

## L408A,B; L608A VaporStat® Controllers

### PRODUCT DATA



### APPLICATION

The L408A,B and L608A VaporStat® Controllers are line voltage pressure controllers that provide operating control or automatic limit protection for pressure systems of up to 4 psi (0.28 kg/cm<sup>2</sup> or 27.6 kPa).

### FEATURES

- Primarily for use in vapor heating systems, but also may be used with liquids, air, and other noncombustible gases
- Stainless steel diaphragm also allows use with ammonia, oxygen, distilled water, and similar media.
- L408A and B models have an spst switch; L408A breaks and L408B makes when pressure rises to the main scale setpoint.
- L608A models have an spdt switch that breaks R-B when pressure rises to the main scale setpoint.
- Dustproof, trouble-free mercury switch.
- Maximum surge pressure of 15 psi (103.4 kPa).
- All models have an adjustable subtractive differential.
- Adjustments are made by screws on top of case.
- Scaleplates are marked in English (psi) and metric (kg/cm<sup>2</sup>) units.
- Case has clear plastic cover so that pressure settings and switch action can be observed.
- Leveling indicator visible through cover.
- Hexagonal fitting with 1/4-18 NPT internal threads for direct mounting to the 14026 Steam Trap (siphon loop), which is included.
- Can also be surface mounted by screws through holes (knockouts) in back of case.

### Contents

Application .....	1
Features .....	1
Specifications .....	2
Ordering Information .....	2
Installation .....	3
Wiring .....	5
Setting and Checkout .....	6
Service Information .....	7



## SPECIFICATIONS

### IMPORTANT

The specifications given in this publication do not include normal manufacturing tolerances. Therefore, this unit may not match the listed specifications exactly. Also, this product is tested and calibrated under closely controlled conditions, and some minor differences in performance can be expected if those conditions are changed.

### Models:

L408A,B and L608A VaporStat® Controllers. See Tables 1, 2, and 3 below. All models include a 14026 Steam Trap (siphon loop), which is necessary for boiler installations.

**Table 1. Models Available.**

Model	Switch Type	Switch Action on Pressure Rise
L408A	Spst	Breaks
L408B	Spst	Makes
L608A	Spdt	Breaks R-B; makes R-W.

**Table 2. Switch Contact Ratings (in amperes at 50/60 Hz).**

Model	Load	120 Vac	240 Vac	120 Vdc	240 Vdc
L408A,B	Full Load	8.0	5.1	2.4	1.2
	Locked Rotor	48.0	30.6	24.0	12.0
	Noninductive	10.0	5.0	5.0	2.0
L608A	Full Load	8.0	5.1	2.0	1.0
	Locked Rotor	48.0	30.6	20.0	10.0
	Noninductive	10.0	5.0	8.0	4.0

**Table 3. Operating Ranges Available for All Models.**

Pressure Ranges			Midscale Subtractive Differential (Adjustable)		
English Units	kg/cm <sup>2</sup>	kPa	oz/in. <sup>2</sup>	kg/cm <sup>2</sup>	kPa
0 to 16 oz/in. <sup>2</sup>	0 to 0.07	0 to 6.9	2 to 16	0.01 to 0.07	0.9 to 6.9
0 to 4 psi	0 to 0.28	0 to 27.6	4 to 16	0.02 to 0.07	1.7 to 6.9
0 to 16 oz/in. <sup>2</sup>	0 to 0.7	0 to 6.9	3.5 to 16	0.02 to 0.07	1.6 to 6.9

### Maximum Surge Pressure:

15 psi (1.05 kg/cm<sup>2</sup> or 103.4 kPa).

### Switch:

Mercury switch in all models.

### Pressure Sensing Element:

Stainless steel diaphragm.

### Maximum Ambient Temperature:

150°F (66°C).

### Minimum Ambient Temperature:

-35°F (-37°C); also refer to note under Location and Mounting in the Installation section.

### Adjustment Means:

Screws on top of controller case. Scales are marked in psi and kg/cm<sup>2</sup>.

### Electrical Connections:

Internal screw terminals; holes in side of case for 1/2 inch conduit.

## ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care  
1885 Douglas Drive North  
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

**Mounting Means:**

Hexagonal fitting on diaphragm has 1/4-18 NPT internal threads for mounting on a pipe or steam trap (siphon loop). Also can be surface mounted by screws through two holes (knockouts) in back of case.

**Dimensions:**

See Fig. 1; also Fig. 2 for mounting steam trap (siphon loop).

**Weight:**

2 lb, 4 oz. (1.02 kg).

**Finish:**

Gray.

**Approvals:**

Underwriters Laboratories Inc. Listed: File No. MP466, Vol. 10; Guide No. MBPR.

Canadian Standards Association Certified: File No. LR1620; Guide No. 400-E-0.

**Replacement Parts:**

129178 Thermoplastic Cover.

14026 Steam Trap (siphon loop)—1/4 inch black iron pipe; included with all models.

**Accessories:**

33312B Knurled Adjustment Knob—with setscrew; fits on main scale pressure adjusting screw.

4074BWJ Limit Stop Assembly—to limit setpoint ranges: includes 129564 Range Stop, 107194 Range Stop Screw, and 23466 Wrench.



**MERCURY NOTICE**

If this control is replacing a control that contains mercury in a sealed tube, do not place your old control in the trash. Dispose of properly. This control also contains mercury in a sealed tube. It must also be disposed of properly when it is replaced.

Contact your local waste management authority for instructions regarding recycling and the proper disposal of an old control.

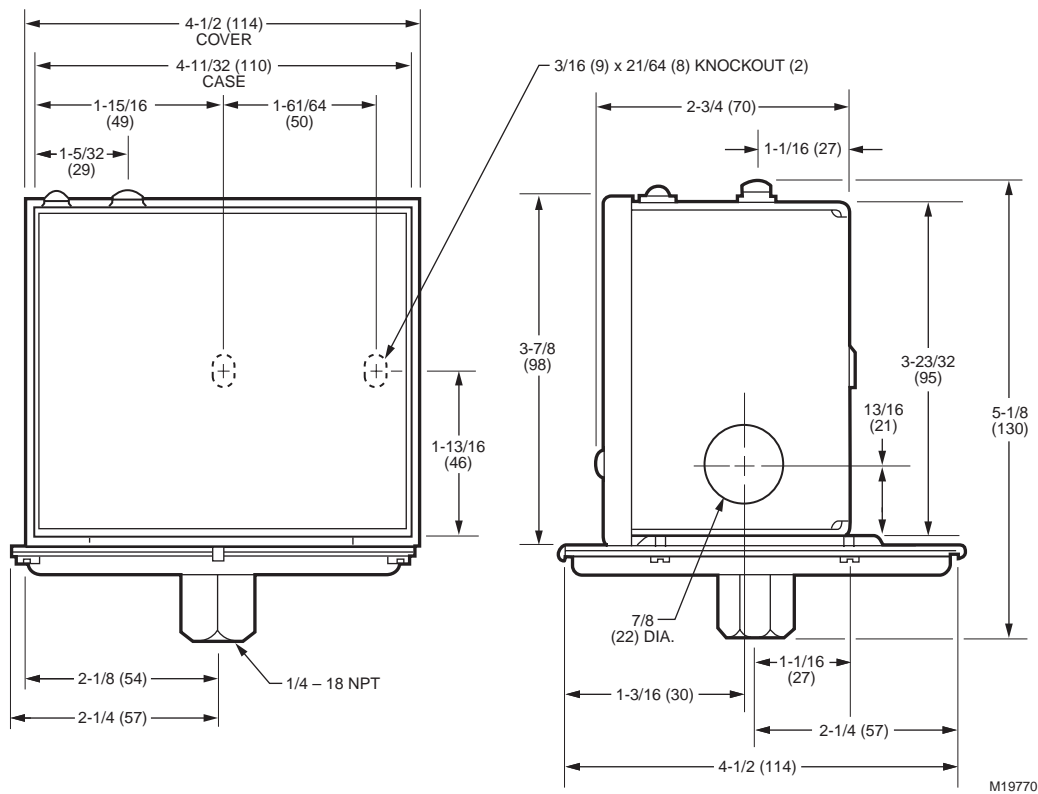


Fig. 1. Mounting dimensions of the L408A,B and L608A VaporStat® controllers in inches (millimeters in parentheses).

**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.

## ⚠ WARNING

### Electrical Shock Hazard.

Can cause severe injury, death or property damage.

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

## ⚠ CAUTION

### Equipment Damage Hazard.

Improper use with a compressor can damage the controller.

When using the controller with a compressor, install a dampening device (such as a needle valve, header, or surge tank) to dampen pulsations that can damage the controller or reduce its life.

### IMPORTANT

1. Locate the controller where the ambient temperature will not exceed 150°F (66°C).
2. Use pipe compound sparingly to avoid clogging the hole in the pipe or diaphragm fitting.
3. Do not tighten the controller by hand by holding the case.
4. The controller must be accurately leveled for proper operation.

## Location and Mounting

**NOTE:** For most accurate operation, supplemental heat should be added to installations where the temperature falls below -20°F (-29°C). Never locate the controller where the temperature falls below -35°F (-37°C), as mercury in the switch will freeze at this temperature.

When used with steam boilers, always mount the controller *above the water line* in the boiler. A steam trap (siphon loop) must always be connected between the controller and the boiler (see Fig. 2) to prevent boiler scale and corrosive vapors from attacking the diaphragm. The loop on the steam trap must always be perpendicular to the face of the controller. If the loop is parallel to the controller, expansion or contraction of the loop will tip the controller and cause the switch to operate inaccurately.

The controller can be mounted (1) alongside the pressure gauge, (2) in a fitting on the boiler provided by the manufacturer, (3) at a remote location in case of excessive vibration, or (4) in a special mounting on a low water cutoff.

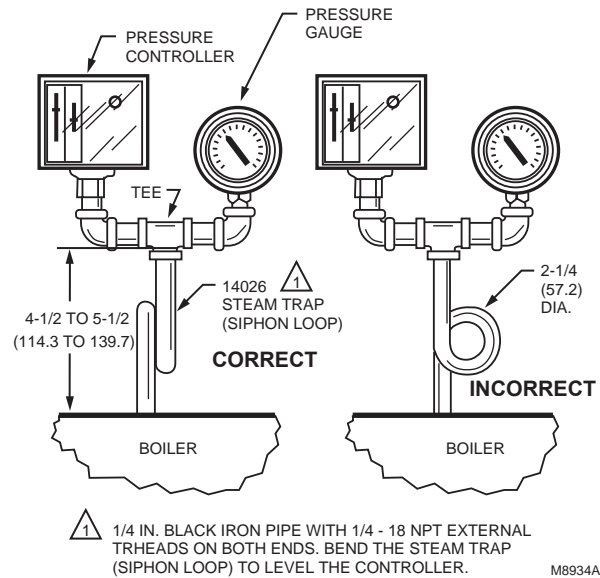
Make all pipe connections in accordance with approved standards. When making pipe connections, use pipe compound sparingly to seal the joints. Excess pipe compound may clog the small hole in the fitting and prevent the controller from operating properly. To avoid leaks and damage to the case, use a parallel jaw wrench on the controller hexagonal fitting. *Do not tighten the controller by hand by holding the case.*

## Leveling

A VaporStat® Controller must be accurately leveled for proper operation. It is level when the leveling indicator hangs freely with its pointer directly over the index mark inside on the back of the case. Level the controller by carefully bending the steam trap (siphon loop).

## Mounting Alongside a Pressure Gauge

To mount the controller alongside a pressure gauge, remove the gauge. In its place, install a steam trap (siphon loop) with a tee on top. Using elbows and pipe nipples, mount the controller and pressure gauge on the ends of the tee. See Fig. 2. Level the controller after installation.



**Fig. 2. Correct and incorrect mounting of a steam trap (siphon loop) with approximate dimensions in inches (millimeters in parentheses).**

## Mounting on a Boiler

If it is not convenient to mount the controller alongside the pressure gauge, install a steam trap (siphon loop) in the fitting provided by the boiler manufacturer. Screw the controller directly on the steam trap and level the controller.

## Mounting at a Remote Location

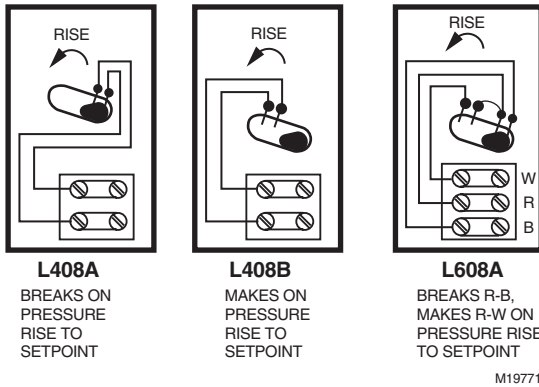
If there is excessive vibration at the boiler which may adversely affect the operation of the controller, the controller should be mounted at a remote location. All piping from the boiler must be suitable and solidly mounted. The piping must be properly pitched to drain all condensation back to the boiler. A steam trap (siphon loop) must be mounted between the remote piping and the controller. Level the controller after installation.

# WIRING

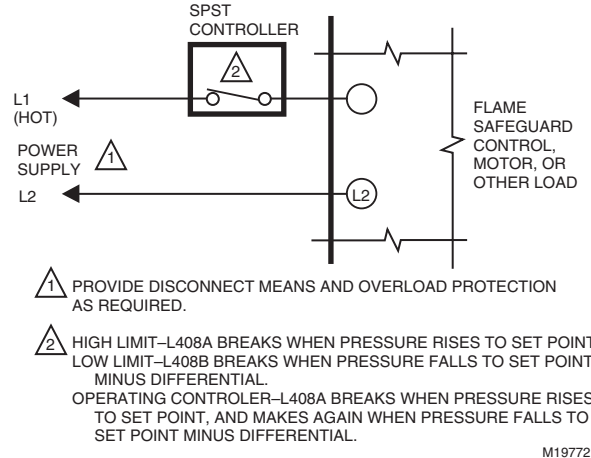
## ⚠ WARNING

**Electrical Shock Hazard.**  
**Can cause severe injury, death or property damage.**  
 Disconnect the power supply before beginning wiring. More than one disconnect may be required.

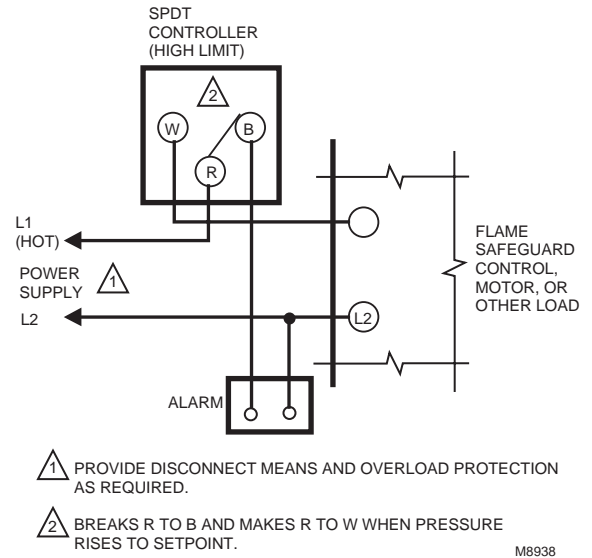
1. All wiring must comply with applicable electrical codes, ordinances and regulations. Use NEC Class 1 (line voltage) wiring.
2. For normal installations, use moisture-resistant NO. 14 wire suitable for at least 167°F (75°C) if you are using the controller with a flame safeguard primary control or at least 194°F (90°C) if you are using it with a programming control.
3. For high temperature installations, use moisture-resistant No. 14 wire, selected for a temperature rating above the maximum operating temperature.
4. Disconnect the power supply before beginning wiring to prevent electrical shock and equipment damage.
5. All models have a terminal block inside the cover (see Fig. 3) and a 7/8 in. (22 mm) hole in one side for 1/2 in. (13 mm) conduit, cable or wires. Remove the front cover by loosening the screw at the bottom of the main scale.
6. Refer to Fig. 4 through 7 for typical hookups. Follow the burner or boiler manufacturer wiring diagram, if provided.
7. Make sure the loads do not exceed the Switch Contact ratings in the Specifications section.
8. Replace the front cover when wiring is complete.



**Fig. 3. L408A,B and L608A terminal blocks and internal schematics.**



**Fig. 4. L408 used as a limit or as an operating controller.**



**Fig. 5. L608A used as a high limit, with an alarm circuit.**

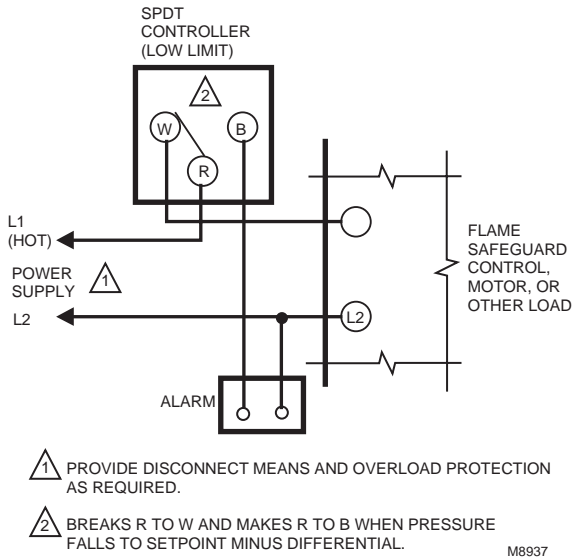


Fig. 6. L608A used as a low limit, with an alarm circuit.

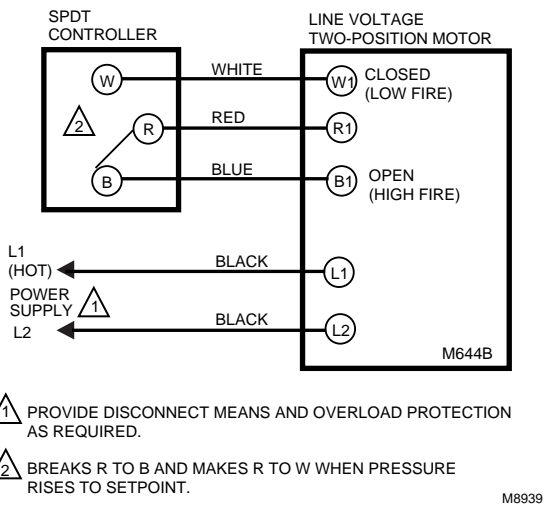


Fig. 7. L608A controlling an M644B Motor.

## SETTING AND CHECKOUT

### Setting

In all models, the differential is subtractive from the main scale setpoint. The upper operating point is determined by the main scale setpoint, while the lower operating point is determined by the main scale setting less the differential setting. Operating points are shown in Fig. 8.

Adjust the main scale setpoint for the desired operating pressure by turning the main scale adjusting screw (see Fig. 9) on the top of the case until the main scale setting indicator is at the desired value. Adjust the differential setting by turning

the differential adjusting screw until the differential setting indicator is at the desired value. The scales are marked in psi and kg/cm<sup>2</sup>.

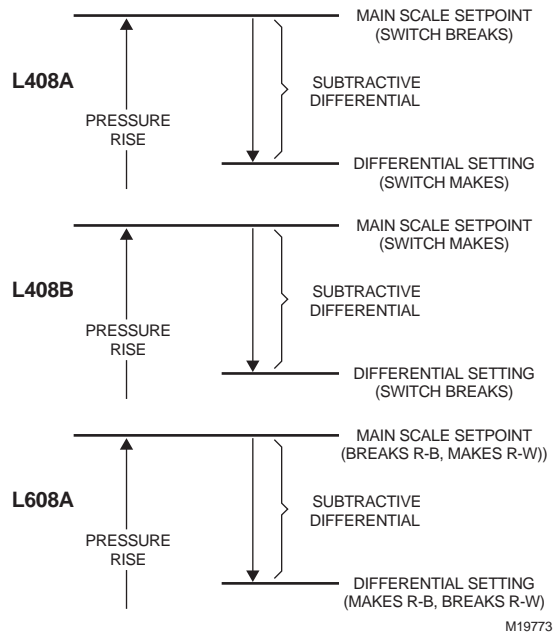


Fig. 8. L408A,B and L608A operating points.

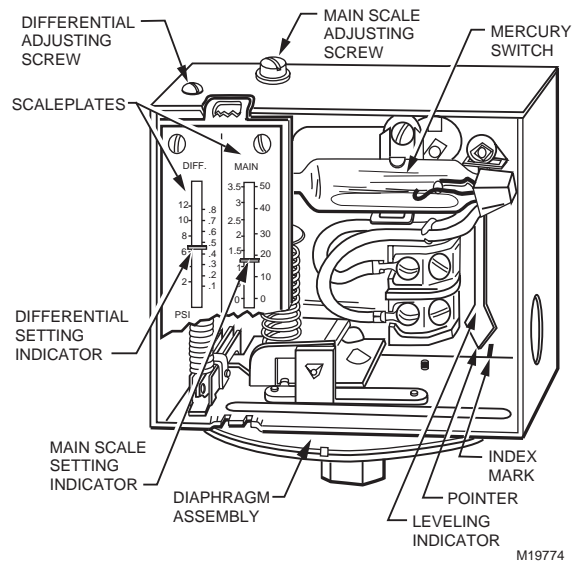


Fig. 9. Setting a VaporStat® Controller.

### Checkout

After the controller has been installed, wired, and set, it should be tested with the system in operation. First allow the system to stabilize. Then observe the operation of the controller while raising and lowering its setpoint. Pressure should increase when the setpoint is raised and decrease when the setpoint is lowered.

Also check the make and break points of the controller. If they do not agree with a separate, accurately calibrated, pressure gauge, a slight adjustment of the scaleplate(s) may be necessary.

Use accurate pressure testing equipment when checking out the controller. Do not rely on inexpensive gauges. The controllers are carefully calibrated at the factory.

## Boiler Installation

If the controller is being used on a boiler installation, test it as follows:

1. Note the boiler pressure by checking the boiler pressure gauge. (To perform this test properly, the boiler should have a pressure reading near the middle of the controller main scale range.)
2. Turn the main scale adjusting screw (see Fig. 9) until the main scale setting indicator on the controller corresponds to the boiler pressure gauge reading.
3. The L408A should break the control circuit automatically when the boiler pressure gauge reading equals or slightly exceeds the controller setting.

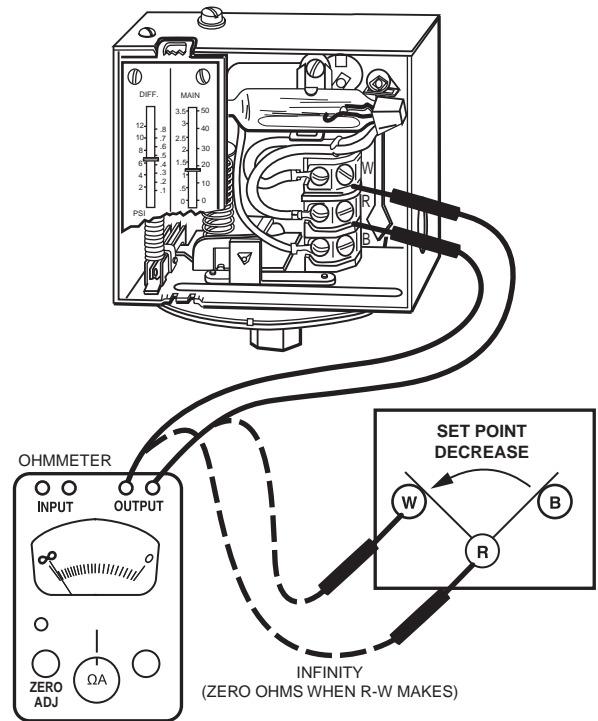
**NOTE:** The L408B should make the circuit under the same circumstances. The L608A should make the R-W and break the R-B circuit under the same circumstances.

4. If the controller is operating properly, turn the main scale adjusting screw (see Fig. 9) until the main scale setting indicator is at the desired setpoint.

## If a Controller Seems to Operate Improperly

If the controller is suspected of operating improperly, it may be checked further as follows (see Fig. 10):

1. Disconnect all power to the controller, loosen the cover screw and remove the cover.
2. Disconnect the wires from the controller.
3. Connect an ohmmeter between the switch terminals.
4. Lower the setpoint of the controller (simulating a pressure increase) through a range greater than the differential. The switch should either make or break, depending on the model of the controller. (An L408A should break, an L408B should make, and an L608A should break R-B and make R-W.) If it makes, the ohmmeter will read zero; if it breaks, the ohmmeter will read infinity.
5. Raise the setpoint of the controller (simulating a pressure decrease) through a range greater than the differential. The switch should break or make, just the opposite of the result in step 4.



**1** AN L608A IS SHOWN. AN L408 HAS ONLY 2 TERMINALS (SPST SWITCHINGS); AN L408A WILL BREAK AND AN L408B WILL MAKE WHEN THE SET POINT IS DECREASED FAR ENOUGH. M19775

**Fig. 10. Checking a VaporStat® controller.**



## CAUTION

**Equipment Damage Hazard.**  
Failure to follow checkout instructions can damage components or systems.

Do not put the system into service until you have satisfactorily completed all applicable tests described in this Checkout section, in the Checkout section of the applicable instruction sheet for the flame safeguard control,

## SERVICE INFORMATION

### Calibration

The controller was carefully calibrated during manufacture and should not require recalibration. Most calibration errors are caused by improper leveling. The controller should be level if the pointer on the leveling indicator is directly over the index mark (see Fig. 9). In some cases, the leveling indicator may not be accurate enough. The pointer may be over the index mark but the controller still may not be operating within the tolerance of its scale setting. In that case, carefully bend the steam trap (siphon loop) until the controller switches properly.

## Maintenance

The cover of the controller should be in place at all times to protect the internal components for dirt, dust, and physical damage. Routine maintenance should consist of occasional

inspection and blowing or brushing away an accumulated dirt and dust. To ensure proper functioning of the controller at all times, an operational check of the entire system should be performed during routine maintenance checks.

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