



# **202 Control**

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## **Installation and Maintenance Instructions**



# **Installation & Maintenance Instructions**

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# 1 General description

## Description

1.1. The 202 Control Fig. 1 consists of a sensor (a) for sensing outside air temperature which is coupled to an immersion sensor (b) by means of a capillary tube which is extended to the valve actuator (c).

## Operation

1.2. The purpose of this control when coupled to a suitable valve is to vary the flow temperature to the heating system in accordance with the external air temperature. The 202 Control will normally be used with a two ported valve to control the primary steam or hot water supply to a calorifier or a three ported valve to control the secondary water circulation where the primary supply temperature is controlled by other means.

**It is suitable for use only on systems where the secondary circulation is pumped.**

There are 3 types designated 2021, 2022 and 2023 to match the valves as shown under section 2 and 3.

## Storing

1.3. If the control has to be stored for any length of time before being fixed, it is advisable to leave the factory packing intact and to store in a cool dry place.

## Damage

1.4. A careful examination should be made and any damage reported immediately.

## Important

**The top end of the outside sensor contains a limiting device (d) to prevent overheating should the outside temperature fall below the normal minimum. Under no circumstances should this be tampered with.**

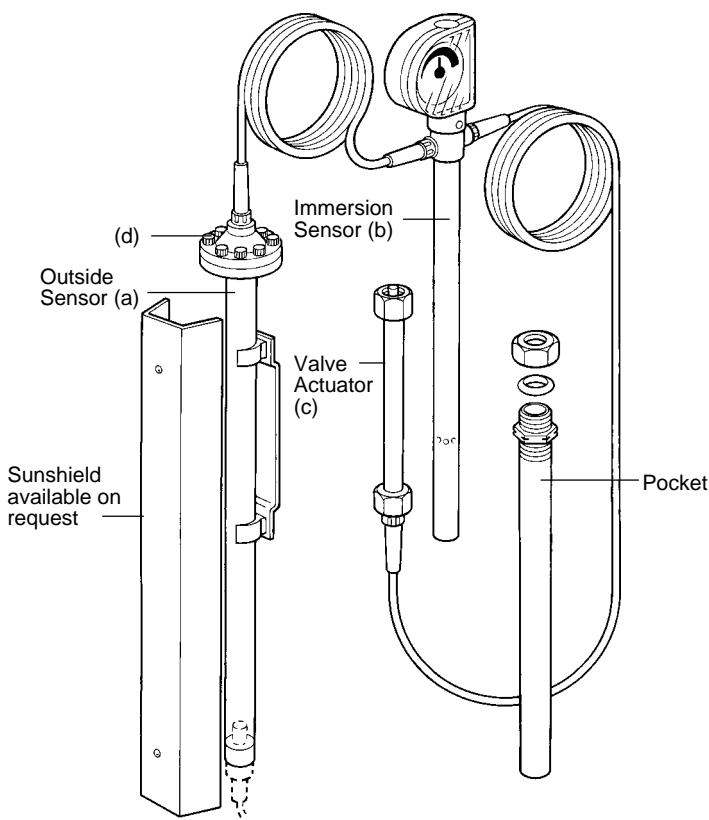


Fig. 1

## 2 Installation for controlling the primary supply

### The Control System

For details see section 4.

### The valve

Any Spirax Sarco two ported valve up to 50mm in size may be used with the 202 Control on this application.

The valve must be fitted in a horizontal pipeline with the actuator below it.

### General layout

2.1. Fig. 2 shows a typical installation when the primary medium is **steam**.

Fig. 3 shows a typical installation when the primary medium is **Medium or High Temperature Hot Water**.

### Size of pipeline

2.2. When the primary heating medium is steam, the valve will normally be of smaller nominal bore than the pipeline.

Any reduction in line size to meet the valve size should be carried out adjacent to the valve as shown in Fig. 2.

### Pipeline stresses

2.3. It is important that line stresses such as could be caused by expansion or inadequate supporting of the pipe are not imposed on the the valve body.

### Isolating valves

2.4. Where isolating valves are fitted they should be of the same size as the pipeline and not the same size as the control valve where this is smaller than the line.

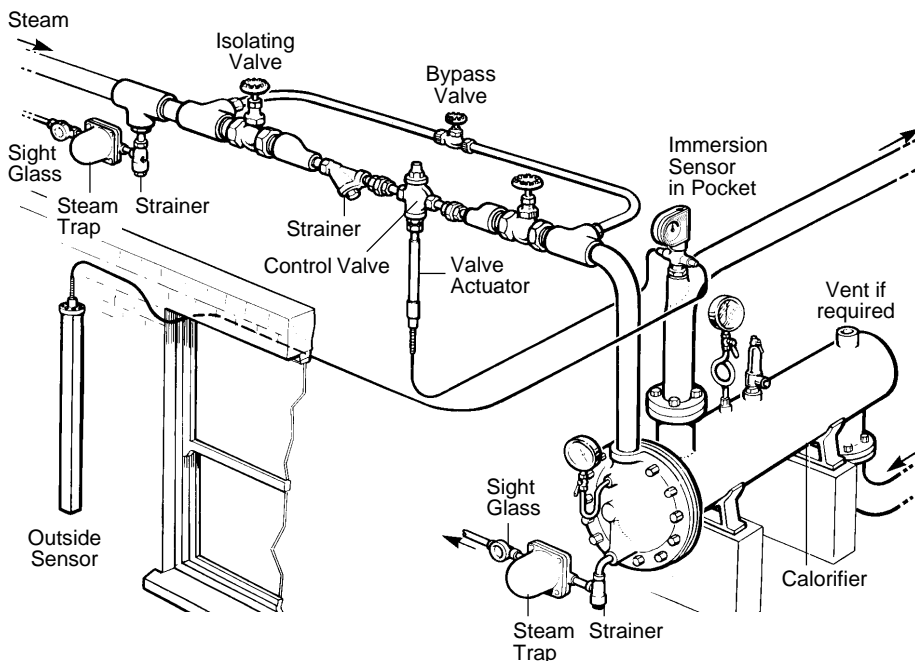


Fig. 2 Typical Installation when the primary medium is steam

## Removal of condensate

2.5. Where the primary medium is steam, condensate which forms due to radiation losses in the steam main should be prevented from reaching the valve by fitting an adequate drain pocket and steam trap. If the steam is known to be wet it is best to fit a Spirax Sarco Separator in the line.

## Preventing dirt

2.6. It is advisable to protect the valve by fitting a strainer immediately before the valve.

## Bypass

2.7. Where continuous duty is essential, it is recommended that a by-pass be installed to enable the plant to be kept in operation when inspecting or servicing the control valve. The by-pass valve should be the same size as the control valve and may be arranged above or to the side of the main assembly, but never below it when the medium is steam, because of the danger of condensate collecting.

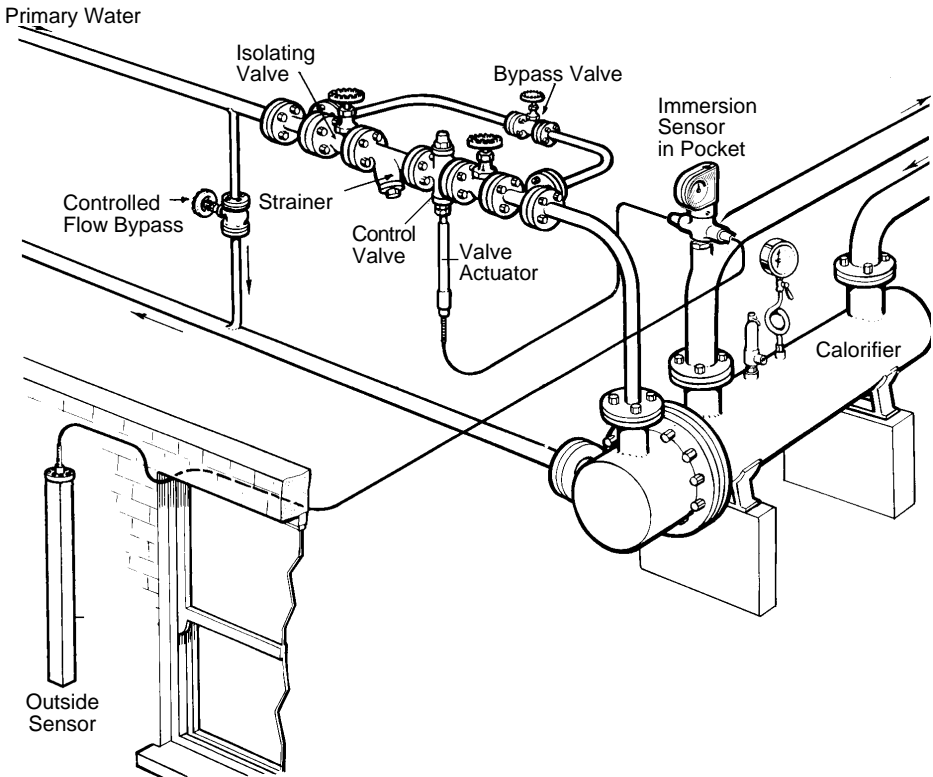


Fig. 3 Typical Installation when the primary medium is high or medium pressure hot water

# 3 Installation for controlling the secondary circulation

## The control system

For details see section 4.

## The valve

Any Spirax Sarco TW Valve may be used with the 202 Control on this application.

## General layout

3.1. Fig. 4 shows a typical installation. The 3 valve ports are marked X, Z and O. The valve should always be fitted as in Fig. 4a, in a horizontal pipeline with the valve closing element vertically below the line as shown.

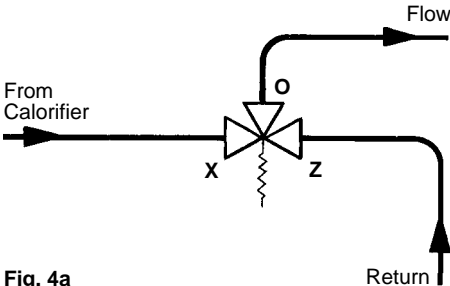


Fig. 4a

## Pipeline stresses

3.2. It is important that line stresses such as could be caused by expansion or inadequate supporting of the pipe are not imposed on the valve body.

## By-pass

3.3. Where continuous duty is essential, it is recommended that a by-pass be installed to enable the plant to be kept in operation when inspecting or servicing the control valve.

## Small bore by-pass

3.4. The small bore bypass shown on Fig. 4 is essential and must be set to give a minimum flow through the calorifier when the TW valve is in the fully recirculating position.

## Thermometers

3.5. Thermometers should be fitted to indicate the temperature of the water into leaving the valve.

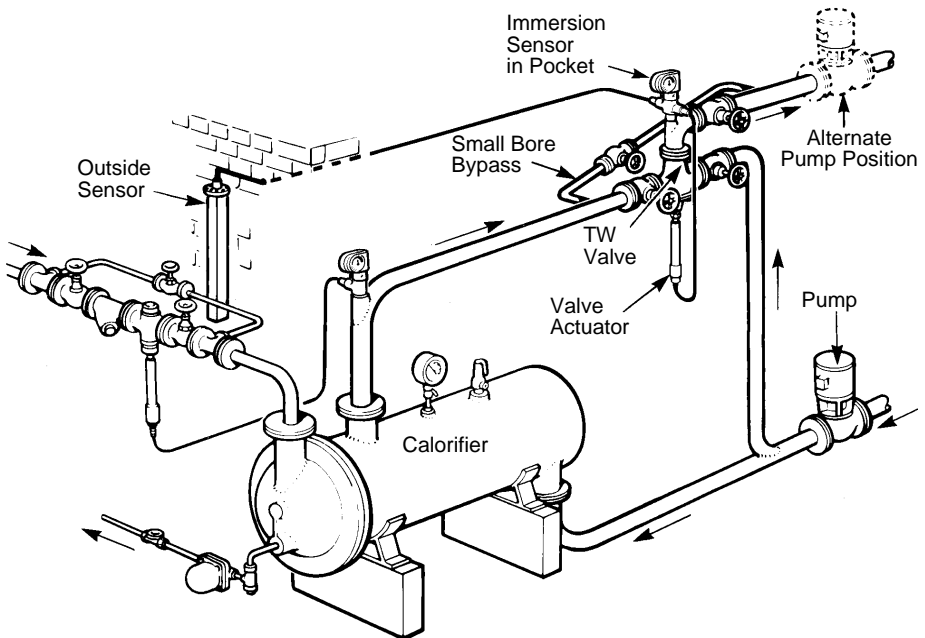


Fig. 4 Typical installation when the secondary water circulation is controlled

## 4 The Control System

### Capillary tube

4.1. The Capillary tube linking the units of the control system is a small bore tube filled with oil and must be handled carefully. It should be run so that there are no sharp bends and in such a position that it is not exposed to external damage. Because this capillary tube is no more than 1/4" o.d. and is reasonably flexible, it is often found that the outside sensor can be passed through an open window or doorway and the frame nicked to receive the capillary.

Where this simple method cannot be carried out and it is essential to pass the sensor through the wall, a hole 90 mm diameter will be required. Should it be necessary at any time to return the control system for servicing it will be necessary to withdraw the outside sensor through this hole. So temporary rather than permanent closure of the hole is desirable.

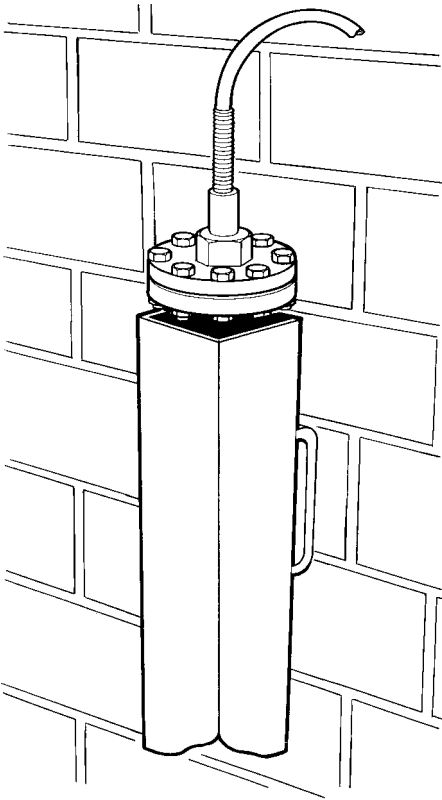


Fig. 5

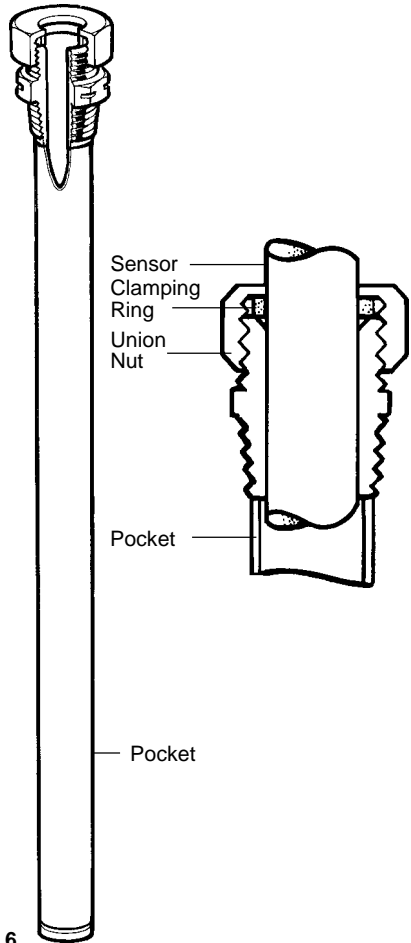


Fig. 6

### The Outside sensor

4.2. The outside sensor should be fitted vertically on an outside wall with the capillary leaving the top as Fig 5.

It should be fitted on a north facing wall but where this is not practical it should be shielded from direct solar radiation.

The sensor is held in a plastic sleeve which can be removed for fixing to the wall.

### Immersion sensor

4.3. A pocket fig. 6 is provided to house the immersion sensor. It has a 1" BSP male thread and should be fitted into a secondary flow to secure the controlled water temperature as follows.



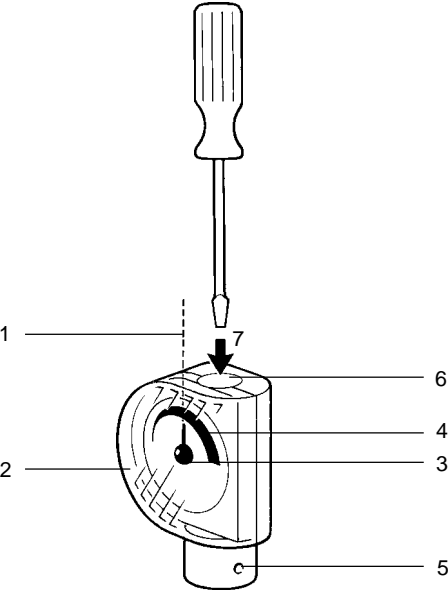
Where the primary supply is being controlled as in Section 2 the immersion sensor should be fitted into the calorifier or into the secondary pipeline as close to the calorifier as possible, as shown in Figs. 2 & 3. Where the secondary circuit is being controlled by mixing as in Section 3 the immersion sensor should be fitted into a mixed water outlet from the TW valve is shown in Fig. 4.

After installation the sensor should be inserted into the pocket and the union nut tightened to hold it in place.

**4.4.** To assist in the response of the sensor it is an advantage to add some heat transfer liquid such as oil to the pocket before inserting the sensor.

### Temperature ranges

Range	Outside Temp		Flow Temp	
	°C	°F	°C	°F
A	-1 to 18	30 to 65	82 to 38	180 to 100
B	-1 to 18	30 to 65	66 to 38	150 to 100



**Fig. 7 Adjustment head**

#### 4.5. Display adjustment

The display of the self acting temperature control may be adjusted to suit your specific requirements.

The adjustments include:-

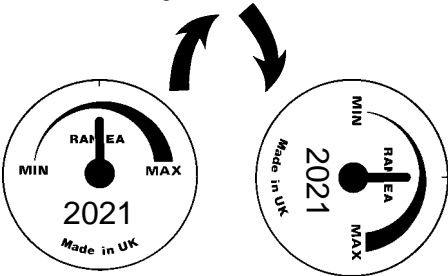
1. Rotation of temperature scale (see Fig. 8)

#### 4.6 Rotating the scale

In some instances it may be necessary to rotate the scale so the set temperature may be more easily read. In such cases the following procedure should be adopted and references made to figure 7 and figure 8.

1. Remove tamper proof plug (Fig. 7, Item 6) and use a suitable screwdriver to set indicator (Fig. 7, Item 3) to the midway point (Fig. 7, Item 1)
2. Remove transparent cover (Fig. 7 Item 2)
3. Remove indicator (Fig. 7, Item 3)
4. Remove the scale (Fig. 7, Item 4) from the indicator head and relocate to desired position.
5. Replace indicator (Fig. 7, Item 3) to the midway point of the scale (Fig. 7, Item 1)
6. Replace transparent cover (Fig. 7, Item 2)

This self acting temperature control is now ready for commissioning.



**Fig 8**

#### 4.7. Temperature Adjustment

A dial head Fig. 7 is provided at the immersion sensor, which enables the set temperature to be raised by 5°C (10°F) or lowered by 10°C (20°F). To make any adjustments a suitably sized screw driver is engaged in the adjustment drive (Fig. 7, Item 7) on the end of the indicator dial. Turning clockwise will lower the temperature, anti-clockwise will increase it.

#### 4.8. Maintenance

The control system is an entirely sealed unit and requires no maintenance. If damaged or if through fair wear and tear it fails to operate satisfactorily, it can be returned to our works for overhaul.

#### WARNING

On installation where the sensor is immersed directly into the solution to which temperature control is required, we would not recommend the unit to be subjected to:- Aqueous solutions containing chloride, fluoride and halogen. The above applies to complete immersion liquid level lines and splash zones.

## 5 Automatic Temperature Depression

### General

**5.1** The type 202 Control can be fitted with automatic temperature depression (reset) which is a system devised to slightly lower the flow temperature over any given period. It is normally applied during the night when the building is unoccupied, but by adjustment of the time clock may be brought into operation at any predetermined time.

### How it works

**5.2.** The method used to produce the Depression is to add heat artificially to the outside sensor so that the immersion sensor is temporarily reset to control at a lower temperature.

Fig. 9 shows how a small electric heating element is incorporated in the outside sensor. This element is supplied with low voltage current from the control box during the night depression period and during the day the current is switched off altogether, allowing the sensor to control in normal fashion.

### Electrical supply

**5.3.** The system is designed for a 230-250 volt single phase AC supply to the control box.

### Isolating switch

**5.4.** It is essential that an isolating switch be fitted in the main supply to the control box so that the box can be isolated before the lid is opened. This switch is not included with the equipment.

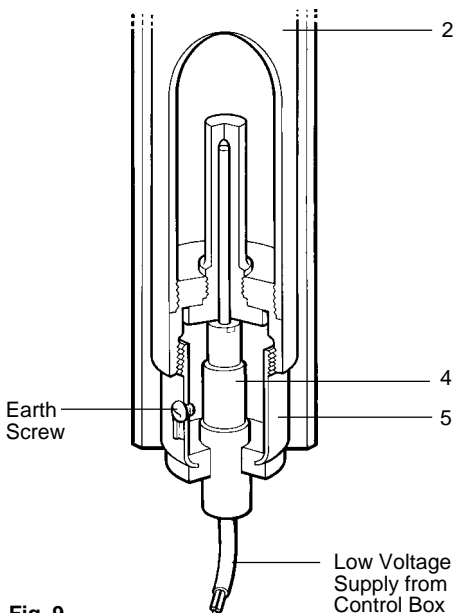


Fig. 9

### The control box

**5.5.** The Type 6 Control Box used in this system should be mounted on a wall inside the building usually in the calorifier chamber.

It includes a time clock which feeds the main current through a relay to a transformer which in turn supplies current at reduced voltage to a terminal block. The outside cover of the control box is fitted with indicating lights to show whether Day or Night setting is in operation. Fig. 10 is a diagram of the wiring within the control box, and the supply should be connected to the terminals marked L and N.

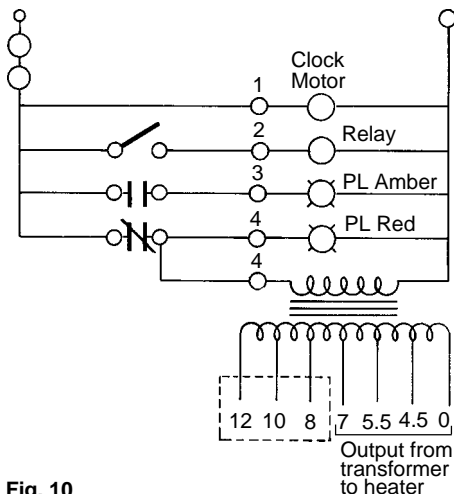


Fig. 10

### The heater

**5.6.** The heater element (4) is fitted into the base of the sensor (2) and is held in position by the screwed sleeve (5) in Fig. 9. The heater element is provided with approximately 1 m of twin core waterproof flexible cable which should be taken to a junction box fitted preferably inside the building. If fitted outside it must be properly waterproofed. From the junction box, these two wires should be connected to the terminals 0-5.5 in the control box using 1 mm or 1.5 mm 250 volt grade wire. The length of cable between the control box and the outside sensor should not exceed 50 m. Alternatively depression may be increased by connecting to the terminal 0.7 or decreased by connecting to the terminal 0-4.5. The terminals 8-10-12 must not be used when Type 6 Control Box is serving the 202 Control.

### Earth

**5.7.** The control box must be connected to earth.



