

### APPLICATION

These boiler-mounted, immersion type controllers operate in response to temperature changes in hydronic heating systems.

L4006A,C; L4007A break the circuit on a temperature rise to the control setting. They are used for high limit or low limit control. When used as a controller or as a low limit, a separate high limit must be used.

L4006B, L4007B make the circuit on a temperature rise. They are used as a circulator controller, delaying circulator operation if boiler water temperature is below the control setting.

L4006E (horizontal well with vertical option) models include trip-free manual reset switch. Whenever the temperature of the controlled medium reaches the high limit setting, these models are designed to break the control circuit. A reset button at the front of the case must be pressed to re-establish the control circuit.

L4006G includes two switches which break simultaneously on temperature rise to the control setting. This model is used for high limit and circulator control.

Depending on the model, the Aquastat controllers may include:

- bulb compression fitting (L4006C only),
- immersion well for mounting vertically, or
- immersion well for mounting horizontally.

### INSTALLATION

#### WHEN INSTALLING THIS PRODUCT.

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

### CAUTION

Disconnect power supply before beginning installation to prevent electrical shock or equipment damage.

### MOUNTING

The boiler manufacturer generally provides a tapping for insertion of the Aquastat controller's sensing element. This tapping is located in a representative point where typical boiler water temperature can be measured. Depending on model, the element is either inserted in an immersion well or through a bulb compression fitting.

If immersion well or bulb compression fitting must be ordered, refer to form 68-0040 "Wells and Fittings for Temperature Controllers," for part numbers and ordering information.

### FOR MODELS USING AN IMMERSION WELL

The well of the Aquastat controller must always be exposed to average temperature circulating water, and must never be located close to a hot or cold inlet or steam coil. Where the tapping is on the side of the boiler, use an Aquastat controller in which the well can be mounted

horizontally. Where the tapping is on top of the boiler, use a model in which the well can be mounted vertically. Some models include an adapter for vertical or horizontal mounting. See Fig. 2.

### IMPORTANT

Controller may be used with or without immersion well. Well, if used, must fit sensing bulb snugly for good thermal response. Bulb should be inserted until it rests against bottom of well, then hold it there while tightening the tubing clamp.

NOTE: Some models have an adjustable tubing length to 3 in. [76 mm]. In these models, extra tubing inside the case may be pulled out, if needed.

Follow the mounting instructions furnished by the system manufacturer if available; otherwise, proceed as follows.

### INSTALLING THE IMMERSION WELL

On existing installations, shut off the power and remove the old control. If the old immersion well appears suitable, and if the adapter clamp on the Aquastat controller fits the old well spud, this well need not be replaced.

To install new well:

1. If the system is filled, drain system to a point below the boiler tapping.
2. Remove old well from boiler tapping.
3. Install the immersion well. Both 1/2 and 3/4 inch x 1/4 NPT wells are available. Depending on size of boiler tapping and model ordered, a reducer fitting may be required.
4. Fill the system. Make sure that the well is screwed in tightly enough to prevent leakage. Do NOT use the case as a handle to tighten well after controller is secured to well.

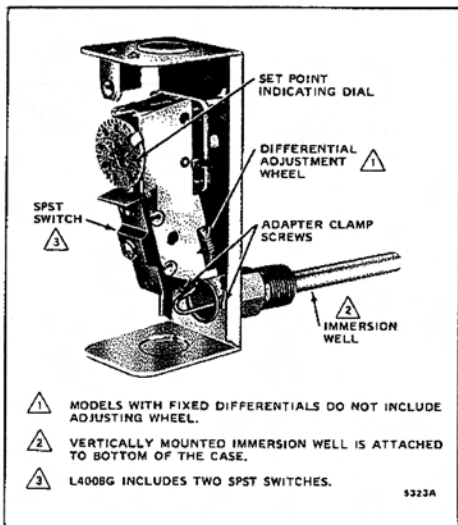


Fig. 1—Internal view showing L4006 (model with horizontal well).

## FOR INSTALLATION OF SENSING BULB IN IMMERSION WELL

1. Loosen screw (at top of case, above scale setting), and remove cover. Loosen 2 screws that secure adapter clamp. See Fig. 1.

2. Insert the sensing element into the immersion well.

3. Fasten the case of the Aquastat controller to the well with the adapter clamp. Make certain that the clamp is properly positioned over the groove of the well spud. Also be sure the flange at the opening of the well fits snugly into the opening of the case. The sensing bulb must bottom in the well for best temperature response.

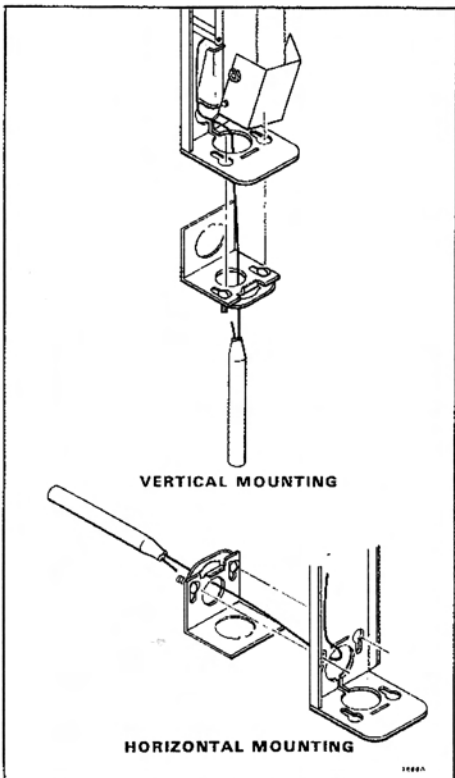


Fig. 2—Mounting bracket placement for vertical or horizontal mounting.

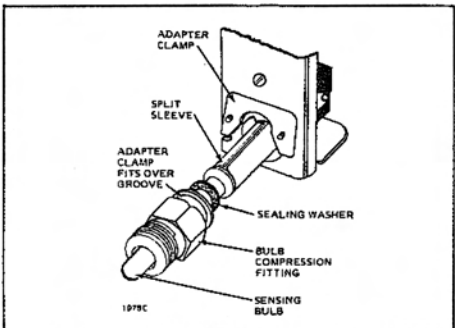


Fig. 3—Direct immersion model with bulb compression fitting partially removed.

## MODELS DESIGNED FOR DIRECT IMMERSION (without well)

For either horizontal or vertical placement of the mounting bracket, see Fig. 2. Some models, which provide for direct immersion of the sensing element into the boiler, include a bulb compression fitting instead of an immersion well. Install fitting in boiler tapping. Be sure sealing washer is in place as shown in Fig. 3. Make sure that spud of fitting is screwed in tightly enough to prevent leaking. Insert sensing bulb through fitting. Adjust the adapter clamp so that it fits over the groove at the opening of the fitting. Tighten adapter clamp screws so that Aquastat controller is firmly attached to fitting.

## WIRING

Disconnect power supply before connecting wiring to avoid electrical shock or equipment damage.

All wiring must comply with local electrical codes and ordinances.

Refer to Figs. 4-9 for typical diagrams of Aquastat controllers used in heating systems.

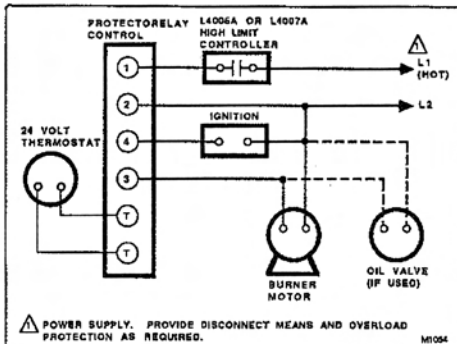


Fig. 4—Typical hookup for oil-fired gravity system, using L4006A or L4007A.

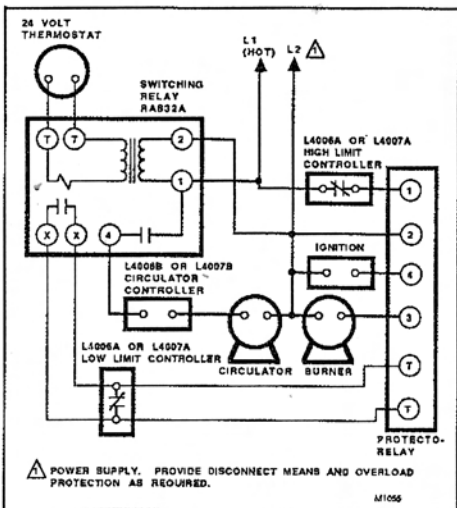


Fig. 5—Hookup for oil-fired, summer-winter hydronic system with domestic hot water using L4006A or B, L4007A or B. This is typical where control for domestic hot water is added, or where each Aquastat controller is mounted in a separate location.

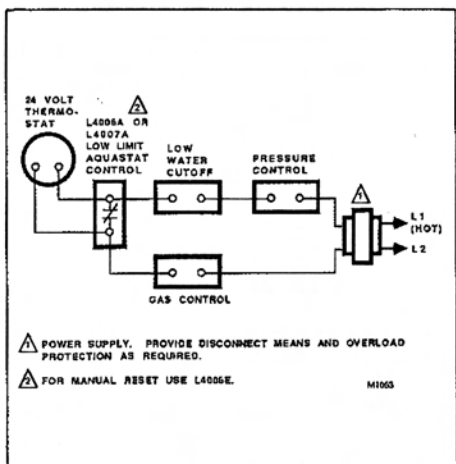


Fig. 6—Typical hookup for gas-fired system with domestic hot water, using L4006A, E or L4007A.

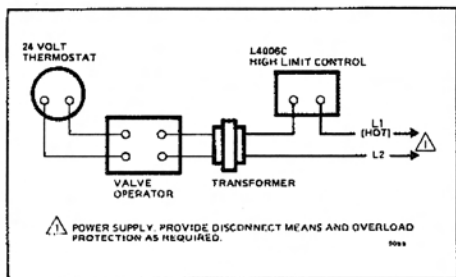


Fig. 7—Typical wiring diagram for 24 V gas system, using L4006C.

## OPERATION

For proper selection of settings, follow the boiler manufacturer's recommendations.

1. High limit controller—shuts off burner if water temperature exceeds high limit setting. Burner restarts when temperature drops to high limit setting, less differential.

NOTE: If L4006E, see Manual Reset, below.

2. Low limit controller—maintains minimum boiler temperature for domestic hot water. Turns on burner at temperature setting, minus differential.

3. Circulator controller—prevents circulation of water that is not hot enough. Breaks circulator circuit at temperature setting minus differential, remakes at setting.

## ADJUSTING

Set the differential to correspond with the boiler manufacturer's recommendations. To adjust models with adjustable differential, rotate the wheel on the back of the snap switch until the desired reading is aligned with the "V" notch in the frame. The wheel provides an adjustment from 5 F to 30 F [3 C to 17 C]. Replace the cover on the Aquastat controller.

Adjust the control point to correspond with the boiler manufacturer's recommendations. To adjust, insert a

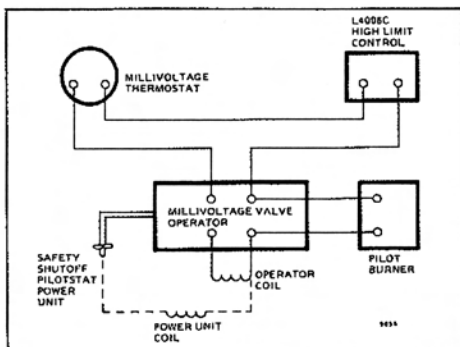


Fig. 8—Typical Powerpile system wiring diagram, using L4006C.

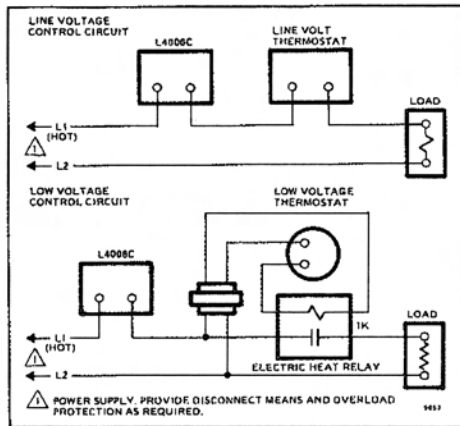


Fig. 9—Typical systems with 120 V electrical heat primaries, using L4006C.

screwdriver in the slotted screw type head located beneath the window in the cover. Turn the scale to the desired control point.

## MANUAL RESET

If the device includes manual reset (model L4006E), be sure to press the red reset button on the front of the case to make sure that the controller is not locked out on safety. In checking out the system, adjust the limit setting low enough so that temperature of the controlled medium reaches the high limit setting. When the limit setting is reached, the Aquastat controller locks out and the burner shuts down. When temperature of the controlled medium drops to the high limit setting, minus differential, push the manual reset button and the system should again be operative. Reset control to proper high limit setting.

## CHECKOUT

Check to make certain the Aquastat controller has been installed and adjusted properly. Put the system into operation and observe the action of the device through several cycles to make certain that it provides proper control of the system as described under OPERATION. Further adjustments then can be made to meet more exact comfort requirements.