

THE  
*Aquastat*  
STORY

ONLY HONEYWELL MAKES THE AQUASTAT

Today's compact new boiler must respond instantly to sudden peak loads—both for heating and domestic hot water.



convectors and baseboard radiation, plus smaller diameter tubing or piping have reduced the volume of water used in the distribution system and have increased responsiveness.

New flash-type boilers of lighter construction permit far greater output from compact new heating units. While the typical old-style domestic boiler contained from 40 to 50 gallons of water, a modern unit of comparable heating capacity operates with but 10 or 12 gallons. By reducing the size and gallonage in a boiler, the heating contractor now offers the homeowner a saving in first cost, improved performance, and considerable saving of space.

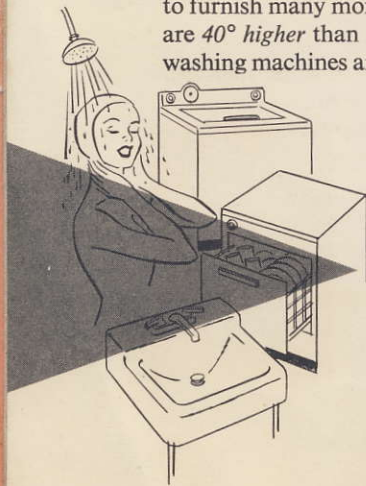
While these important advances in design afford far less mass and increased responsiveness in the new type boiler and the entire heating system, radical and sudden fluctuations in boiler water temperature have created special problems that require a new type of Aquastat.

With less hot water volume available, we still have the same heating job to do which means that water must circulate much more rapidly throughout the heating system. As a result, the *temperature rate of exchange* in today's compact new boilers far exceeds that found in the older style boiler.

For example, when only 10 gallons of water (in a small, new-type boiler) are being raised 100°, conditions are radically different from a situation with an older boiler, where 40 to 50 gallons are being gradually heated.

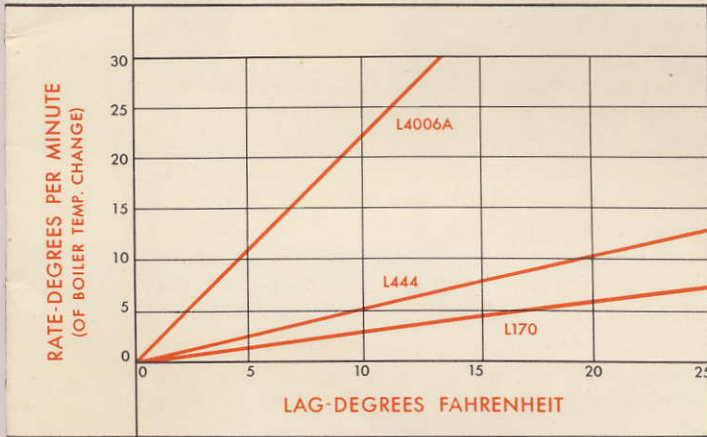
Where the boiler supplies domestic hot water, not only is it required to furnish many more gallons per hour, but domestic hot water needs are 40° higher than they used to be. This is largely due to automatic washing machines and dishwashers. With automatic dishwashers and washing machines—plus two or possibly three baths, domestic hot water demand in the modern home can be more than *twice* as great as it was formerly, when we usually had but one bath, and fewer appliances.

While the boiler has become smaller, with fewer gallons of water in the system, the demand for *heating capacity has increased many-fold*. Typical is the home using spread-out rambler or ranch-type construction, with long heating runs, large glass areas, and baseboard heating



that requires 180° water. Adequate control can only be provided by temperature sensing devices of the utmost responsiveness.

That's where Honeywell Fast-Acting Aquastats fit into the hot water heating picture. These immersion-type temperature controllers are designed to maintain precise boiler water temperatures in a variety of applications—such as high-limit, low-limit, and reverse-acting



*This graph (left), comparing lag characteristics of the conventional Aquastat and the new Honeywell Fast-Acting Aquastat, vividly shows why these new models are known in the industry as the most rapid-responsive controls of this type ever built!*

controls with some models combining the function of high-limit and operating controls (operating a Circulator or burner). The new models feature the latest design improvements that have been developed for water temperature regulators of this type.

That, too, is why today's new Fast-Acting Aquastats . . . more responsive, versatile and dependable than ever before . . . are the preferred controls among leading hot water heating men throughout the nation.



L4011 and L6011



L4007 and L6007



L4008 and L6008

HERE'S THE "NEW LOOK" IN *Aquastats!*



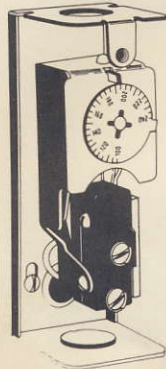
L4006 and L6006



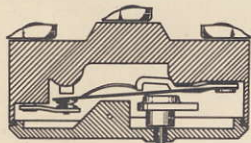
L4010 and L6010

# NEW FAST-ACTING Aquastats . . .

built to do the job better, faster,  
more dependable than ever before!



Vital parts protected—  
control point scale easy  
to read and set



Sectional view,  
showing simple,  
direct-acting Micro  
Switch unit

Completely  
enclosed bellows



Compact, direct-acting  
hydraulic temperature-  
sensing element.

## STURDY, COMPACT DESIGN

Built to provide maximum protection to the working parts . . . the metallic diaphragm, the MICRO SWITCH enclosed snap switch, and the setting dial are all enclosed. The mechanical linkage between the diaphragm and the switch is just a single direct-acting lever, built for lasting performance.

## EASY TO READ, EASY TO SET

Large, clearly marked dials are easy to read and adjust. Dial may be set externally, without removing cover. Range: 100°-240° F.

## MICRO SWITCH\* PRECISION SWITCHING

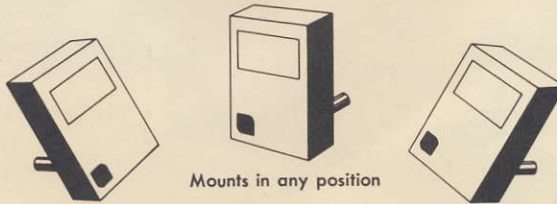
Dependable MICRO SWITCH enclosed snap-switches are built for precision operation and require minimum movement of the actuating lever. Because these switches operate at any angle, the Aquastat can be *mounted in any position*.

*Suitable for line-voltage, low-voltage, and millivoltage circuits, the MICRO SWITCH enclosed unit used on the Fast-Acting Aquastats is a universal-type of switch that can be used with 500 millivolts (as in Powerpile system), 24 volts, and line-voltage circuits. This makes*

\*Trademark



Ruggedly built  
immersion well—fits  
snugly around capsules  
for greater sensitivity



Mounts in any position

the switching unit suitable for *all* control system requirements, and reduces inventory.

### FAST-ACTING RESPONSE

Liquid filled elements that fit snugly in the Aquastat immersion well respond quickly to boiler water temperature changes. Small bulb has a minimum of mass, to provide extra sensitivity.

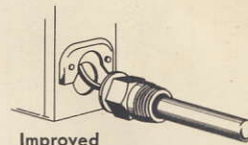
### EASY TO INSTALL

Honeywell's exclusive new clamp-on style immersion well provides easy, quick installation. It requires no "swing distance" when mounting, because the well can be screwed into the tapping without turning the Aquastat. It can be mounted vertical, horizontal, or at any angle. Models are also available with vertical or horizontal immersion wells, or with flexible remote elements with pressure fittings that permit remote insertion at any point above the control, at the same level, or below the control. Simple electrical connections with ample room for wiring save time and money.

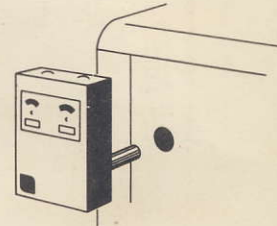
### ADAPTABLE TO VARYING HEATING CONDITIONS

The fast responsiveness characteristic with this new type Aquastat, plus the optional adjustable differential feature, makes this control adaptable to a wide variety of situations peculiar to certain types of installations. For example, if the Aquastat is mounted in the boiler too close to the return, the adjustable differential could be widened, thus preventing cold return water from causing the circulator Aquastat from stopping the Circulator.

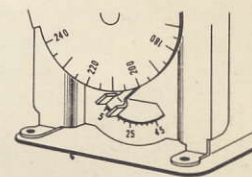
A wide selection of models afford complete selection as to type of mounting and type of switching action to best meet job requirements.



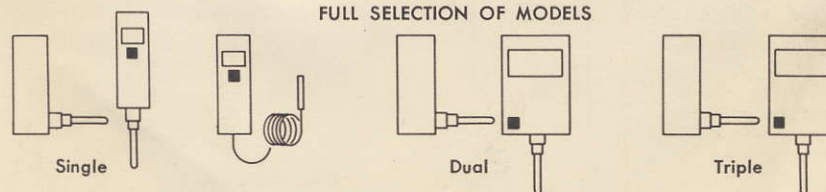
Improved method of attaching element into well—reduces installation time

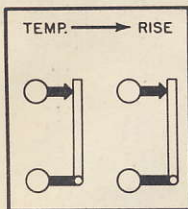


Dual or triple-function Aquastats require only one boiler tap.

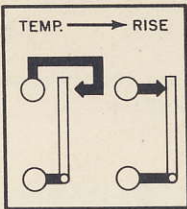


5° to 45° adjustable differential—standard on models with SPDT switches; available on SPST switches at extra cost

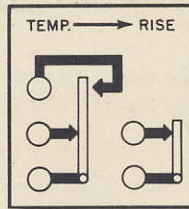




L4010A, L4011A  
(2—SPST Ea.)



L4010B, L4011B  
(2—SPST Ea.)



L6010A, L6011A  
(1—SPDT and 1—SPST Ea.)

**Whatever your switching requirements, there is a Honeywell Aquastat designed to do the job... accurately and dependably**

Shown below are schematics for various Honeywell Aquastats. The switching characteristics of each device is shown along with the model number.

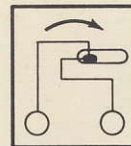
**Switching action shown includes the following:**

**SPST** (*single-pole, single throw*)

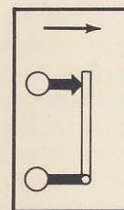
This indicates that the switch has but a single set of switching contacts that close in only one position.

**SPDT** (*single-pole, double throw*)

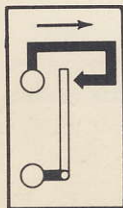
This indicates that the switch is designed so that a common contact that will make to either one or the other of two fixed contacts, thus making or breaking either one of the two separate circuits.



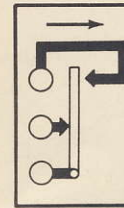
L444, LA409  
(1—SPST Ea.)



L4006A, L4007A, L4008A  
(1—SPST Ea.)



L4006B, L4007B, L4008B  
(1—SPST Ea.)



L6006A, L6007A, L6008A  
(1—SPST Ea.)

MEET THE HONEYWELL

# Aquastat FAMILY

The Aquastat models shown and described in the following pages serve to familiarize you with the wide range of Aquastats available to serve your every hot water temperature control need. The first portion of this section features the new Honeywell line of fast-acting Aquastats, listing their most common applications, and what older Aquastat models they replace. Operating characteristics and other data are included.

These Aquastats are applicable to all types of hot water heating systems and steam systems where minimum boiler water temperature must be maintained. They are also used to control oil temperature in pre-heaters on heavy oil burners. They can be used on low-voltage, line-voltage, and millivoltage (Powerpile) systems.

Shown at the back of this section, are a number of Aquastats that for years have been main-stays in the Honeywell control line. These older model Aquastats are still useful for replacement jobs and on installations where the high response characteristics of the new Honeywell Fast-Acting Aquastats are not essential to effective operation of the control system.

FOR INSTALLATION AND SERVICE INFORMATION CONSULT HONEYWELL. INSTALLATION SHEETS PACKED WITH EACH CONTROL. YOUR WHOLESALER OR HONEYWELL REPRESENTATIVE WILL ALSO SUPPLY INFORMATION TO YOU.



## IMMERSION

L4006 and L6006

# Aquastats



The L4006 replaces the L444 and L170 Aquastats as a fast-acting limit control.

The standard model L4006 is furnished with a 5° non-adjustable differential. The L6006 Aquastat is made with 5°-45° adjustable differential as standard. An adjustable differential is also available on the L4006 as a special feature.

The L6006A is a new dual-function control which can be used as a low limit and a circulator control. This instrument is usually mounted in or near the tankless coil.

The hydraulic element actuates an enclosed snap switch. This model is designed to mount on the side of a boiler with its element inserted in a separate well that extends into the boiler. It can also be installed in the supply line to an indirect water heater, or it can be mounted directly in the heater, or in a fitting in the feed riser about six inches above the boiler.

**Models:** L4006A—SPST Opens on temperature rise. Immersion well.  
L4006B—SPST Closes on temperature rise. Immersion well.  
L6006A—SPDT Opens R-B, makes R-W on temperature rise. Immersion well. 5-45° adjustable differential Standard.

For further information on the above Aquastats, see Honeywell Instruction Sheet 95-1763.

## VERTICAL MOUNTING

L4007 and L6007

# Aquastats



The L4007 replaces the L454 Aquastat

This type of Aquastat is for application where it is desirable to make installation with the sensing element inserted *vertically* into the controlled medium.

In other respects, these models are the same as the L4006 and L6006 Aquastats. On hot water heating systems, the L4007 or L6007 is normally mounted in the top of the boiler. It can also be mounted in a supply riser, in an indirect hot water heater, or in its supply.

- Models: L4007A**—SPST Opens on temperature rise. Immersion well.  
**L4007B**—SPST Closes on temperature rise. Immersion well.  
**L6007A**—SPDT Opens R-B, makes R-W on temperature rise. Immersion well. 5-45° adjustable differential Standard.

For further information on the L4007 and L6007 Aquastats, see Honeywell Instruction Sheet 95-1773.

#### REMOTE MOUNTING

L4008 and L6008

## Aquastats



#### For applications requiring remote mounting of the Aquastat

It can be mounted either vertically or horizontally on a wall, panel, or directly on a boiler, tank, or vessel. When used as a controller in a hot water heating system, the remote bulb is inserted directly into the boiler. It is also frequently located in the feed riser just above the boiler, or in an indirect water heater, or its supply.

The liquid-filled remote bulb sensing element used in this control enables it to respond rapidly to temperature change. The bulb is normally immersed directly in the boiler water and uses the Q281B compression fitting. A separable well may also be specified. Wells and compression fittings are available for  $\frac{1}{2}$  and  $\frac{3}{4}$  inch boiler tapings and must be ordered separately. Five-foot capillary length is standard. Other lengths are available.

- Models: L4008A**—SPST Opens on temperature rise.  
**L4008B**—SPST Closes on temperature rise.  
**L6008A**—SPDT Opens R-B, closes R-W on temperature rise. 5-45° adjustable differential Standard.

For further information on the L4008 and L6008 Aquastats, see Honeywell Instruction Sheet 95-1805.

DUAL

L4010

## Aquastats



The L4010A Dual Aquastat replaces the L170 and L444A Aquastat combination. The L4010B model replaces the L428B Summer-Winter Controller.

The L4010 combines two fast-acting Aquastats (similar to the L4006) in one compact case. Each unit operates independently of the other, and has its own temperature setting adjustments, and separate fast-acting liquid-filled temperature-sensing elements. The sensing elements of both Aquastats are encased in a single separable well, so that only one boiler tapping is needed, providing a simplified, neater installation.

The temperature sensing elements extend from the back of the case, and are designed for horizontal mounting in the side of the boiler or supply riser. MICRO SWITCH enclosed snap-acting switches provide accurate, dependable switching, and permit installation at any angle or position. A 5° non-adjustable differential is standard. A 5°-45° adjustable differential (for either switch or both) is also available.

**Models: L4010A**—two direct acting SPST switches that open on temperature rise (similar to two L4006A Aquastats). Most generally used to provide high-limit and low-limit control.

**L4010B**—One SPST direct-acting switch, one SPST reverse-acting switch. Reverse acting switch can be used to prevent Circulator operation at low boiler water temperatures. (Similar to one L4006A and one L4006B Aquastat).

The direct-acting switch can be used for low-limit or high-limit control.

For further information on the L4010A and L4010B Dual Aquastats, see Honeywell Instruction Sheet 95-2031.

DUAL

L4011

## Aquastats

FOR VERTICAL MOUNTING



These Aquastats are similar to the L4010A and L4010B models respectively, except that the dual temperature sensing elements extend from the bottom of the case to permit vertical mounting on the top of the boiler.

TRIPLE-FUNCTION

L6010

# Aquastat



**Three Aquastats in one—functions as high-limit, low-limit, and Circulator control! Replaces the L428B (and L170A or L444A Aquastats) as used in Summer-Winter systems providing domestic hot water.**

The L6010A model combines the operation of the L4006A and L6006A Aquastats in a single case. Each control has two temperature setting adjustments (independent of each other), and two separate liquid-filled temperature-sensing elements noted for their rapid responsiveness to temperature change. In order to utilize a single boiler tapping and to simplify installation, both hydraulic temperature sensing elements are incased in a single immersion well.

Temperature sensing elements from each unit extends from the back, and are designed for horizontal mounting in the side of the boiler or supply riser. MICRO SWITCH enclosed snap-acting switches provide accurate dependable switching, and permit installation at any angle or position. A 5° non-adjustable differential is standard on the limit switch. A 5°-45° adjustable differential is standard on the dual-function side.

The L6010A has one direct acting SPST switch and one SPDT switch. Typically, this model would serve as a low-limit and circulator control on the single-pole double-throw switch, and a high-limit control on the single-pole single-throw switch.

For further information on the L6010A Aquastat, see Honeywell Instruction Sheet 95-1541A.

TRIPLE-FUNCTION

L6011

# Aquastat

FOR VERTICAL MOUNTING

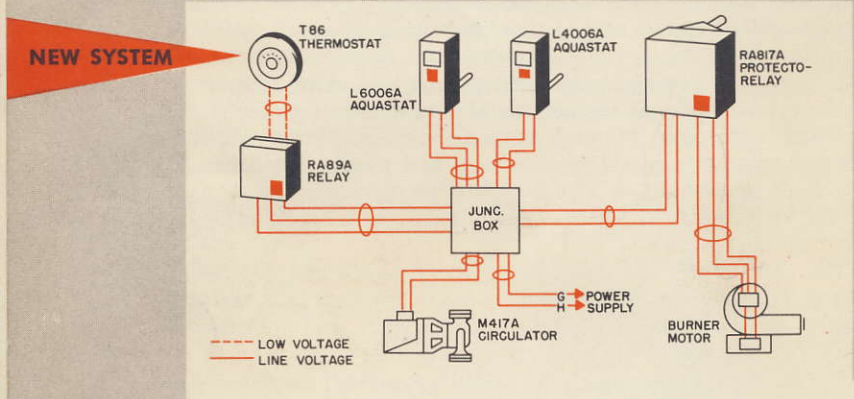


This is similar to the L6010A Aquastat described above, except that the dual temperature sensing elements extend from the bottom of the case to permit vertical mounting on top of the boiler.

# Let's compare the old with the new...

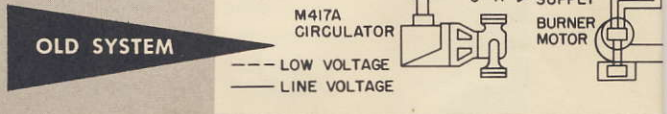
Through the next several pages, examples are given to show hook-ups using the older model Aquastats, and illustrating how the new Fast-Acting Aquastats are used on similar applications to simplify installation and improve operation of the system. These are typical forced hot water control systems providing domestic hot water.

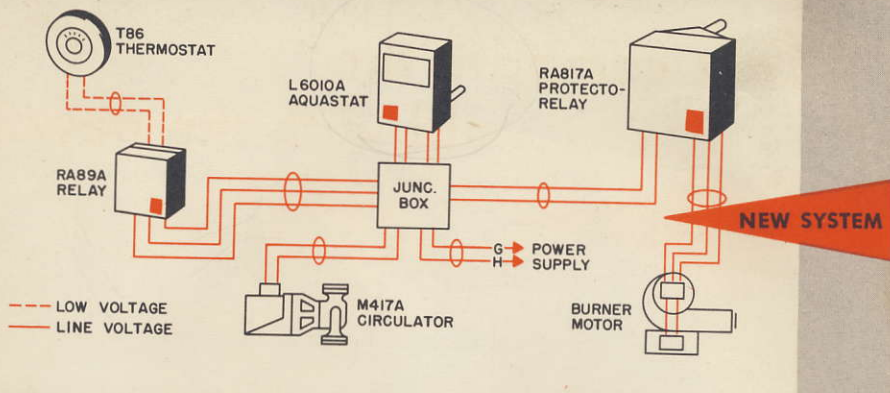
A number of oil-fired systems are shown, including a zone control system. In gas systems, both a low-voltage and Powerpile (self-powered) system is shown. While all schematics illustrate a manual thermostat, the TM850 Electric Clock Thermostat, the TM801 Time-O-Stat, or any of the new Electronic Moduflow systems can also be used. Schematic wiring shown may require modification to comply with applicable electrical codes and ordinances.



**Using an L4006A Aquastat as high limit control and the L6006A Aquastat as the low limit and Circulator control.**

This system is preferred where it is advantageous to measure the high limit and low limit boiler water temperatures at separate locations.



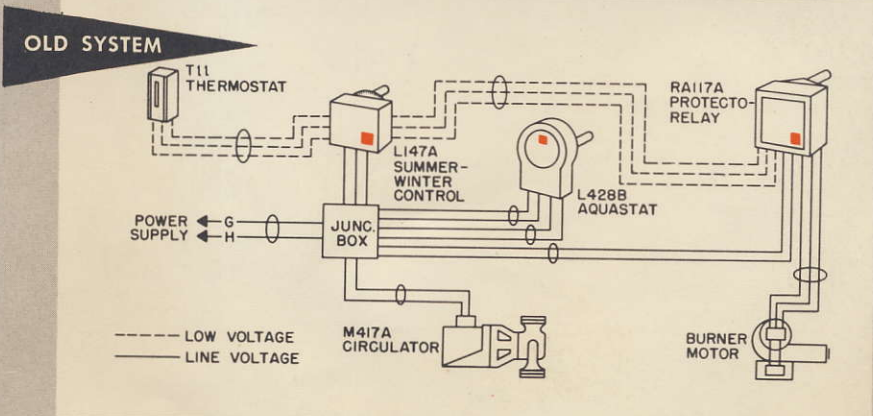
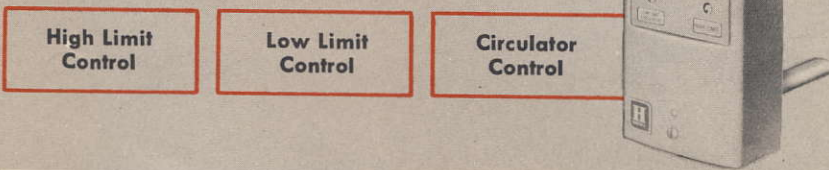


## using the new Triple-Function Aquastat

This system is preferred by many installers because it requires only one boiler tapping and it's easier to hook up. By using the new L6010A Triple-Action Aquastat, there is a saving in first cost, wiring is more economical, and installation time is reduced.

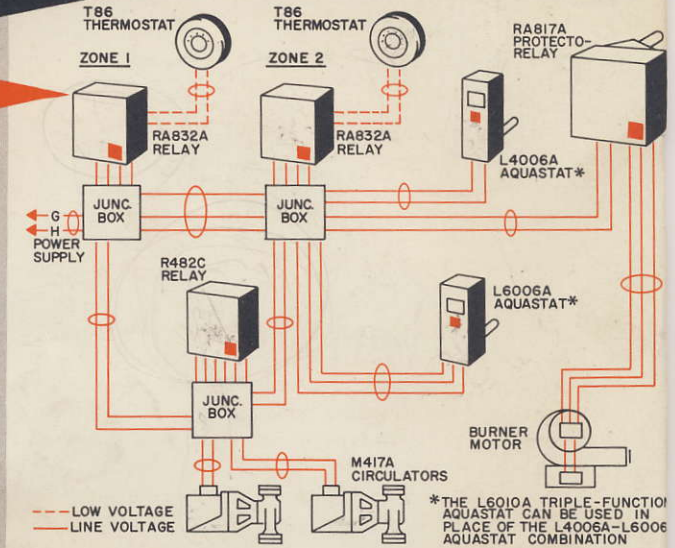
The system shown above operates the same as the new control system featured on page 15, and combines in one control the functions of both the L4006A and L6006A Aquastats.

### THE L6010A REPLACES ALL THREE!



# ZONE CONTROL

## NEW SYSTEM



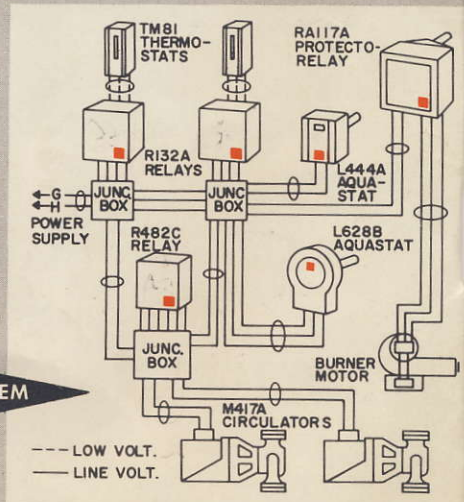
## Multiple zone, forced hot water oil-fired system

In this application, a separate thermostat controls a zone Circulator through an R832A relay to maintain temperature in each zone. The L6006A Fast-Acting Aquastat operates as a Circulator and low-limit control to maintain boiler water at a set minimum temperature.

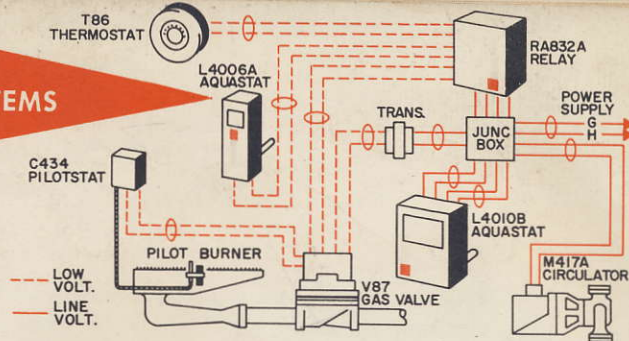
When any zone thermostat calls for heat, the RA817A Protectorelay is energized to start the burner. This control hook-up is identical to the forced hot water zone control system shown below, except that it uses the new Fast-Acting Aquastats, more responsive zone thermostats, and the new RA817A Protectorelay.

Any number of zones can be used with this system.

## OLD SYSTEM



## GAS CONTROL SYSTEMS



### Low-Voltage Electric Control System

This system features the L4010B Aquastat (providing high limit control and Circulator control), and the L4006A Aquastat for low limit control.

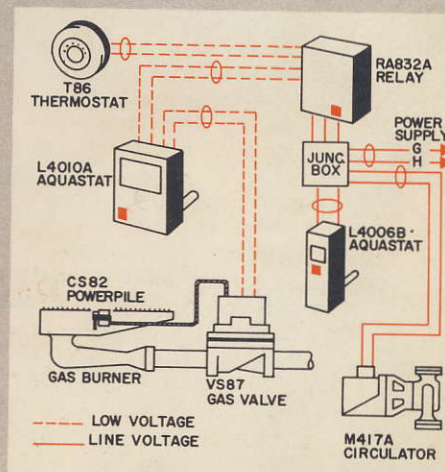
In milder weather (or in summer) when there is little or no demand for heat, the L4006A Aquastat operates the burner, maintaining a set minimum boiler water temperature to insure adequate domestic hot water throughout the year. The L4006A low limit Aquastat is insertion mounted, and can be located near the domestic hot water heat exchanger, or in the hot water storage tank.

The high limit switch in the L4010B Dual Aquastat shuts down the burner (but not Circulator) if boiler water temperature reaches the high limit setting. A reverse-acting switch also prevents Circulator operation if boiler water temperature is too low to assure sufficient domestic hot water. The L4010B is used in this hook-up because it is desirable to have all line-voltage wiring (high limit and Circulator control) connected to this Dual Aquastat. It also enables the high limit to stop the burner but not the Circulator.

### Powerpile (self-powered) Control System

This Powerpile system provides the same control features as the electrical system described above, assuring constant domestic hot water supply throughout the year. Except for the line voltage Circulator, the balance of the system is self-powered.

The L4010A Dual Aquastat provides high limit and low limit control. The L4006B Aquastat prevents Circulator operation unless boiler water temperature is adequate to supply domestic hot water. Because control of the Circulator is a line-voltage switching operation, it is advantageous to use the single-function L4006B (reverse-acting) Aquastat.





earlier model **Aquastats ...**  
currently available



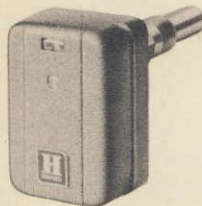
**L847A SUMMER-WINTER CONTROLLER**

Used where year-round domestic hot water is provided. It combines the functions of an R832A Relay and an L444A Aquastat in one unit and includes a low-voltage transformer. Wherever the L847A is used, a separate high-limit Aquastat must also be specified.



**L428B IMMERSION AQUASTAT**

Used on tankless heater installations. It uses two bimetal actuated mercury switches. One switch acts to prevent Circulator operation until boiler water is hot enough for domestic use. Second switch acts as high-limit control. Immersion element uses a  $\frac{3}{4}$  inch well. The L428B is replaced by the L4010B Dual Aquastat.



**L444 IMMERSION AQUASTAT**

Bimetal actuated mercury switch type of control. Line voltage, immersion well  $\frac{3}{4}$  inch. Replaced by L4006.

**L444A**—functions as a high or low limit control—still used for many high-limit control applications.

**L444B**—functions as a Circulator control. Replaced by the L4006B Aquastat where fast response is required.



**L454 AQUASTAT**

Similar to L444A and L444B, except for vertical mounting. Replaced by L4007.

**LA409 SURFACE AQUASTAT**

Bimetal actuated mercury switch type of limit control, designed to strap on a pipe. Non-adjustable differential, approximately 10°F.

**LA409A**—used as limit or safety control, along with a room thermostat.

**LA409B**—reverse-acting low limit control often used on unit heaters. Prevents fan operation when no heat is in coil.

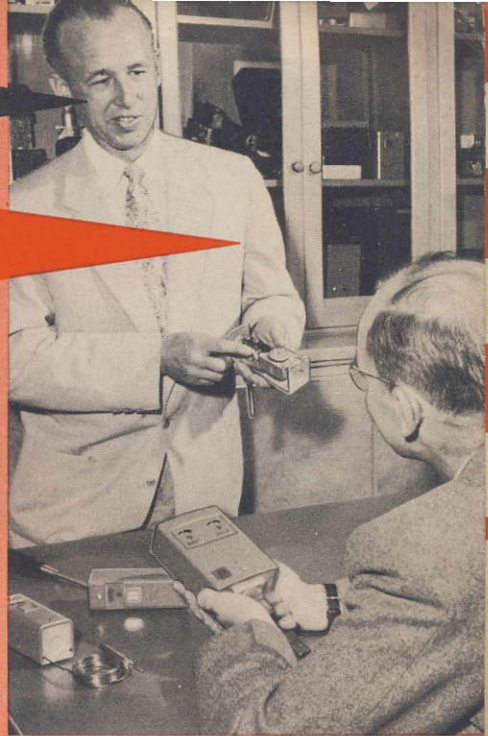
MR. WHOLESALER!

MR. DEALER!

get down to  
brass tacks on

## Aquastats

Consider your current hot water heating needs — make sure that each installation is equipped with the Aquastat that suits the job best — check with your supplier NOW!



Ask your supplier about the complete boiler package plan, and the latest control recommendations for various hot water heating systems, along with a number of domestic hot water hook-ups. For hot water installations requiring a highly responsive boiler control, specify one of the new Honeywell Fast-Acting Aquastats to provide the *ultimate* in boiler water temperature control.

If you want to train your men and show them the new, modern hot water controls and systems, pick up the phone and call the nearest Honeywell office. Ask for the heating control representative in your area. The Honeywell salesman will be glad to help you arrange a training session which includes the heating and control information most practical for your men. In addition to technical assistance, your Honeywell representative can assist you with your merchandising. Free catalog data sheets, sales literature and a wholesaler's counter display are available on the new Fast-Acting Aquastats.

**REMEMBER — EXPERT CONTROL ENGINEERING ASSISTANCE IS AS CLOSE TO YOU AS YOUR PHONE—so reach for it NOW!**

you benefit all around, with an

## ALL-HONEYWELL CONTROL SYSTEM

### 1. Your installation will work better

Honeywell controls give faster, more accurate response. They are designed to work together to *coordinate* the functions of the heating plant, assuring top efficiency of operation.

### 2. You have the most complete choice in type of controls

The very *completeness* of the Honeywell line makes it possible to select just the *right* control for *every* job. Whether control requirements are unusual or quite ordinary, you can select Honeywell controls that have been specially engineered for each type of application.

### 3. You can eliminate non-profit service, installation problems

Through Honeywell's more than 70 years of leadership in the automatic control industry, its advanced engineering and production know-how has consistently developed controls best known for their easy installation and trouble-free performance.

### 4. Heating jobs sell easier

By featuring an *All-Honeywell Control System* on all of your heating jobs you are assured greater customer acceptance. The public has learned to recognize *Honeywell* as the maker of the finest heating controls.

### 5. It pays to Standardize on Honeywell

All through the years of automatic heating, installation and service men have known and understood Honeywell controls. Parts and replacement stocks are most easily available. The Honeywell office in your area has factory trained control experts to personally assist you—whether it pertains to a control application or assistance in training your men.

This all adds up to easier, *better* and more *profitable* installations, and *greater customer satisfaction*.