

# PROPORTIONAL TEMPERATURE CONTROLLERS

T991A Proportional Temperature Controllers provide modulating control of water or air temperatures in ducts, tanks, and similar applications. Standard models have a sensing bulb and capillary; fast response models have a coiled sensing element that operates at least four times faster than standard controllers, depending upon operating conditions.

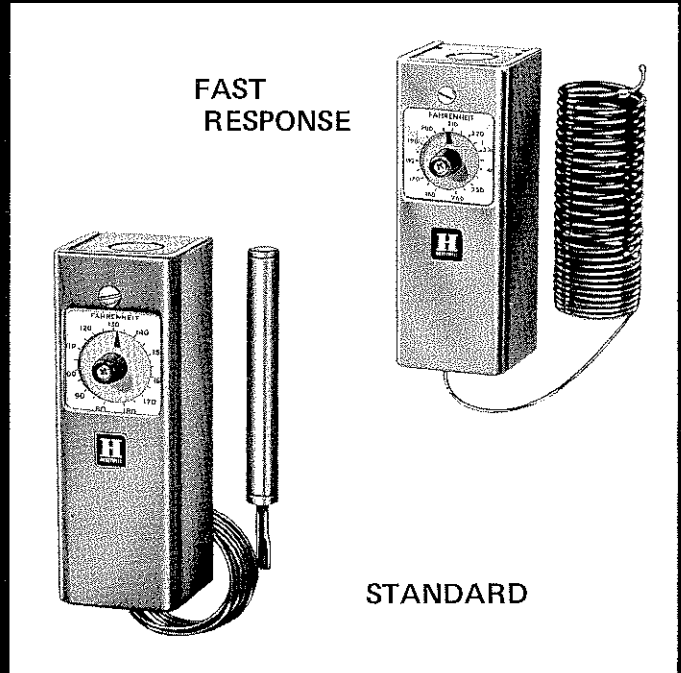
All models compensate for effects of ambient temperature on the case and tubing.

Controls temperature of air or liquids.

Sensing element capillary tubing allows remote mounting of sensing element.

Set point may be read and adjusted through cover.

Throttling dial inside case adjusts proportioning range.



## T991A

# SPECIFICATIONS

**MODELS:** T991A Temperature Controller—standard or fast response.

**ELECTRICAL RATING:** 24 to 30v ac.

**POTENTIOMETER RESISTANCE:** 135 ohms (280 ohms available as option on model with 55 to 175 F range).

**TEMPERATURE RANGES AND LIMITS:**

Range	Maximum Ambient Temperature for Controller	Maximum Operating Temperature for Bulb
0 to 100 F	125 F	125 F
55 to 175 F <sup>a</sup>		200 F
80 to 180 F		200 F
160 to 260 F		280 F
-15 to 35 C	52 C	52 C
15 to 75 C <sup>a</sup>		93 C
30 to 80 C		93 C
75 to 125 C		138 C

<sup>a</sup> Available in 20 ft x 7/64 O. D. averaging element (copper)—senses temperature along length of element.

**PROPORTIONING RANGE:** Adjustable from approximately 3 to 30 degrees F (1.7 to 17 degrees C); set point is always the center point of proportioning range.

**BULB PRESSURE RATING:** 50 psi maximum for direct immersion.

**CAPILLARY LENGTH AND MATERIAL** (5/64 inch O.D.):

Copper: 5, 10, 20, or 24 feet.

Stainless steel: 20 feet.

**MOUNTING MEANS:** Three holes in back of case for furnished screws.

**DIMENSIONS:** See Fig. 1.

**FINISH:** Gray.

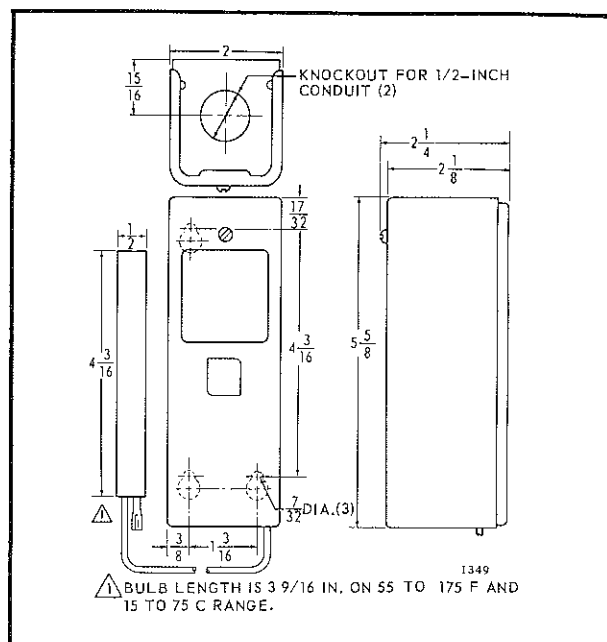


FIG. 1—APPROXIMATE DIMENSIONS IN INCHES.

**ACCESSORIES:**

1. Separable immersion wells, to be screwed into tank or boiler: 112622AA—1/2 inch NPT, or 112630AA—3/4 inch NPT.
2. Pressure fitting 7617ABY—1/2 inch NPT, rated at 50 psi water or 15 psi air pressure.
3. Duct Bulb Holder 107324A.  
Duct Coil Holder 131524A.
4. T-Strap 105900 for strapping bulb to a pipe.
5. Bracket assembly 7640HY (a standoff bracket for mounting T991A to insulated duct).
6. Assembly 7640HX for mounting T991A with averaging element when access into duct is not available.
7. Calibration wrench 801534.
8. Weatherproof enclosure Q615A.

**OPTIONAL SPECIFICATIONS:**

1. 280 ohm potentiometer on 55 to 175 F model.
2. Averaging element available on 55 to 175 F model or 15 to 75 C model.

# ORDERING INFORMATION

WHEN ORDERING REFER TO THE TRADELINE CATALOG OR PRICE SHEET FOR COMPLETE ORDERING SPECIFICATION NUMBER, OR . . .

SPECIFY—

1. MODEL NUMBER.
2. SCALE RANGE.
3. CAPILLARY LENGTH AND MATERIAL.
4. OPTIONAL SPECIFICATIONS OR ACCESSORIES, IF DESIRED.

ORDER FROM—

1. YOUR USUAL SOURCE, OR
2. HONEYWELL  
1885 DOUGLAS DRIVE, NORTH  
MINNEAPOLIS, MINNESOTA 55422  
(IN CANADA—HONEYWELL CONTROLS LIMITED  
740 ELLESMERE ROAD  
SCARBOROUGH, ONTARIO)

# INSTALLATION

**CAUTION:** Disconnect power supply.

Installation should be made only by a qualified serviceman. Follow instructions of system manufacturer, if available.

## LOCATION

The T991A may be mounted in any convenient position on a flat surface where the ambient temperature does not exceed 125 F. When mounting on a hot or cold surface, mount the case on a wood board or other insulating material. The capillary tube provides for remote mounting.

## MOUNTING

On replacement applications, mount the T991A in place of old control if requirements under LOCATION above, are met. Mount case according to instructions below. Use old sensing bulb hole, bulb holder, immersion well, or compression fitting if these are suitable; otherwise, follow the instructions below for new applications.

### MOUNT THE CONTROLLER CASE:

1. Remove cover. Using the case as a template, mark three screw hole locations on mounting surface, then punch or drill holes.
2. Fasten T991A securely to mounting surface with the furnished mounting screws.

### TO INSTALL SENSING BULB IN AIR DUCT:

Locate the sensing bulb where duct air of average temperature can circulate freely around it. Avoid mounting the bulb close to hot pipes, cooling coils, and other places where air temperatures are not representative.

To support the bulb in the duct, use bulb holder accessory (see Fig. 2).

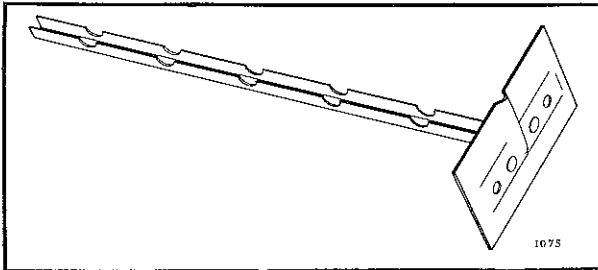


FIG. 2—BULB HOLDER.

1. Drill a 3/4 inch hole in the duct wall to admit the sensing bulb and holder.
2. Using the holder as a template, mark and drill holes for bulb holder mounting screws.

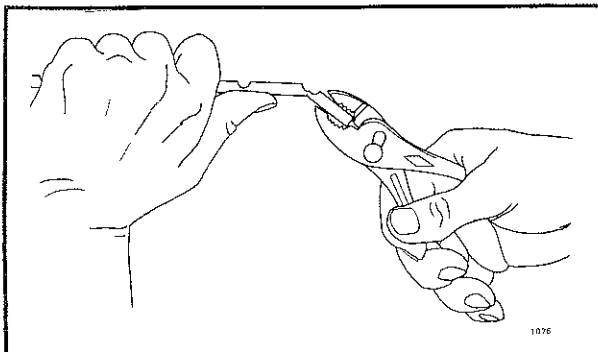


FIG. 3—SHORTENING THE BULB HOLDER.

3. Break off bulb holder to desired length, as shown in Fig. 3. NOTE: Holder should be long enough to hold sensing bulb in freely circulating air, away from duct wall. Neatly coil any excess capillary tubing at controller case or at bulb holder.

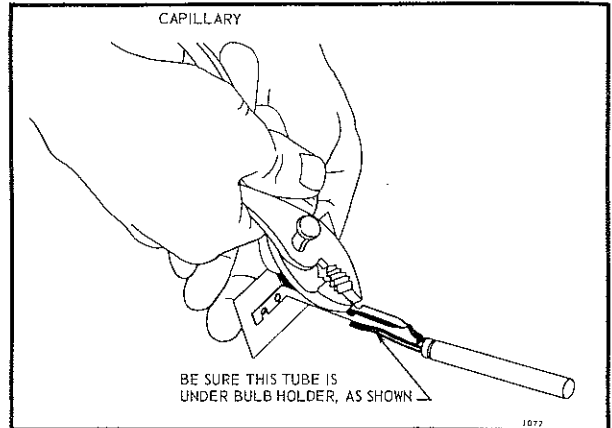


FIG. 4—INSERTING CAPILLARY TUBING IN HOLDER.

4. Place capillary tubing in bulb holder channel, and pinch top edges of holder together at each segment, as shown in Fig. 4.

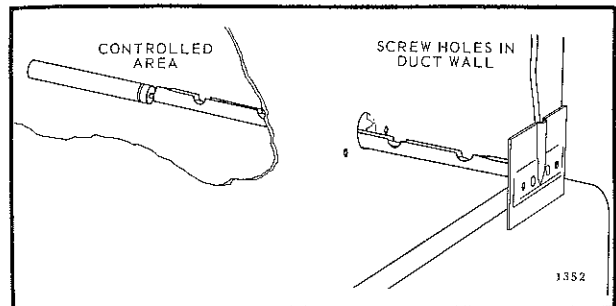


FIG. 5—INSERTION INTO DUCT.

5. Insert bulb and holder into controlled area through hole prepared in Step 1 (Fig. 5).

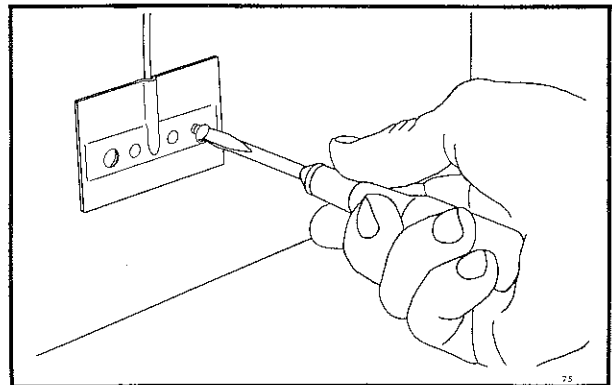


FIG. 6—FASTENING HOLDER TO DUCT WALL.

6. Fasten bulb holder to duct wall with screws furnished, as shown in Fig. 6.

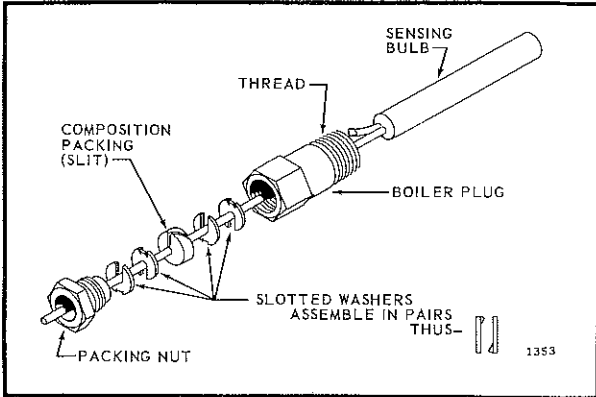
### TO INSTALL A FAST RESPONSE MODEL:

Use duct holder assembly for the sensing coil. Drill a 1-5/8 inch hole in the duct wall to receive the whole coil, and then use the mounting procedure for the standard model. WARNING: Do not stretch the coil more than eight inches on the holder.

**TO INSTALL SENSING BULB IN TANK OR BOILER:**

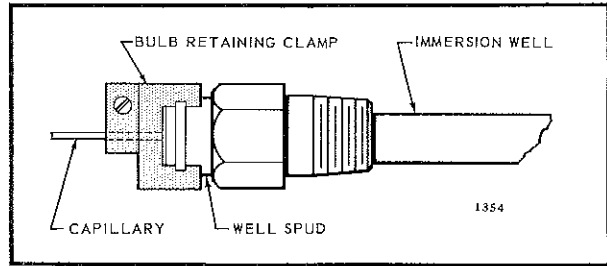
The bulb may be inserted directly into a tank or boiler tapping by means of a pressure fitting (see ACCESSORIES), or the bulb may be inserted into an immersion well that is screwed into the tank or boiler (see ACCESSORIES).

To install pressure fitting:



**FIG. 7—PRESSURE FITTING ASSEMBLY.**

1. Drain system, and screw boiler plug into properly sized and threaded boiler or pipe tapping (1/2-14 NPT).
2. Place packing nut on T991A capillary tube.
3. Slide sensing bulb completely through boiler plug.
4. Place composition disc and the four slotted brass washers on tubing in the order shown in Fig. 7.
5. Slide the assembly into the boiler plug, and tighten the packing nut.
6. Refill the system and check for leaks. Neatly coil excess capillary tubing at T991A case.



**FIG. 8—IMMERSION WELL ASSEMBLY.**

To install immersion well:

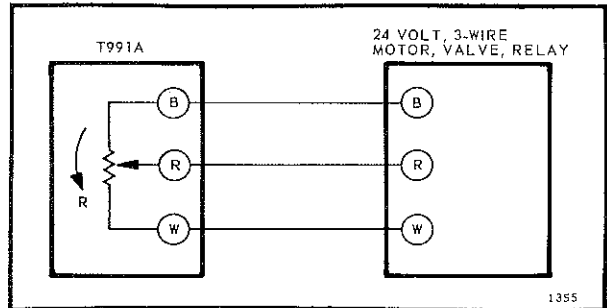
1. Drain system. Screw the well into properly sized and threaded boiler tapping or pipe fitting.
2. Refill the system and check for leaks.
3. Insert sensing bulb into well until it bottoms.
4. Fit bulb retaining clamp over immersion well flange and capillary tubing, and tighten screw, as shown in Fig. 8.

Coil excess capillary tubing at T991A case.

**WIRING**

All wiring must comply with local codes.

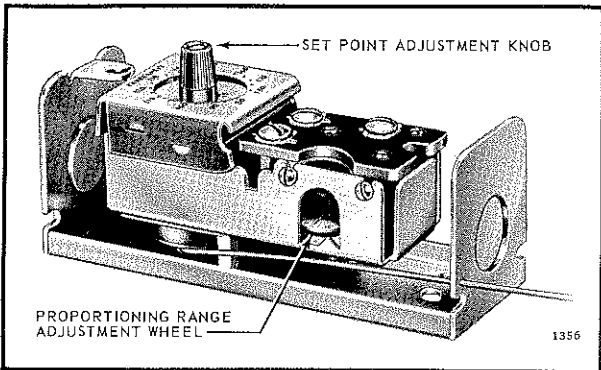
Two knockouts are provided at top and bottom of case for 1/2 inch conduit. Follow any wiring instructions furnished with heating or cooling system. In replacement applications, make certain the T991A is wired in the system to operate the same way as old control. Fig. 9 shows typical wiring.



**FIG. 9—TYPICAL HOOKUP.**

## ADJUSTMENTS AND CHECKOUT

**TEMPERATURE SETTING:** Turn knob on front of case until pointer indicates desired set point temperature. This is the center point of the proportional range.



**FIG. 10—PROPORTIONING RANGE ADJUSTMENT.**

**RANGE ADJUSTMENT:** The T991A may be adjusted to vary the temperature range within which proportional action is desired. With cover off, turn adjustment wheel until pointer indicates desired range.

Example: If the temperature of the controlled medium is to be maintained at 130 F, and proportional action from 125 F to 135 F (a range of 10 degrees) is desired—turn the temperature set point indicator to 130 F and the proportional range adjustment wheel to 10.

**CHECKOUT**

After mounting and wiring have been completed, let the controlled equipment operate until system temperature stabilizes (from 1 to 3 hours). Observe the motor action to see if it stabilizes. If the motor shaft constantly moves back and forth, widen the T991A proportional range (about five degrees at a time) until the system is stable.