

Installation & Programming Instructions

for

Enerstat SHP-123

**1 Cool/2 Heat/3 Speed Fan
OWNER'S MANUAL**

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IMPORTANT

READ THIS BOOKLET THOROUGHLY IN ORDER TO UNDERSTAND ALL THE OPERATION FEATURES OF YOUR PROGRAMMABLE CONTROLLER.

RECORD THE MODEL NUMBER AND SERIAL NUMBER IN THE SPACE PROVIDED.

MODEL NUMBER _____

SERIAL NUMBER _____

DATE OF INSTALLATION _____

INTRODUCTION

The Programmable Controller represents the most advanced solid-state, microcomputer temperature control on the market today. The controller incorporates state-of-the-art technology packaged in an extremely low profile designer series case. Ultra-Touch controls are combined with an easy-to-read, full function liquid crystal display to provide the ultimate in "user friendly" operation of your heating and air conditioning equipment.

STANDARD FEATURES

- No batteries required – always remembers scheduled events and temperatures
- 100% Solid State circuitry
- Computerized heat anticipation and cooling droop
- Built-in short cycle equipment protection
- Tamper proof electronic keyboard lockout
- Auto or Manual fan operation
- Auto or Manual Heat/Cool changeover
- Constant Hold feature allows continuous override
- Temporary override
- Selectable 12 or 24 hour clock display
- Selectable Fahrenheit or Celsius temperature display
- Lockable Access Cover
- Full Function Liquid Crystal Display (LCD)

INSTALLATION INSTRUCTIONS

Controller Location

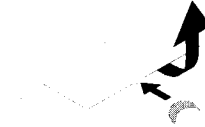
To ensure proper operation, the controller should be mounted on an inside wall in a frequently occupied area of the building. In addition, its position must be at least 18" (46 cm) from any outside wall, and approximately 5' (1.5 m) above the floor in a location with freely circulating air of an average temperature.

BE SURE TO AVOID THE FOLLOWING LOCATIONS:

- Behind doors or in corners where freely circulating air is unavailable
- Where direct sunlight or radiant heat from appliances might affect control operation
- On an outside wall
- Adjacent to, or in line with, conditioned air discharge grilles, stairwells or outside doors
- Where its operation may be affected by steam or water pipes or warm air stacks in an adjacent partition space, or by an unheated/uncooled area behind the controller
- Where its operation will be affected by the supply air of an adjacent unit
- Near sources of electrical interference such as arcing relay contact

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REMOVING THE CONTROLLER FROM THE SUBBASE



1. Insert a flat blade screwdriver or a coin, 1/8" into the slot located in the bottom center of the controller case and twist 1/4 turn. When you feel or hear a "click", grasp the case from the bottom two corners and separate from the subbase as shown in the diagram at the left.

2. Swing the controller out from the bottom.

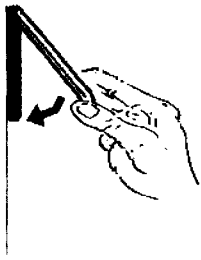
3. Lift the controller up and off the subbase.

4. Place the rectangular opening in the subbase over the equipment control wires protruding from the wall and, using the subbase as a template, mark the location of the two mounting holes (exact vertical mounting is necessary only for appearance).

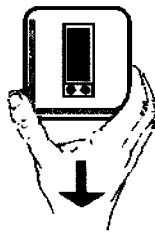
base as a template, mark the location of the two mounting holes (exact vertical mounting is necessary only for appearance).

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5. Use the supplied anchors and screws for mounting on drywall or plaster; drill two 3/16" (5mm) diameter holes at the marked locations; use a hammer to tap the nylon anchors in flush to the wall surface and fasten subbase using the supplied screws. (Do not overtighten!)
6. Connect the wires from your system to the controller terminals as shown in the wiring diagrams. Carefully dress the wires so that any excess is pushed back into the wall cavity or junction box. Ensure that the wires are flush to the plastic subbase. The access hole should be sealed or stuffed to prevent drafts from the wall affecting the controller.
7. Before the controller is re-installed on the subbase, install the indoor and/or outdoor remote sensor (if used). Refer to the installation instructions supplied with each optional unit. Also, verify the position of the slide switches on the back of the controller.



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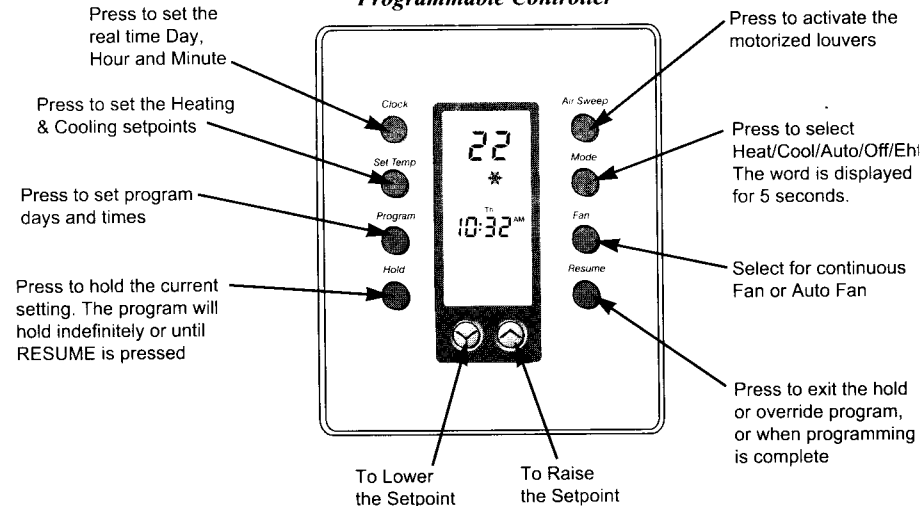
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REPLACING THE CONTROLLER ON THE SUB-BASE

1. Position the controller on the hinged tabs located at the top of the subbase.
2. Gently swing the controller down and press on the bottom center edge until it snaps in place.

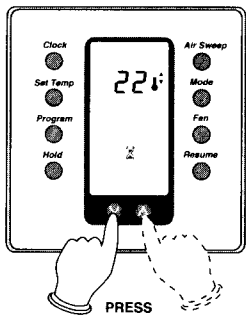
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For Enerstat SHP-123 Programmable Controller



Press ▼ & ▲ at the same time to change the temperature from Celsius(°C) to Fahrenheit(°F)

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OPERATING YOUR CONTROLLER

TEMPORARY OVERRIDE

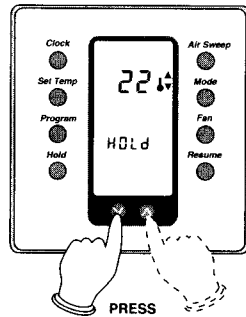
You can change the scheduled program temperature at any time without affecting the program. Pressing the ▼ or ▲ button temporarily changes the scheduled program setpoint for a 3 hour period. Pressing the RESUME button cancels the override period.

TEMPORARY OVERRIDE WITH KEYBOARD LOCKED

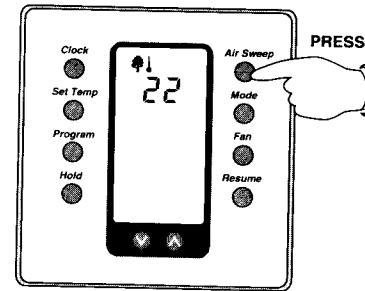
You can change the scheduled program temperature by a maximum of $\pm 3^\circ$ ($^\circ\text{F}$ or $^\circ\text{C}$) at any time without affecting the program. Pressing the ▼ or ▲ button temporarily changes either the Morning setpoint (using 4 programs per day) or the Day setpoint (using 2 programs per day) for a **1 hour** period. This 1 hour override period cannot be cancelled (keyboard is locked.)

CONSTANT OVERRIDE (HOLD)

To maintain a temperature setting for an indefinite period of time, press and release the HOLD button and the word 'HOLD' is displayed. The current scheduled temperature will be maintained. To set a different temperature, press the ▼ or ▲ button. The last temperature selected (scheduled or new) will be maintained continuously until the RESUME button is pressed.



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USING THE AIR SWEEP SWITCH

Depress Air Sweep button to activate or deactivate motion of swing louvers (not available on cassette units). Depress the Air Sweep button again and the louvers will stop at that position.

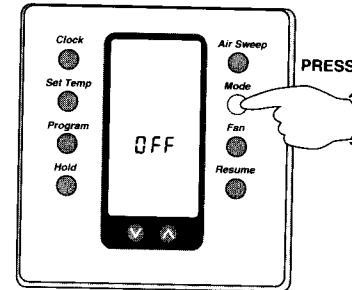
OTHER KEYBOARD FUNCTIONS

OFF MODE:

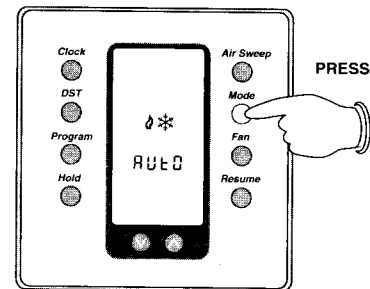
To turn off the heating or cooling system, press and release the MODE button until the word OFF appears on the display. It will remain displayed until the mode is changed. The OFF mode prevents the system from being energized, however, all programmed schedules will be remembered.

FAN

If continuous fan is not selected, the fan will operate automatically and the fan symbol (☼) will be off. To select continuous fan operation, press the FAN button. The fan has 3 speeds; Low (☼), Medium (☼), High (☼).



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AUTO CHANGEOVER MODE:

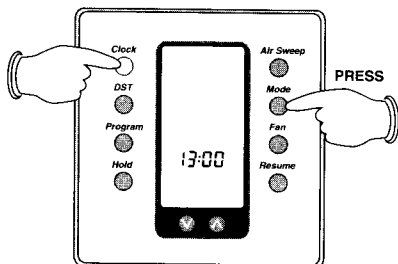
Your controller can be used to automatically switch from heating and cooling through the Auto Changeover Mode. Press and release the MODE button until the word AUTO and both the heating and cooling symbols appear on the display. The controller will energize the heating or cooling system based on the temperature setpoints for each mode.

CHANGING THE DISPLAY FROM FAHRENHEIT TO CELSIUS

Simultaneously press ▼ & ▲ to switch between Celsius ($^\circ\text{C}$) and Fahrenheit ($^\circ\text{F}$) temperature display.

CHANGING THE CLOCK FROM 12 TO 24 HOUR TIME

To change the time indicated from 12 hour to 24 hour, press and release the CLOCK button, then press the MODE button.



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DESCRIPTION OF DIP SWITCHES

	SWITCH SELECTIONS	DESCRIPTION
1.	4 events/2 events per day	Allows selection of 2 event (day, night) or 4 event (morning, day, evening, night) programming.
2.	Smart Fan disabled/enabled	The fan will cycle with the equipment or can be controlled by selecting continuous fan in all events except when the Smart Fan is enabled. Smart Fan enabled will cause the fan to cycle with the equipment in night event even if continuous fan is pressed.
3.	Heat/Cool: 4 or 2 minute minimum on and off	Allows selection of minimum on/off time for heating or cooling equipment.
4.	Keyboard unlocked/locked	Allows user to disable buttons to prevent tampering

DESCRIPTION OF LED INDICATORS

LED POSITION	FUNCTION
Center (orange)	Auxiliary Heat
Right (red)	Fault - compressor safety lock-out when wired

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FEATURES

Remote Sensor RS1 – RS2 – RS+V terminals

The controller is designed to accept up to six remote sensors, which will allow you to locate your controller in an area away from view. Refer to instruction sheet provided with sensors for installation details.

Power Outages

One of the unique features of your controller is that there is no battery required to maintain your selected setpoints in the event of a power loss, as the memory is unaffected by power failures of any duration.

Power Failures During the Regular Program Schedule

Should your power fail at any time during the regular program, the controller will maintain the clock internally for up to 30 minutes. If the power has not been restored during this time period, the clock will stop. When the power is restored, the controller clock defaults to a flashing 12:00 AM. The controller will be held in the Night program until the user sets the clock. The controller will display “AC” when the 24V is not powered.

NOTE: There is no need to re-program the setpoint temperatures or start times as the controller will “remember” these program parameters.

To reset the time, refer to the Programming Instructions “Setting the Current Time and Day”.

Power Failures During the Constant Hold Program

Should the power fail at any time during the HOLD program, the controller will maintain the clock internally for up to 30 minutes. When the power is restored, the controller will control in the HOLD program as if the power had never failed, or until the resume button is pressed. The clock will then start flashing 12:00 AM and remain in the Night program until the clock is set.

SEQUENCE OF OPERATIONS

Cooling Mode

- ‘Y’ contact will be closed
- ‘O’ contact will be closed
- ‘H1’ contact will be open

Heating Mode

- ‘Y’ contact will be closed
- ‘O’ contact will be open
- ‘H1’ contact will be closed

Heat Pump Mode

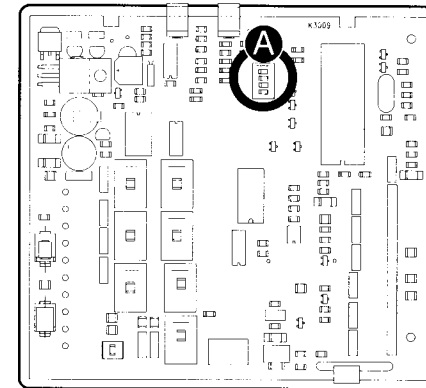
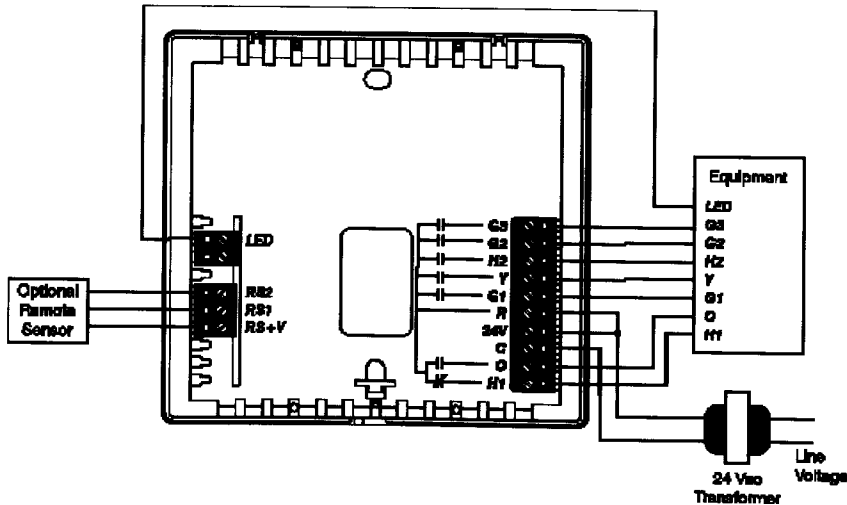
- ‘Y’ is providing mechanical heating
- ‘H1’ contact remains closed

If logic dictates aux. heat will come on through ‘H2’ and aux LED will be illuminated.

Emergency Heat Mode

Brings on ‘H2’ exclusively and also fan

WIRING DIAGRAM

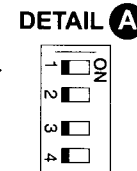


Controller body, Rear View

OUTPUT TERMINAL FUNCTIONS

- G3**Energizes Air Sweep relay
- G2**Fan relay FR2 is energized with a call for heating or cooling or selected by fan button
- H2**Auxiliary Heat is energized as back-up or Emergency Heat
- Y**Compressor is energized with a call for heating or cooling
- G1**Fan relay FR1 is energized with a call for heating or cooling or selected by fan button
- R**Independent switching voltage
- 24V(c)**24 VAC Hot from equipment transformer
- C**24VAC Common from equipment transformer
- O**Energizes the reversing valve in cooling mode
- H1**Energizes Heatpump mode
- LED**Fault indicator
- RS2**Use to connect
- RS1**Indoor Remote Sensor Option. Refer to the instructions included with the sensors.
- RS+V**

- | | |
|---------------------------------------|--------------------------------------|
| DIP Switch in the OFF Position | DIP Switch in the ON Position |
| 1. 4 events per day | 1. 2 events per day |
| 2. Smart Fan disabled | 2. Smart Fan enabled |
| 3. 4 Minute (Min. ON) | 3. 2 Minute (Min. ON) |
| 4. Keypad Unlocked | 4. Keypad locked |



SPECIFICATIONS

Rated Voltage	20-30 V, 24 nominal
Rated A.C. Current	0.050 Amps to 0.75 Amps continuous per output with surges to 3 Amp Max.
Rated D.C. Current	0.0 Amps to 0.75 Amps continuous per output with surges to 3 Amp Max.
Control Range	Heating: 38 to 88°F in 1° Steps 5 to 30°C in 1° Steps Cooling: 60 to 108°F in 1° Steps 16 to 40°C in 1° Steps
Controller Measurement Range	28 to 124°F or 0 to 48°C
Control Accuracy	± 0.5° C at 20°C ± 1°F at 68°F
Minimum Deadband	(between heating and cooling) 2°F or 1°C

NOTE: This controller contains electronic circuitry replacing the conventional mechanical anticipator.

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Programming Instructions for Enerstat SHP-123

7 Day Programmable Controller

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HOW TO PROGRAM YOUR CONTROLLER

SETTING THE CURRENT DAY AND TIME

STEP 1: Press and release the CLOCK button. Display will flash MO (Monday). Figure 2

STEP 2: Press the ▼ or ▲ button until current day appears on the display.

NOTE: Pressing the ▼ or ▲ buttons will move the day backward and forward.

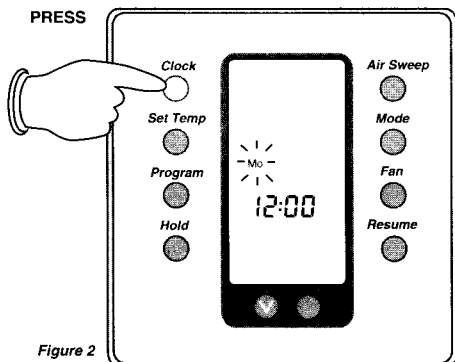


Figure 2

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PRESS

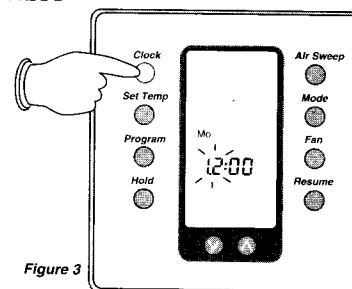


Figure 3

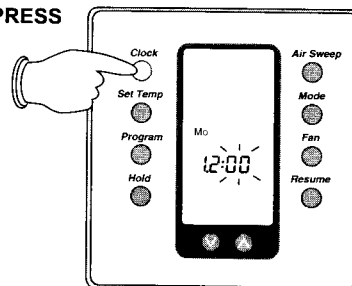
SETTING THE CURRENT DAY AND TIME (CONTINUED)

STEP 3: Press and release the CLOCK button. Display will flash the hour (12:). Figure 3

STEP 4: Press the ▼ or ▲ button until current hour appears on the display. Be sure AM or PM corresponds to proper time.

NOTE: Pressing the ▼ or ▲ buttons will move the hours backward and forward.

PRESS



STEP 5: Press and release the CLOCK button. Display will flash minutes (:00).

STEP 6: Press ▼ or ▲ button until current minutes appear on the display.

NOTE: Pressing the ▼ or ▲ button moves the minutes backward or forward.

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SELECTING 2 OR 4 EVENTS PER DAY

Your 7 day programmable controller is designed so you can select either 2 events (Day ☀ or Night ☾) programming or 4 events (Morn 🌅, Day ☀, Evening 🌃, or Night ☾) programs. The switch is located inside the controller and should be set prior to any programming. (Switch #1 Off = 4 Events/day, Switch #1 On = 2 Events/day)

SETTING THE PROGRAM TEMPERATURES

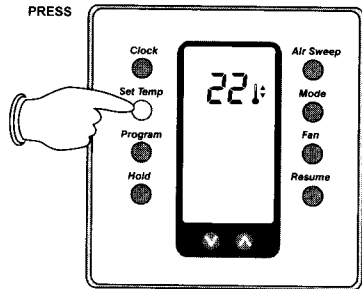
The heating and cooling setpoints can be programmed by pressing the SET TEMP button.

Note: The setpoints will be the same for all 7 days.

Press the SET TEMP button; the current mode will appear on the display (i.e. HEAT), as well as the temperature setpoint for that mode. The setpoint will flash and can be modified by pressing the ▼ or ▲ buttons. Repeatedly pressing the SET TEMP button will allow all of your temperature settings to be displayed and adjusted.

Press the MODE button to change the setpoints for the other mode of operation (i.e. COOL).

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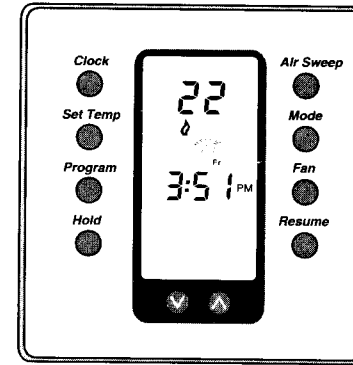
SETTING THE TIMED SCHEDULE FOR YOUR PROGRAM

Press and release the PROGRAM button. MO will flash on the display along with the morning symbol (🌅) (4 events per day) or the Day (☀) symbol (2 events per day). Press the ▼ or ▲ button to select the day, i.e. TU.

Press and release the PROGRAM button to select the start time hour. Press the ▼ or ▲ button until the display shows the desired start time hour.

Press and release the PROGRAM button to select the start time minutes. Press the ▼ or ▲ button until the display shows the desired start time minutes. (Program minutes to the 10 minute interval only, i.e. 8:10, 8:20, 8:30, etc.)

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USING THE COPY FUNCTION

The copy function has been designed into the PROGRAM button. For example, with MONDAY programmed for DAY (☀) and NIGHT (☾), the final function will show the word COPY on the display. Press the ▼ to display all 7 days of the week, then press PROGRAM to program the Monday programs to all 7 days of the week. Press the ▲ to select individual days to copy the program to individual days.

SETTING A SEPARATE DAY PROGRAM (i.e. SATURDAY)

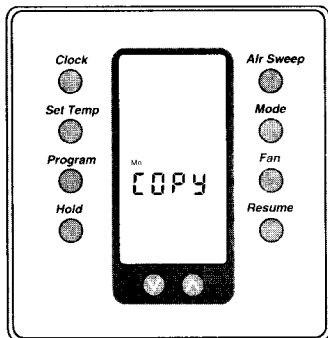
Use the ▼ or ▲ button to advance the day indicator to the day that may have a separate program. Press the program button to change that day's hour and minutes.

NOTE: If the RESUME button is not pressed, the controller will automatically start the program schedule within fifteen seconds after the last button is pressed.

REVIEWING THE SCHEDULED TIMES

To review your programmed schedules, repeatedly press and release the PROGRAM button. Each scheduled event will be displayed, starting with the Temperature, Day, Hour and Minute for each day of the week. To cancel your review, simply press and release the RESUME button, or wait 15 seconds for the controller to resume automatically.

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REVIEWING PROGRAMMED TEMPERATURES

To review your programmed temperatures, repeatedly press the SET TEMP button. The display will change to show the Mode, Event (Day or Night) and the temperature selected.

Sample Event Start Times

Temperature Settings			Event Start Times						
			MON	TUE	WED	THU	FRI	SAT	SUN
*	MORN	HEAT 68°	6 AM	6 AM	6 AM	6 AM	6 AM	6 AM	6 AM
		COOL 74°							
	DAY	HEAT 68°	8 AM	8 AM	8 AM	8 AM	8 AM	6 AM	--- --
		COOL 74°							
*	EVENING	HEAT 68°	5 PM	5 PM	5 PM	5 PM	5 PM	12 PM	--- --
		COOL 74°							
	NIGHT	HEAT 68°	11 PM	11 PM	11 PM	11 PM	11 PM	12 PM	12 PM
		COOL 74°							

Controller controls to the DAY setpoint until noon.

Controller controls to the NIGHT setpoint until 6 a.m. Sunday morning.

*Available in 4 events/day

TO SKIP AN EVENT

Press and release the PROGRAM key until you reach the desired day and event you wish to skip. Press and hold the PROGRAM key; the hour or minutes display will begin to flash. Press and release the MODE key; the time display will read "-- : --" and that event is now skipped.





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SET YOUR PERSONAL SCHEDULE

This blank form is for your own use. Start by selecting your heat/cool temperatures, then determine the times you want the temperatures to be active. Write in the desired times in the appropriate location. If you wish to skip a temperature, select the four dashes as is done in the sample schedule.

NOTE: It is suggested that you set your desired program times about 1 hour before the time that you actually require your home to reach the set temperature. So, if you get up at 7 AM, set the wake up temperature to come on at 6 AM.

Use this chart to record your personal schedule

Temperature Settings			Event Start Times						
			MON	TUE	WED	THU	FRI	SAT	SUN
MORN		HEAT							
		COOL							
DAY		HEAT							
		COOL							
EVENING		HEAT							
		COOL							
NIGHT		HEAT							
		COOL							

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WARRANTY

LIMITED ONE YEAR WARRANTY

The manufacturer warrants to the original purchaser that its product and component parts will be free from defects in workmanship and materials for a period of one year from the date of purchase. Your dealer will provide free replacement of your controller upon proof of purchase.

EXCLUSIONS

This warranty does not apply in the event of misuse, abuse, or as a result of unauthorized alterations or repairs. The manufacturer will not be liable for any consequential damages including, without limitation, damages resulting from defects, loss of use or misuse.

This equipment, if installed in strict accordance with the manufacturer's instructions, complies with the limits for a class B computing device pursuant to Subpart J of Part 15 of FCC rules.

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TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
No display/faint display	Supply voltage incorrect	Check the voltage between the 24V and 24V(c) terminals. Voltage should be between 20-30 VAC. If less than 20 VAC, disconnect the controller and check voltage between 24V and other system wires. If voltage is greater than 30 VAC, troubleshoot the power source and replace the controller.
	System transformer weak or overloaded	Check and/or replace with a suitable 24V transformer.
	Controller damaged due to voltage greater than 30 VAC	Replace with new controller and ensure new controller is isolated from the system using suitable relays and transformer of proper rating.
Keyboard Inoperative	Keyboard locked	Switch the keyboard DIPswitch to the unlock position
Controller will not call for heat	Compressor delay still in progress	Wait...equipment short cycle protection in progress.
	Controller setpoint is satisfied	Raise the heating temperature using the ▲ button.
Controller will not call for cooling	Compressor delay still in progress	Wait...equipment short cycle protection in progress.

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TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
Controller will not call for cooling	Setpoint is satisfied	Lower the cooling setpoint using the ▼ button.
Fan does not turn on.	Fan failure	Place a jumper between terminals R and G1. Fan should come on. If not troubleshoot the fan system. If fan does come on replace the controller.
"AC" appears on the LCD	20-30 VAC is absent from 24V and 24V(c)	Measure voltage between the 24V and 24V(c) terminals. If the reading is less than 20 VAC, check system transformer. If voltage is between 20 and 30 VAC, replace controller.
LCD shows missing or extra segments	20-30 VAC is absent from 24V and 24V(c)	Replace unit.
4 Events per day	DIPswitch #1 is 'OFF'	Switch DIPswitch #1 to 'ON', for 2 events per day
2 Events per day	DIPswitch #1 is 'ON'	Switch DIPswitch #1 to 'OFF', for 4 events per day
Fan runs continuously in unoccupied mode	DIPswitch #2 is 'OFF'	Switch DIPswitch to 'ON'. When continuous fan is selected, fan will run continuously in occupied mode and only with equipment in unoccupied mode.
Min. On time too long causing overshoot	DIPswitch #3 is 'OFF'	Switch DIPswitch #3 to 'ON'. This will decrease minimum run from 4 to 2 minutes.

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TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
Min. On time too short	DIPswitch #3 is 'ON'	Switch DIPswitch #3 to 'OFF'. This will increase minimum run from 2 to 4 minutes.
Keys won't operate- lock symbol appears on	DIPswitch #4 is 'ON'	Switch DIPswitch #4 to 'OFF'. This will unlock the keyboard.