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# **Sarcotherm**

## **Installation Instructions**

**Read carefully and  
keep for future reference**

**SARCOTHERM CONTROLS, INC.  
EMPIRE STATE BLDG. NEW YORK 1, N.Y.**

**BRANCHES IN PRINCIPAL CITIES**

**CANADIAN REPRESENTATIVES - SARCO CANADA LIMITED, TORONTO, ONT.**

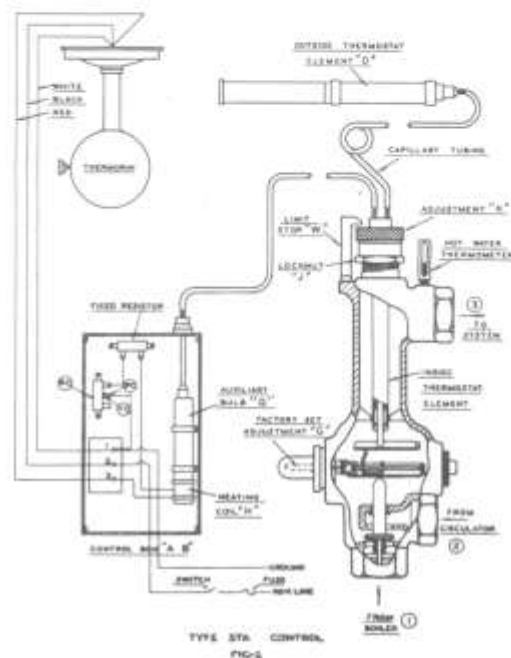
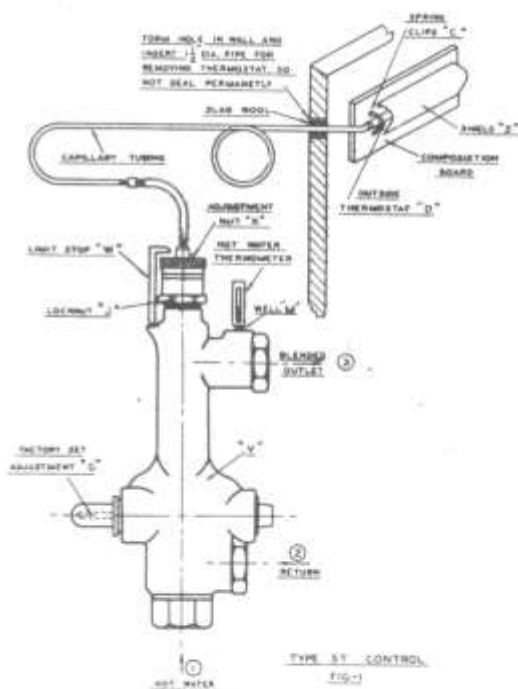
DO NOT INSTALL SARCO THERM CONTROL BEFORE YOU READ THESE INSTRUCTIONS  
READ CAREFULLY AND KEEP FOR FUTURE REFERENCE

INSTALLATION INSTRUCTIONS FOR SARCO THERM CONTROLS

UNPACKING:

a. Unpack the control very carefully, taking care not to bend or in any way damage the armor-covered capillary tubing.

b. Remove the outside thermostat "D" (See Fig. 1) from the mounting bracket and shield "S". To do this simply push the thermostat "D" toward the mounting board and thus force it out of the spring clips "C".



INSTALLATION:

a. When connecting the Sarcotherm blender control valve "W" to the boiler, follow as closely as possible the arrangement shown in Fig. 3. In laying out the piping, sufficient room must be allowed between the top of the Sarcotherm valve and the ceiling to allow for the removal of the blender thermostat when necessary. This clearance should be not less than 2 feet, as indicated in the typical layout drawing, Fig. 3. If the ceiling is too low to allow this clearance with the hook-up as shown in Fig. 3, the Sarcotherm control valve may be connected in the manner shown in Fig. 4. When the

hook-up is made in accordance with Fig. 4, however, an automatic air eliminator of the Sarco 13-W type must be installed to eliminate the air from the loop, otherwise air will accumulate at this point and retard the circulation throughout the system.

b. It is imperative to install strainers ahead of the Sarcotherm control on both the supply and return lines whether shown or not in any of the hook-up diagrams. Failure to do so may result in improper operation and perhaps damage to the control, especially where welded pipe is used in the coils or circuits of the system. Small particles of iron from the welded joints and scale from the pipes may collect in the valve and circulating pump and cause serious damage. Even with copper pipe, jointing material and dirt may collect in the working parts of the valve and cause trouble if strainers are not provided.

c. To allow easy removal of the Sarcotherm valve a manually controlled by-pass with isolating valves and unions or flanges should be provided, as shown in Figs. 3 and 4. In cases of emergency the by-pass valve may be opened to supply water to the system directly from the boiler, but when this is done the aquastat on the boiler should then be previously reset to control the boiler water temperature to that required in the heating system. (Normally, the aquastat may be set to give a boiler water temperature approximately 20°F above the highest temperature for which the Sarcotherm is calibrated.) After the emergency period is over and the control system is reinstalled, the aquastat on boiler should be reset to the correct normal operating temperature.

d. A hot water thermometer with well should be installed in the screwed connection provided on the blended water outlet of the Sarcotherm valve, as shown at "M"

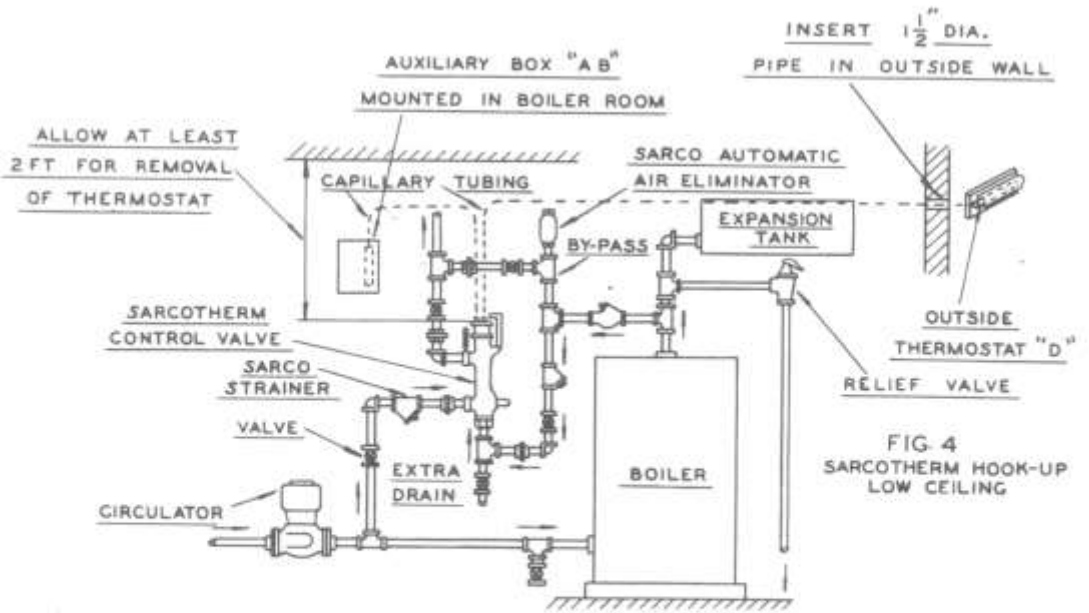
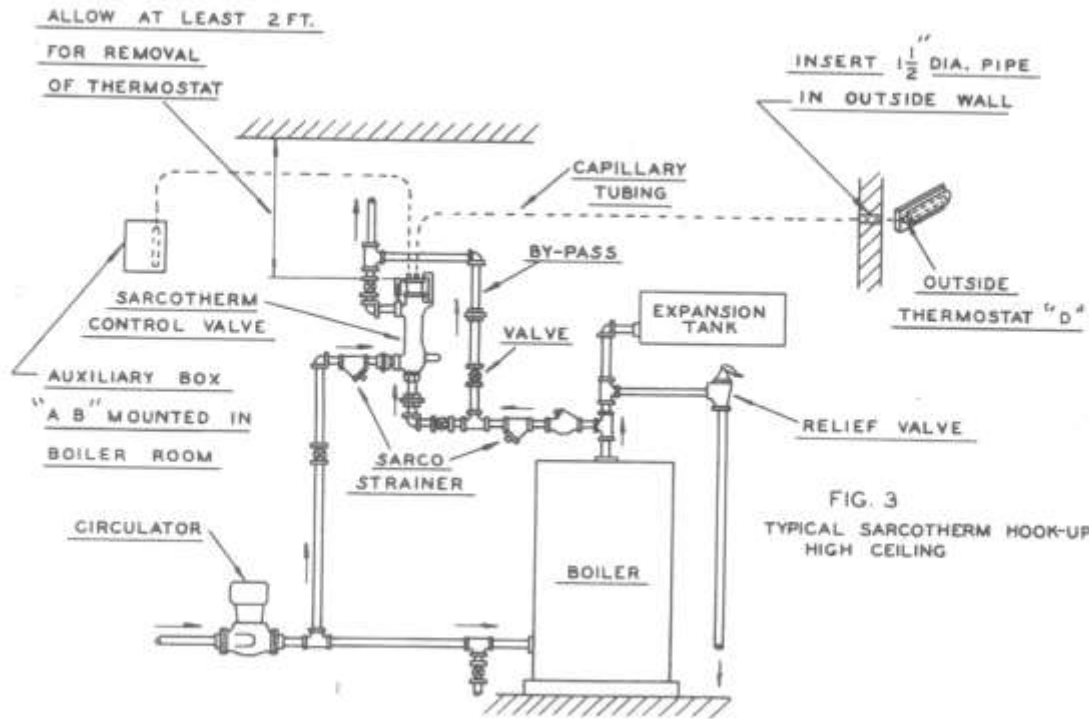
(Fig. 1). It is advisable to also have a thermometer in the main return pipe.

e. If the STA type control is used the auxiliary bulb box "AB" (See Fig. 2) should be mounted on the wall so that heat does not reach the box by radiation from any uninsulated part of the boiler or pipes. Then too, its position on the wall should be such that heat cannot be conducted from the flue or the boiler. For correct wiring check wiring diagram applicable to your installation.

f. A hole should be formed through the outside wall and a piece of 1-1/2" wrought iron pipe inserted to allow easy passage of the outside thermostat "D" (Fig. 1) when installing or replacing the thermostatic system of the control.

g. When installing the outside thermostat, pass the bulb "D" through the 1-1/2" pipe, taking care not to damage or bend too sharply the capillary tubing. DO NOT PERMANENTLY SEAL THE 1-1/2" DIAMETER HOLE, although the space around the capillary tubing may be packed with slag wool or other suitable material which may be easily removed when desired. DO NOT IMBED ANY PART OF THE CAPILLARY IN PLASTER OR CONCRETE, OR COVER THIS IN ANY WAY. The entire thermostatic system should be accessible for examination or easy removal at any future date.

h. To install the outside thermostat, first fasten the composition board to outside wall with substantial bolts or screws. The location of the board should, if possible, be on the north wall at least 7 feet from the ground level. When the building is zoned, the thermostat for each zone should be mounted on the wall providing the greatest exposure for any particular zone, always taking care not to expose the thermostat to the direct rays of the sun, unless the Sarcotherm



is to control a sun-room only.

i. To secure the thermostatic bulb "D" to the board, simply snap the bulb "D" back into the spring clips "C".

#### ADJUSTMENT:

a. The final adjustment should not be made on the Sarcotherm control valve before the functioning of the control has been observed over an extended period of time with various outside temperatures. This is to give sufficient time for the heat to well saturate the structure. If it is found that the inside room temperatures are consistently too low or too high, it is possible to raise or lower the water temperature by turning the knurled cap at "K", towards "Warmer" or "Colder" (See Fig. 1). If the TEMPERATURE OF THE WATER LEAVING THE SARCO THERM VALVE REMAINS TOO LOW, IT MAY BE DUE TO DIRTY STRAINER SCREENS, ESPECIALLY WHEN FIRST STARTING THE SYSTEM AND, THEREFORE, BEFORE MAKING ANY ADJUSTMENT, REMOVE STRAINER BASKETS AND CLEAN THOROUGHLY. These may need cleaning several times before the system is entirely free of dirt and foreign material.

b. To raise the water temperature, loosen the locknut "J" and turn the knurled adjustment nut "K" (See Fig. 1) one-half turn from left to right, as shown by the arrow "WARMER" on the nut. If, after allowing sufficient time for conditions to stabilize (usually several hours), the rooms are still too cold, unscrew the adjustment nut "K" another half turn from left to right, and so on, until the required temperature is reached. Reverse the above procedure if it is necessary to lower the room temperature.

CAUTION: Never turn the adjustment nut "K" beyond the limit of the stop "W" attached to the Sarcotherm valve, otherwise the inside thermostat may be forced out of the valve.

c. If no change is observed after making the above adjustments to the limit of the valve, it may be assumed that something is wrong with the system, caused either by air locks, dirt, or other impediments, and investigations should be made, or write to Sarcotherm Controls, Inc., giving all particulars.

d. The adjustment "G" provided on the ST and STA types (Figs. 1 and 2) is factory-set and should not be touched unless so advised by Sarcotherm Controls, Inc.

e. The STA type control (Fig. 2) is similar to the ST type (Fig. 1), except that it is equipped with an auxiliary bulb "Q" which, when operated by a room thermostat, Thermoray, or time clock, has the effect of decreasing the amount of heat delivered to the building. When using a room thermostat or Thermoray wired to the auxiliary bulb panel of the STA control, make certain that thermostat or Thermoray is furnished with normally open switch. The amount of heat supplied to the heating coil "H" (Fig. 2) is limited by the combined effect of the fixed resistance "T" and the adjustable resistance "Rc".

The adjustable resistance "Rc" is factory-adjusted to provide a temperature depression of 20°F for radiant heating and 30°F for hot water heating. If it is desired to change the amount of this temperature depression in the circulating water when the heater "H" is energized by the thermostat or Thermoray, loosen the screw "Fc" and move the strap "Pc" downward to decrease the amount of maximum temperature depression and, conversely, if it is desired to increase the amount of temperature depression, move

the strap "Pc" upward. Failure to loosen the screw "Fc" before moving the strap may damage the resistor. Tighten screw "Fc" after resetting the strap "Pc".

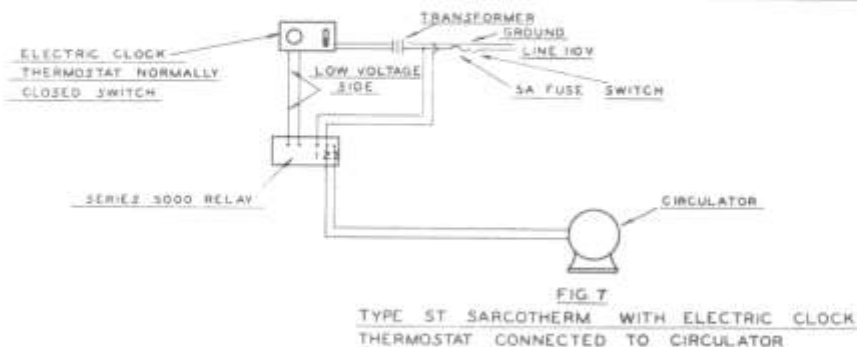
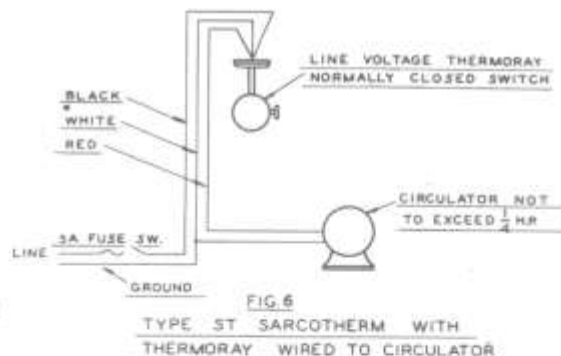
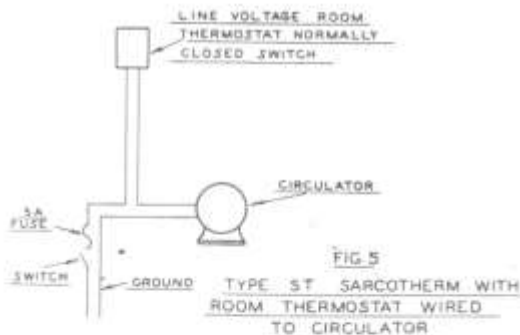
BEFORE STARTING UP THE HEATING SYSTEM, CHECK OVER THE FOLLOWING POINTS:

1. Are strainers installed on both the hot water and return connections to Sarcotherms? If not, they should be installed immediately.
2. Is the capillary tubing so installed that it can be removed at any time without difficulty?
3. Is the aquastat on boiler (or regulator if a preheater is provided) set for 10 to 20 degrees higher than calibration of Sarcotherm control valve?
4. Are room thermostats, Thermorays or other electric controls wired properly according to wiring diagram?
5. Are room thermostats, or Thermorays furnished with switch

normally open (to close with rise in temperature) or normally closed (to open with rise in temperature) depending upon the requirement of the particular installation.

6. Are valves provided for isolating and by-passing the Sarcotherm valve, and is the by-pass valve closed with the other two valves wide open?
7. Are automatic air vents provided at all high points or circuit pipes and mains? This is imperative!
8. Have all air taps been tested for the removal of air?
9. An altitude gauge on the boiler or flow main is recommended to indicate any irregularities in the static pressure.

NOTE: Instructions for the STP and STPA are exactly similar to those for the ST and STA respectively, except that the side adjustment "G" has been omitted from the STP and STPA types and, therefore, this selectivity is not available.



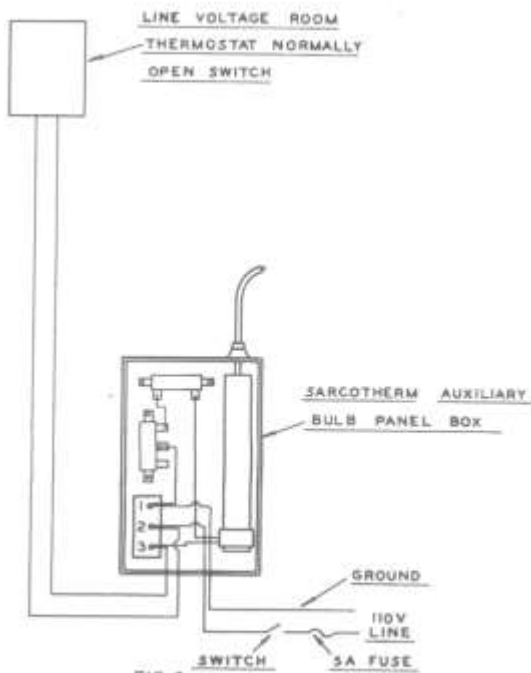


FIG. 8  
TYPE STA SARCO THERM WITH ROOM THERMOSTAT

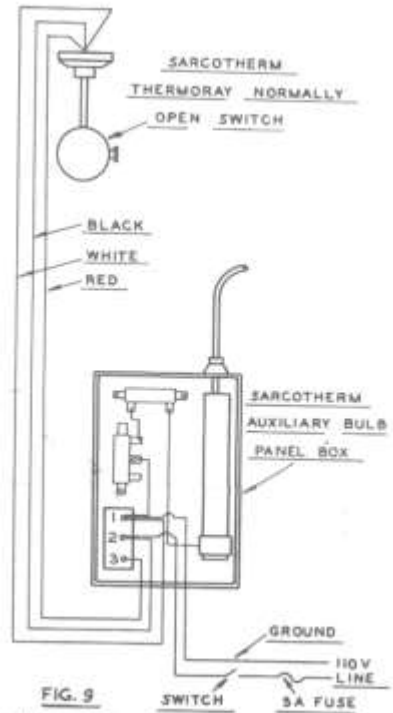


FIG. 9  
TYPE STA SARCO THERM WITH THERMORAY

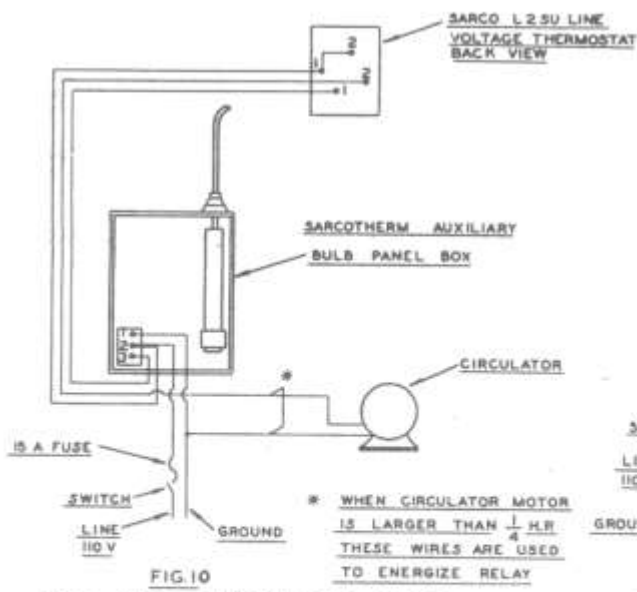


FIG. 10  
TYPE STA SARCO THERM USING L2SU THERMOSTAT

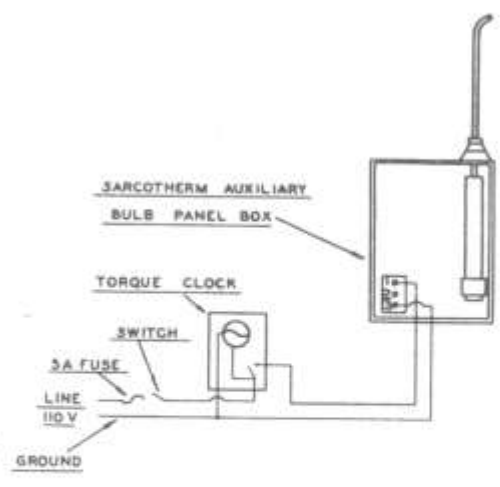


FIG. 11  
TYPE STA SARCO THERM USING TORQUE CLOCK

### SARCOTHERM THERMORAY:

On radiant heating systems, the room thermostat must be sensitive to both air temperature and radiant rays. The Sarcotherm "Thermoray" was designed to meet these special requirements which the conventional room thermostat cannot satisfy. Sarcotherm manufactures three types of "Thermorays": Ceiling, wall and flush types.

a. CEILING TYPE: This instrument is generally specified with floor heating. Fig. 12 showing dimensions indicates the method of installation. As the "Thermoray" controls temperatures throughout the system it should be located in a room frequently occupied, preferably the living room. Locate this instrument away from the windows but in such a position that it will be affected not only by the radiant rays from the heating surface but also by the sun. NEVER PLACE THE "THERMORAY" ON THE CEILING WHEN CEILING COILS ARE USED TO HEAT THE ROOM. Install a wall type instead.

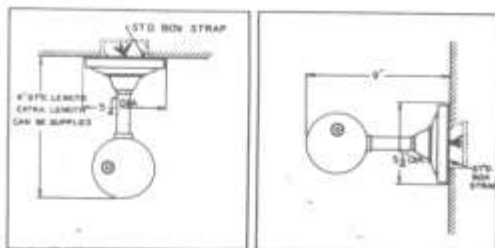


Fig. 12

Fig. 13

b. WALL TYPE: Fig. 13, indicating all dimensions shows the method of installation for this instrument which can be used with either floor or ceiling radiant panels. Just as the ceiling type this type should also be located in a frequently used room and installed on an inside wall above breathing level, taking care not to block it with furniture. NEVER INSTALL WALL TYPE "THERMORAY" ON ANY WALL THAT IS HEATED BY WALL COILS.

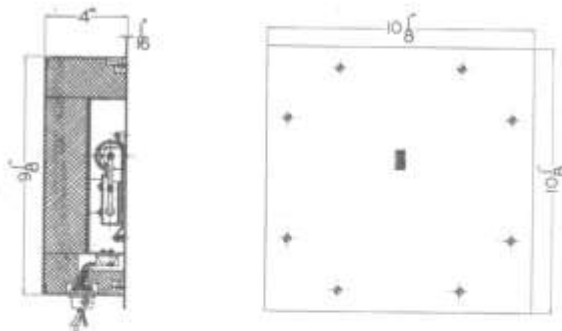


Fig. 14

c. FLUSH TYPE: This type, as illustrated in Fig. 14, is suggested for rooms where, for esthetic reasons, the spherical type cannot be used. The location and principle of operation is the same as that of the spherical type. It can be very conveniently installed in partitions, however, great care must be exercised not to screen or paint over the instrument in any way. It must be exposed to all rays from heated surfaces, sun and air circulation.

Wiring diagrams for all types are identical. A typical application with the type STA Sarcotherm control valve is illustrated in Fig. 9. Here the "Thermoray" is equipped with normally open switch.

For systems using the type ST Sarcotherm, the "Thermoray" (equipped with normally closed switch) is connected to start and stop the circulator. This wiring diagram is shown in Fig. 6.

**CAUTION:** Before installing "Thermoray" make certain that it is furnished with normally open switch if wired to auxiliary bulb panel of type STA control and with normally closed switch if wired to circulating pump.

FOR FURTHER DETAILED INFORMATION ON SARCOTHERM CONTROLS, WRITE FOR CATALOG ST-500 AND THE SARCOTHERM MANUAL.



## SARCOTHERM, Type STA OUTDOOR AND INDOOR CONTROL

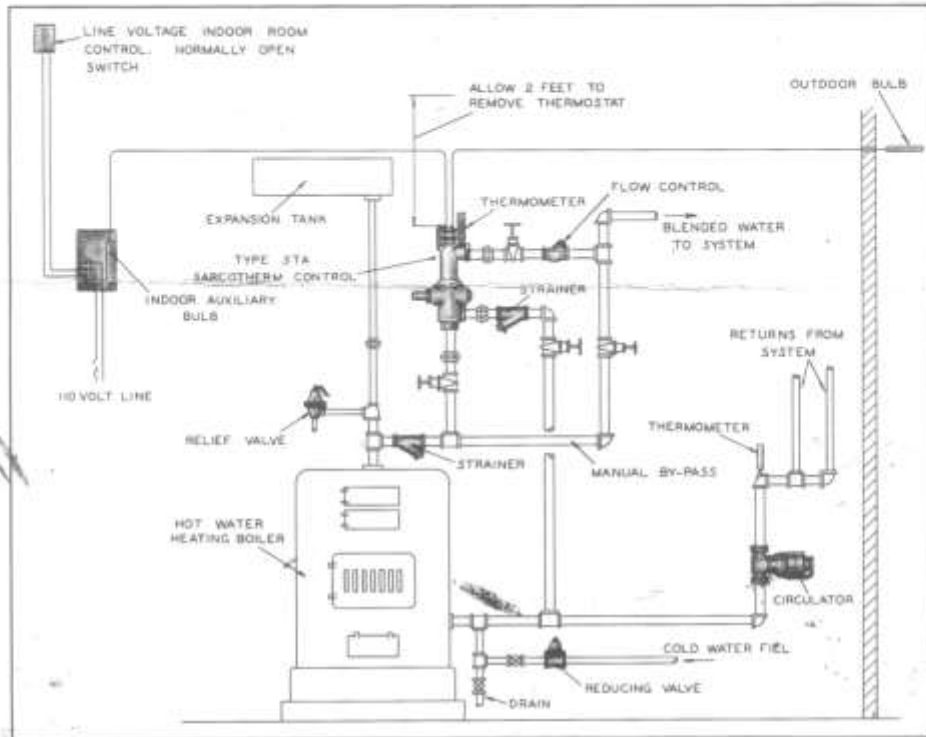


Fig. 5. Typical installation of Sarcotherm, Type STA

### Compensating Indoor Control

Heat loss from buildings is subject to variables, not all of which can be controlled in accordance with fluctuations of outside temperature alone. Exposure, wind velocity and direction, as well as the insulating properties of the building walls, all exert their influence. Because there is a certain lag between changes in atmospheric conditions and the temperature in the rooms, control by outside temperature alone may at times result in rooms becoming too warm. When desired, an automatic check can be provided to guard against such overheating.

With the compensating indoor control it is also possible to arrange for night set-back, without stopping circulation. This method is especially recommended for Radiant Heating Systems where continuous circulation is desired.

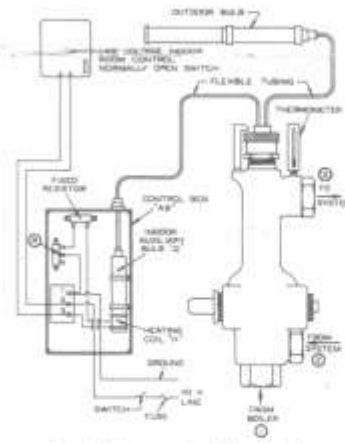


Fig. 6. Compensating Indoor Control

## SARCOTHERM, Type ST OUTDOOR CONTROL

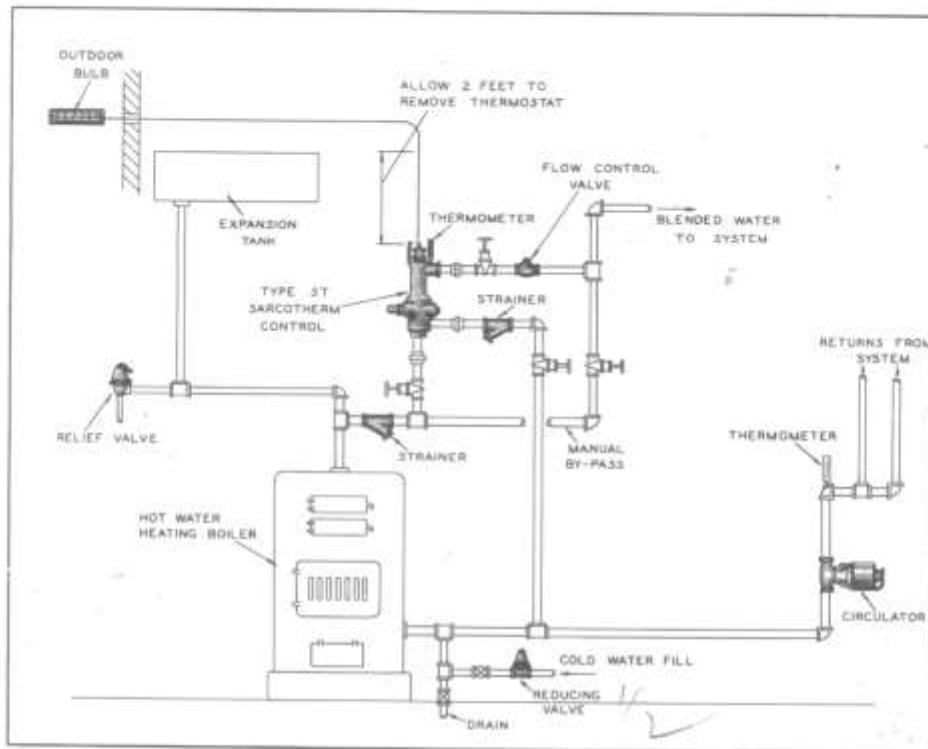


Fig. 4. Typical Installation of Sarcotherm, Type ST

### List Prices and Net Weights Sarcotherm Control, Type ST

Size	Construction	Type ST List	Net Weight Pounds
1 1/4" ST	Iron-Screwed	\$132.00	27
1 1/2" ST	Iron-Screwed	138.00	27
2" ST	Iron-Screwed	166.00	40
2 1/2" ST	Iron-Screwed	195.00	67
3" ST	Iron-Screwed	201.00	67
4" ST	Iron-Flanged	304.00	155
5" ST	Iron-Flanged	517.00	180
6" ST	Iron-Flanged	759.00	270

Above prices include 20 ft. of flexible connecting tubing between outside thermostat and valve. For longer connecting tubing add 50¢ list per foot.

The Type ST Sarcotherm Control system consists of the 3-way mixing valve and outdoor bulb and will proportion the hot water to the system according to outdoor temperature changes. However, for conventional hot water systems, it is recommended that a normally closed switch Room Thermostat be wired to the circulator. For effective night temperature setback use the Sarcotherm No. 125-D Electric Clock Thermostat as shown in Fig. 26.

When ordering specify: 1. Valve size; 2. Length of connecting tubing to outside bulb; 3. Temperature of water leaving Sarcotherm valve for lowest design outside temperature. For sizing of Sarcotherm Valves see chart 22 on page 13.

It is imperative that strainers be placed both in the hot water and return lines to the Sarcotherm valve. List prices for Strainers are shown on page 17.