

PSP722E

1. FEATURES

- Universal Compatibility
- Controls Up To 2 Stages Of Heat And 2 Stages Of Cooling + Auxiliary and Emergency Heat
- Large Hybrid Display
- Auxiliary and Emergency Heat Indicators
- Electro-luminescent Display Backlight
- Clean Cycle® (Patent No. 6,968,671) Independently Programmable Fan
- 7 Day Programming
- Default ENERGY STAR Approved Program
- 4 Periods Per Day
- Temporary Override
- Temperature Hold
- Optional Smart Recovery
- ENERGY STAR Compliant
- Programmable Filter Timer With Change Filter Indicator
- Energy Usage Monitor
- F/C Temperature Display
- 12/24 Hour Clock
- Easy Programming with LUX Speed Dial®
- Advanced Copy Function For Fast Easy Programming
- Nonvolatile Memory For All Programs And Settings
- Daylight Saving Button
- Multimode Keyboard Lockout With User Programmable 3 Digit Code
- Programmable High And Low Setting Limits
- Silence-able Audible Button Response
- Menu Driven Setup Done From The Front Panel
- Temperature Offset (User Calibration)
- Dual Power Capable (System/Battery)
- Multi-Stage Adjustable Temperature Differential /

Cycle Rate

- Programmable Length Minimum Run Time
- Programmable Auto-Changeover Dead-Band
- Programmable Fan Delays For Heat, Cool, In Both On And Off

2. COMPATIBILITY

Your PSP722E is compatible with most 24 volt gas, oil, or electrical Heating and/or Cooling systems. It cannot be used with 120 volt heating systems. Ask your dealer for other LUXPRO thermostats to control those systems.

2.1. HEAT STAGES

The PSP722E is capable of controlling systems with up to two stages of heat in furnace mode. In heat pump mode, the thermostat can be configured to control up to two stages of compressor driven heat plus auxiliary and emergency heat stages.

NOTE: AUX HEAT ACTIVATION IS PROVIDED AT TERMINAL W1

2.2. COOLING/COMPRESSOR STAGES

The PSP722E is capable of controlling systems with up to two stages of cooling.

2.3. ELECTRICAL RATINGS

- 30V maximum (24VAC nominal)
- 1.5A maximum per terminal
- 2.0A terminal sum

3. INSTALLATION

3.1. TOOLS REQUIRED

- #1 Phillips screwdriver (small)
- Drill with 3/16-in. (4.8mm) bit
- Wire stripper/cutter

3.2. LOCATION

On replacement installations, mount the new thermostat in place of the old one unless the conditions listed below suggest otherwise. On new installations, follow the guidelines listed below.

- Do not locate in a damp area. This can lead to corrosion that will shorten thermostat life.
- Do not locate where air circulation is poor, such as in a corner or an alcove; or behind an open door.
- Do Locate the thermostat on an inside wall, about 5 ft. (1.5m) above the floor, and in a room that is used often.
- Do not install it where there are unusual heating conditions, such as: in direct sunlight; near a lamp, radio, television, radiator, register, or fireplace; near hot water pipes in a wall; near a stove on the other side of a wall.
- Do not locate in unusual cooling conditions, such as: on a wall separating an unheated room; or in a draft from a stairwell, door, or window.
- Do not install the unit until all construction work and painting has been completed.

3.3. REMOVAL OF OLD UNIT

CAUTION: Read instructions carefully before removing any wiring from existing thermostat. Wires must be labeled before they are removed. When removing wires from their terminals, ignore the color of the wires since they may not comply with any standard.

- Switch electricity to the furnace and air conditioner OFF; then proceed with the following steps.
- Remove cover from old thermostat. Most are snap-on types and simply pull off. Some have locking screws on the on the side. These must be loosened.
- Note the letters printed near the terminals. Attach labels (enclosed) to each wire for identification. Label and remove wires one at a time. Make sure the wires do not fall back inside the wall.
- Loosen all screws on the old thermostat and remove it from the wall.

3.4. MOUNTING

CAUTION: Be careful not to drop the unit or disturb electronic parts.

- Strip insulation 3/8 in. (9.5mm) from wire ends and clean off any corrosion.
- Fill wall opening with non-combustible insulation to prevent drafts from affecting the thermostat.
- With each thumb on a release tab at the bottom of the body, and fingers over the top of the unit. Release the unit from its base plate by squeezing the tabs into the body.
- Separate the unit from its base plate by pulling the body outward from the bottom.

NOTE: If you are mounting the base to a soft material like plasterboard or if you are using the old mounting holes, the screws may not hold. Drill a 3/16-in. (4.8mm) hole at each screw location, and insert the plastic anchors provided. Then mount the base as described below.

- Route the wires through the open areas in the base plate above the terminals. Hold the base against the wall, with the wires coming through. Position the base for the best appearance (to hide any marks from an old thermostat). Attach the base to the wall with the two screws provided.

3.5. WIRING

3.5.1 TERMINAL DEFINITIONS

Terminal	Definition
1	G Fan
2	O Cooling Mode
3	Y2 Second stage cool
4	Y1 First stage cool
5	RC Cooling power source (transformer +)
6	C Common, system power -
7	RH Heating power source (transformer +)
8	W1 First stage heat
9	W2 Second stage heat
10	E Emergency heat/Freeze protection
11	B Heating Mode
12	TC Future Indoor temperature input -
13	T Future Indoor temperature input +
14	OT Future Outdoor temperature sensor input (a)
15	OT Future Outdoor temperature sensor input (b)

- 1. G** The fan terminal is live at any time the thermostat attempts to turn the system fan or blower on.
- 2. O** This terminal is live at any time the unit is in Cool mode.
- Y2** Activation of this terminal signifies that the thermostat is calling for a second stage of cooling. This terminal will remain inactive unless a second stage compressor has been specified in the installer setup menu.
- Y1** Activation of this terminal signifies that the thermostat is calling for a first compressor stage. This terminal will remain inactive unless at least one compressor stage has been specified in the installer setup menu.
- RC** This terminal provides power to the cooling and fan terminals.
- C** Use of this terminal allows the unit to be system powered rather than battery powered. Note that the display backlight is battery powered only.
- RH** This terminal provides power to the heating terminals.
- W1** This terminal is active when the thermostat is calling for the first available stage of furnace or electric heat. It will remain inactive unless at least one stage of furnace type heat has been specified in the installer setup menu.

9. **W2** This terminal is active when the thermostat is calling for a second stage of furnace or electric heat. It will remain inactive unless two stages of heating have been specified in the installer setup menu.

10. **E** This terminal is active when the thermostat is calling for Emergency heat in a heat pump system. This terminal also powers freeze protection if it is desired. It will be active below 40°F (5°C) regardless of mode or battery condition or other unforeseen condition.

11. **B** This terminal is live at any time the unit is in Heat mode.

12. **TC** Future indoor temperature sensor common. May be wired to a maximum of three external indoor sensor units.

13. **T** Future indoor temperature sensor. May be wired to a maximum of three external indoor sensor units.

14. **OT** Future first of two terminals dedicated to the outdoor temperature sensor. Polarity of these leads does not matter.

15. **OT** Future second of two terminals dedicated to the outdoor temperature sensor. Polarity of these leads does not matter.

3.5.2 FREEZE PROTECTION

The PSP722E incorporates a mechanical thermal switch which may be used to prevent a freeze-up by calling for heat in the event the unit has accidentally been turned off or its batteries have not been replaced as recommended.

- This switch is available at the E terminal of the thermostat. In most systems using this feature will require wiring a jumper between the W1 and E terminals. The thermostat will call then for the first stage of heat, in furnace mode, or Aux heat in heat pump mode. See EMERGENCY HEAT.

- The nominal temperature set point of this switch is 40°F (5°C).

3.5.3 SPECIAL WIRING NOTES

- In heat pump mode, AUX heat is available at W1.
- In heat pump mode, Emergency Heat is activated from the E terminal. This terminal also provides freeze protection and it will be active below a nominal temperature of 40°F (5°C).

3.5.4 COMMON WIRING OPTIONS

Though not shown here additional second stages may be used where applicable. Be sure to enable them properly in the Installer Setup menu.

W2 is second stage heat

E is emergency heat and freeze protection

Y2 is second stage cool or second stage heat pump

OPTIONAL O or B terminals may be used to power heating dampers or changeover valves in any system configuration.

OPTIONAL C terminal may be connected to a system

common to power the thermostat from the system in any wiring configuration.

WARNINGS: 1. A B wire is sometimes used as a common wire. Connecting a common B wire to the B terminal in these systems will likely cause damage to the thermostat and/or HVAC system. Do not connect a wire to the B terminal if you are unsure whether it may be wired to a system common.

2. If Both Y and C wire are present, then C is common. Tape it off or connect it to the C terminal to allow the system to power the thermostat.

OPTIONAL C, X, B, TC	C	Transformer Common
	B	Changeover Valve
	O	Use O or B not both

3.5.5 SINGLE STAGE HEATING SYSTEM LABEL CROSS REFERENCE

System	Previous Thermostat Terminal Marking	New Thermostat Terminals	Wire To
All 2 Wire Heat	RH, R, RC, V, 5	RH	Transformer
	W, H, 4	W1	Heating Valve
3 Wire	RH, R, RC, V, 5	RH	Transformer
	W, 4	W1	Heat Control
	B, C	Tape Off *	
3 Wire (one wire is 'F' or 'G')	RH, R, 5, V	RH	Transformer
	W, 4	W1	Heating Valve
	G, F	G	Fan Relay

3.5.6 SINGLE STAGE COOLING SYSTEM LABEL CROSS REFERENCE

System	Previous Thermostat Terminal Marking	New Thermostat Terminals	Wire To
2 Wire	RC, R, V	RC	Transformer
	Y, Y1, C	Y1	Cooling Relay
3 Wire	RC, R, V	RC	Transformer
	Y, Y1, C	Y1	Cooling Relay
	G, F	G	Fan Relay

3.5.7 SINGLE STAGE FURNACE HEATING AND SINGLE STAGE COOLING SYSTEM LABEL CROSS REFERENCE

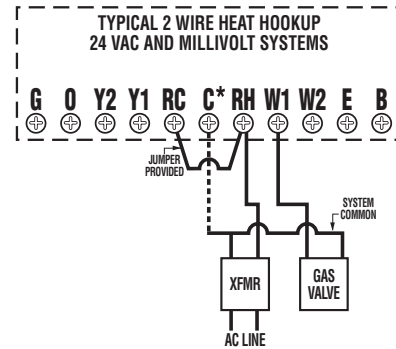
System	Previous Thermostat Terminal Marking	New Thermostat Terminals	Wire To
4 Wire (heat & cool with single transformer)	RH, RC, R, V	RH & RC, w jumper	Transformer
	W, W1	W1	Heating Relay
	Y, Y1, C	Y1	Cooling Relay
	G, F	G	Fan Relay
5 Wire (heat & cool with two transformers)	RH	RH	Heating Transformer
	RC	RC	Cooling Transformer
	W, W1	W1	Heating Relay
	Y, Y1, C	Y1	Cooling Relay
	G, F	G	Fan Relay

3.5.8 TWO STAGE HEAT, SINGLE STAGE COOL, HEAT

PUMP SYSTEM LABEL CROSS REFERENCE

System	Previous Thermostat Terminal Marking	New Thermostat Terminals	Wire To
Heat Pump	RH, RC, R, V	RH & RC, w jumper	Transformer
2 Heat, 1 Cool	Y, Y1, C	Y1	Compressor Relay
	W, W2	W1	Aux Heat Relay
	E	E	Em Heat/Freeze Prot
	B	B*	*Changeover Valves
	O	O*	Use O or B not both
	G, F	G	Fan Relay

3.5.9 WIRING DIAGRAMS

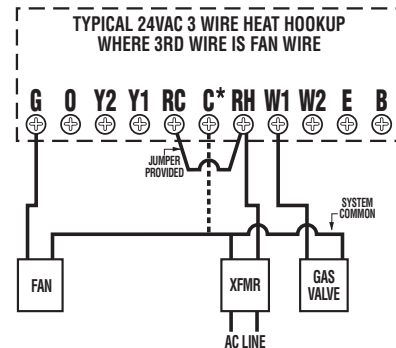


TYPICAL INSTALLER SETUP:

- (01) SYSTEM TYPE = FURNACE
- (02) HEAT STAGES = 1
- (03) COMPRESSOR STAGES = 0
- (04) MODES = Heat-Off
- (09) HEAT FAN CONTROL = GAS

NOTES:

- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER

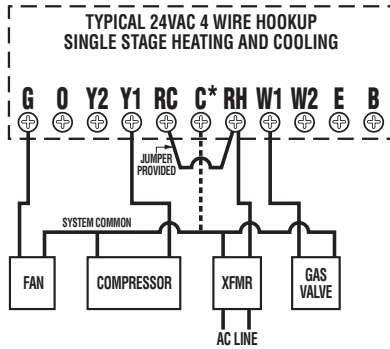


TYPICAL INSTALLER SETUP:

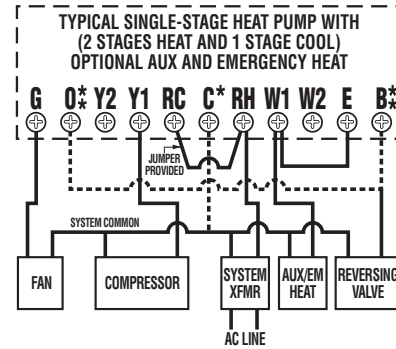
- (01) SYSTEM TYPE = FURNACE
- (02) HEAT STAGES = 1
- (03) COMPRESSOR STAGES = 0
- (04) MODES = Heat-Off
- (09) HEAT FAN CONTROL = GAS

NOTES:

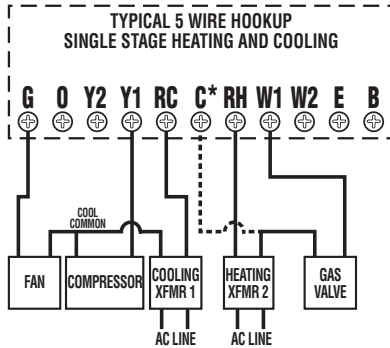
- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER



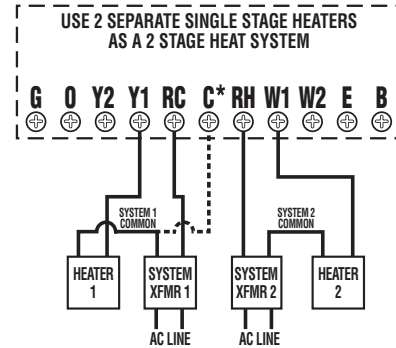
- TYPICAL INSTALLER SETUP:**
- (01) SYSTEM TYPE = FURNACE
 - (02) HEAT STAGES =1
 - (03) COMPRESSOR STAGES =1
 - (04) MODES = HI-Off-CI-Auto
 - (09) HEAT FAN CONTROL = GAS
- NOTES:**
- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER



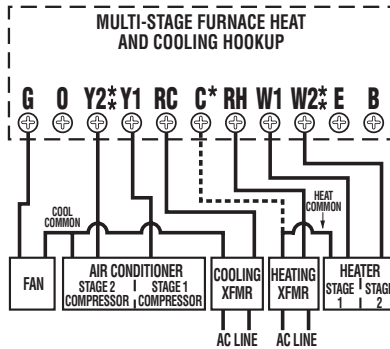
- TYPICAL INSTALLER SETUP:**
- (01) SYSTEM TYPE = HEAT PUMP
 - (02) HEAT STAGES =1
 - (03) COMPRESSOR STAGES =1
 - (04) MODES = HI-Off-CI-EmHI-Auto
 - (09) HEAT FAN CONTROL = ELECTRIC
- NOTES:**
- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER
 - (2) * USE "B" OR "O" BUT NOT BOTH
 - (3) AUX HEAT AND EMERGENCY HEAT ARE OPTIONAL



- TYPICAL INSTALLER SETUP:**
- (01) SYSTEM TYPE = FURNACE
 - (02) HEAT STAGES =1
 - (03) COMPRESSOR STAGES =1
 - (04) MODES = HI-Off-CI-Auto
 - (09) HEAT FAN CONTROL = GAS
- NOTES:**
- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER



- TYPICAL INSTALLER SETUP:**
- (01) SYSTEM TYPE = HEAT PUMP
 - (02) HEAT STAGES =1
 - (03) COMPRESSOR STAGES =1
 - (04) MODES = Heat-Off
 - (09) HEAT FAN CONTROL = ELECTRIC
- NOTES:**
- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER

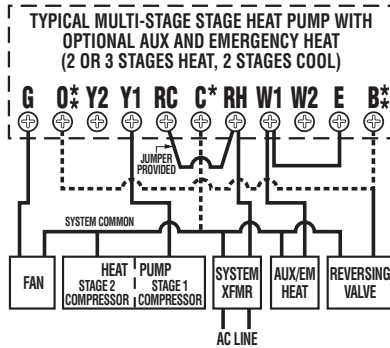


TYPICAL INSTALLER SETUP:

- (01) SYSTEM TYPE = FURNACE
- (02) HEAT STAGES = (MATCH SYSTEM)
- (03) COMPRESSOR STAGES = (MATCH SYSTEM)
- (04) MODES = H-Off-CI-Auto
- (09) HEAT FAN CONTROL = ELECTRIC

NOTES:

- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER
- (2) * EITHER SECOND STAGE MAY BE OMITTED



TYPICAL INSTALLER SETUP:

- (01) SYSTEM TYPE = HEAT PUMP
- (02) HEAT STAGES = MATCH SYSTEM
- (03) COMPRESSOR STAGES = MATCH SYSTEM
- (04) MODES = H-Off-CI-EmH-Auto
- (09) HEAT FAN CONTROL = ELECTRIC

NOTES:

- (1) * OPTIONAL COMMON ALLOWS USE OF SYSTEM POWER
- (2) * USE "B" OR "O" BUT NOT BOTH
- (3) AUX HEAT AND EMERGENCY HEAT ARE OPTIONAL

3.6. INSTALL BATTERIES

Install batteries at this time. For instructions, see BATTERY INSTALLATION.

3.7. INSTALLER SETUP

Configuration items are selected from the Installer Set up Menu. They are stored in non-volatile RAM, and will be preserved even in the event that the unit's batteries are run down, or removed, or the hardware reset on the rear of the unit's circuit board of the thermostat is pressed.

NOTE: Pressing the S/W RESET button on the rear of the unit's circuit board will write default values of all temperature programs and setup menus into the unit nonvolatile memory. Take care not to inadvertently press this button when the thermostat has been removed from the wall plate!

3.7.1 ACCESS AND NAVIGATE INSTALLER SETUP MENU

Note: Insure that all relays are off before making changes in the installer menu. There are two methods, which may be used to do this. Place the unit in the OFF mode and wait for 5 minutes or Press the H/W RESET button on the rear of the unit's circuit board. Take care not to inadvertently press the S/W RESET button.

- To enter the Installer Setup Menu press and hold the Setup Button for 10 seconds.
- Use the NEXT button to scroll through its options. As you proceed the menu item number will be displayed in the left portion of the screen.
- Selections can be changed by pressing the UP/DOWN button.
- Moving from one menu item to the next and acceptance of changes is done by pressing the NEXT button.
- All changes become effective when the unit exits the Installer Setup mode.
- The Installer Setup mode will be exited when the Setup button is pressed again, or, if no other keys are pressed for 20 seconds.

All settings, their choices and default values are given in INSTALLER SETUP MENU WITH FURNACE SYSTEM TYPE SELECTED: and INSTALLER SETUP MENU WITH HEAT PUMP SYSTEM TYPE SELECTED AND FUTURE OUTDOOR SENSOR ENABLED.

3.7.1.1 SYSTEM TYPE

This option determines whether the thermostat is to control a furnace and air conditioning system or heat pump system.

- In furnace mode the unit will make the proper W terminals live for Heating, and the proper Y terminals live for cooling.
- In Heat Pump mode the unit makes the proper Y terminals live for the first and second stages of a heat pump unit during heating or cooling. In this mode an additional stage of Aux Heat may also be activated through the W1 terminal.

3.7.1.2 HEAT STAGES

Set this to the number of non-compressor driven heat stages to use for temperature control by this system.

3.7.1.3 COMPRESSOR STAGES (COOL/HEAT PUMP STAGES)

Set the number of compressor driven system stages to use for temperature control. These stages include all cooling or heat pump stages to be used for temperature control by this system.

3.7.1.4 MODES

The modes setting selects what system modes will be available to the user. The selections available are system mode dependant:

- Heat-Off
- Cool-Off
- Heat-Off-Cool
- Heat-Off-Cool-Auto (Furnace Mode) or
- Heat-Off-Cool-Em Heat-Auto (Heat Pump Mode)

3.7.1.5 MINIMUM RUN TIME

Minimum Run Time provides compressor protection and prevents short cycling. Compressor stages are held off for a minimum of this time. During program run this is also the minimum on time.

3.7.1.6 HEAT PUMP LOCKOUT

This menu item is available only in Heat Pump Mode with an operational outdoor temperature sensor. Enabling this option allows the thermostat to disable a heat pump and request AUX Heat below the Heat Pump Lockout Temperature.

3.7.1.7 HEAT PUMP LOCKOUT TEMPERATURE

This menu item is available only in Heat Pump Mode with an operational outdoor temperature sensor. With it you may set the outdoor temperature at which the thermostat will cease to call for heat pump sourced heat, and use the alternate AUX Heat source.

3.7.1.8 DEADBAND

When using auto-changeover, deadband provides a disallowed temperature range between the maximum heat temperature set point and minimum cool temperature set point. Deadband may be set from 3 to 5 degrees. With auto-changeover active and the Deadband set to 3°F and heat set to 70°F the minimum allowed cool temperature set point will be 73°F. If the cool temperature set point is lowered, then the heat temperature set point will be lowered by the same amount maintaining the 3°F Deadband.

3.7.1.9 SWING 1

Swing 1 sets the temperature variation the system allows above the temperature set point before switching the first stage heat source off, or below the temperature set point before switching the first stage heat source on. In Cool, Swing 1 sets the temperature variation the system allows above the temperature set point before switching first stage of cooling on, or below the temperature set point before switching the first stage of cooling off.

3.7.1.10 SWING 2

This value is similar to the Swing 1, but it controls the temperature variation the system allows above and below Swing 1's lower limit before calling for a second stage. Once a second stage is activated, it will remain on until the temperature set point has been reached. If a third stage of heat is present in heat pump mode, Swing 2 is used to control it from the stage 2 lower limit.

3.7.1.11 HEAT FAN CONTROL

Fossil fuel furnaces normally control the system fan while the furnace is operating. Electric systems normally require the thermostat to activate the fan. This setting instructs the thermostat how to handle fan control during heating. Electric heat and heat pumps generally require the thermostat to activate the fan and therefore use the electric setting.

3.7.1.12 HEAT FAN ON DELAY

This setting allows the installer to program the length of time between heating activation and fan activation (delay on make).

3.7.1.13 HEAT FAN OFF DELAY

This setting allows the installer to program the length of time between heating deactivation and fan deactivation (delay on break).

3.7.1.14 COOL FAN ON DELAY

This setting allows the installer to program the length of time between cooling activation and fan activation (delay on make).

3.7.1.15 COOL FAN OFF DELAY

This setting allows the installer to program the length of time between cooling deactivation and fan deactivation (delay on break).

3.7.1.16 FUTURE OUTDOOR SENSOR

This setting enables and disables an outdoor sensor if it is present. The setting will be held NA if a sensor is not present, and will be reset to NA if the sensor is disconnected for any reason, including removal of the thermostat from its base-plate, the thermostat will automatically disable the sensor changing the setting in this menu from ON to NA. With an outdoor sensor present and enabled, the outdoor temperature will be displayed alternately with time. The word OUT will be visible to the right of the temperature while the outside temperature is displayed.

3.7.1.17 INTERNAL TEMPERATURE SENSOR

This setting enables and disables the thermostats internal temperature sensor. It may only be disabled if there are indoor remote sensors present and enabled.

3.7.1.18 FUTURE INDOOR REMOTE SENSOR 1, 2, 3

Used to enable and disable the respective remote sensors in a system. When more than one indoor sensor is used, the values of their measurements are averaged for use in temperature control.

3.7.2 INSTALLER SETUP MENU WITH FURNACE SYSTEM TYPE SELECTED:

Menu Item	Display	Selections	Default
01	System Type	Furnace / Heat Pump	Furnace
02	Heat Stages	0 - 2	2
03	Compressor Stages	0 - 2	2
04	Modes	Heat-Off Cool-Off Heat-Off-Cool Heat-Off-Cool-Auto	* * * *
05	Minimum Run Time	1 to 5 min	4 min
06	Deadband	3°F(1°C) to 5°F(3°C)	3°F(1°C)
07	Swing 1	0.25°F(0.15°C) to 2.25°F(1.25°C)	0.25°F(0.15°C)
08	Swing 2	0.25°F(0.15°C) to 2.25°F(1.25°C)	0.5°F(0.3°C)
09	Heat Fan Control	Gas / Electric	Gas
10	Heat Fan On Delay	0, 15, 30...180 sec	0 sec
11	Heat Fan Off Delay	0, 15, 30...180 sec	0 sec
12	Cool Fan On Delay	0, 15, 30...180 sec	0 sec
13	Cool Fan Off Delay	0, 15, 30...180 sec	0 sec
14	Outdoor Sensor (future)	NA/ON/OFF	NA/OFF
15	Internal Temp Sensor (future)	ON/OFF	ON
16	Remote Sensor 1 (future)	NA/ON/OFF	NA/OFF
17	Remote Sensor 2 (future)	NA/ON/OFF	NA/OFF
18	Remote Sensor 3 (future)	NA/ON/OFF	NA/OFF

3.7.3 INSTALLER SETUP MENU WITH HEAT PUMP SYSTEM TYPE SELECTED AND OUTDOOR FUTURE SENSOR ENABLED:

Menu Item	Display	Selections	Default
01	System Type	Furnace / Heat Pump	Furnace
02	Heat Stages	0 - 1	1
03	Compressor Stages	0 - 2	1
04	Modes	Heat-Off Cool-Off Heat-Off-Cool Heat-Off-Cool-Em Heat-Auto	* * * *
05	Minimum Run Time	1 to 5 min	4 min
06*	Heat Pump Lockout	ON, OFF	Off
07*	Heat Pump Lockout Temperature	0°F(-17°C)-17°C(10°C)	0°F(-17°C)
08	Deadband	3°F(1°C) to 5°F(3°C)	3°F(1°C)
09	Swing 1	0.25°F(0.15°C) to 2.25°F(1.25°C)	0.25°F(0.15°C)
10	Swing 2	0.25°F(0.15°C) to 2.25°F(1.25°C)	0.5°F(0.3°C)
11	Heat Fan Control	Electric	Electric
12	Heat Fan On Delay	0, 15, 30...180 sec	0 sec
13	Heat Fan Off Delay	0, 15, 30...180 sec	0 sec
14	Cool Fan On Delay	0, 15, 30...180 sec	0 sec
15	Cool Fan Off Delay	0, 15, 30...180 sec	0 sec

16	Outdoor Sensor (future)	NA/ON/OFF	NA/OFF
17	Internal Temp Sensor	ON / OFF	ON
18	Remote Sensor 1 (future)	NA/ON/OFF	NA/OFF
19	Remote Sensor 2 (future)	NA/ON/OFF	NA/OFF
20	Remote Sensor 3 (future)	NA/ON/OFF	NA/OFF

*Available only with an outdoor sensor present and enabled

3.7.4 COMPLETING YOUR INSTALLATION

- Turn the power back on to your heating and/or air conditioning system.
- Verify that the system and its fan are operating properly. When set to a high temperature, the heating system should provide warm air after a short time. Likewise a cooling system should provide cool air after a short time. Usually sound from the furnace and air conditioning units can be heard while they are running. The rush of moving air should be heard within a short time after either has been started.

NOTE: If you have an electric system and the blower does not operate after installation, verify that the electric/gas option in installer set up is set to Electric.

- Installation is now complete.

4. OPERATION

4.1. OPERATING BASICS

4.1.1 UP/DOWN ARROW CHANGE KEYS

There are two arrow keys just the right of the units display. They are used to adjust set temperatures, and change other settings.

4.1.1.1 TEMPERATURE ADJUSTMENT

- Pressing an arrow key once adjusts a set temperature by one degree in the associated direction.
- Holding the key will automatically advance the setting in the associated direction.

4.1.1.2 CHANGING OTHER SETTINGS

If there are many choices for a value, usually that setting will automatically advance by holding one of the arrow keys. Some settings though, must be changed one press at a time.

4.1.2 SET DAY AND TIME

The time used by your thermostat for temperature control is that displayed by the unit. To set the correct time after the unit has been unpowered or after software reset:

- Open the drop down door on the front of the thermostat. Rotate the dial to the SET DAY/TIME position. Use the UP key to advance the day to the current day of the week.
- Press NEXT to adjust the time. Pressing NEXT again will toggle from Set Day to Set Time.
- Use the UP or DOWN key to set the thermostats clock.
- Return the dial to its RUN position.

4.1.3 DEFAULT PROGRAM

- As supplied from the factory, the following ENERGY STAR approved program will be used for temperature control. This program and all other settings may be restored to their default values via a SOFTWARE RESET.
- Default Daily Temperature Program

Period	Heat Mode	Cool Mode
Morning	6:00 AM 70°F	6:00 AM 78°F
Day	8:00 AM 62°F	8:00 AM 65°F
Evening	6:00 PM 70°F	6:00 PM 78°F
Night	10:00 PM 62°F	10:00 PM 62°F

4.1.4 MODES

Because of your thermostats great versatility not all modes will be applicable to your application. The mode selections available to you are determined by settings in the Installer Setup Menu. Often the unit's mode is displayed during program run. When a unit has first been powered up with the dial in the Run position, your thermostat will begin to control your heating and/or air conditioning system according to it's default ENERGY STAR approved program in AUTOCHANGE mode.

4.1.4.1 OVERRIDE

During a run, either the Heat or Cool set point temperature may be altered with the temperature UP/DOWN arrow button. **T Override** will be displayed in line two of the display. The adjusted temperature will remain the set temperature until the next program period begins. Then, temperature settings will return to program control.

4.1.4.2 HOLD

Press this button to indefinitely maintain a fixed temperature. **HOLD** will be displayed in line two of the display.

- Press this button once to enter permanent temperature HOLD from program run or temperature OVERRIDE.
- Pressing this button again will toggle HOLD off returning to program RUN.

4.1.4.3 AUTOCHANGE

The AUTOCHANGE mode allows your thermostat to switch between Heat and Cool modes of temperature control automatically.

- AUTOCHANGE may not be available or applicable in your installation.

- To enter AUTOCHANGE mode if it is available, press the MODE button repeatedly until the display indicates that the unit is in AUTOCHANGE mode.

- In AUTOCHANGE mode, you can determine whether your thermostat will call for heating or cooling (at that time) by whether HEAT SET or COOL SET is visible on the units display.

- To switch from heating to cooling or vice versa, press both arrow keys at the same time.
- Pressing the UP/DOWN temperature arrow keys will adjust the active, visible set temperature.
- When AUTOCHANGE is first entered, the unit may need to determine which if either heating or cooling is

required. Heating and cooling set temperatures may not be adjusted until heating or cooling is necessary, or one of these modes is manually selected by pressing and releasing both arrow keys at the same time.

- You can force heating or cooling to be the active mode by pressing and releasing both arrow keys at the same time until the desired mode is indicated. After, the unit will then switch modes as necessary to control temperature.

4.1.4.4 HEATING

- Press the MODE button repeatedly until the word HEAT is shown along the top of the display. The unit is in HEAT mode ready to control your heating system.
- Press temperature UP or DOWN keys until your desired temperature is displayed in the HEAT SET area of the display.
- While heating is active, a flame icon will flash above the HEAT SET temperature. If a second stage of heat is called for the flashing rate increases.

4.1.4.5 COOLING

- Press the MODE button repeatedly until the word COOL is shown along the top of the display. The unit is in Cool mode ready to control your air conditioner.
- Press temperature UP or DOWN keys until your desired temperature is displayed in the COOL SET area of the display.
- While cooling is active, a snowflake icon will flash above the COOL SET temperature. If a second stage of heat is called for the flashing rate increases.

4.1.4.6 OFF

- Press the MODE button repeatedly until the display indicates that the unit is in OFF.
- Heating and cooling will be disabled.
- Periods programmed to maintain a minimum fan run time will continue to do so.

4.1.5 DISPLAY ILLUMINATION

- Press the light bulb button to illuminate the display. Pressing other buttons will keep the display illuminated until no button has been pressed for approximately 20 seconds.

4.2. USER SETUP MENU

User selectable options are available from the User Setup Menu. To access the User Setup Menu press the Setup button. All settings, their choices and default values are given in the USER SETUP MENU.

4.2.1 ACCESS AND NAVIGATE USER SETUP MENU

- To scroll through the User Setup Menu one item at a time, momentarily press Setup Button.
- Selections can be changed by pressing the UP/DOWN button.
- Moving from one menu item to the next and acceptance of changes is done by pressing the NEXT button.
- All changes become effective when the unit exits the User Setup mode.
- The User Setup mode will be exited when the Setup

button is pressed again, or if no other keys are pressed for 20 seconds.

4.2.2 KEYBOARD LOCK

Two types of Keyboard locks allow owners/operators to prevent unauthorized changes to the thermostats settings. The two types of locks are full and partial. When the thermostat is locked, a three digit code is set. That code must be reentered before locked settings can be changed without performing a software reset off the unit. Entering a code toggles the selected lock on or off. While a lock is effective, a padlock is shown near the lower right corner of the screen.

4.2.2.1 PARTIAL KEYBOARD LOCK

A partial lock allows other users to adjust only the temperature set point to values at or between the Maximum Heat Setting and Minimum Cool Settings.

4.2.2.2 FULL KEYBOARD LOCK

A full lock disables all the keys except the Setup button on the front, and the S/W Reset button on the rear. Pressing the S/W Reset button will rewrite all settings and programs to their default values.

4.2.2.3 SETTING THE LOCK

1. Press SETUP.
2. Select Full or Partial.
3. Press NEXT.
4. Set code one digit at a time. Press NEXT after each digit.
5. When NEXT is pressed after the third digit has been entered, the unit will be appropriately locked.

4.2.2.4 CLEARING A LOCK

1. Press SETUP.
2. Enter code one digit at a time. Press NEXT after each digit.
3. When NEXT is pressed after the third digit has been entered, the unit will be unlocked if the correct code was entered.

If you have forgotten the code, your thermostat may be unlocked by pressing the Software Reset button on the rear of the unit's circuit board. This will restore the unit to its default settings and it will likely need to be reconfigured to control your HVAC system.

4.2.2.5 CHANGING THE LOCK CODE

1. Press SETUP.
2. Select NEW CODE.
3. Press NEXT.
4. Enter old code one digit at a time. Press NEXT after each digit.
5. Enter new code one digit at a time. Press NEXT after each digit.
6. When NEXT is pressed after the new third digit has been entered, the new code will be effective.

4.2.3 BEEP

This option allows the audible feedback tone (Beep) to be enabled or disabled.

4.2.4 TEMPERATURE DISPLAY FORMAT (F/C DISPLAY)

Temperature may be displayed in Fahrenheit or Celsius with this option.

4.2.5 CLOCK FORMAT

The time shown on the thermostats clock may be displayed in 12 or 24 hour format. Set this option to your preference.

4.2.6 CALIBRATION OFFSET

Your thermostat is accurately calibrated at the factory to within $\pm 1^\circ\text{F}$ An offset value up to $\pm 5^\circ\text{F}$ may be added to the temperature value that the thermostat measures. This may allow you to match this thermostat to another.

4.2.7 MAXIMUM HEAT SETTING

The temperature that this option is set to will be the highest HEAT SET temperature available in run mode or while programming the thermostat.

4.2.8 MINIMUM COOL SETTING

The temperature that this option is set to will be the lowest COOL SET temperature available in run mode or while programming the thermostat.

4.2.9 SMART RECOVERY

Your thermostats Smart Recovery allows your HVAC system to attempt to recover from a setback period and reach your desired comfort temperature set point by the beginning of your programmed comfort period. This option allows you to choose whether to use Smart Recovery.

If enabled, Smart Recovery will initiate if:

- Recovery is valid only from a night setback to morning comfort or day setback to evening comfort period.
- In Heat mode the temperature set point of the comfort period must be higher than the setback period.
- In Cool mode the temperature set point of the comfort period must be lower than the setback period.
- The estimated Smart recovery time must be longer than 15 minutes for an Smart recovery to be initiated.
- Maximum Smart recovery time is one hour.
- AUX heat will not be activated during the first half hour of a Smart recovery. Then it will only be activated if necessary to achieve the programmed temperature by the beginning of the next period.
- The Smart recovery temperature set point must be achievable. If a desired smart recovery is repeatedly ignored by your thermostat that is an indicator that you should modify your program so that the recovery can be achieved within the 1 hour limit.
- A Smart recovery may not be initiated for 48 hours after the units programs have been changed. This allows the unit to gather the data necessary to predict a Smart recovery time.

4.2.10 FILTER LIMIT

Your thermostat will warn you that your HVAC systems air filter should be changed after the systems fan has run the number of hours that this setting has been pro-

grammed for. A general rule of thumb is to assume that the fan will run at 1/3 duty cycle. A 90 day filter will then be good for 90*24/3=720 hours. This is the default value. Setting the filter counter limit to 0000 will disable the change filter indicator. Valid entries are from 0 to 2000hrs.

4.2.11 USER SETUP MENU:

Menu Item	Display	Selections	Default
01	LOCK KEYPAD	NO, PARTIAL, FULL, NEW CODE	NO
02	BEEP	ON, OFF	ON
03	F/C DISPLAY	F, C	F
04	CLOCK FORMAT	12HR / 24HR	12HR
05	CALIBRATION OFFSET	$\pm 5^\circ\text{F}$ ($\pm 3^\circ\text{C}$)	0°F
06	MAX HEAT TEMP	45°F-90°F (7°C-32°C)	90°F (32°C)
07	MIN HEAT TEMP	45°F-90°F (7°C-32°C)	45°F (7°C)
08	EARLY RECOVERY	ON, OFF	OFF
09	FILTER LIMIT	0-2000HRS	720HRS

4.3. ADVANCED FEATURES AND OPERATION

4.3.1 EMERGENCY HEAT

- To use an emergency heat system, press the MODE button repeatedly until the EMER HT is shown along the top of the display. The unit is in emergency heat mode ready to control your emergency heating system. In heat pump systems, the emergency heat terminal is often wired to W1 the AUX heat terminal.
- Press temperature UP or DOWN keys until your desired temperature is displayed in the HEAT SET area of the display.
- Freeze protection is also provided at this terminal. See FREEZE PROTECTION.

4.3.2 FAN MODES

Your thermostat provides three fan modes. They are AUTO, CLEAN, and ON. The fan may be controlled by your units program, or the program may be overridden by pressing the FAN button and selecting another mode. Appropriate indicators are visible along the top of the units display when active.

4.3.2.1 FAN AUTO

FAN AUTO denotes that the fan will run only to fulfill your heating and cooling requirements.

4.3.2.2 CLEAN

This enables the CLEAN CYCLE® feature. The FAN icon alone in the display denotes that the fan is maintaining the programmed minimum run time; it will also run additional time as required to maintain temperature control. The algorithm used avoids additional fan time when the minimum run time has been met over the last hour through temperature control. Minimum fan run times are met by running one third the hourly requirement at twenty minute intervals.

4.3.2.3 FAN ON

FAN ON denotes that your system fan will run continuously.

4.3.3 VACATION HOLD

Use this feature to instruct the thermostat to hold a fixed temperature for a period of from 1 to 30 days.

- Verify that the unit is in Heat, Cool or AUTOCHANGE with a temperature set point visible. The unit must be have a temperature set point visible to enter Vacation Hold mode.
- Press and hold the HOLD button for approximately three seconds.
- Use the UP/DOWN arrow keys to adjust the number of days to your preference. The maximum number of additional days is 30.
- Press NEXT. The thermostat will display the number of days remaining in this Vacation Hold.
- If the unit is in Heat mode, it will now maintain a minimum temperature by controlling your heating system. If the unit is in Cool mode, it will now maintain a maximum temperature by controlling your cooling system.
- The Vacation Hold will be complete when there are no remaining days left and the unit will resume using the temperature programs stored in its memory.
- A Vacation Hold may also be terminated prematurely by Pressing the HOLD button again, changing the mode of the system, or rotating the dial.

4.3.4 DAYLIGHT SAVINGS TIME ADJUSTMENT (DST)

This button is labeled DST. When pressed it shifts the units clock time in a three press sequence. A first press will add 1 hour to the displayed time. A second press subtracts one hour from the original time, and a third press returns the unit to the original time. After one minute with no new DST button presses, the sequence is reset starting with the current displayed time.

4.3.5 AIR FILTER

This unit incorporates a timer, which records the number of hours the thermostat has activated the fan. This timer is intended to indicate when your HVAC systems filter should be cleaned or replaced.

- Refer to the User Setup menu to set the number of hours the timer will use to indicate that changing the filter is recommended.
- To view the number of hours the thermostat has activated the fan since the last timer reset, rotate the dial to the AIR FILTER position.
- To reset the timer press the UP or Down arrow key once. Pressing an arrow key again will toggle between 0000 and the current value. The value in display when you exit this mode will be the value retained in memory. Leave the value at 0000 to reset the timer.
- To exit the AIR FILTER mode, rotate the dial to another position.

4.3.6 ENERGY USAGE

Your thermostat records the total number of hours the thermostat has activated heating and cooling with six separate timers. They measure:

- Today's cumulative heating time
 - Today's cumulative cooling time
 - Yesterdays cumulative heating time
 - Yesterdays cumulative cooling time
 - Total cumulative heating time
 - Total cumulative cooling time
- To view this set of timer values:
- Rotate the dial to the ENERGY USAGE position. Timer values will repeatedly display the above sequence.
 - The cumulative timers may be reset by pressing the UP or Down arrow key once. Pressing an arrow key again will toggle between 00:00 and the current value. Pressing the UP or Down arrow key also stops the scrolling.
 - Press NEXT to resume scrolling.
 - When you rotate the dial to another mode, the current values will be the values retained in memory. Leave the value at 00:00 to reset the cumulative timers.

4.3.7 FUTURE OUTDOOR SENSOR

An optional outdoor sensor may be installed to enable the thermostat to display the temperature outside your home. This sensor may also be used to instruct the unit to switch from a heat pump to another source of heat. Once installed the outdoor temperature will alternate with the time in the display. To install an outdoor sensor refer to the Installation Section of this manual. To enable an outdoor sensor or change heat pump settings refer to the Installers Setup Section of this manual.

4.3.8 FUTURE REMOTE INDOOR SENSORS

Up to three optional indoor sensors may be installed. The temperature measurements of all active indoor sensors will be averaged and used in temperature control. With remote indoor sensors functioning, the units' internal temperature sensor may be enabled or disabled to allow the thermostat to be mounted in locations that would otherwise be non-ideal.

To install indoor temperature sensors refer to the Installation Section of this manual. To enable or disable the units internal sensor or other remote indoor temperature sensors refer to the Installers Setup Section of this manual.

4.3.9 RESET

There are two RESET buttons on the rear of the unit's circuit board. They are the Hardware and Software RESET buttons.

4.3.9.1 HARDWARE RESET (H/W RESET)

The H/W RESET button restarts your thermostats program at the beginning of normal operation. This button is generally of little use to an owner.

4.3.9.2 SOFTWARE RESET (S/W RESET)

The S/W RESET button restarts your thermostats program at initialization. It may be used to reset every programmable value to it's default setting.

Pressing this button will write default values of all temperature programs and setup menus into the unit's nonvolatile memory. Take care not to unintentionally press this button when the thermostat has been removed from the wall plate!

4.4. PROGRAMMING

You can change the preset time/and temperatures to suit your schedule for each day of the week. Each day has four consecutive periods. They are Morning, Day, Evening, and Night. Separate set points are provided for Heat and Cool.

Fan programming is similar to temperature programming. It has four consecutive periods, which are independent of the four temperature periods. The default setting for your systems fan requires it to run only as required by your environmental system. It may be programmed to maintain a minimum run time on an hourly basis, or run continuously.

4.4.1 WEEKDAY TEMPERATURE PROGRAMMING

- Rotate the dial to Set Weekday Programs. The heat and cool set points will be displayed on the left side of the display. The start time for the displayed day will flash to show that this is the setting currently ready for edit.
- Use the up or down arrow keys to change the start time for this period. One period ends at the start time of the next period. The beginning of that period may not be any closer to the beginning of the next period than one 15 minute increment.
- Press NEXT to accept the displayed start time and advance to edit the heat set point. It will be flashing.
- Use the up or down arrow keys to change Heat Set to the temperature you desire.
- Press NEXT to accept the displayed heat set point to the temperature and advance to edit the cool set point. It will be flashing.
- There is a minimum value that must be maintained between the heat temperature set point and Cool temperature set point. The value that must be maintained is called the Deadband. It is programmable and may be changed in the Installer Setup menu. If you move the heat set point temperature to close to the cool set point temperature the cool set point temperature will move away from the heat set point temperature to maintain the dead band. Conversely the heat set point temperature will move if you adjust the cool set point temperature to close. There are programmable limits for both heat and cool, which you will not be able to exceed. These values are accessible from the User Setup Menu.
- When you have changed the Cool set point to your desired temperature, press NEXT to advance to the next period. Its start time will be flashing indicating that it is under edit.
- When all the periods for a day have been set, the start time for the next weekday will be displayed to begin editing the settings for that day.

ing the settings for that day.

- Rotate the dial back to RUN to and accept all current values and end the programming session.

4.4.2 WEEKDAY FAN PROGRAMMING

Programming fan operation is similar to programming the temperature periods and set points. Fan periods are independent of temperature periods and are designated P1, P2, P3, P4.

• Rotate the dial to Set Weekday Programs, then press and hold the FAN button for over 2 seconds.

- The fan day and period will be displayed in the top center and right portion of the screen. The bottom portion will show the fan mode and start time for that period. The fan mode for this period will be flashing to indicate that it may be changed with the UP/DOWN arrow keys. Choices are:

- **Auto:** default value; the fan will run only when necessary for your HVAC system to maintain temperature control.

- **Program:** This mode will insure that during every hour, the fan will run for the for at least the number of minutes shown at the top left of the display, beginning at the displayed time for this period until the beginning of the next period. If your heating or cooling requirement fulfills the minimum fan run time, additional fan run time will not be requested. Activation of the fan when necessary is done at twenty minute intervals for one third the hourly run time.

- **On:** The On setting will run the fan continuously during this period.

- Set the desired Fan mode for his period. Press NEXT to advance and edit this periods start time.
 - Use the UP or DOWN arrow keys to change the start time. A period ends at the start time of the next period. The beginning of a period may not be any closer to the beginning of the next period than one 15 minute increment.
 - Press NEXT to advance and set the minimum fan run time if this period is to use program mode.
 - Pressing NEXT again will bring you to the next period's mode.
 - When all the periods for a day have been set, the start time for the next weekday will be displayed to begin editing the settings for that day.
 - The sequence of days that you may program progresses the weekdays MON - FRI, and repeats.
 - Then press and hold the FAN button for over 2 seconds to return to Weekday temperature editing or rotate the dial back to RUN to and accept all current values and end the programming session.
- #### 4.4.3 WEEKEND PROGRAMMING
- Weekend programming is identical to weekday programming except rotate the dial to set weekend programs, and the sequence of days that you may program is SAT, SUN and then repeating this two day sequence.

4.4.4 COPY PROGRAMMING

The COPY button allows you to easily copy temperature or fan programs from any day, to any other day, to all weekdays, to both weekend days, or all days. The Copy function copies only the temperature or fan program from a day, not both at the same time. To copy a day's temperature or fan programs from one day to others:

- In the appropriate programming mode press COPY.
- The display will show COPY FROM with current day being programmed flashing below.

- Use the UP or DOWN arrow buttons to select the day you want to copy from. Selections are:

Any single day, SUN - SAT
All weekdays MON to FRI
Both weekend days SAT and SUN
All days at once SUN - SAT

- Press NEXT.
- Again use the UP or DOWN arrow buttons to select the day or days you want to copy.
- Press NEXT to accept the displayed copy to days, and the copy will be complete.

5. BATTERIES/MAINTENANCE

Depending on your installation, your unit may require batteries to control your HVAC system. If required, replace your thermostat's batteries at least once a year or when the battery symbol appears in the display.

5.1. BATTERY INSTALLATION

1. Remove fresh batteries from their carton.
2. Remove body of thermostat as described during installation.
3. Remove the used batteries if present and replace them within 90 seconds to avoid having to reset the day and time.
4. Install two new "AA" size Energizer or Duracell alkaline batteries in the battery compartment. Observe the polarity marking shown in the compartment.

WARNING: Use Energizer® or DURACELL® Alkaline Batteries Only.

5. Place the thermostat body back on the wall.

NOTE: Replace your thermostat's batteries with new alkaline batteries at least once a year or when the battery symbol appears in the display.

The use of high quality alkaline batteries is absolutely required for your thermostat to operate properly.

6. TECHNICAL DETAILS

6.1. STAGING

- Stage one of a heating system will be activated at the value of swing 1 below the temperature set point. Stage one of a cooling system will be activated at the value of swing 1 above the temperature set point.
- Stage one of a heating system will be deactivated at the value of swing 1 above the temperature set point.

Stage one of a cooling system will be deactivated at the value of swing 1 below the temperature set point.

- Stage two of a heating system will be activated at the value of (swing 1 + swing 2) below the temperature set point. The auxiliary heat indicator **AUX HT** will be visible when a second stage of heat is activated. Stage two of cooling will be activated at the value of (swing 1 + swing 2) above the temperature set point.
- Stage two of a heating or cooling system will be deactivated at the temperature set point.
- Stage three of a heating system will be activated at the value of (swing 1 + 2 * swing 2) below the temperature set point.
- Stage three of a heating or cooling system will be deactivated at the temperature set point.

7. TECHNICAL ASSISTANCE

If you have any problems installing or using this thermostat, please carefully and thoroughly review the instruction manual. If you require assistance, please contact our Technical Assistance Department at 856-234-8803 during regular business hours between 8:00AM and 4:30PM Eastern Standard Time, Monday through Friday. You can also receive technical assistance online anytime day or night at <http://www.luxproproducts.com>. Our web site offers you answers to the most common technical questions, and also permits you to email your questions to our technical support staff at your convenience.

8. WARRANTY

Limited Warranty: If this unit fails because of defects in materials or workmanship within three years of date of original purchase, LUX Products Corporation will, at its option, repair or replace it. This warranty does not cover damage by accident, misuse, or failure to follow installation instructions. Implied warranties are limited in duration to three years from date of original purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Please return malfunctioning or defective units to the participating retailer from which purchase was made, along with proof of purchase. Please refer to "TECHNICAL ASSISTANCE" before returning thermostat. Purchaser assumes all risks and liability for incidental and consequential damage resulting from installation and use of this unit. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. Applicable in the U.S.A. only.

LUXPRO®

PSP722E

52026

LUXPRO EVERYTHING 'STAT® PSP722E INSTALLATION AND OPERATING INSTRUCTIONS

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