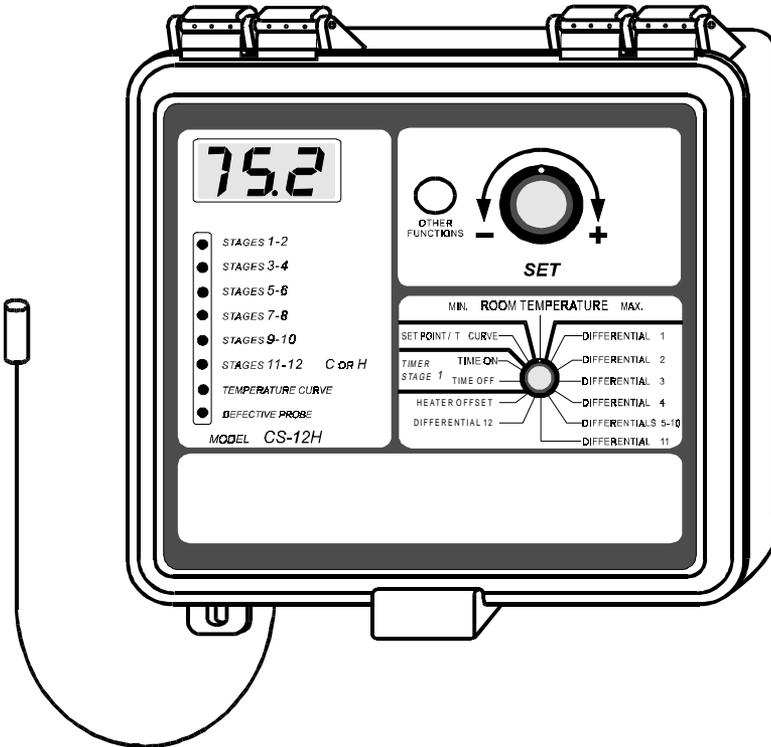

Temperature Controller

CS-12H

User's Guide



Read this guide carefully before using the controller.

FEATURES

The CS-12H controls 10 stages of constant speed fans as well as two stages of either constant speed fans or heating units.

The main features of the controller are as follows:

- A **THREE DIGIT DISPLAY** allows you to specify temperatures to within one tenth of a degree (Celsius or Fahrenheit).
- **PILOT LIGHTS** indicate the state of outputs, allowing you to monitor the operation of the system without having to enter the room.
- Up to **FOUR INDEPENDENT TEMPERATURE PROBES** can be connected to the controller in order to obtain a more accurate reading of the average room temperature and a faster reaction time.
- A **TEMPERATURE CURVE** comprised of six different points provides an automatic adjustment of the target room temperature over a given period of time.
- A **MINIMUM VENTILATION CYCLE** allows you to operate the fans continuously or intermittently when ventilation is not required for a cooling purpose. This reduces the level of humidity and supplies oxygen to the room. It also prevents the fans from freezing in the winter.
- Fuses located at the input and outputs of the controller provide **OVERLOAD AND OVERVOLTAGE PROTECTION**.

- When used with a computer communication module, the controller **COMMUNICATES WITH A COMPUTER**. This makes possible the centralization of information management and a more diversified control strategy.
- When used in combination with a WR-F-1A controller, the CS-12H **COORDINATES THE MOVEMENT OF THE AIR INLETS WITH THE OPERATION OF THE FANS**. This allows the air inlets to be adjusted correctly, free of the influence of uncontrollable factors such as wind or air from adjoining rooms.

PRECAUTIONS

In case of a system failure, we strongly recommend that you install an alarm system as well as a natural ventilation system in the room. We also recommend that you install a back-up thermostat on at least one cooling stage (to connect the thermostat, refer to the wiring diagram enclosed with this user's guide).

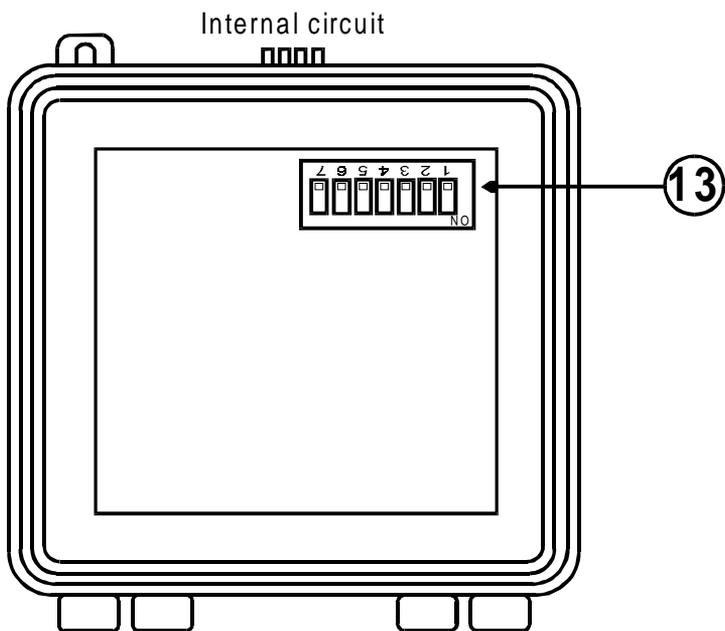
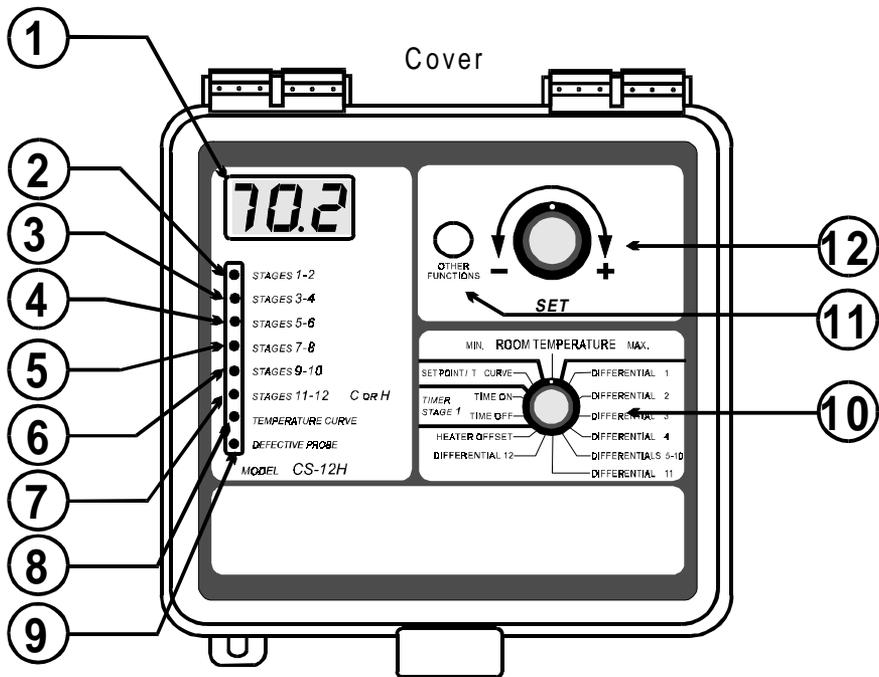
Fuses on the input and outputs of the controller provide overload and overvoltage protection. To further prolong the life of the controller, we recommend that you install an additional protection device on the supply circuit as well as an external relay on all stages.

The room temperature where the controller is installed **MUST ALWAYS REMAIN BETWEEN 32° ET 104°F (0° ET 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

LOCATION OF THE CONTROLS



- 1 THREE DIGIT DISPLAY**
Displays temperatures and other parameters shown around the parameter selection knob.
- 2 STAGES 1 - 2 PILOT LIGHT**
Flashes when the stage 1 fans are on and turns on when the stage 2 fans are on.
- 3 STAGES 3 - 4 PILOT LIGHT**
Flashes when the stage 3 fans are on and turns on when the stage 4 fans are on.
- 4 STAGES 5 - 6 PILOT LIGHT**
Flashes when the stage 5 fans are on and turns on when the stage 6 fans are on.
- 5 STAGES 7 - 8 PILOT LIGHT**
Flashes when the stage 7 fans are on and turns on when the stage 8 fans are on.
- 6 STAGES 9 - 10 PILOT LIGHT**
Flashes when the stage 9 fans are on and turns on when the stage 10 fans are on.
- 7 STAGES 11 - 12 PILOT LIGHT**
Flashes when the stage 11 fans or heating units are on and turns on when the stage 12 fans or heating units are on.
- 8 TEMPERATURE CURVE PILOT LIGHT**
Turns on when the temperature curve is activated.
- 9 DEFECTIVE PROBE PILOT LIGHT**
Turns on when a defective probe is detected.
- 10 PARAMETER SELECTION KNOB**
Use this selection knob to select a parameter.
- 11 PUSH-BUTTON**
Use this push-button to view or set the points of the temperature curve.
- 12 ADJUSTMENT KNOB**
Use this adjustment knob to adjust the value of the selected parameter.

13

SWITCHES

Use these switches to set the operating modes as described in the table below.

DESCRIPTION	SWITCH		OPERATING MODE
	#	POSITION	
LOCKING THE PARAMETERS	1	ON OFF	Locked parameters Unlocked parameters
TEMPERATURE UNITS	2	ON OFF	Degrees Celsius Degrees Fahrenheit
PROBE # 2	3	ON OFF	Activated probe Deactivated probe
PROBE # 3	4	ON OFF	Activated probe Deactivated probe
PROBE # 4	5	ON OFF	Activated probe Deactivated probe
COOLING OR HEATING	6 and 7	6 : OFF ; 7 : ON or OFF 6 : ON ; 7 : ON 6 : ON ; 7 : OFF	Stage 11 : cooling Stage 12 : cooling Stage 11 : heating Stage 12 : heating Stage 11 : cooling Stage 12 : heating

INSTALLATION

Step 1 : MOUNTING THE CONTROLLER

Open the latch and lift the cover. Remove the black caps located on each of the four mounting holes. Mount the enclosure to the wall using four screws. Insert the screws into the mounting holes and tighten. **Fasten the black caps onto the mounting holes.**

Step 2 : CONNECTING THE EQUIPMENT

To connect the fans and heating units to the controller, refer to the wiring diagram enclosed with this user's guide.

- Set the voltage switch located inside the enclosure to the appropriate line 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 communication module.
- If metallic cable holders are used to secure cables entering the enclosure, connect the ground wire to the ground plate located inside the enclosure.
- When connecting heating units to the controller, it may be necessary to install a transformer in order to adapt the voltage to the heating units.



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 SHOCK AND EQUIPMENT DAMAGE.

Step 3 : CONNECTING THE PROBES

To extend the probes:

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

- Use a shielded cable with an outside diameter between 0.245 and 0.260 in (6.22 and 6.60 mm) (the cable dimension must 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°.

To connect the probes:

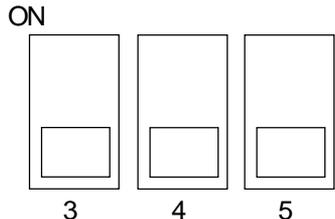
The controller is supplied with one probe connected to terminal #1. Up to three additional probes can be connected to the controller.

- Use terminals # 2, 3 and 4 to connect the additional probes as shown on the wiring diagram enclosed with this user's guide.

CAUTION: The probes operate under low voltage and are isolated from the supply. Be sure the probe cables remain isolated from all high voltage sources. In particular, do not route the probe cables through the same electrical knockout as other power cables.

- Activate each additional probe by setting the appropriate switch to ON:

- Switch # 3 activates terminal # 2.
- Switch # 4 activates terminal # 3.
- Switch # 5 activates terminal # 4.



FACTORY SETTING: When the controller is shipped from the factory, switches # 3, 4 and 5 are set to OFF (the probes are deactivated).

Defective probes:

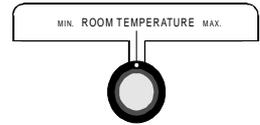
If a defective probe is detected, the defective probe pilot light turns on. The room temperature shown on the display will then be the average value of all temperatures measured by the probes remaining in proper condition and the controller will operate according to this temperature.

To determine which probe is defective:

- Set the parameter selection knob to ROOM TEMPERATURE. The room temperature appears on the display.



- Press the push-button. If the probe connected to terminal #1 (supplied with the controller) is not defective, the word "PR1" and the temperature measured by the probe will alternately appear on the display. If the probe connected to terminal #1 (supplied with the controller) is defective, the word "PR1" and the letter "P" will alternately appear on the display.



For each additional probe connected to the controller:

- Press the push-button once again. If the probe is not defective, the word "PR#" (# is the number of the terminal to which the probe is connected) and the temperature measured by the probe will alternately appear on the display. If the probe is defective, the word "PR#" and the letter "P" will alternately appear on the display.

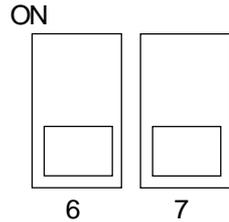
Step 4 : SELECTING THE OPERATING MODE FOR STAGES 11 AND 12

Stages 11 and 12 can both be used for cooling or heating. If one stage is used for cooling and the other for heating, the fans must be connected to stage 11 and the heating units to stage 12.

To select the operating mode:

- Set switches # 6 and # 7 to the required position:

- Stages 11 and 12 used for heating:
set switch # 6 to ON and switch # 7 to ON.
- Stages 11 and 12 used for cooling:
set switch # 6 to OFF and switch # 7 to ON or OFF.
- Stage 11 used for cooling and stage 12 used for heating:
set switch # 6 to ON and switch # 7 to OFF.

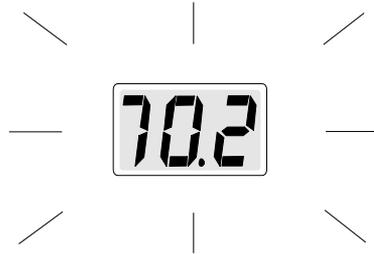


FACTORY SETTING: When the controller is shipped from the factory, switch # 6 is set to OFF and switch # 7 is set to OFF (stage 11 and 12 used for cooling).

USING THE CONTROLLER

1 VALUES FLASHING ON THE DISPLAY

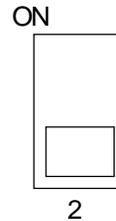
The display flashes certain values and does not flash others. The flashing indicates that the value on the display can be adjusted. Values that are not flashing can not be adjusted.



2 HOW TO SELECT A TEMPERATURE UNIT

Temperatures can be displayed either in degrees Celsius or degrees Fahrenheit.

- Set switch # 2 to the desired position:
 - ON : degrees Celsius.
 - OFF : degrees Fahrenheit.

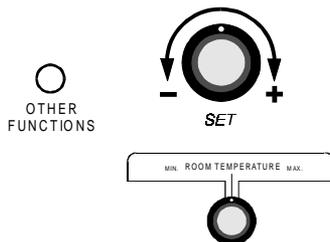


FACTORY SETTING: When the controller is shipped from the factory, switch #2 is set to OFF (temperatures are displayed in degrees Fahrenheit).

3 HOW TO VIEW AND RESET TEMPERATURES

To view the room temperature and the temperature measured by each probe:

- Set the parameter selection knob to ROOM TEMPERATURE. The room temperature appears on the display.



The room temperature shown on the display is the average value of all temperatures measured by probes that are activated and in proper operating condition.

- Press the push-button. The word "PR1" and the temperature measured by the probe connected to terminal # 1 (supplied with the controller) alternately appear on the display.

For each additional probe connected to the controller:

- Press the push-button once again. The word "PR#" (# is the number of the terminal to which the probe is connected) and the temperature measured by the probe alternately appear on the display.

To view the minimum and maximum temperatures:

- Set the parameter selection knob to ROOM TEMPERATURE. The room temperature appears on the display.
- Turn the adjustment knob clockwise by one notch. The minimum temperature appears flashing on the display.
- Turn the adjustment knob clockwise one notch further. The maximum temperature appears flashing on the display.
- Turn the adjustment knob clockwise a third notch. The room temperature again appears on the display.

- If the adjustment knob is turned counterclockwise rather than clockwise, the display sequence will be reversed (room-maximum-minimum-room).

The minimum and maximum temperatures are the lowest and highest values of all room temperatures measured since the last reset.

To reset the minimum and maximum temperatures:

- Set the parameter selection knob to ROOM TEMPERATURE. The room temperature appears on the display.
- Turn the adjustment knob clockwise (or counterclockwise) by one notch and leave it in this position. The minimum (or maximum) temperature first appears flashing on the display. After 10 seconds, the display stops flashing and the room temperature again appears on the display, indicating that the reset is completed.

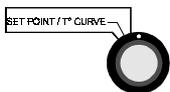
When the minimum and maximum temperatures are reset, their current values are erased from memory and the controller begins to store in memory new values measured from that moment on.

NOTE : To avoid resetting the minimum and maximum temperatures while viewing them, be sure to return to the room temperature display within the 10 second delay.

4

PARAMETER DESCRIPTIONS

► SET POINT / TEMPERATURE CURVE



The controller maintains a specified target room temperature by controlling the operation of the fans and heating units. The target room temperature can be specified in two ways:

1 - With a temperature set point

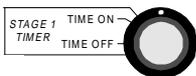
When a temperature set point is specified, the controller considers this temperature set point as the target room temperature as long as the temperature curve is not activated.

2 - With a temperature curve

When a temperature curve is specified and activated, the controller automatically adjusts the target room temperature over a given period of time. The temperature curve is comprised of six points. A day number as well as a temperature set point for this day number must be specified for each of the six points. When the temperature curve is activated, the controller adjusts the target room temperature every hour in a linear fashion between two consecutive points. When the last point of the curve is reached, the temperature curve becomes deactivated. The controller maintains the last temperature set point of the curve until the curve is reactivated or until a new temperature set point is specified.

► STAGE 1 PARAMETERS

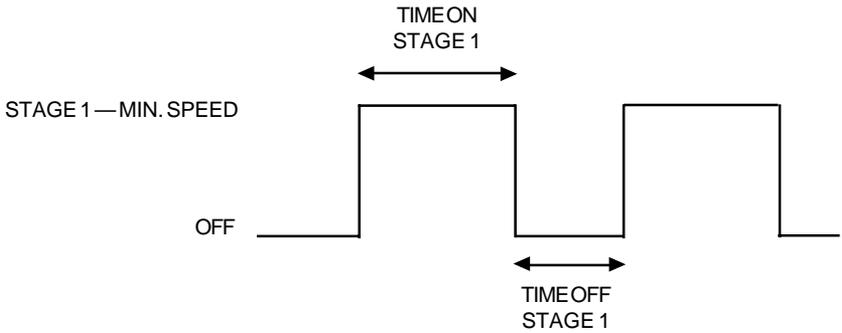
Minimum ventilation cycle parameters:



When ventilation is not required for a cooling purpose, the stage 1 fans operate according to the minimum ventilation cycle.

Time on [seconds] - When the stage 1 fans operate according to the minimum ventilation cycle, they run during time on.

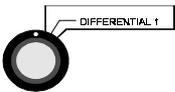
Time off [seconds] - When the stage 1 fans operate according to the minimum ventilation cycle, they stop running during time off.



The fans can be set to operate in three different ways:

- 1 - To run the fans continuously: set time off to zero and time on to any value other than zero.
- 2 - To run the fans intermittently: set time on to the desired running time and time off to the desired off time.
- 3 - To stop the fans: set time on to zero and time off to any value (equal to or other than zero).

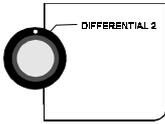
Other parameters:



When ventilation is required for a cooling purpose, the stage 1 fans run continuously. They no longer operate according to the minimum ventilation cycle.

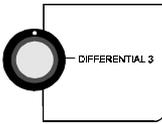
Differential 1 [°F or °C] - The stage 1 differential is the number of degrees above the set point at which the stage 1 fans stop operating according to the minimum ventilation cycle and begin to run continuously.

► STAGE 2 PARAMETERS



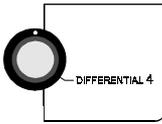
Differential 2 [°F or °C] - The stage 2 differential is the variation in the room temperature between the moment the stage 2 fans turn on and the moment they turn off.

► STAGE 3 PARAMETERS



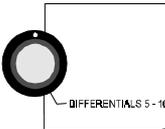
Differential 3 [°F or °C] - The stage 3 differential is the variation in the room temperature between the moment the stage 3 fans turn on and the moment they turn off.

► STAGE 4 PARAMETERS



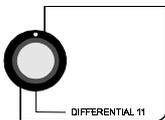
Differential 4 [°F or °C] - The stage 4 differential is the variation in the room temperature between the moment the stage 4 fans turn on and the moment they turn off.

► STAGES 5 - 10 PARAMETERS



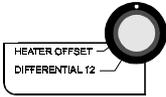
Differentials 5 -10 [°F or °C] - The stage 5 to 10 differential is the variation in the room temperature between the moment the stage 5 to 10 fans turn on and the moment they turn off.

► STAGE 11 PARAMETERS



Differential 11 [°F or °C] - The stage 11 differential is the variation in the room temperature between the moment the stage 11 fans or heating units turn on and the moment they turn off.

► STAGE 12 PARAMETERS



Differential 12 [°F or °C] - The stage 12 differential is the variation in the room temperature between the moment the stage 12 fans or heating units turn on and the moment they turn off.

Heater offset [°F or °C] - The stage 12 heater offset is the number of degrees below the temperature set point at which the stage 12 heating units turn off. When the heater offset is activated, it can be adjusted to a positive or negative value. When the heater offset is deactivated, it can be adjusted only to a positive value.

5 ► PARAMETER FACTORY SETTINGS

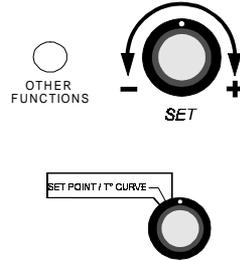
The controller is programmed at the factory with the settings shown below. Keep the settings that are convenient for you and make changes where necessary. These factory settings will not be retained in memory once they have been changed.

PARAMETER		FACTORY SETTING
Temperature set point		75.0°F (23.9 °C)
Temperature curve		deactivated
STAGE 1	Time on	15 seconds
	Time off	0 seconds
	Differential	3.0°F (1.7°C)
STAGE 2	Differential	2.0°F (1.1°C)
STAGE 3	Differential	2.0°F (1.1°C)
STAGE 4	Differential	2.0°F (1.1°C)
STAGES 5 - 10	Differentials	2.0°F (1.1°C)
STAGE 11	Differential	2.0°F (1.1°C)
STAGE 12	Heater offset	0.5°F (0.3°C)
	Differential	2.0°F (1.1°C)

NOTE: If the power supply is cut off, the parameter settings will be kept in memory until the power is restored.

► SET POINT / TEMPERATURE CURVE

The set point and the points of the temperature curve can be adjusted only if the temperature curve is deactivated. If the temperature curve pilot light is on, the temperature curve is presently activated.



Deactivate the temperature curve as follows:

- Set the parameter selection knob to SET POINT / T° CURVE. The current temperature set point appears flashing on the display.
- Press the temperature curve push-button repeatedly until the word ON appears flashing on the display.
- Turn the adjustment knob counterclockwise one notch and leave it in this position. The word OFF appears flashing on the display and after 10 seconds, the temperature curve pilot light turns off indicating that the temperature curve is now deactivated.

To adjust the temperature set point:

- Set the parameter selection knob to SET POINT / T° CURVE. The current temperature set point appears flashing on the display.
- Turn the adjustment knob to adjust the temperature set point to the desired value.

To adjust the points of the temperature curve:

- Set the parameter selection knob to SET POINT / T° CURVE. The current temperature set point appears flashing on the display.

- Press the temperature curve push-button. The word OFF appears on the display, indicating the temperature curve is deactivated.

Repeat the following steps for each of the six points:

- Press the temperature curve push-button once again. A day number, preceded by the letter "d", appears flashing on the display.
- Turn the adjustment knob to adjust the day number to the desired value.
- Press the temperature curve push-button once again. The current temperature set point for this day number appears flashing on the display.
- Turn the adjustment knob to adjust the temperature set point to the desired value.

NOTES: (1) All six points of the curve must be specified. If you do not need six different points, repeat your last temperature set point for each unnecessary point of the curve.

(2) To reduce the risk of errors:

- it is not permitted to specify decreasing day numbers;
- it is not permitted to specify increasing temperature set points;
- the highest day number is 99;
- the temperature variation can not exceed 3°F (1.6°C) per day.

When the six points of the temperature curve have been specified, the temperature curve must be activated for the controller to begin to automatically adjust the target room temperature.

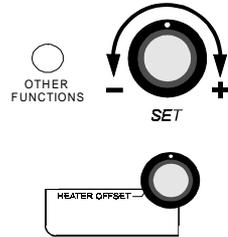
Activate the temperature curve as follows:

- Press the temperature curve push-button once again. The word OFF appears flashing on the display.
- Turn the adjustment knob clockwise by one notch and leave it in this position. The word ON appears flashing on the display and after 10 seconds, the temperature curve pilot light turns on indicating that the temperature curve is now activated.

NOTE: When the temperature curve is activated, the current target room temperature can be viewed at any time by setting the parameter selection knob to SET POINT / T° CURVE. The current day number can then be viewed by pressing the temperature curve push-button.

► STAGE 12 HEATER OFFSET

When the heater offset is activated, it can be adjusted to a positive or negative value.
When the heater offset is deactivated, it can be adjusted only to a positive value.



Activate or deactivate the heater offset as follows:

- Set the parameter selection knob to HEATER OFFSET. The current heater offset appears flashing on the display.
- Press the push-button. The word ON or OFF appears flashing on the display. Turn the adjustment knob clockwise one notch to activate the heater offset (the word ON appears flashing on the display) or counterclockwise to deactivate the heater offset (the word OFF appears flashing on the display).

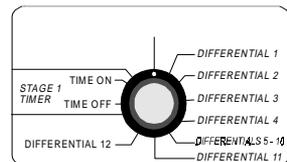
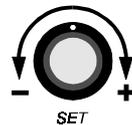
To adjust the stage 12 heater offset:

- Set the parameter selection knob to HEATER OFFSET. The current heater offset appears flashing on the display.
- Turn the adjustment knob to adjust the heater offset to the desired value.

► OTHER PARAMETERS

To adjust the other parameters:

- Set the parameter selection knob to the desired position.
- Turn the adjustment knob to adjust the parameter to the desired value.



7 PARAMETER ADJUSTMENT RANGES

PARAMETER		ADJUSTMENT RANGE
Temperature set point		-40.0 and 99.9°F (-40 and 37.7°C)
STAGE 1	Time on	0 to 900 seconds, by increments of 15 seconds
	Time off	0 to 900 seconds, by increments of 15 seconds
	Differential	0.5 and 20.0°F (0.3 and 11.1°C)
STAGE 2-11	Differential	0.5 and 20.0°F (0.3 and 11.1°C)
STAGE 12	Heater offset - activated - deactivated	-9.9 and 20.0 °F (-5.5 and 11.1 °C) 0 and 20.0°F (0 and 11.1°C)
	Differential	0.5 and 20.0°F (0.3 and 11.1°C)

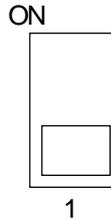
Locking the parameters ensures their settings are not changed by accident. When the parameters are locked, the only settings that can be changed are the temperature set point and the points of the temperature curve (if the temperature curve is deactivated), as well as the stage 1 time on. All other parameter settings can not be changed.

To lock the parameters:

- Set switch # 1 to ON.

To unlock the parameters:

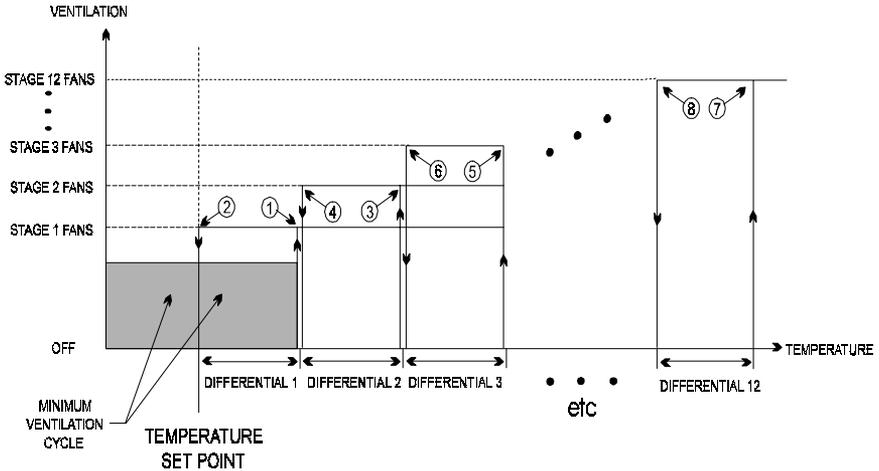
- Set switch # 1 to OFF.



FACTORY SETTING : When the controller is shipped from the factory, switch # 1 is set to OFF (the parameters are unlocked).

HOW THE CONTROLLER OPERATES

1 IF STAGES 11 AND 12 ARE USED FOR COOLING



If the room temperature rises:

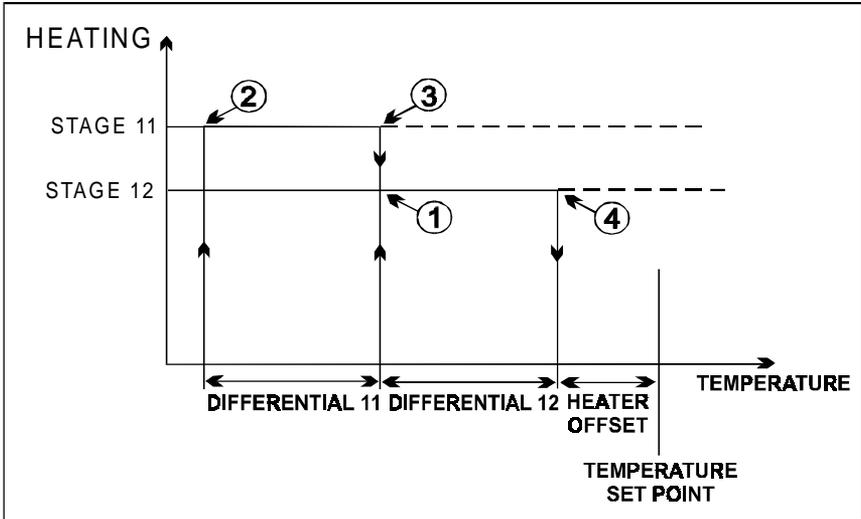
- **When room < set point + differential 1**, the stage 1 fans run according to the minimum ventilation cycle.
- **At POINT 1:** the stage 1 fans stop operating according to the minimum ventilation cycle (point 1) and start to run continuously.
- **At POINT 3:** the stage 2 fans start to run.
- **At POINT 5:** the stage 3 fans start to run.
- Etc...
- **At POINT 7:** the stage 12 fans start to run.

If the room temperature falls:

- **At POINT 8:** the stage 12 fans return to a stop.

Etc...

- **At POINT 6:** the stage 3 fans return to a stop.
- **At POINT 4:** the stage 2 fans return to a stop.
- **At POINT 2:** the stage 1 fans stop running continuously and operate according to the minimum ventilation cycle.

2**IF STAGES 11 AND 12 ARE USED FOR HEATING**

When stages 11 and 12 are used for heating, stages 1 through 10 operate as described for cooling. However stages 11 and 12 operate at room temperatures below the set point, as described hereafter.

If the room temperature falls:

- **AT POINT 1:** the stage 12 heating units turn on.
- **AT POINT 2:** the stage 11 heating units turn on.

If the room temperature rises:

- **AT POINT 3:** the stage 11 heating units turn off.
- **AT POINT 4:** the stage 12 heating units turn off.

TROUBLESHOOTING

PROBLEM	CHECK POINTS
<p>There is no display.</p>	<ul style="list-style-type: none"> ▶ The circuit breaker at the service panel is off or tripped. — Reset the circuit breaker. ▶ The wiring is incorrect. — Correct the wiring. ▶ The 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 not plugged into the power supply board properly. — Be sure the cable is firmly plugged in.
<p>The display shows the letter "p".</p>	<ul style="list-style-type: none"> ▶ Probe # 1 is connected improperly. — Correct the probe's connection.
<p>The defective probe pilot light is on.</p>	<ul style="list-style-type: none"> ▶ The controller has detected a defective probe. — Follow the procedure described in DEFECTIVE PROBES (page 11) to identify the defective probe. Replace the defective probe.
<p>The display shows sudden variations in the room temperature.</p>	<ul style="list-style-type: none"> ▶ A variation in resistance is induced on the probe circuit. — Be sure the probes are dry. Also, move them away from drafts and from any source of radiant heating. ▶ There is electrical noise near the cable of an extended probe. — Do not run probe cables next to other power cables. When crossing over other power cables, cross at 90°.

PROBLEM	CHECK POINTS
<p>The stage 1 fans do not stop running when operating according to the minimum ventilation cycle.</p>	<ul style="list-style-type: none"> ▶ The wiring is incorrect. <ul style="list-style-type: none"> — Correct the wiring. In particular, be sure two different lines are connected to each fan motor: line L1 modulated by the controller should be combined with another line (N for 115V or L2 for 230V) to activate the fan motor. Also be sure the stage 1 COMMON terminal is supplied by line L1. ▶ The time on is adjusted to a value other than zero. <ul style="list-style-type: none"> — Adjust the time on to zero.
<p>The fans or heating units connected to one of the stages are not operating.</p>	<ul style="list-style-type: none"> ▶ The stage's fuse is open. <ul style="list-style-type: none"> — Replace the fuse. ▶ The display board interconnect cable is not plugged into the power supply board properly. <ul style="list-style-type: none"> — Be sure the cable is firmly plugged in. ▶ The wiring is incorrect. <ul style="list-style-type: none"> — Correct the wiring. In particular, be sure two different lines are connected to each fan motor or heating unit: line L1 at the controller's output should be combined with another line (N for 115V or L2 for 230V) to activate the fan motor or heating unit. Also be sure the stage's COMMON terminal is supplied by line L1. ▶ The fan motor or heating unit is defective. <ul style="list-style-type: none"> — Connect the fan motor or heating unit to an alternate power supply. Replace the fan motor or heating unit if it still is not operating. ▶ The controller is defective. <ul style="list-style-type: none"> — 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 get the controller repaired.

TECHNICAL SPECIFICATIONS

MASTER BOX

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 outputs supplied with 12 VDC.

AUXILIARY BOX #1

Supply: - 115/230 VAC, 50/60 Hz, overload and overvoltage protection fuse F6-1A fast blow.

- 12 VDC for AC back-up supply, can activate stages 1, 2, 3 and 4 if supplied with 12 VDC.

Stage 1: ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A FAN, 10A RES, fuse F1-10A slow blow.

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

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

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

AUXILIARY BOX #2

Supply: - 115/230 VAC, 50/60 Hz, overload and overvoltage protection fuse F6-1A fast blow.

- 12 VDC for AC back-up supply, can activate stages 5, 6, 7 and 8 if supplied with 12 VDC.

Stage 5: ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A FAN, 10A RES, fuse F1-10A slow blow.

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

Stage 7: ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A FAN, 10A RES, fuse F3-10A slow blow.

Stage 8: ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A FAN, 10A RES, fuse F4-10A slow blow.

AUXILIARY BOX #3

Supply: - 115/230 VAC, 50/60 Hz, overload and overvoltage protection fuse F6-1A fast blow.

- 12 VDC for AC back-up supply, can activate stages 9, 10, 11 and 12 if supplied with 12 VDC.

Stage 9: ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A FAN, 10A RES, fuse F1-10A slow blow.

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

Stage 11: ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A FAN, 10A RES, heating or ventilation, fuse F3-10A slow blow.

Stage 12: ON-OFF output, 115/230 VAC, 50/60 Hz, 30 VDC, 6A FAN, 10A RES, heating or ventilation, fuse F4-10A slow blow.

OTHER:

Probes: Low voltage ($< 5V$), isolated from the supply. Operating range: -40.0° to $120.0^{\circ}F$ (-40.0° to $49^{\circ}C$). Accuracy: $1.8^{\circ}F$ ($1^{\circ}C$) between 41° and $95^{\circ}F$ (5° and $35^{\circ}C$).

Enclosure: ABS, moisture and dust-tight.

The temperature where the controller is installed MUST ALL AT TIMES REMAIN BETWEEN 32 AND 104 °F (0 and 40 °C).