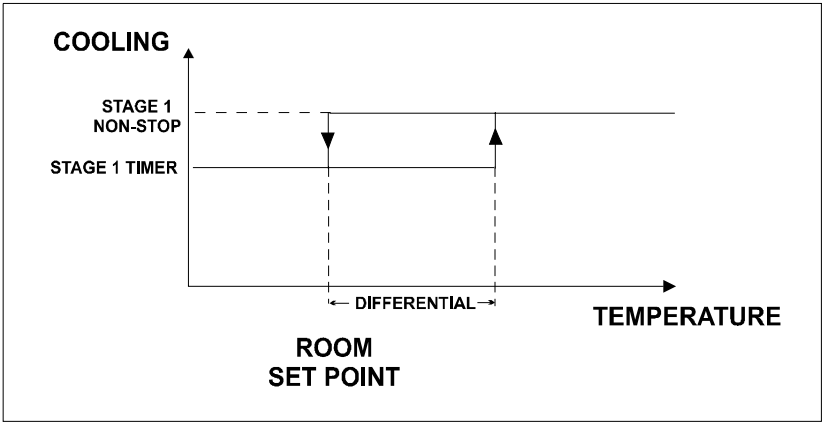
- Set the selection knob to **SET POINT / T° CURVE**. The current temperature set point is displayed.
- Press the push-button. The current day number is displayed.
- Use the adjustment knob to set the day number to the desired value.

## ❹ To Deactivate Temperature Curve

- Set the selection knob to **SET POINT / T° CURVE**. The current temperature set point is displayed.
- Press the push-button to display the points of the curve actually defined until the word **ON** appears (fourteen clicks).
- Turn the adjustment knob counterclockwise one notch and leave in this position for at least 10 seconds. The word **OFF** flashes on the display and after 10 seconds, the Temperature Curve Pilot Light turns off indicating that the temperature curve is now deactivated.
- Set the selection knob to **ZONE TEMPERATURE**.

# STAGE 1 PARAMETERS

## COOLING




**Temperature Rises:** When the room temperature is below the set point, the Stage 1 fans operate in timer mode to provide minimum ventilation (see below). When the temperature rises above the set point by a value equal to the differential, the Stage 1 fans operate continuously.

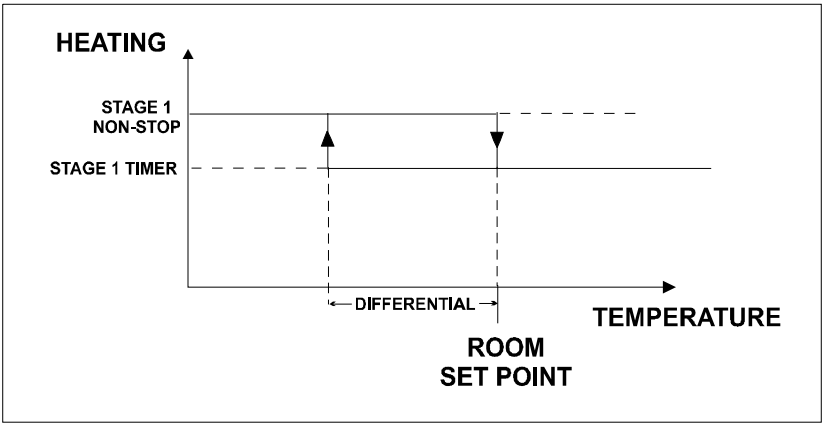
**Temperature Falls:** When the temperature falls to the set point, the Stage 1 fans stop operating continuously and operate in timer mode to provide minimum ventilation (see below).

**For example:** Set Point is **75°F** / Differential is **2°F**

(i) Temperature is less than 75°F: timer mode
(ii) Temperature rises to 77°F: continuous operation
(iii) Temperature falls to 75°F: timer mode

**NOTE:** The temperature reading for Stage 1 depends on the probe assignment for stage 1 (see Probe Assignments, p. 33).

## HEATING




**Temperature Falls:** When the room temperature drops below the set point by a value equal to the differential, the stage 1 heaters stop operating in timer mode and run continuously.

**Temperature Rises:** When the temperature reaches the set point, the stage 1 heaters stop operating continuously and operate in timer mode.

**For example:** Set Point is **75°F** / Differential is **-2°F**

(i) Temperature is greater than 75°F: timer mode
(ii) Temperature falls to 73°F: continuous operation
(iii) Temperature rises to 75°F: timer mode

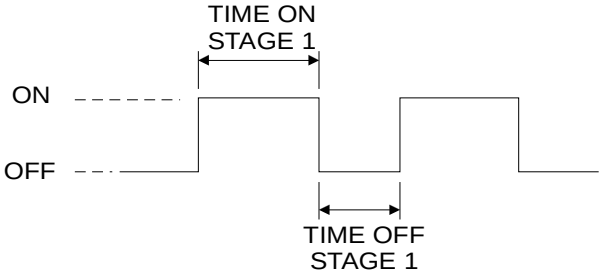
**NOTE:** The temperature reading for Stage 1 depends on the probe assignment for stage 1 (see Probe Assignments, p. 33).

### Timer Operation

The stage 1 timer can be used in both cooling and heating applications for running fans or heater units.

When stage 1 is in cooling mode, the timer can be used to provide minimum ventilation using fans. When the room temperature is below

the set point, the Stage 1 fans operate according to the minimum ventilation cycle. Running the fans even though ventilation is not required for a cooling purpose is useful to reduce humidity levels and supply oxygen to the room. It also prevents the fans from freezing in winter.




During time on, the Stage 1 fans or heating units are operating. The Stage 1 Pilot Light turns on. During time off, the Stage 1 fans or heating units do not run. The Stage 1 Pilot Light turns off.

## Timer Operating Modes

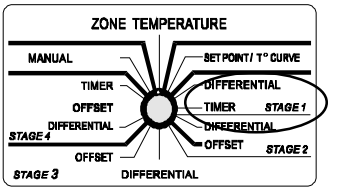
**1.** To run the fans or heating units continuously, set time off to zero and time on to any value other than zero.

**2.** To stop the fans or heating units, set time on to zero and time off to any value.

**3.** To run the fans or heating units intermittently, set time on to the desired running time and time off to the desired off time.

## Stage 1 Parameter Settings

### ❶ To Adjust the Time On / Time Off for Stage 1

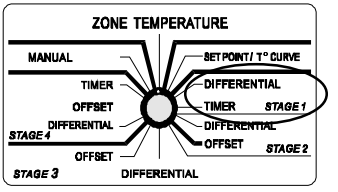



- Set the selection knob to **STAGE 1 - TIMER**. The current time on for Stage 1 flashes on the display, alternating with the word "On".
- Use the adjustment knob to adjust the time on to the desired value.
- Press the push-button. The current time off for Stage 1 flashes on the display, alternating with the word "Off".
- Use the adjustment knob to adjust the time off to the desired value.

Time on and Time off can be adjusted between 0 and 900 seconds, in increments of 15 seconds.

### ❷ To Adjust the Differential for Stage 1

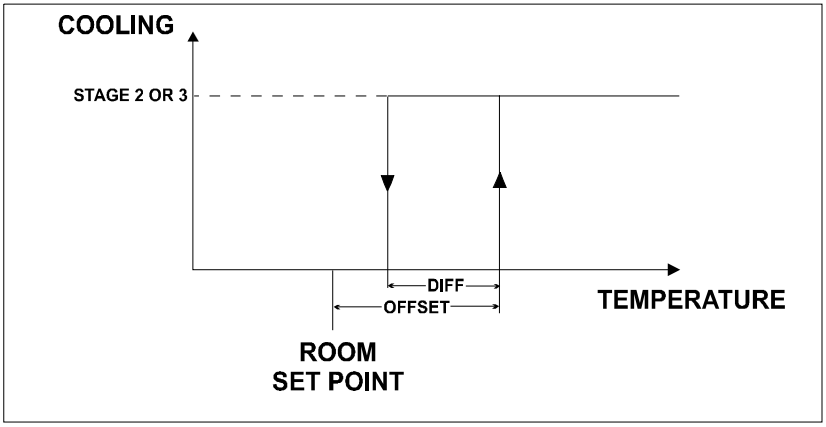
The Stage 1 differential is the temperature difference from the set point at which the Stage 1 constant-speed fans or heating units start to run continuously. They operate according to the timer settings when the temperature has returned to the set point (see the diagrams above). The differential can be adjusted between 0.5°F and 20.0°F (0.3°C and 11.1°C) for cooling and between -0.5°F and -20.0°F (-0.3°C and -11.1°C) for heating.




- Set the selection knob to **STAGE 1 - DIFFERENTIAL**. The current differential flashes on the display. This value represents the temperature difference from the set point. If you would like to see the corresponding value expressed as a temperature (i.e. set point + differential), press the push-button.
- Use the adjustment knob to adjust the differential to the desired value. When the differential is positive, stage 1 is used for cooling and when the differential is negative, stage 1 is used for heating.

# STAGE 2 AND 3 PARAMETERS

## COOLING




**Temperature Rises:** When the temperature rises above the set point by a value equal to the offset, the Stage 2 or 3 fans operate continuously.

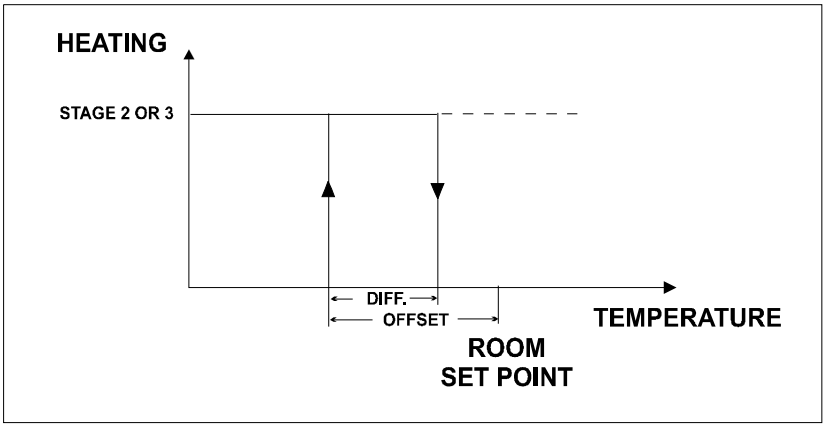
**Temperature Falls:** When the temperature falls to the set point plus the offset less the differential, the Stage 2 or 3 fans stop operating.

**For example:** Set Point is **75°F** / Offset is **8°F** / Differential is **2°F**

(i) Temperature rises to 83°F: fans start operating
(ii) Temperature falls to 81°F: fans stop operating

**NOTE:** The temperature reading for Stage 2 or 3 depends on the probe assignment for the stage (see Probe Assignments, p. 33).

## HEATING




**Temperature Falls:** When the room temperature drops below the set point by a value equal to the offset, the stage 2 or 3 heaters run continuously.

**Temperature Rises:** When the temperature reaches the set point less the offset plus the differential, the stage 2 or 3 heaters stop operating.

**For example:** Set Point is **75°F** / Offset is **-8°F** / Differential is **2°F**

(i) Temperature falls to 67°F: heaters start operating
(ii) Temperature rises to 69°F: heaters stop operating

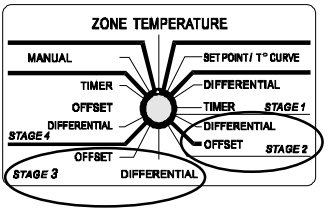
**NOTE:** The temperature reading for Stage 2 or 3 depends on the probe assignment for the stage (see Probe Assignments, p. 33).

## Parameter Settings

### ❶ To Adjust the Offset for Stages 2 and 3

The offset is the temperature difference from the set point at which the constant-speed fans or heaters start to run. They return to a stop when the temperature draws closer to the set point by a value equal

to the differential for that stage (see the diagram above). The offset can be adjusted between -40°F and 40.0°F (-22.2°C and 22.2°C).

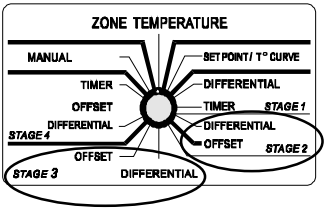



- Set the selection knob to the OFFSET position for the corresponding stage. The current offset flashes on the display. This value represents the temperature difference from the set point. If you would like to see the corresponding value expressed as a temperature (i.e. set point + offset), press the push-button.

- Use the adjustment knob to adjust the offset to the desired value.

## ❷ To Adjust the Differential for Stages 2 and 3

The differential is the temperature difference from the offset at which the constant-speed fans or heaters stop operating (see the diagram above). The differential can be adjusted between 0°F and 20.0°F (0 °C and 11.1°C).

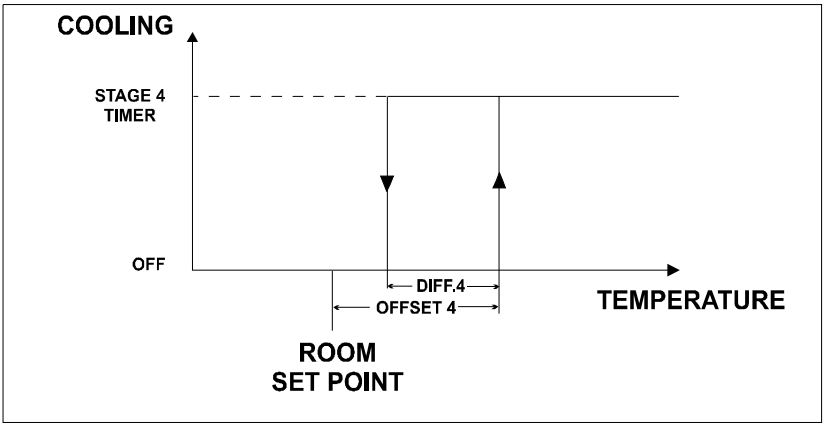



- Set the selection knob to the DIFFERENTIAL position for the corresponding stage. The current differential flashes on the display. This value represents the temperature difference from the offset. If you would like to see the corresponding value expressed as a temperature (i.e. set point + offset - differential), press the push-button.

- Use the adjustment knob to adjust the differential to the desired value.

# STAGE 4 PARAMETERS

## COOLING




**Temperature Rises:** When the room temperature is below the set point plus the offset, the Stage 4 fans or mist units do not operate. When the temperature rises above the set point by a value equal to the offset, the Stage 4 fans or mist units operate in timer mode (see below).

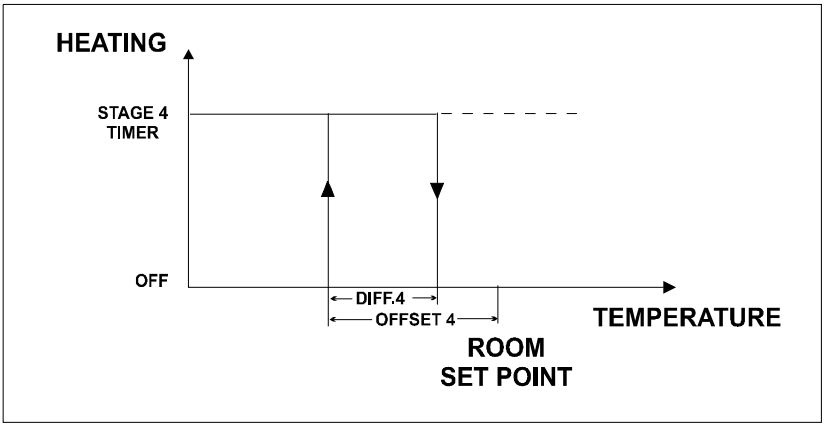
**Temperature Falls:** When the temperature falls to the set point plus the offset less the differential, the Stage 4 fans or mist units stop operating.

**For example:** Set Point is **75°F** / Offset is **8°F** / Differential is **2°F**

(i) Temperature is less than 83°F: off
(ii) Temperature rises to 83°F: timer mode
(iii) Temperature falls to 81°F: off

**NOTE:** The temperature reading for Stage 4 depends on the probe assignment for stage 4 (see Probe Assignments, p. 33).

## HEATING




**Temperature Falls:** When the room temperature drops below the set point by a value equal to the offset, the stage 4 heaters operate in timer mode.

**Temperature Rises:** When the temperature reaches the set point less the offset plus the differential, the stage 4 heaters stop operating.

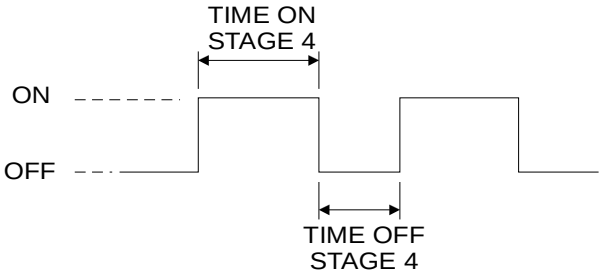
**For example:** Set Point is **75°F** / Offset is **-8°F** / Differential is **2°F**

(i) Temperature falls to 67°F: continuous operation
(ii) Temperature rises to 69°F: timer mode

**NOTE:** The temperature reading for Stage 4 depends on the probe assignment for stage 4 (see Probe Assignments, p. 33).

## Timer Operation

The stage 4 timer can be used in both cooling and heating applications for running fans, heaters or mist units.




During time on, the Stage 4 fans or heating units are operating. The Stage 4 Pilot Light turns on. During time off, the Stage 4 fans or heating units do not run. The Stage 4 Pilot Light turns off.

## Timer Operating Modes

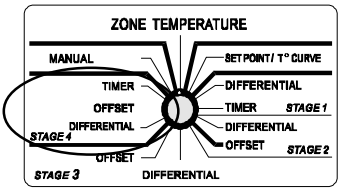
**1.** To run the fans or heating units continuously, set time off to zero and time on to any value other than zero.

**2.** To stop the fans or heating units, set time on to zero and time off to any value.

**3.** To run the fans or heating units intermittently, set time on to the desired running time and time off to the desired off time.

## Stage 4 Parameter Settings

### ❶ To Adjust the Time On / Time Off for Stage 4

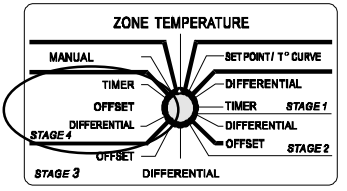



- Set the selection knob to **STAGE 4 - TIMER**. The current time on for Stage 4 flashes on the display, alternating with the word "On".
- Use the adjustment knob to adjust the time on to the desired value.
- Press the push-button. The current time off for Stage 4 flashes on the display, alternating with the word "Off".
- Use the adjustment knob to adjust the time off to the desired value.

Time on and Time off can be adjusted between 0 and 900 seconds, in increments of 15 seconds.

### ❷ To Adjust the Offset for Stage 4

The Stage 4 offset is the temperature difference from the set point at which the Stage 4 constant-speed fans or heating units start to run continuously. They return to a stop when the temperature draws closer to the set point by a value equal to the differential for that stage (see diagrams above). The offset can be adjusted between -40°F and 40.0°F (-22.2°C and 22.2°C).



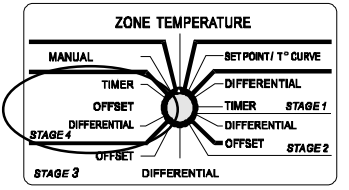

- Set the selection knob to **STAGE 4 - OFFSET**. The current offset flashes on the display. This value represents the temperature difference from the set point. If you would like to see the corresponding value expressed as a temperature (i.e. set point + offset), press the push-button.

- Use the adjustment knob to adjust the offset to the desired value. When the offset is positive, stage 4 is used for cooling and when the offset is negative, stage 4 is used for heating.

## ❸ To Adjust the Differential for Stage 4

The differential is the temperature difference from the offset at which the constant-speed fans, heating units or mist units stop operating (see the diagram above). The differential can be adjusted between 0°F and 20.0°F (0 °C and 11.1°C).

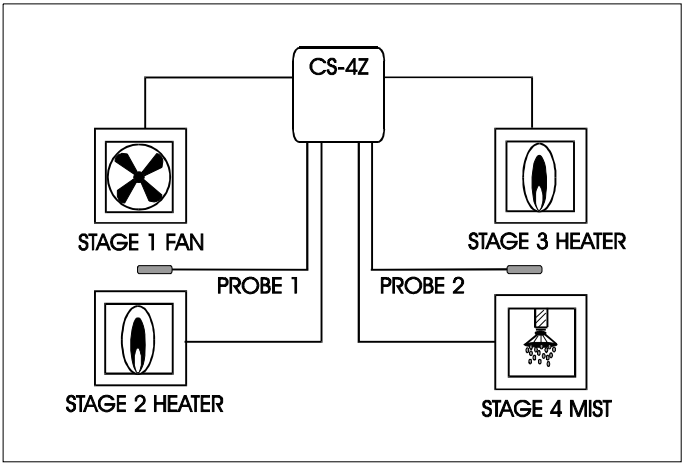
- Set the selection knob to **STAGE 4 - DIFFERENTIAL**. The current differential flashes on the display. This value represents the temperature difference from the offset. If you would like to see the corresponding value expressed as a temperature (i.e. set point + offset - differential), press the push-button.




- Use the adjustment knob to adjust the differential to the desired value.

# PROBE ASSIGNMENTS

If two probes are connected to your system, they can be assigned individually as a temperature reference for activating and deactivating the stages. For a given stage, either one of the probes can be defined as a reference, or an average of both probes can be used. In the example below, stages 1 and 2 are in one part of the building and stages 3 and 4 are in another part of the building. Stages 1 and 2 are assigned to probe 1 and stages 3 and 4 are assigned to probe 2.




## To Change the Probe Assignment for a Stage

Probe 1, probe 2 or both probes can be assigned to a stage to serve as a temperature reference. This temperature will be used to determine when to activate or deactivate the stage.

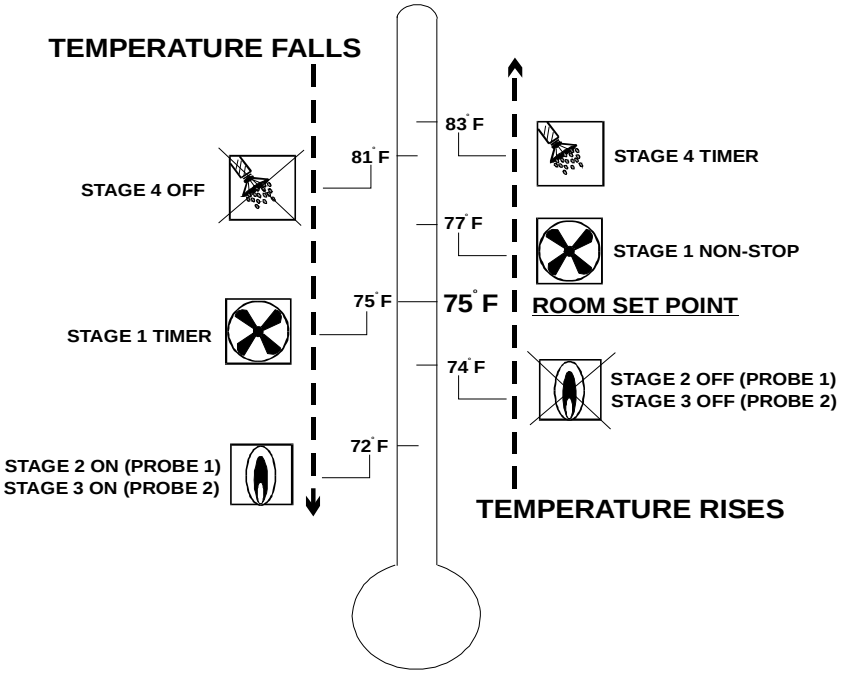
- Set the selection knob to the **DIFFERENTIAL** position for stage 1 or the **OFFSET** position for stages 2, 3 and 4. The current offset for the stage flashes on the display.

- Press the push-button twice. The current probe assignment for the stage is displayed (i.e. **Pr 1** for Probe 1; **Pr 2** for Probe 2; or **ALL** for both probes).

- Use the adjustment knob to change the probe assignment.

# TYPICAL APPLICATION

The diagram below shows a typical configuration using fans, heaters and mist units.




**PARAMETER SETTINGS**

STAGE 1 DIFFERENTIAL = 2°F
STAGE 2 OFFSET = -3°F; DIFFERENTIAL = 2°F
STAGE 3 OFFSET = -3°F; DIFFERENTIAL = 2°F
STAGE 4 OFFSET = 8°F; DIFFERENTIAL = 2 °F

Stage 1 is configured for cooling fans, with a timer setting for minimum ventilation. Stages 2 and 3 are configured for heating. Stage 4 is a mist stage. Stage 2 uses probe 1 and Stage 3 uses probe 2. Stages 1 and 4 use the average of both probes. On the right side of the thermometer, the temperature is rising and on the left side, the temperature is falling.

**Temperature Rises:** At 74°F on Probe 1, the Stage 2 heaters turn off. At 74°F on Probe 2, the Stage 3 heaters turn off. At 77°F, the Stage 1 fans stop operating in timer mode and operate continuously. At 83°F, the Stage 4 mist units start operating in timer mode.

**Temperature Falls:** At 81°F, the Stage 4 mist units turn off. At 75°F, the Stage 1 fans stop operating continuously and operate according to the timer settings. At 72°F on Probe 1, the Stage 2 heaters turn on. At 72°F on Probe 2, the Stage 3 heaters turn on.

# TROUBLESHOOTING GUIDE

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| **The display doesn't work.** | The circuit breaker on the service panel is off or tripped. | Reset the circuit breaker. |
| | The wiring is incorrect. | Fix the wiring. |
| | The F6 input fuse is open. | Replace the fuse. |
| | The voltage selector switch is in the wrong position. | Set the switch to the correct position. |
| | The display board interconnect cable is unplugged from the power supply board. | Plug the cable. |
| **The display shows the letter "P"** | Probe # 1 or Probe # 2 is improperly connected. | Fix the probe's connection. |
| **The Defective Probe Pilot Light is on.** | One or more probes are defective. | Follow the procedure described in DEFECTIVE PROBES to identify and replace the defective probe. |
| | A probe assignment has been made to a non-existant probe. | If only one probe is connected to the unit, all the probe assignments must be made to PR 1. |

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| **The display shows sudden variations in the ambient temperature.** | A variation in resistance is induced on a probe. | Make sure the probes are dry and move them away from drafts and sources of radiant heating. |
| | There is electrical noise near an extended probe cable. | Do not run probe cables next to other power cables. When crossing other power cables, cross at 90°. |
| **Stage 1 fans are not running.** | The wiring is incorrect. | Correct the wiring. In particular, make sure two different lines are connected to each motor: line L1 modulated by the controller should be combined with another line (N for 115V or L2 for 230V) to activate the motor. Also, be sure the Stage 1 COMMON is supplied by line L1. |
| | The Stage's F7 fuse is open. | Replace the fuse. |
| | The display board interconnect cable is not plugged into the power supply board properly. | Make sure the cable is firmly plugged in with the tabs in place. |
| **Stage 1 fans run continuously.** | The wiring is incorrect. | Fix the wiring. |
| | The ambient temperature is above the set point. | Adjust the set point to the desired value. |

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| **Stages 2, 3 or 4 do not work.** | The Stage's fuse is open. | Replace the fuse. |
| | The display board interconnect cable is not plugged into the power supply board properly. | Make sure the cable is firmly plugged in with the tabs in place. |
| | The wiring is incorrect. | Correct the wiring. In particular, make sure two different lines are connected to each motor: line L1 modulated by the controller should be combined with another line (N for 115V or L2 for 230V) to activate the motor or heating unit. Also, make sure the Stage's COMMON is supplied by line L1. |
| | The fan motor or heating unit is defective. | Verify if the motor or heating unit is defective by connecting it to an alternate power supply. Replace the motor or heating unit If it still is not operating. |
| | The controller is defective. | Listen to see if there is a clicking sound when the Stage's pilot light turns on. If there is no clicking sound, contact your distributor to repair the controller. |

# TECHNICAL SPECIFICATIONS

**Supply:** - 115/230 VAC (-18%, +8%), 50/60 Hz, overload and overvoltage protection fuse F6-1A fast blow.

- 12 VDC for AC back-up supply, can activate all stages if supplied with DC back-up voltage.

**Stage 1:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30VDC, 6A FAN, 10A RES, heating or cooling, fuse F7-10A slow blow.

**Stage 2:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30VDC, 6A FAN, 10A RES, heating or cooling, fuse F2-10A slow blow.

**Stage 3:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30VDC, 6A FAN, 10A RES, heating or cooling, fuse F3-10A slow blow.

**Stage 4:** ON-OFF output, 115/230 VAC, 50/60 Hz, 30VDC, 6A FAN, 10A RES, heating or cooling, fuse F4-10A slow blow.

**Probes:** Low voltage ( < 5V), isolated from the supply. Operating range: -40.0° to 120.0°F (-40.0° to 48.9°C). Accuracy: 1.8°F (1°C) between 41° and 95°F (5° and 35°C).

**Enclosure:** ABS, moisture and dust-tight.

**The room temperature where the controller is located MUST ALWAYS REMAIN BETWEEN 32° AND 104°F (0° AND 40°C).**