



**WHITE-RODGERS**

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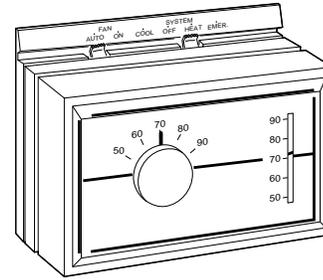
Low Voltage Multi-Stage Heat Pump Thermostat  
**INSTALLATION INSTRUCTIONS**

**Operator: Save these instructions for future use!**

**FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.**

## DESCRIPTION

This thermostat and subbase combination is designed to control a heat pump system where automatic changeover is not required. However, manual changeover of the reversing valve can be controlled by the wiring selection on the subbase and the switching of the **SYSTEM** switch to **COOL** or **HEAT** (see fig. 2).



## PRECAUTIONS

If in doubt about whether your wiring is millivolt, line, or low voltage, have it inspected by a qualified heating and air conditioning contractor, electrician, or someone familiar with basic electricity and wiring.

Do not exceed the specification ratings.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

### **CAUTION**

To prevent electrical shock and/or equipment damage, disconnect electric power to system, at main fuse or circuit breaker box, until installation is complete.

Do not short out terminals on gas valve or primary control to test. Short or incorrect wiring will burn out heat anticipator and could cause personal injury and/or property damage.

### **WARNING**

Do not use on circuits exceeding 30 volts. Higher voltage will damage control and could cause shock or fire hazard.

## SPECIFICATIONS

### ELECTRICAL DATA

#### Switch Rating:

24 VAC

Stage 1 heat – 0 to 1.2 amp

Stage 2 heat – 0.15 to 1.2 amp

Cooling – 0 to 1.5 amp

#### Switch Action:

Stage 1 heat & cool – SPDT

Stage 2 heat – SPST (sealed mercury contacts)

#### Anticipator Rating:

Stage 1 heat – 24 VAC, fixed

Stage 2 heat – 0.15 to 1.2 amp, adjustable

Cooling – 24 VAC, fixed

Fan Circuit: See Fig. 2 – **FAN CAUTION**

### THERMAL DATA

**Temperature Range:** 50°F to 90°F (10°C to 32°C)

**Rated Differential:** Stage 1 heat – 1.5°F

Stage 2 heat – 1°F

Cooling – 1.5°F



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# INSTALLATION

## SELECT THERMOSTAT LOCATION

Proper location insures that the thermostat will provide a comfortable home temperature. Observe the following general rules when selecting a location:

1. Locate thermostat about 5 ft. above the floor.
2. Install thermostat on a partitioning wall, not on an outside wall.
3. Never expose thermostat to direct light from lamps, sun, fireplaces or any temperature radiating equipment.
4. Avoid locations close to windows, adjoining outside walls, or doors that lead outside.
5. Avoid locations close to air registers or in the direct path of air from them.
6. Make sure there are no pipes or duct work in that part of the wall chosen for the thermostat location.
7. Never locate thermostat in a room that is warmer or cooler than the rest of the home, such as the kitchen.
8. Avoid locations with poor air circulation, such as behind doors or in alcoves.
9. The living or dining room is normally a good location, provided there is no cooking range or refrigerator on opposite side of wall.

## ROUTE WIRES TO LOCATION

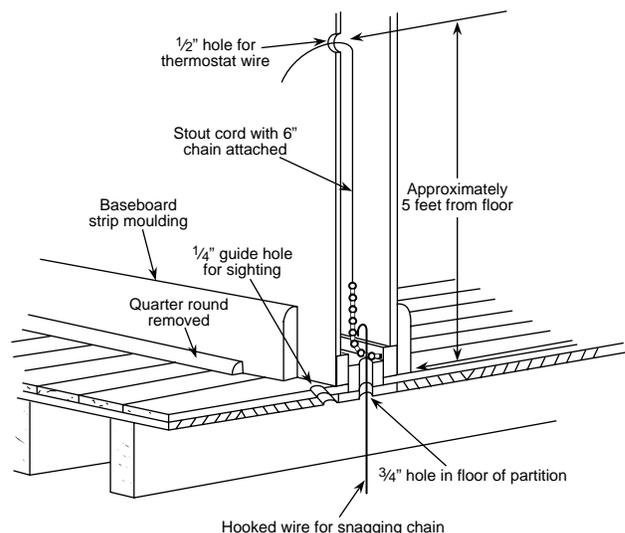
1. If an old thermostat is being replaced and is in a satisfactory location, and the wiring appears to be in good condition, use existing wiring. If in doubt, re-wire.
2. If a new location is chosen or if this is a new installation, thermostat wire must first be run to the location selected. All wiring must conform with local and national electrical codes and ordinances.
3. Probe for obstructions in partition before drilling  $\frac{1}{2}$ " hole in wall at selected location. Take up quarter round and drill a small guide hole for sighting (see fig. 1). From basement, drill  $\frac{3}{4}$ " hole in partition floor next to guide hole. In houses without basements, drill  $\frac{1}{2}$ " hole through ceiling and into partition from above (see fig. 1).
4. Through this hole drop a light chain, or 6" chain attached to a strong cord. Snag cord in basement with hooked wire. In houses without basements, drop cord through hole in ceiling and down partitioning; snag cord at the thermostat location.
5. Attach thermostat wire to cord and pull wire through hole in wall so that 6" of wire protrudes.

## ATTACH SUBBASE TO WALL

1. Pull wires through opening near center of subbase and connect wires under terminal screws (see figs. 2 & 3).
2. Push excess wire into wall and plug up hole with fire-resistant material, such as fiberglass insulation, to prevent drafts from affecting thermostat operation.
3. Place subbase over hole in wall for wires and mark mounting hole locations on wall.
4. Drill mounting holes.
5. Fasten subbase loosely to wall, as shown, using two mounting screws. Place a level against bottom of subbase, adjust until level, and then tighten mounting screws to secure subbase. If holes in wall are too large and do not allow you to tighten subbase snugly, use plastic screw anchors to secure subbase.
6. Check anticipator setting and adjust, if required (see **OPERATION & MAINTENANCE**).

### **⚠ CAUTION**

**Care must be taken when securing and routing wires so they do not short to adjacent terminals or rear of thermostat. Shorted wires may result in personal injury and/or property damage.**



**Figure 1. Routing thermostat wires**

**⚠ CAUTION**

To prevent electrical shock and/or equipment damage, disconnect electrical power to system, at main fuse or circuit breaker, until installation is complete.

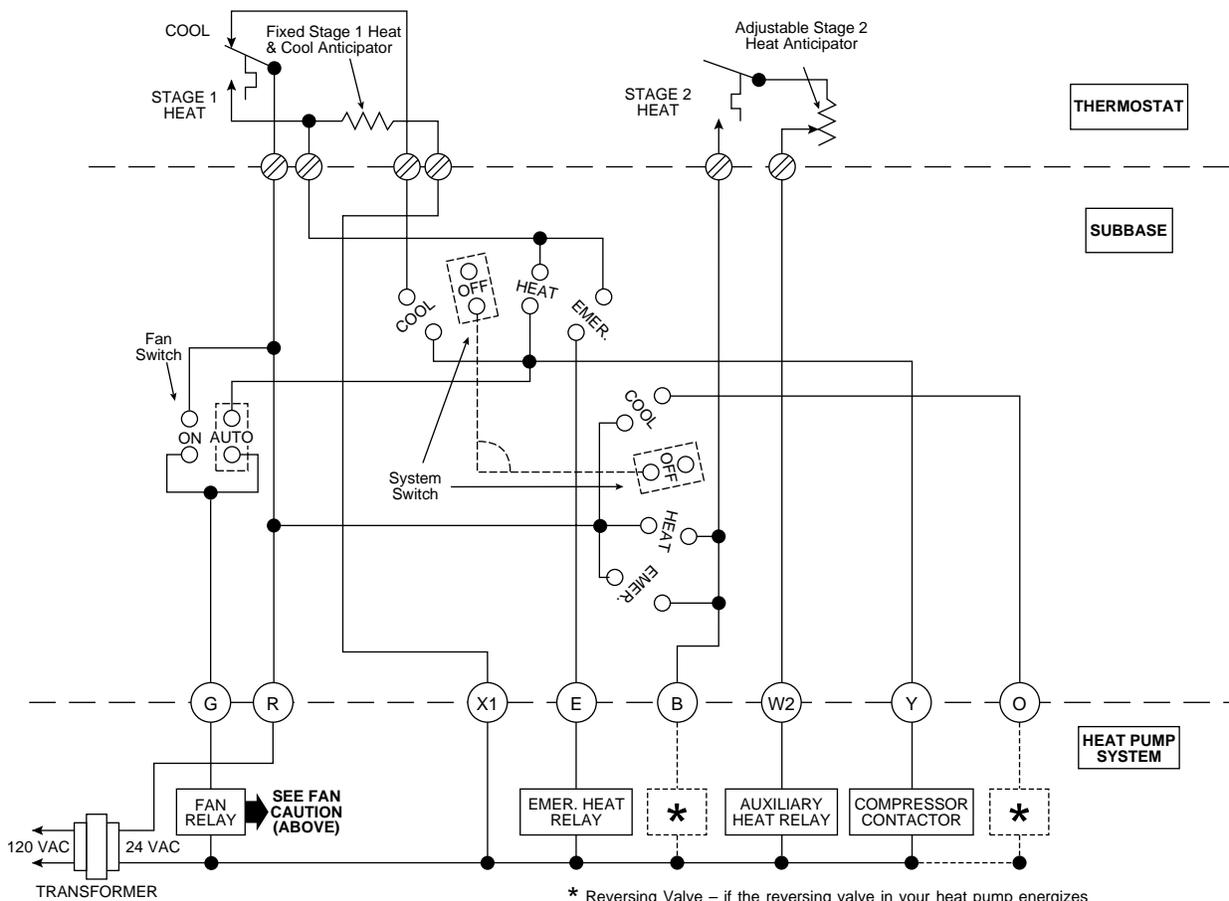
**⚠ FAN CAUTION**

To prevent personal injury and/or equipment damage, check equipment manufacturer's wiring of fan relay circuit when in EMER HEAT. When the thermostat system switch is in the EMER HEAT position, the thermostat DOES NOT energize the fan relay when the fan switch is in the AUTO position.

**NOTE**

This typical wiring diagram shows only the terminal identification and wiring hookup. Always refer to wiring instructions provided by equipment manufacturer for system hookup.

All wiring should be installed in accordance with local and national codes and ordinances.



\* Reversing Valve – if the reversing valve in your heat pump energizes during HEAT, then make your electrical connection at terminal B on the subbase. If the reversing valve is energized during COOL, then make your connection at terminal O on the subbase.

Always refer to equipment manufacturer's instructions for proper identification of the reversing valve electrical connections.

Figure 2. Typical wiring diagram

## ATTACH THERMOSTAT TO SUBBASE

1. Remove cover from thermostat base by gripping the base in one hand and with the fingers of the other hand, pull lightly at the top or bottom of the cover.
2. Carefully remove the shipping protective packing from the mercury switches.

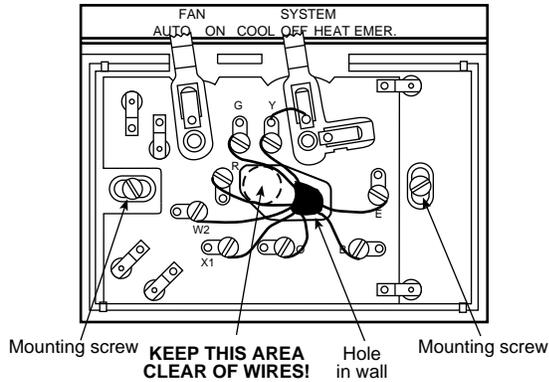


Figure 3. Thermostat subbase

3. Attach thermostat base to subbase. Be sure that all captive screws are tightened snugly, because they serve as electrical connections between thermostat and subbase (see fig. 4).
4. Snap cover onto thermostat and set temperature lever to desired setpoint. Turn on electrical power.

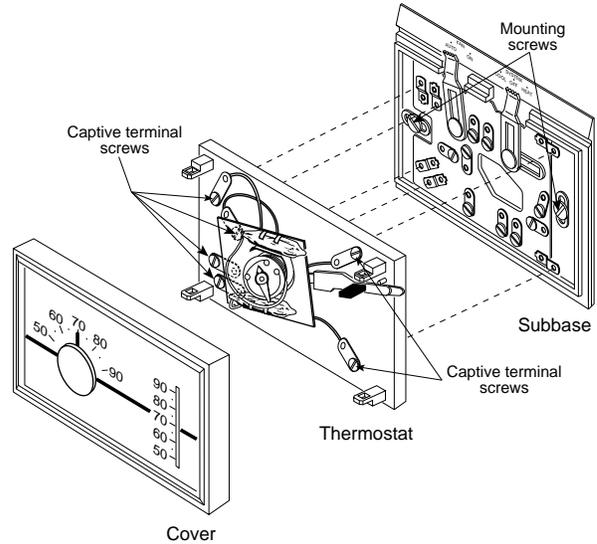


Figure 4. Attach thermostat to subbase

## OPERATION & MAINTENANCE

The chart below shows the how the system functions when the system and fan switches are in various positions.

SUBBASE SWITCH POSITIONS						SYSTEM FUNCTION					COMPONENT OPERATION
FAN		SYSTEM				Fan Relay	Rev Valve	Emer Heat Relay	Aux Heat Relay	Compr. Contact	
Auto	On	Cool	Off	Heat	Emer						
■			■								No heat - no cool - no fan.
■				■		■	B			■	Heat Mode: stage 1 calling. Fan relay and compressor contactor energized by thermostat.
■				■		■	B		■	■	Heat Mode: both stages calling. Fan relay, compressor contactor, and auxiliary heat relay are energized.
■					■	G	B	■			Emergency Heat Mode: stage 1 calling. Emergency heat relay energized. Compressor locked out at thermostat.
■					■	G	B	■	■		Emergency Heat Mode: both stages calling. Emergency and auxiliary heat relays energized. Compressor locked out at thermostat.
■		■				■	O			■	Cool Mode: Compressor contactor and fan relay energized.
	■										Fan relay energized. Fan runs continuously, regardless of system switch position.

■ Indicates switch position on thermostat subbase and system function at those switch positions.

○ Reversing valve energized if connected to the O terminal.

B Reversing valve energized if connected to B terminal.

G See fig. 2 (fan caution)

## ADJUSTING STAGE 2 HEAT ANTICIPATOR

This thermostat is equipped with two anticipators. The anticipator for stage 1 heat and cool is fixed and does not require any adjustments. The stage 2 anticipator is adjustable and must be set to the current draw of the component it is controlling.

To determine the correct stage 2 anticipator setting, measure the current draw of the stage 2 (auxiliary heat) relay. You may use the following procedure to determine current draw.

1. Loosely wrap **exactly** 10 coils of thermostat wire around the jaws of a split-jaw induction-type current meter (see fig. 5).
2. With the subbase correctly wired to the heat pump system, attach one end of the 10-turn coil to terminal **R** and attach the other end to terminal **W1**.
3. With the heat pump system power **on**, center the coil on the meter jaws and read the current draw of the stage 2 heat relay on the meter and divide the reading by 10. This is the value that should be set on the adjustable anticipator.

### Example:

$$\frac{\text{Meter reads 6.0 amp}}{10 \text{ turns of wire}} = 0.6 \text{ amp anticipator setting}$$

4. Turn power to heat pump system **off**, then remove coil leads from the subbase and move system switch to **OFF**.

The stage 2 heat anticipator is located on the thermostat base. Adjust the anticipator by turning the lever until the pointer is set on the correct anticipator setting determined above (see fig. 6). If additional adjustments are necessary, they may be made as follows (adjust the anticipator  $\frac{1}{2}$  division at a time; for example, from 0.6 to 0.55).

1. If **shorter** heating cycles are desired, set the anticipator to a slightly **lower** setting.
2. If **longer** heating cycles are desired, set the anticipator to a slightly **higher** setting.

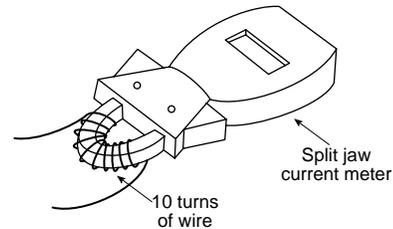


Figure 5. Current meter

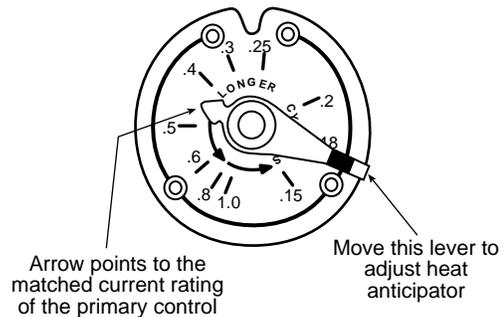


Figure 6. Anticipator adjustment

## CALIBRATION ADJUSTMENT

This thermostat has been carefully adjusted at the factory and should not require recalibration.

A few degrees difference between the indicator setting of the thermostat and actual room temperature is not considered important. If the disagreement is appreciable, however, first make sure that the thermostat is properly located and leveled. Then, if recalibration still seems necessary, proceed as follows:

1. Move temperature adjustment lever to a setting about  $5^\circ$  above room temperature.
2. Remove thermostat cover. Slip  $\frac{7}{32}$ " wrench onto hex nut beneath bimetal and hold temperature adjustment lever stationary. Turn hex nut clockwise until mercury shifts to right end of tube (see fig. 7).
3. Move temperature adjustment lever to lowest setting.
4. Replace thermostat cover. Wait 10 minutes for bimetal temperature to stabilize. Don't stand near thermostat during this period as your breath and body heat will affect temperature of bimetal.

5. Move temperature adjustment lever to correspond to actual room temperature. Then remove thermostat cover.
6. Slip  $\frac{7}{32}$ " wrench onto hex nut, holding temperature adjustment lever

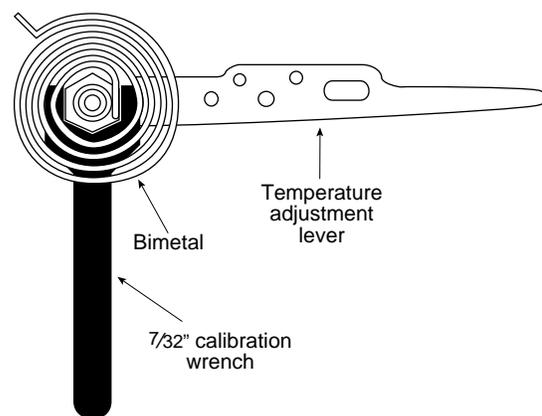


Figure 7. Calibrating thermostat

If you need further information about this product, please write to

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